

Textbook on Evidence-Based Holistic Mind-Body Medicine

Research, Philosophy, Economy
and Politics of Traditional
Hippocratic Medicine

SØREN VENTEGODT ♦ JOAV MERRICK



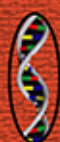
Health and Human Development
Joav Merrick (*Series Editor*)

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HEALTH AND HUMAN DEVELOPMENT

**TEXTBOOK ON EVIDENCE-BASED
HOLISTIC MIND-BODY MEDICINE**

**RESEARCH, PHILOSOPHY, ECONOMY
AND POLITICS OF TRADITIONAL
HIPPOCRATIC MEDICINE**

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**SØREN VENTEGODT
AND
JOAV MERRICK**



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Preface

Holistic medicine, or quality of life as medicine as we often call it, is basically a strategy for improving the patient's quality of life through mobilizing of inner resources. This can never harm and will almost always benefit the patient's well-being and often also help him or her to fight back disease. The cure is very much the same for all patients: Help to know yourself better and to step into character and be more yourself and more in tune with the universe. So it can be started right away, also without a specific diagnosis. Is modern, holistic medicine powerful? Oh yes, very much so. Holistic medicine is a truly powerful medicine, in spite of nobody really understanding the deepest structures of consciousness, the connection between mind and body, and the way holistic medicine works. But just because our scientific understanding admittedly still is limited, we should not stop doing what we know works. In this book, the authors cover research, philosophy, economy and politics of traditional Hippocratic medicine from a new and modern scientific approach.

Foreword

Hatim A Omar, MD, FAAP*

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Historically, physicians and healers had one strong advantage that physicians of today (or medical care providers) do not have, namely knowledge of their patients. A provider used to know the patients, their families, their social status and their health conditions very well, which allowed the provider to approach the patient in a holistic (and comprehensive) manner. Today, medical providers are under pressure from workload, rules and regulations, legal and ethical issues, paperwork and economic or academic issues. That leaves them with very little time to explore the wide range of issues surrounding their patients. The result is an encounter focusing on the most pressing problem and “quick fixes” that may not be the best treatment and not always adequate to improve the quality of life of that patient. In many instances, psychosocial issues are dominating the clinical picture, and obviously a “quick fix” will not improve these issues. Frequently, the patient-provider encounter is concluded by a prescription for a medication or a procedure that may be appropriate for the medical condition but does not lead to a cure or a significant improvement in the quality of life of the patient. Take, for example, a young teenager who is being sexually abused by a family member. In most countries, the abuser may be punished, and usually the victim is taken away from home and sent to a group home or to foster care. Obviously, the impression for the victim is that he/she is being punished, since he/she is separated from parents and or siblings, losing his/her home and privacy, and/or his/her economic resources. That would usually lead to low self-esteem, depression and very poor quality of life. This victim is then offered antidepressant medication and/or brief counseling but not much more. As one of my teen patients under similar circumstances said to me “unless you can change my life, you cannot help me.”

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In the last two decades, a whole gamma of complementary and alternative approaches to health care has developed and is gaining more and more recognition. Some will go to the extreme of indicting biomedicine as the culprit in poor health outcomes; others completely deny the usefulness of biomedicine, while a third group utilizes the best of all available methods. Biomedicine has done miracles, from the development of immunizations that help eradicate some of the worst epidemics to trauma surgery that saved millions of lives and many other successes. However, there are times when biomedicine alone cannot cope with some issues, as in the case mentioned above. There are also many instances when a success or a failure cannot be “scientifically” explained.

In my personal view, there is only one medicine, and that is the “right” medicine. What I mean by that is: providers should know their patient well; consider everything about him/her including economic conditions, family structure, cultural beliefs, overall health and psychosocial status in order to be able to help properly. In addition, often providers will also need the help of the patient’s family, friends, co-workers and society as a whole to achieve better results and improvement in quality of life. This book offers alternative approaches and methods to improving health and quality of life. Some readers may agree and others may not; however, I believe that it is imperative for all health providers to understand the views of others and to have an open mind to allow them to utilize whatever is proven to be safe and effective. After all, the common goal for professionals in health care should be to do the best they can to help heal their patients and improve their quality of life. Mutual respect for each other’s opinions is a must for a better future. I believe that this book will contribute to our knowledge and should be considered by anyone in the health care field.

Introduction

Søren Ventegodt and Joav Merrick

The question “what is life” is as old as science itself. To be honest, this question has not been answered by science. We are not even close. The problem is that life masters information, that it is conscious, and that purpose and meaning seem to be totally integrated in all biological matters all the way down to the living cells.

The cell seems to be the unit of life. Bacteria and eukaryote cells, plants, fungi and animals, all living beings consist of cells. What is a cell then? Cells have features we can describe like lipid membranes, DNA and RNA, organelles like ribosomes and mitochondria, complex protein molecules in even more complex self-organised structures and ensembles. But is that life? Not really. Life is conscious. Life masters information. Life is joyful and purposeful. This cannot be explained by a handful of molecules. Life is magic. Life is a mystery.

When you are working to help another person who has severe disturbances in life, in outer life and inner life, you are dealing with these magical and mystical aspects. You are dealing with purpose denied and repressed. You are dealing with consciousness that has gone astray, into darkness, oblivion, half the way to death.

You might be the brightest student on earth, but if you cannot instinctively, intuitively deal with these aspects of life, and bring love, light and joy back into the dark, pain, sorrowful know, you are no good as a doctor. So we want you to know, but only in the end to acknowledge that in spite of all your knowledge, you do not know a thing. Life is going its own way, and all you can do is to open your eyes and go with the flow, as resistance-less as you can. This is not easy, and what we ask from you we can hardly do ourselves. Still this is what is needed, if you truly want to help.

If you only know a little, you will get the feeling that you know a lot. Your ego will inflate, and you will behave like a leader, the king of the clinic. If you know more, your tiny ego cannot contain it. The ego will go. And a larger and wiser person will appear. This person will be humble. He or she will know for sure that life is really mysterious and everything, even a bad heart, cancer or schizophrenia, happens for a reason. We are journeying souls. We are here to learn. And we can only learn in pain. Therefore, we unconsciously seek painful situations and circumstances. We create our own universe, so that we can develop and learn. So when you sit with a person, troubled and ill, and you want to help, this help is not really

about taking the pain away. Because then you are steeling the learning from your patient. The challenge is to invite your panicked and escaped friend back into business, back into his or her life. To explore, to finish what was started, to harvest the great learning from the many troubled days and years.

You need to know, and you need to be open. You need to know everything; you need to come from omniscience. All knowing is, like all-presence and total joy – the sat-shit-ananda – our natural state of being. But few of us go to this place, where we joyfully know all, and where we through our unshakable presence can inspire and support the growth, learning, and integration of all events of life, which brought your patient to where he or she is today.

In this book, we offer you a scientific door into the unknown, into the mystery. By helping you to know so much, we help you to realise that all this science stuff is not really leading us anywhere. We will not go to omniscience by reading science. We can only go there by letting go of everything we think we know. Only in the moment of complete detachment will the mind stop its continuous talk, and let us see the world as it truly is. This moment is enlightenment. This moment you become wisdom itself. This moment you arrive in your own life. Now you are able to help. Not before this moment.

Section 1: Holistic science on matter, life, and consciousness



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Twenty fundamental problems of biology, medicine, and neuropsychology related to biological information

As a student, it is easy to get the impression that science knows most of what there is to know. This is not so. On the contrary, there are countless unsolved problems in biology today. First of all, the unsolved enigma concerning how the differentiation from a single zygote to an adult individual happens has been object for severe research for decades.

In this section, we shall introduce you to a new holistic biological paradigm that introduces an energetic-informational interpretation of reality. It is a new way to experience biology. In the chapters of this section, we will introduce you to new solutions of the problems connected with the events of biological ontogenesis. The solution involves a fractal hierarchy, from a single cell to the function of the human brain. The problems discussed are interpreted within the frames of a universe of roomy fractal structures containing energetic patterns that are able to deliver biological information. Nobody knows for sure if there are such energy-patterns, as there are no mechanical devices yet that can measure and test them. On the other hand, they can easily be experienced by anybody who wants to see for him- or herself. The structure has been described in the old Indian Vedas (Google “nested spirals”) and esoteric teaches of all times have described them. The patterns described are surprisingly close the modern physical concept of super symmetrical strings, quantum fluctuations, etc. Many modern healers talk about “quantum healing” because of these similarities.

“Qualitative analysis” and direct experience has been the research method used in this area. We are convinced that this method is as valid as quantitative measurement, but it has been used much less in medical science, and therefore our understanding of the fine and inner structure of life energy is still very modest.

We think biological organization is guided by energetic changes on the level of quantum mechanics, interacting with the intention that again guides the energetic conformation of the fractal structures to gain disorders or healthiness. Furthermore, we introduce two new concepts: “metamorphous top down evolution” and “adult human metamorphosis.” The first is a new evolutionary theory involving metamorphosis – the idea that biological beings can shift shape according to intentions, i.e., the caterpillar becoming a butterfly – as a main

concept of evolution. The last is tightly linked to the evolutionary principle and explains how human self-recovery is governed. Other subjects of special interest that we shall look deeper into are the immunological self-nonself discrimination, the structure and function of the human brain, the etiology and salutogenesis of mental and somatic diseases, and the structure of the consciousness of a human being. We shall criticize Szentagothai's model for the modulated structure of the human cerebral cortex and Jerne's theory of the immunological regulatory anti-idiotypic network.

In this section, we make a journey away from the practical level of science; but only if we understand the inner structure of reality can we interfere with it in a rational and scientific manner. Nothing is as practical as a good theory. We strongly encourage students not to give up on this section in spite of a number of new and often difficult concepts and ideas.

Introduction

Several well-known phenomena in the living world have not yet found an adequate explanation. What is human consciousness, and how is it connected to the brain and the wholeness of the organism? How is the differentiation of the cells brought about in the developing organism during ontogenesis? Basically, how does a fertilized egg develop into an adult organism? What are the forces behind the evolution of the living world? How is biological information stored and distributed in the organism – is everything really in the DNA? How is information managed in a living organism? How does the phenomenon of self-nonself discrimination, the basis of immune system regulation, arise? How does an organism maintain and re-establish biological order and, thus, health and physical well-being during its lifetime? What are the structural relations of the living world with the physical energy of the world's particles, atoms, and molecules? And what happens when the cellular order is disturbed and suddenly reappears in spontaneous healing? We shall address these persistent questions in the next paper devoted to the unsolved topics and discuss their relevance for clinical holistic medicine.

These questions and many more have been discussed by the research team of the Quality of Life Research Center in Copenhagen over the past many years, and we have tried to put the thoughts, questions, and discussions into paper form and relate them to clinical holistic medicine. Here we will discuss a theory for life, biological information, healing, and adult human metamorphosis for use in clinical holistic medicine. Biology, medicine, and neural sciences have fundamental problems that are related to the fundamental problem of biological information. This problem in science can be worded simply (1): What is life? This is how basic it is. Everything about life is mysterious: its joy, its wisdom and tacit knowledge and competence, its ability to assume form and to be creative and intelligent, and of course, its fundamental ability to be conscious. The mystery of the two sides of life, the objective material and structural side, and the subjective experiential problem might be the hardest of all the problems. This problem is often referred to as *the hard problem* (2).

Penrose, Hameroff, and others have addressed the hard problem using the concepts, formalisms, and ideas from quantum mechanics. The problem with using concepts from physics is that physics has as many fundamental problems as does biology, and many physical theories are in conflict these days, such as the theory of relativity and the theory of

quantum mechanics. Niels Henrik David Bohr (1885–1962) stated that you should not make pictures of the quantum levels of energy, because quantum mechanics does not explain about reality but only something about how we describe reality, which has made it difficult to proceed. We believe that physics should provide us with pictures and understanding of the energy of the universe, but this has not happened yet. The super symmetrical strings (superstring theory), wormholes, etc., have provided us with some pictures and ideas of the energy of the world but are still not usable for biology.

In 1996, Holger Bech Nielsen (professor at the Niels Bohr Institute in Copenhagen), Søren Ventegodt, and the Dalai Lama had a discussion on “science and spirituality,” where the Dalai Lama explained that when his friend meditated, he could make knots on hard needles. Holger Beck Nielsen concluded that the whole physics had to be changed if that was true, and he has often said (as member of the study group “Matter, Life and Consciousness”) that he doubts if consciousness really exists because there are no laws in physics that make this kind of integrative and nonlocal phenomenon possible. For many years, brain research has been unable to explain the simplest things like memory and perception. Actually, the analysis into feature detectors in the brain has made the problem on qualia much more obvious. Qualia is the basic quality of perception (like the colour red), which the brain really cannot provide, as the neurons that make the brain use signals that are simple electrical impulses without any quality attached to them, according to contemporary physical and biochemical laws! Biology is full of fundamental problems, like the sad fact that chemistry cannot provide the spatial information to build an embryo according to the known laws of chemistry and diffusion, as we are going to demonstrate in the papers in this series. When this is said, nobody can be surprised that complicated things like cellular order of the body, morphogenesis, evolution and phylogenesis, perception and psychosis, disease and healing are not understood.

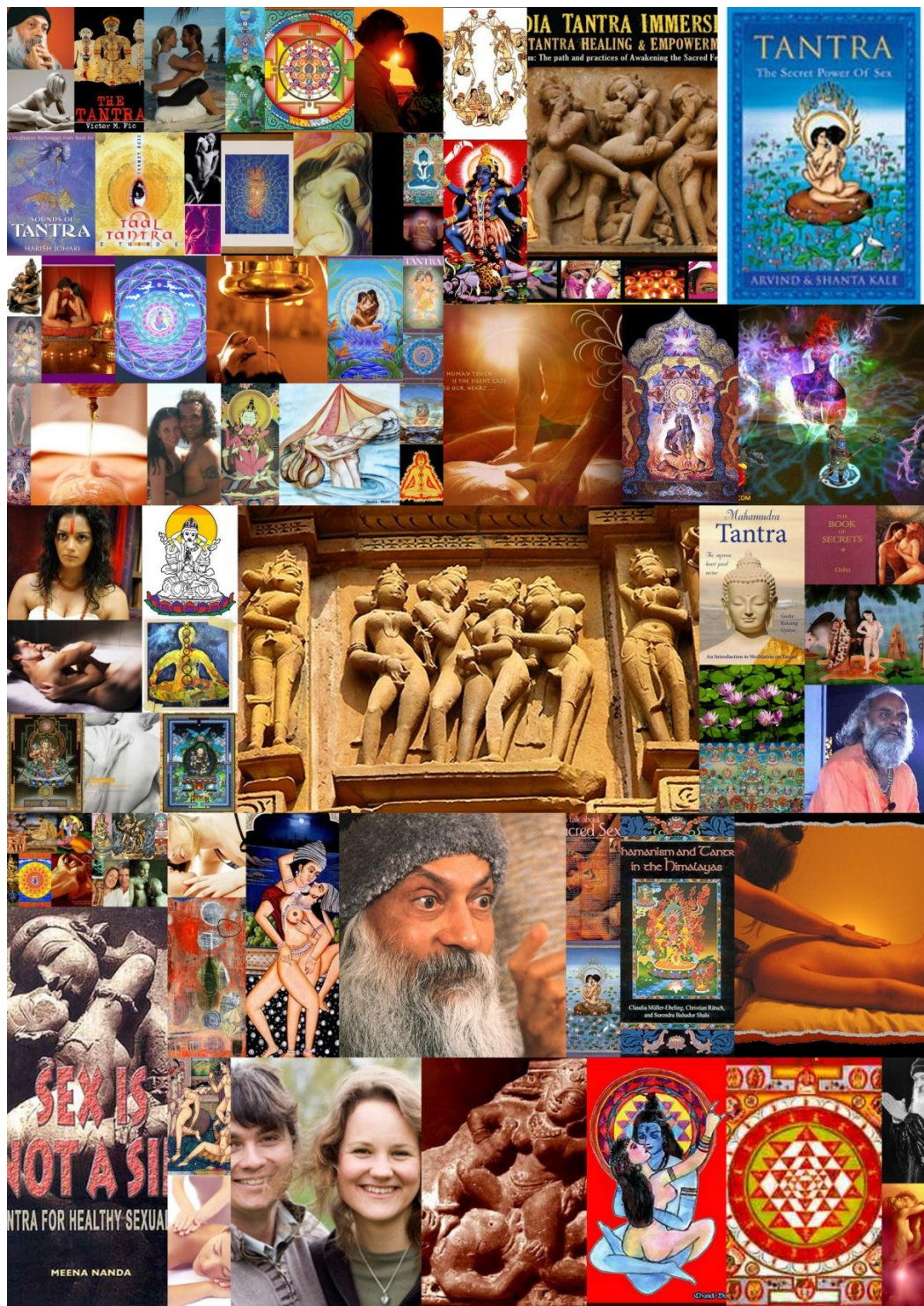
In this introductory chapter, we want to list some of the problems that we are going to address and to which we are going to give our solution. Hopefully, after reading the following chapters, you will actually have an idea of biological information, consciousness, health, disease, and healing. If we succeed in our mission and make at least some physicians develop an understanding of phenomena like spontaneous healing and human adult metamorphosis, we can hope to have strengthened the general belief in the patient’s inner healing powers. This understanding is important in order to mobilize in the patient the all-important fight against unhappiness, disease, and poor ability. In these chapters, we would like to address some of the following fundamental issues and problems of holistic biology:

- There are many fundamental problems in biology, medicine, and neuropsychology; most of these problems are related to biological information.
- The problem of science is that the disciplines use different concepts and methods, making it very difficult to establish the needed interdisciplinary and integrated theory for matter, life, and consciousness. Without such a multidisciplinary approach, there is little hope ever to get to an understanding of complex phenomena like healing and human adult metamorphosis.
- We have a body-mind and brain-mind, each carrying its own perspective of life and reality. How can we unite these almost opposite and contradicting interpretations of the world into one wise synthesis?

- The living cell cannot be understood through the concept of self-organization because more information is needed than the molecules apparently can provide. And consciousness remains a riddle. • Biochemistry cannot provide the spatial information needed to explain morphogenesis.
- Supracellular morphogenesis is mysterious. Nobody seems to understand the origin of biological and cellular order.
- Physical energy is deeply mysterious. How can we proceed when the physicist will not give us the explanatory tools we need as biologists?
- Quantum chemistry could be the key to cell consciousness. Can a deeply structured quantum field give cells memory, coherence, intent, consciousness, and choice?
- What is the wholeness of man? How can 10,000 billion cells say they are me?
- Evolution has bred a fly with eyes and humans with a large wonderful brain. But how did the organisms materialize these things? Is creative metamorphosis a product of the conscious wishes of plants, animals, and humans?
- How can we understand the structure of the cerebral cortex, the most complex structure in the known universe? Can we reduce it to something simple like a number of modules in the brain?
- How does the brain think? Can it think without the body? Can it think without the wholeness (including the soul)? How does it remember? How does it organize a model of reality?
- Can a fractal music theory based on holistic brain theory explain the foundation of minor major?
- We survive by degenerating our existence. Can adult human metamorphosis upgrade our purpose of life, our level of existential responsibility, and the depth of our consciousness if we are low lives?
- Why do we get mentally ill?
- How can the etiology of mental diseases be explained by the mental and spiritual crises of metamorphosis?
- How is the immune system regulated?
- How does the immune system function? How does the immune system make self-nonsel discrimination?
- Why do we get physically ill?
- What is healing and how can we get well again when we are ill? What is spontaneous healing? Is human adult metamorphosis really a possibility?

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We need an integrated theory for matter, life and consciousness to understand life and healing

For almost two decades, we have experimented with supporting the philosophical development of severely ill patients to induce recovery and spontaneous healing. It has been a most interesting journey. We have witnessed cancer patients spontaneously getting well again, and schizophrenic patients coming back to the world, getting jobs and partners. It has been truly amazing. Far beyond what we dreamt was possible when we got out of medical school. To be honest, our expectations for our careers as healers were not high at this point in time.

The last decade, we have observed a new pattern of extremely rapid, spontaneous healing in the form of dramatic healing crises that apparently can facilitate even the spontaneous remission of cancer and the spontaneous recovery of mental diseases, like schizophrenia and borderline schizophrenia. To begin with, we did not understand the nature of this, but today we know that you have to heal the same way as you got ill – through a big, existential crisis.

Our working hypothesis for understanding the mechanism of the healing process is that the accelerated healing is a function of the patient's brain-mind and body-mind coming closer together due to the development of what we call "deep" cosmology. Our cosmology is really our understanding of the world – the whole universe, or the cosmos, with an old Greek word.

To understand and describe what happens at a biological level in the healing crisis, we have suggested naming the process *adult human metamorphosis*, a possibility that is opened by the human genome showing full generic equipment for metamorphosis. Metamorphosis is the shift of form and character many animals are going through during their life, more dramatic for insects and frogs, less dramatic for humans. But still, we shift form and character during periods of active metamorphosis (like puberty).

To understand the mechanistic details in the complicated interaction between consciousness and biology, we need an adequate theory for biological information. We have proposed what we call "holistic biology for holistic medicine." We suggest that a relatively simple model based on interacting wholenesses instead of isolated parts can shed a new light on a number of difficult issues that we need to explain and understand in biology and medicine in order to understand and use metamorphosis in the holistic medical clinic.

We aim to give a holistic theoretical interpretation of biological phenomena at large, morphogenesis, evolution, immune system regulation (self-nonself discrimination), brain function, consciousness, and health in particular. We start at the most fundamental problem: what is biological information at the subcellular, cellular, and supracellular levels if we presume that it is the same phenomenon on all levels (using Occam's razor), and how can this be described scientifically? The problems we address are all connected to the information flow in the functioning, living organism: function of the brain and consciousness, the regulations of the immune system and cell growth, the dynamics of health and disease. We suggest that life utilizes an unseen fine structure of the physical energy of the universe at a subparticular or quantum level to give information-directed self-organization; we give a first sketch of a possible fractal structure of the energy able to both contain and communicate biological information and carry individual and collective consciousness. Finally, through our analysis, we put up a model for adult human metamorphosis.

Introduction

The last decade, we have observed what seems to be a completely new pattern of highly accelerated, spontaneous healing in our holistic medical research clinic. We intend to help people to improve their quality of life, health, and ability by developing their consciousness and the value they create by using more of their inborn talents, and for some reason, we have been able to do this more effectively.

The new pattern of healing resembles the process of metamorphosis of the caterpillar/butterfly—the larvae turns into pupae and, in only ten days, melts totally down to reappear as the adult butterfly. We have noticed that the human genome contains full equipment for metamorphosis and actually very much the same genes for metamorphosis as insects and lower vertebrates, like the amphibian. The frog goes through a radical metamorphosis from tadpole to frog, and we were frogs not long ago on the evolutionary scale.

The genes for human metamorphosis are known to be active during ontogenesis, but we have observed adult human metamorphosis happening in very few days, completely transforming the outer appearance of a patient from very ugly to very beautiful (1). This possibility was very surprising to us. We had heard about it, and we knew that some healers call it “DNA-activation.” But we had just not seen it before.

We have seen the change in the whole character of the person, from purpose of life, to cognitive patterns of the interpretation of the world, to the actual physical form of the body. The patients that enter metamorphosis seem to have two things in common: 1) they have been arrested in their psychosexual development early in life, often due to severe sexual or violent abuse or neglect, and 2) they have come to a sudden, deeper understanding of life.

This deeper understanding must be of the form we would call “a deepening of their cosmology.” We have observed that our understanding of the world can go through evolution and revolution. The evolution is the gradual growth of insight and understanding, and the revolution is a crisis, where everything loses its normal meaning and significance in a way, and in this void, a completely new fundamental pattern of understanding of the world appears. What seems to happen is that the structure of the conceptual tree in the brain-mind changes;

in our analysis, this structure is fractal and what happens is that the bifurcation number changes (2). When it goes down, we run away from our existential responsibility, and this event often seems to happen in our early childhood, where responsibility becomes too painful (3). When the adult person searches for deeper understanding, this reduced cosmology relates (4), so survival is re-exchanged with a deeper, more complex cosmology, looking very much like the original “natural” and deep, emotionally rich cosmology of the small child (4).

Interestingly, the brain-mind and the body-mind (the informational system of the organism) seem to be separated by the cosmology going down in number, separating also mind and body, and making emotions less intense (4). As an adult, the opposite happens: a new and deeper cosmology appears, a new emotional and experiential life being, with more intense living, more focus on the body, on enjoying, on sexuality, and on existence (4). So it seems that deepening the cosmology is a hallmark of existential healing. It seems that this healing brings the brain-mind and the body-mind together, making the person more whole and more emotional. When body and mind merge, the totality of the being surfaces, and the self is perceived more transcendently. We say that the person recovers the existential coherence, because life inside is reconnected with the world outside and quality of life (QOL), health (both mental and physical), and all the abilities of the person are often radically improved. Adult human metamorphosis is strange in that this process happens in weeks, not over several years, as normal therapy does.

The patient undergoing metamorphosis often becomes completely introverted and enters a highly visionary state of existence, known from Native American rituals like the Mitote (using the hallucinogenic cactus peyote) (5) and the Vision Quest (using no drugs, but focused intent on transformation) (6). More peculiar is the very ill patient’s tendency to recover suddenly, or so it seems, from even cancer (7-9) and schizophrenia (10,11), when QOL improved during and after transformation. What we have found is highly unexpected, and it seems to call on radical new thinking; it simply needs a new, more holistic, theory of biology and the role of consciousness both in ontogenesis and phylogenesis.

As we see it, it calls for a deep understanding of biological information, for the informational flows and the appearance of the hidden person almost in one magical stroke is really what needs explanation. Of course, we already know metamorphosis from the animal world, so it cannot be that much of a shock for the observant reader to see human beings melting down, entering the state of the human pupae, and reappearing as a completely upgraded version of themselves after a few weeks. Even recovering from severe mental or somatic disease is really unexpected, even for the most open-minded physician.

Our clinical experience and observations

It might be that we are completely mistaken or mistaken in our interpretations of what we observe. On the other hand, during the last years, we have been studying human development first, then the phenomenon of holistic healing, then human transformation, and now the accelerated process of human metamorphosis, which seems also to explain the slower processes of spontaneous healing in biological terms. It is quite clear from studying the patients who enter the transitional state of metamorphosis that the patients seem to open up to what Carl Gustav Jung used to call “the collective consciousness” (12): a layer of immense

information about being human, that all human beings can dive into for inspiration and renewal. We have learned just recently that many pre-modern cultures like the Native American cosmology of the Delicate Lodge – in our analysis carrying the bifurcation-number 8 (an “8-ray cosmology”) – in its ontology has the collective consciousness of plants (called “The White Buffalo Woman”), animals (called “Sacred Sweet Medicine”), and man. So we know that different people and cultures have appreciated these deep information-carrying levels of human existence. Western medicine is just now opening up to their existence in research (13,14).

Professor Daniel Shek from Hong Kong (personal communication) has talked about “the three Ts of holistic medicine: transformation, transcendence, and totality.” This is very accurately the focus of our holistic medical endeavour of healing our patients, which are not only the traditionally ill patients but everybody who needs an improvement of QOL. The accelerated human growth of metamorphosis also seems to be very promising for helping the most troubled and harmed of the people.

Holistic understanding of life

Our interest in theoretical biology started in the 1980s, but for two decades, our work seemed to be too idiosyncratic to be published. Only now, after first testing the models and noticing their positive consequences for holistic medicine, have we gained sufficient confidence in these models to publish them. The induction of spontaneous healing from unsolvable health problems, like cancer and severe mental diseases, at our Research Clinic for Holistic Medicine (7-10) has also given us the belief that it is time to publish our unconventional perspective on biology and human development (15,16).

The idiosyncratic feeling stems from the radical belief that we need to go all the way down to the fundamental energy of the universe to understand biology. Instead of using established mathematical structures as the basis of our model, in 1985, we looked for a more intuitive, correct presentation of biological informational systems of the living organisms, from single cells to large ecosystems. Unfortunately, the structures that followed from this quest were not compatible with any known mathematical structures at that time.

As you might have guessed, we discovered, as did Benoit B Mandelbrot and many others at that time, the fractal nature of the living world. We made our first fractal model for the organism in 1986 (2). After 25 years, everybody seems to have accepted the fractals, but biology has not been better explained after all. So we are still missing the point. What we try to bring forward now is what we believe to be the missing parts of the puzzle. Our major point is that the well-known order of the universe described by contemporary science is illusory in a way, and our certainty of many things might make us overlook a hidden order in the universe, which guides not only how the subatomic energy and particles are organized into atoms and molecules (17) but also how matter is organized into the living cell, with its dynamic organelles and highly advanced supramolecular structures (18). It might be the same principles that guide the cells into a complex organism (19), and the organisms into extremely complex and “intelligently” created biospheres, including planet Earth at large (20). And it might even be the same principles that count for “white” and dark matter organizing the dust, planets, and stars into galaxies and clusters of galaxies.

Our suggestions

We suggest that there exists one hidden, but highly active, fundamental, organizing principle that we call *the fine structure of the physical energy*, and we believe that a first approximation to a description of this energy is a spiral fractal (2). We suggest a simple geometry in which all levels interact with each other and with every part existing on each level. Unfortunately, this geometry has been difficult to formalize. As with most other fractals, it cannot be built on logic and set theory. Interestingly, the description we need is fundamentally different from the principles of logic and the sets of the set theory, as both logic and the set theory are based on the idea of a well-defined element distinctly separated from its surroundings, in that it has qualities that are unique to this element and not dependent on the state of the space or of other coexisting elements. Our normal logic only has meaning if such elements exist.

The “dependent” elements of the real world have, as you might know from quantum mechanics, complex and mysterious qualities that have been extremely difficult to define. Our fundamental postulate that started our thinking is that *independent elements do not really exist*. In the world of nonliving “dead” objects, we know that independent elements do not exist on the level of the particle, but large dead elements seem to function almost independent of each other (one is red and square, another blue and round), and researchers for many years have believed that large living organisms could be understood in parallel to large dead objects in this respect.

Our position is that living beings have been specialized in using the deep coherence and connectedness of everything and that consciousness has risen from this connectedness. The coherence of living organisms might be important for evolution. It could help the animal of a species to develop simultaneously (when one fly gets its wings and becomes successful this way, the other flies are encouraged through this connectedness also to turn winged (20)).

We also believe the single cell to be conscious (as do other thinkers in the field) (21) and able to make decisions on its own, changing its behaviours or other characteristics of the whole cell. We also believe that the consciousness of the whole organism rises from the multiple consciousnesses of its cells (12). These cells have the same ability to cohere as all living beings, and they use this coherence to get information to make valuable decisions and thus change their own character and also the character of the whole organism. The cells are efficiently using the fundamental coherent nature of the world, which is so deeply mysterious that we do not have a theory for it yet. This is the theory we want to make.

We believe that science needs a completely new language to describe and analyze what is happening in the living world, and the present work is a first try to provide such a language. We hope that the solution we have found will shed light on many of the unsolved problems of biology.

Most interestingly, many of the human diseases and the patient’s spontaneous healing seem to be understandable on top of this new understanding of biology, the body, immunology, the human brain, and consciousness.

Conclusion

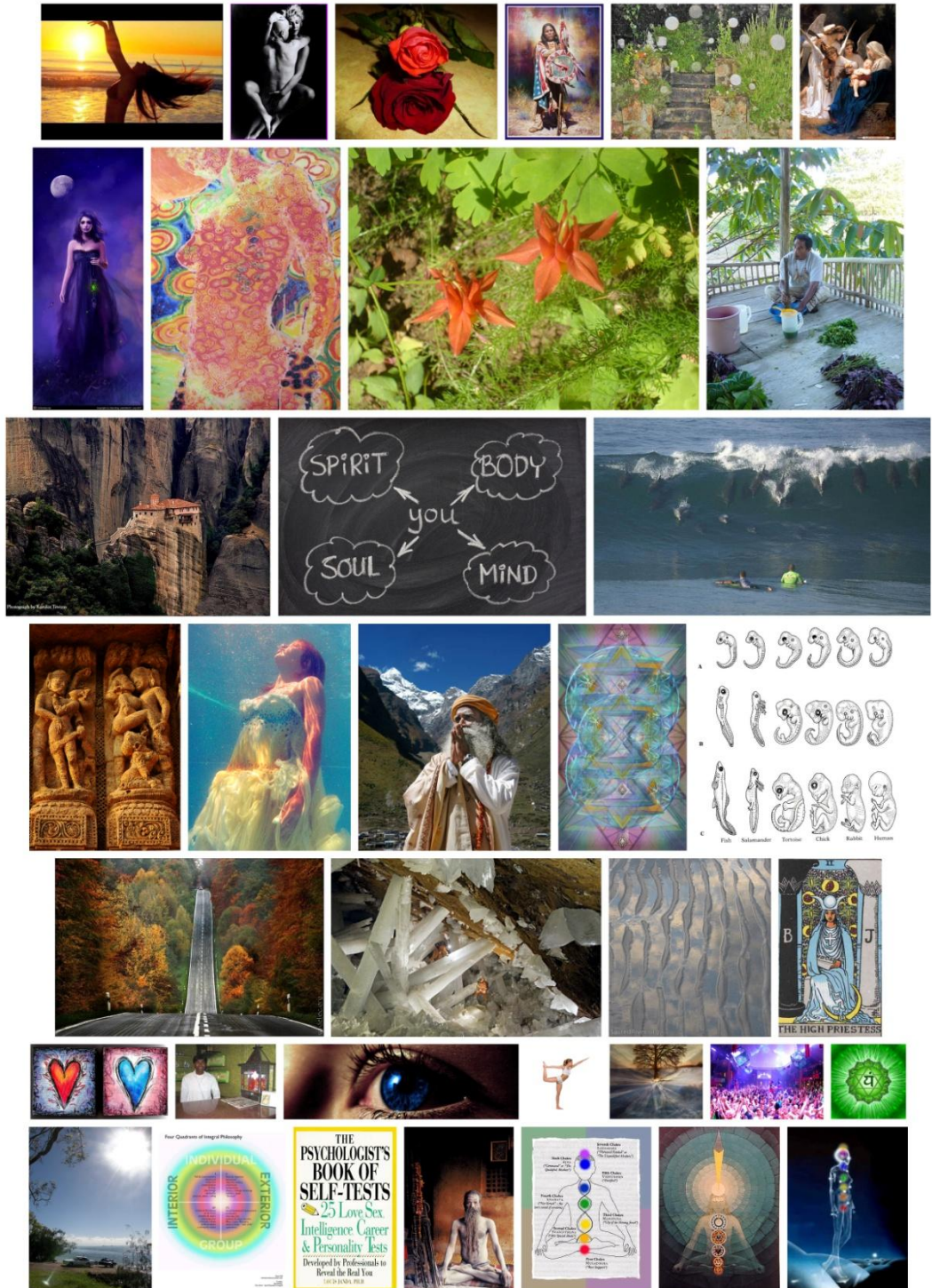
What we want to model is the internal and mechanistic structure of this coherence of the elements and beings of the living world on the many levels of the biological universe, from molecule over the organelle and cell to the whole organism, its family, its species and the ecosystem it inhabits. The phenomenon we have identified seems to be a principle almost only used by living organisms. We have called it “*information-directed self-organization*.” We have analyzed a number of biological systems and situations, and we have found that the concept of “information-directed self-organization” can explain yet unexplained biological phenomena.

Most interestingly, the new symbolic language seems to be able to explain what wholeness is. For instance: man is a wholeness, living in a wholeness of the world. We all feel our autonomous freedom to be, do, and think. But are we free to make choices? Are we free to perceive? Are we determined by our history and our world, or are we really causal to our world? Can we create our own life, healthy and happy, independently of the surrounding world and our personal past, gene pool, etc.? Can we change our own destiny and get well again even from metastatic cancer? Can we go through metamorphosis and change both mind and body, purpose of life, and our fundamental experience of the world – our worldview or cosmology? We believe that we can. But where, then, is the theoretical limit for our human abilities? It is all such questions that we want to answer, and this is the quest that has motivated the present analysis of life and man.

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Bridging brain-mind and body-mind. Introduction to “deep” (fractal, poly-ray) cosmology

We know that when we talk about cosmology, you might be very skeptical, not because you think cosmology is not important, but because you think it is too difficult to comprehend. And, yes, you are right. We all live in a cosmology, and the only way to understand that is to wake up to a state of mind, an altered state of consciousness, where you can watch your own cosmology.

This only happens when you grasp a different worldview. You need, in fact, a meta-cosmologic perspective. To go to this state of consciousness might be very difficult for you. On the other hand, it might also be quite easy. You do not know until you have tried. The idea of the multi-cosmological worldview is that we can look at the world in many different ways and from many different perspectives. People who study cosmology talk about rays—number of rays.

The universe is seen through a basic pattern, scheme or matrix, and this pattern holds a number, for instance, the number four. If you have a four-rayed cosmology, everything in your life is structured around the number four. You have four directions: north, south, east and west. You have four limbs. You have families with two parents and two children, and your car has four wheels. Your house, your garden, your book and this page have four corners. But this goes deeper.

Your world consists of four elements: water, fire, earth and air. There are four types of people: Melancholic, sanguine, phlegmatic and... This is the classical Hippocratic four-ray cosmology. It is simple and nice and everything falls into place where it should be. The chaotic world comes to order. And this is what cosmology is really about.

So when you get this idea that the cosmology can be classified, systematised, you step back and ask: How, then, is my cosmology structured? If you dare take this question seriously, you are in for a surprise. You will have a wakeup call and see the whole world differently. You will find a key to understanding all the different cultures of the world and all the different people and their philosophies. You will be able to embrace humankind on a new level. I hope you are willing to go there because this is where we are aiming.

Mental and the emotional interpretation of reality

Reality can be interpreted in many ways, but two distinctly different ways are the mental and the emotional interpretations. The traditional way of thinking in science today is the first: an often simple and mechanical interpretation of reality that empowers us to handle the outer physical world with great, often brutal, efficiency. The development of a mind that enables us to handle the outer physical world and to survive makes a lot of sense from an evolutionary perspective; the problem is that the mental reason and linear logic reduces all phenomena to well-defined interacting objects, which might not exist from a deeper perspective of reality.

A more intuitive way to interpret the world makes much more sense when it comes to our human relations. So to function as a human being, we need both these two ways of seeing the world and two different *modi operandi*. In many patients, we find an internalized conflict between logical and mental reasoning on one hand, and emotional and sexual approach to reality and human needs on the other. We speculate that this conflict causes the deep emotional problems that really are the basis of most human diseases. Only by merging brain-mind and body-mind will we be whole and free and truly ourselves. We need to develop our mental understanding, deepen our cosmology, and develop our sexuality and body-mind in order to make them meet and merge.

To facilitate this existential healing, we propose a third integrative way of looking at our human nature, which we call “the energetic-informational interpretation of reality.” What it does is allows us to look at both brain-mind and body-mind as a highly structured field of “energy and information.” Energy and information are actually the same from a scientific point of view; when the world is seen through the body-mind, it looks more like energy; when seen through the brain-mind, it looks more like information.

Introduction

Science is about describing and interpreting reality. An interpretation of reality is a brain representation of reality, which carries a specific structure. Reality can be “broken down” and interpreted in several possible ways. Usually, before we develop our understanding of life and consciousness, we are able to interpret reality and its phenomena in at least one of two very different ways: a rational/mental or an emotional/intuitive way.

The rational/mental way is often a mechanistic way of looking at nature, as chemistry and logical patterns of behaviour, while the emotional/intuitive way is a more naive and immediate interpretation of reality with offspring in our bodily experiences. Often, we are able to use the first understanding of the world when we work and the second understanding when we are most private, like taking care of our children or while we are making love to our partner.

The rational interpretation of the world is seen as more “clever” and more discriminative and more analytically intelligent than the intuitive interpretation, which on its own is more “synthesizing” and emotionally intelligent (10), making us see meaning in things and feel love and wholeness. When the rational and mental interpretation of reality has been accepted

by the biological and the medical sciences, as it has happened with molecular biology and biomedicine, this will lead to many anomalies and paradoxes and leave many important phenomena incomprehensible.

The human consciousness is maybe the most difficult thing to explain with a mechanical approach, as the “light” of consciousness has a coherent, unifying, and global quality, which seemingly cannot be matched by any known natural, physical law in contemporary natural science, even when tried with the most brilliant mental intelligence. When we look at the world through our feelings, we see relations and connections with no place in the rational, mental, and formal view of the world. It seems that the emotional interpretation of reality in many ways is closer to human biology than the mental interpretation (1).

We propose a third way of looking at nature that integrates these two perspectives. We call this third perspective the “energetic-informational interpretation of reality.” The search for an integrated perspective is really the search for a philosophy of life that integrates the mental and the emotional-physical side of man. This interesting search is a door to a more general understanding of the many ways the world can be understood: the varieties of cosmologies that exist now. They have been developed through the times by the many human civilizations on many continents, from the African Sangomas to the Australian aboriginals, Asian Indian sages, and American Maya Indians.

Most interestingly, medicine seems to be one of the primary purposes for developing the cosmologies; the most complex of cosmologies, the cosmologies with the greatest concepts and most profound mystical depth, are often held by the shamans and the medicine men for the purpose of healing the people. This is not a coincidence. Bridging the brain-mind and the body-mind is to make man whole; it is a way to heal both mental and physical diseases. The integration is not easy because it takes a deep philosophical understanding of life and self to mobilize all the hidden resources in man (2).

The new integrative interpretation of the world is what allows us to heal and even sometimes to transform completely and go into the process of radical reorganization of the whole existence – the very intense and rapid process of spontaneous self-healing we call “adult human metamorphosis.” The understanding of the background of this pattern of healing is what motivates us for the quest and, interestingly, the quest to understand life better was what motivated and gave one of the authors (SV) the faith to follow the first patients through the dramatic, intense, and often very painful process of human metamorphosis ten years ago, when it looked like a common psychosis, just with more intensity from the deep layer of existence that Carl Gustav Jung (1876–1961) called the “collective consciousness” (3). To make the reader understand and believe what we have seen and found though the last 20 years of research in the connection between health and human consciousness, we will introduce the reader to the different aspects of a new holistic view of the world and its major phenomena: matter, life, and consciousness. This interdisciplinary understanding of human development seems to be what is needed to explain healing.

Holistic biological paradigm

When we approach the world through the mind, we interpret it. We cannot interpret the world without a personal purpose in life to source our values and intentions. In order to make sense

out of chaos, we need to be a part of the world. This makes all science highly biased, which also is the point of many philosophers of science (Popper, Kuhn, Chalmers, Fireaben, Gøtzche).

In a way, it is also nice because it empowers every one of us to look for our own truth. We have been experimenting with different interpretations of reality, as they rose when we looked at the world through different “glasses”: through the brain, the world looks one way, and through emotions and intuition, the world looks quite different. A mental perspective makes it possible to analyze the world into different pieces. An emotional perspective empowers us to see the relations between people and things. To train the ability to see the world in different ways is an exciting experiment that gives us respect for the process of interpretation. Every person has his own way of looking at and understanding the world and is simultaneously able to relate to a set of different ways to look at the world because our human organism embodies a set of faculties of intelligences that make this possible.

This modern view makes science complicated. For what can be absolute truth, if we are so subjective and our worldview so easily manipulated? We believe that when we have understood mind and emotions well, a new set of eyes opens, allowing us to see the world in a deeper and more objective way.

This might be as illusory as everything else of course, but we invite you to follow us on this journey, and we believe that in doing so, you will share our experience of a deeper understanding of life. We have called this deeper perspective *the energetic-informational interpretation of reality* or simply *the holistic paradigm*, as it brings us closer to the wholeness of the world and its phenomena than do both the mental and the emotional interpretations of the world. When we look at biology in this way, it seems possible to obtain a deeper understanding of life and human development.

Reflections on science

Scientists often suppose that they reach their conclusions by use of mental reasoning, and scientists will normally try to avoid bias from emotions, intentions, and beliefs. Mental reasoning is the ability to analyze and group phenomena, built on logic and set theory of mathematics. Classically, science is performed by dividing reality into its parts and then describing the characteristics of these parts and their interactions. The parts can normally be subdivided again and again. By and large, the different scientific disciplines are defined by the different sizes of their study objects (see Figure 1) and, to some extent after, if the phenomenon is subjective or objective (compare: Wilber’s four quadrants) (4)).

Between the disciplines, strong demarcation lines exist, new regularities between interactions of units emerging at each level, respectively; this is based on the idea that reality consists of levels, and each level has its own sphere with its own class of phenomena and associated laws. Mental reason reduces all phenomena to well-defined interacting objects. We become terribly frustrated when a description (for example, of the electron as a well-defined, isolated independent particle) is not valid.

Then, we try to comfort ourselves with the fact that the description of nature as particles at least persists regarding bigger things than particles, even when science shows that the quantum mechanical laws also rules for big molecules (5).

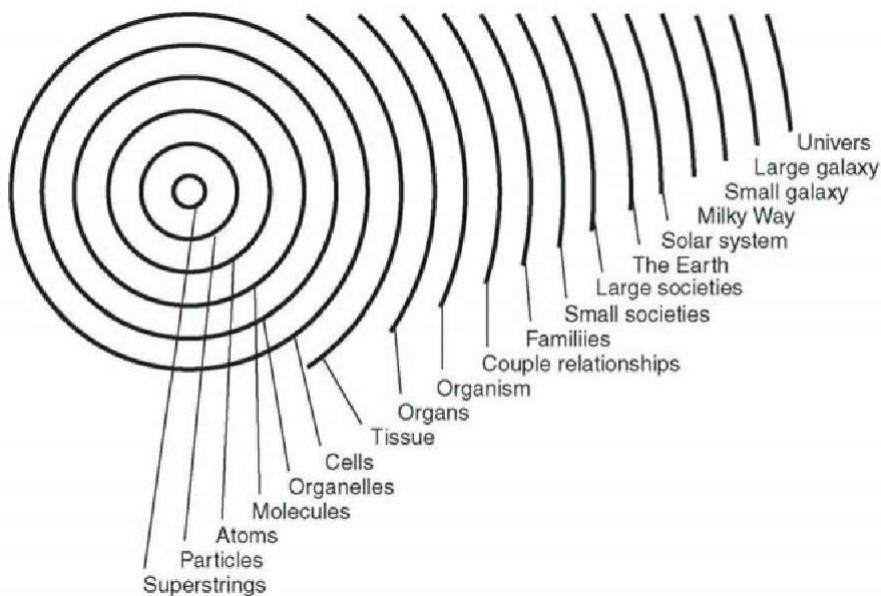


Figure 1. How reason has divided reality into scientific disciplines according to the size of the objects of investigation.

But most unfortunately, we cannot understand biological organisms by reducing them to “things.” To understand why this is so, we must accept that an interpretation of reality always happens to serve a specific purpose.

How reason has divided reality into scientific disciplines according to the size of the objects of investigation. A simple and mechanical (gr. *mechane* = tool) interpretation of reality empowers us as human beings to handle cleverly the outer physical world through the use of tools and technologies. The ability of our reason to reduce reality to interacting elements is reflected deep down in the roots of our language, demonstrating that the brain and language have been busy with this kind of survival for many generations. The development of a mind matching the outer world can be seen from an evolutionary perspective. The complicated use of tools and language makes us as human beings fit for survival, which is exactly what sets us apart from the apes. When we became human and developed logical reasoning, in addition to the feelings and emotional reasoning we already had as apes, we were forced into a conflict between emotions and logical reason. As apes, we had conflicts between reality and simple biological needs. The modern man developed a brain that allowed him to a far higher degree to comply with the physical world; however, the conflict between the biological needs and the outer world persists, but today the conflict has partly moved inwards in the organism and has become a conflict between the brain and the rest of the biological wholeness of man. Man’s excellent ability to adapt has become his Achilles’ heel. We assume that this internalized conflict between logical and mental reason and emotional and sexual needs is the basis of all illnesses in the human being, both concerning mental diseases like schizophrenia (only known in man) and the largest fraction of the somatic illnesses (also found much more frequently in man than in apes and other animals).

Man is generally very vulnerable compared to animals; brain surgery may be carried out without problems in rats under nonsterile conditions; in man, this can hardly be done. The project of science is to explore reality by means of study and experiments. However, experiments always have to be constructed, and the results always have to be interpreted. The

rationalists assume that the road to truth goes through the interpretation of experimental experiences, while the emotions constitute an “irrational element,” diverting reason from truth. But reason betrays, too. Reason notices most easily phenomena that make good sense.

This inevitably leads to confirmation of previously established ideas and expectations. Logic is able to provide consistency in a logical system, but every logical system rests upon axioms, which we get from our intuitive understanding of the world. Reason, therefore, is in its essence nurtured by the tacit, emotional dimensions of existence, not the other way around. When discriminative reason analyzes reality into parts, it requires a “synthetic” function of emotion to group them into a meaningful synthesis. Meaning is supplied by emotionality and intuition.

Emotions betray, because a great amount of conditioned learning (learning that serves adaptation to reality at a given point in time normally motivated by survival) lies between the individual and a direct experience of reality. We have a strong tendency to mistake past for present because we do not update our adaptation to our shifting reality. We feel what we have learned to feel instead of what we really feel.

Reason betrays, because it has a great tendency to notice what gives immediate meaning, which is a phenomena in accordance with previously learned fundamentals and axioms. It is self-affirmative. We are slaves of our learning and “betrayed” by both our emotions and our reason. In order to solve these problems and obtain true knowledge, we must handle the delusion of reason as well as the delusion of emotion. Reason must be expanded through a constant attempt to introduce more roomy axioms and to handle these in a noncontradictory way. The reality of the emotions must be cleansed of conditioned learning in order to make us experience reality without the influence of pollution from past learning.

The ideal is a complete unification of emotions and reason, corresponding to man’s greatest potential of knowledge. The more we cultivate our mind, the better we represent a matter in our consciousness and mental understanding. We call this the double cultivation of emotions and reason, and the application of their synthesis in the interpretation of reality, we call the interpretation paradigm.

Interpretation of reality

When we want to handle the outer world, we use logic, set up theories, and interpret the phenomena of the world as things, e.g., bodies or particles. The particles move in space and when they move, time is created. Their interactions reveal forces that may cause the bodies to accelerate. The resistance to acceleration corresponds to their mass. However, the forces and the masses, as well as the particles themselves, are not explained by this description. Modern physics, including the theories of relativity and quantum mechanics, has shown that a simple, mechanical interpretation of reality, such as Newton’s, is not only insufficient, but also incorrect. We have to admit that our rational interpretation of reality is in fact a simplification of reality. Relativity theory shows that gravitational forces between particles equivalently can be described as curvature in a four-dimensional space-time (6). Space and time have to be broken down in another way. The notion of curved space-time does not supply a real understanding but indicates that a completely new interpretation of reality is necessary for a deeper understanding of reality. Quantum mechanics describes the electron as sometimes a

wave (4,7) and sometimes a particle. This is the famous Copenhagen interpretation of quantum mechanics by Niels Henrik David Bohr (1885–1962). This interpretation violates our straightforward impression of a particle as something well defined in space. Both relativity theory and quantum mechanics points to the fact that a new interpretation of reality is needed to arrive at a proper understanding.

In our daily lives, we usually interpret reality with a starting point in ourselves, introspectively in our inner world, and in the outer world by looking at living organisms – above all, people we love. Our attention is drawn to fluidly changing totalities. We think by association and in pictures. There are no fixed boundaries between the world and us, and there are no fixed boundaries between the parts of the world. There are in fact no parts, only totalities moving to create meaningful patterns. In the rational interpretation of reality, delimited elements are a necessary condition for interpretation, but in the emotional interpretation, we find significance and system states instead. Focus is at the patterns of rays extending throughout the levels (see Figure 2). The rational interpretation is fixed, local, and logical, and it thinks in terms of space, time, and mass. The emotional interpretation is fluid, nonlocal, nonlogical, and not involved with concepts of space, time, and mass. It is the reality of the unconscious, of feelings and urges, and of intention and love.

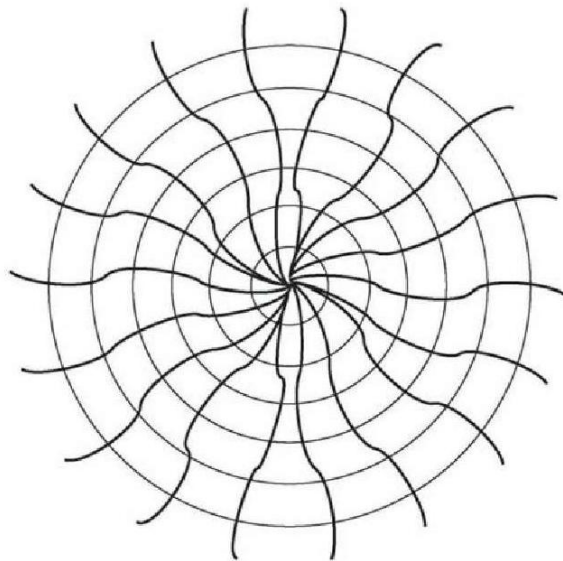


Figure 2. The aspects illustrated across the organizational levels.

In human life, the rational and the emotional interpretations of reality often conflict or seem to mutually exclude each other. The conflict between power and love is a classical conflict, well known to many people in their own lives. In philosophy, the incommensurability of the body and the soul is a manifestation of the same conflict. In order to obtain true knowledge, we have to handle these discrepancies and create a synthesis of the two interpretations. We have to give solidity to the fluid emotions, and we have to make firm reason more liquid. In other words, we have to exchange the axioms of reason with axioms that can incorporate our emotional reality. Hereby, the formerly disparate rational and emotional interpretations become transformed to a deeper interpretation cleansed of all the conditionings that oppose each other in the two separate interpretations. Energy, organization,

and information seem to be sufficiently elastic concepts of the simultaneous description of both the rational and the emotional interpretation of reality.

The concepts of space, time, particle, and mass, therefore, have to be exchanged with the concepts of information, organization, and energy. The particles of physics lose their particle status and have to be described as patterns of structure and information containing energy. What we, according to the rational interpretation, would call a particle in space and time is, in the energetic-informational interpretation, a pattern of structure and information that can never be separated from the totality of which it is a part. The theory of superstrings (8) has done admirable work by expanding the principle of equivalence to all basic forces of nature. But the multidimensional nature of the universe contradicts our common experience of space as three-dimensional.

How can space-time have ten or more dimensions? When mathematical formality requires extra dimensions, these are simply given status as reality. The superstrings are conceived as being very small and are able to form particles. The concept of particles belongs to the rational interpretation of reality and should be abandoned in the energetic-informational interpretation of reality. Even strings seem to be too mechanical to fit in. It is still a simplistic model of reality.

The energetic-informational interpretation of reality must employ a much more complex breakdown of reality. We must seek the complex and coherent structure of the universe to really understand life and consciousness. This is the challenge we face in the present series of papers on holistic biology.

Discussion

We believe that the internalized conflict between logical and mental reason and emotional and sexual needs is the basis of all human illnesses. The severe incongruence of the brain-mind and the body-mind destroys coherence (9-11). We conclude that in order to solve these problems and obtain true knowledge, we must handle the delusion of reason as well as the delusion of emotion. Reason can be expanded through a constant attempt to introduce more spacious axioms and to handle these in a noncontradictory way. This is the evolution of reason. A more radical way is to allow chaos and confusion and let a completely new matter of understanding appear – this is the revolution of mind that lead to deeper cosmology (12).

The more we cultivate our mind, the better we represent the world in our consciousness and mental understanding. We call this the double cultivation of emotions and reason, and the application of their synthesis in the interpretation of reality, the integrative, or “deep,” cosmology. In the concept of the rational interpretation of reality, the relativistic notion of curved space-time and the uncertainties and nonlocality of quantum mechanics indicate that a completely new interpretation of reality is necessary for a deeper understanding of reality. Both relativity theory and quantum mechanics point to the fact that what appears for the eye is not so; a new, more complex interpretation of reality is needed for a proper understanding of the world. Interestingly, both of them are irresponsible in a way; the over-intellectual escapes the painful feelings, and the overemotional escapes the narrowing bands from clear responsible thinking. A true, trustworthy, mature, and “deep” cosmology will deal with all

phenomena of the world in an orderly way, giving a graduated spectrum of phenomena from the dense material to the almost nonexistent spiritual (13).

In human life, the rational and the emotional interpretations of reality often conflict or seem to mutually exclude each other. In order to obtain true knowledge as well as mental, physical, social, and spiritual health, we need to handle these discrepancies and create a synthesis of the two interpretations, leading to an interpretation of reality based on concepts of energy and information. In this, the physical particles lose their particle status, and feelings lose their personal and historical significance. The world is described as patterns of more or less materialized information and more or less free energy. What we would call “a particle in space and time” in the rational interpretation of the world and what we would call “a subjective experience” in the emotional/intuitive interpretation will, in the deep cosmology (in the energetic-informational interpretation of the world), be seen as a pattern of structure and information that can never be separated from the totality of which it is a part.

Conclusion

We become terribly frustrated when a description (for example, of the electron as a well-defined, isolated particle) is not valid. Then, we try to comfort ourselves with the fact that the description of nature as particles persists, at least regarding bigger things than particles, even when science clearly demonstrates that also much larger things than small molecules, atoms and particles are ruled by the strange laws of quantum mechanics. Recently, quantum interference experiments by Olaf Nairz, Markus Arndt, and Anton Zeilingerb with very large molecules have been documenting this quite convincingly (14).

But most unfortunately, we cannot understand biological organisms by reducing them to “things.” To understand why this is so, we must accept that an interpretation of reality always happens to serve a specific purpose. We assume that the internalized conflict between logical and mental reason and emotional and sexual needs is the basis of all illnesses in the human being, both concerning mental illnesses like schizophrenia (only known in man) and the largest fraction of the somatic illnesses (also found much more frequently in man than in apes and other animals).

Emotions betray because a great amount of conditioned learning exists between the individual and a direct experience of reality. Also, reason betrays because it has a great tendency to notice what gives immediate meaning, which is a phenomena in accordance with previously learned fundamentals and axioms. In order to solve these problems and obtain true knowledge, we must handle the delusion of reason as well as the delusion of emotion. Reason must be expanded through a constant attempt to introduce more spacious axioms and to handle these in a noncontradictory way. The reality of the emotions must be cleansed of conditioned learning in order to make us experience reality without the influence of pollution from past learning. The ideal is a complete unification of emotions and reason, corresponding to man’s greatest potential of knowledge.

The more we cultivate our mind, the better we represent a matter in our consciousness and mental understanding. We call this the double cultivation of emotions and reason, and the application of their synthesis in the interpretation of reality, we call the interpretation paradigm. The rational interpretation is fixed, local, and logical, and it thinks in terms of

space, time, and mass. The emotional interpretation is fluid, nonlocal, nonlogical, and not involved with concepts of space, time, and mass. It is the reality of the unconscious, of feelings and urges, and of intention and love. The energetic-informational interpretation of reality (the holistic paradigm) must employ a much more complex breakdown of reality. We must seek for the complex and coherent structure of the universe to really understand life and consciousness.

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The living cell has information-directed self-organization

We expect that you know about DNA – the long molecules in every cell that carry the recopies of the proteins of the body. The proteins are either structural molecules that self-organise to form the small organs of the cells called organelles, or they are enzymes that control all the chemical reactions of the cell. In these chemical reactions, all other molecules are made – many of them will engage with the structural proteins to participate in the formation of the organelles. You might also know that the info is brought from the DNA to the organelles, who decode and make proteins as RNA and that what brings them are smart protein ensembles. So everything in the cell is a little cyclic, with a lot of feedback on both structural and informational levels. Pretty complicated, to say it mildly.

In this chapter, restricted to describing the ontogenesis of the cell, we discuss the processing of DNA through RNA to proteins and argue that this process is not able to transfer the information necessary to organize the proteins in the cell but only to transfer the information necessary to form the shape of the proteins. We shortly describe the structure of the information-carrying field recruited by the cells that we think is responsible for building the organelles and other cellular structures. We use the cell's superior control of its cytoskeleton as an example of how the cell is using an informational field to give the positional information that guides all the local chemical processes behind the cell movement. We describe the information-directed self-organization in cells and argue that this can explain the ontogenesis of the cell.

We also suggest the existence of an undiscovered phenomenon behind the information transmitting cell interactions. We conclude that during evolution, the cell developed into an information-guided self-organizing structure. The mystery we want to solve is: What is the mechanical cause and nature of biological information?

Introduction

Caused by lack of understanding of the cell itself, the contemporary biological theory of ontogenesis does not explain how the information for determination and differentiation of cells is recruited. Using the existing theory of DNA as donor of all cellular information, it has

not been possible to explain the powers controlling the cell ontogenesis. We believe that these powers are transmitted through positional information. For instance, cell movement and axon and dendrite excrescence could be caused by a superior control of the cytoskeleton through positional information, thus making it possible for the cell to induce *information-directed self-organization*.

We believe that, in general, the shapes of organelles (as demonstrated in *Tetrahymena*) (1) are not formed by self-organization of proteins alone, although the self-organizing property of proteins are well known. We found from analysis of the overall morphological dynamics of, say, the cytoskeleton, that more information is needed than what the molecules themselves are able to provide. We propose ontogenesis and cell determination to be explained by the cells using information-directed self-organization. For example, the organelles and other cellular structures are built because the cells can recruit and apply complex information through an information-carrying field.

In existing biological theory, it is particularly the determination and differentiation of the cells that are not accounted for, probably due to the lack of understanding of the cell itself. Generally speaking, ontogenesis is a phenomenon that is poorly understood and makes a puzzle for established science. Based on existing knowledge, we conclude that modern theories are not able to explain ontogenesis. We propose that a holistic biology using holistic organizing principles is needed to explain this astonishing enigma of biology. We propose a holistic biological paradigm based on distribution of information through roomy fractal structures, which seems to be in much better accordance with the real structure of biological organisms and ecological systems. In this series of chapters, we have chosen to split the description of ontogenesis into two parts: “the ontogenesis of the cell” and “the supracellular ontogenesis.” This chapter is restricted to describe only the ontogenesis of the cell and review much of the existing data on this matter.

What we think the cell is

If the information of biological systems has to be understood, it is obvious that we must study how the complexity of the isolated biological system has been developed. This is the case for the development of all levels of the biological systems, such as the organization of the cell structure including organelles, Golgi apparatus, endoplasmic reticulum (ER), etc.; as well as the supracellular structures (described in the next chapter of this series). This process, creation of structure and organization, is called the morphogenesis; or a more comprehensive phrase, ontogenesis, the formation of the being. Figures 1A and B show a generalized representation of the morphogenesis as complex bifurcation, where the different levels of organization are specified as M1, M2, etc.

An example of such a structure in nature is a green Romanesco cauliflower (see an example of this on: <http://www.fourmilab.ch/images/Romanesco/>). We know very little about the mechanisms behind formation of shape, from molecular organization to cell organelles, and further to the superior levels. Therefore, we assume that the same principle stands behind the formation of shape on all biological levels. This counts for organization of organelles in cells, and cell organization to tissue, and this to the superior shape of organisms. The English philosopher, William of Occam (approx. 1285–1349) wrote “when a phenomenon – for

instance, biological formation of shape – has to be explained, you have to use an absolutely minimum of assumptions” (Occam’s razor) (2,3). Therefore, the cell is involved in organization of the ontogenesis of all levels. In this chapter, however, we specifically describe the cellular ontogenesis and give a theory for the cell.

The ontogenesis of the cell

The mechanisms behind organization and morphogenesis are completely uncomprehended. The organization of cells takes place at different levels from molecules to organelles that again organize to form the full cell. A good question is: What kind of powers is the cell organizing on these subcellular levels? Based on the existing knowledge concerning DNA as storage of information, it is obvious to imagine that DNA-information is responsible for the organization of the cell.

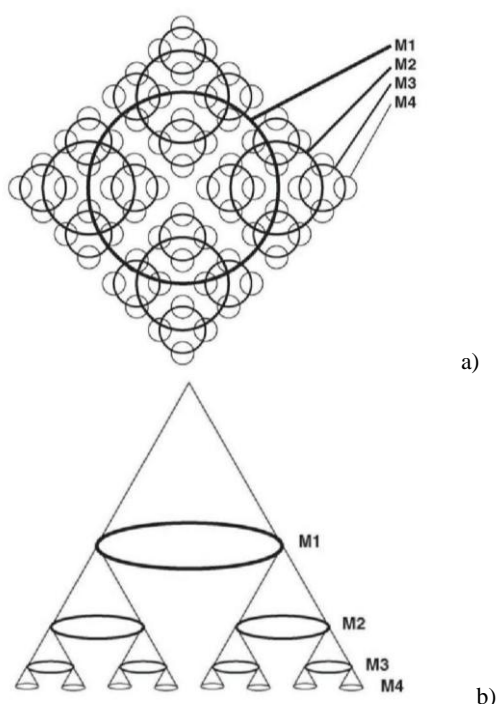


Figure 1. This Figure gives a generalized representation of the morphogenesis as complex bifurcation. First, the zygote is created. This divides – eventually only by division of the core as with the insects – to form a heap of cells. This again divides (as, for instance, with *Hydra*), and when the new group of cells are suitable enough (variegating between different species), it performs its first organization corresponding to the superior construction of the organism (establishment of the germinal layer). After this, the embryo begins to grow, and the germinal layers are divided into organ systems. These again are divided into organs that again are divided into their structures on many levels. This goes on until all details of the organism are specified. All these levels of organization are specified in A and B as M1, M2, etc. (<http://www.fourmilab.ch/images/Romanesco/>).

The transfer of information from DNA to proteins is carried out through a straight pathway, from the DNA through the RNA to proteins, where the RNA translates the DNA code to amino acids that again are gathered to form the proteins of the cell cytoplasm (1)

Thus, the DNA is merely able to transfer the information for the shape of the proteins, not to transfer the information necessary to organize the proteins in the cell. Consequently, it might be that the organizing mechanism comes from an unknown source. The mechanisms behind cell (as well supracellular) organization and morphogenesis thereby seem to be very difficult to describe in terms of a conventional (particular) molecular biological frame of reference. It is very interesting that while the details of biological mechanisms as the replication, transcription, and translation are very well described in molecular biological terms, the regulation of the eukaryotic gene expression – logically, a step in the morphogenesis – is completely uncomprehended, even though it has been thoroughly investigated through decades.

Therefore, it seems that principles are not yet known have to be discovered (this was also the position of Schrödinger) (4). The affinity of proteins is directed against themselves and each other, giving a kind of simple self-organization as, for instance, virus capsules (1). Here, it is tempting to suppose that simple self-organization can explain the whole cell and its behaviour. However, organelles that are 100–1,000 protein diameters in diameter do not show well-ordered, repetitive structures in the size of ten protein diameters (common micrographs results).

This is, for example, seen concerning the difference in mitochondria shape that depends on the type of cells (1), which do not support the simple self-organization idea. The viscous structure that would be caused by this kind of organization conflicts with the great mobility that is characteristic for the organelles. Below, we will discuss a number of concrete phenomena, not explainable by conventional knowledge, but able to enlighten the principles of cell-organization explained by our model.

The shape of organelles is not formed by self-organization of proteins

The formation of virus capsule shape takes place through self-organization of proteins (1). A similar process would be expected in our cells, but this is not the case. Even the polymerization of the simplest structures of the organelles, as actin and microtubules, seems to be the subject of superior and exact control from the cells (1).

For example, cells are able to send out microspikes, a kind of feeler, and draw them back again, if needed. Generally speaking, cell organelles are shaped precisely after the needs of the specific type of cell. Examples of this are the endoplasmatic reticule, the Golgi apparatus, the vesicle, cell membrane systems, and mitochondrion, which take their shape after the specific type of cell (1). This means that the shapes of organelles are often specified a lot more carefully than necessary in condition to the function it is meant to have. Seen in superior perspective, the mechanisms behind the design of organelle shape, mutual organelle movement, and precise mutual placement between the organelles (for example, vesicular transport to the right sack in the Golgi apparatus) are completely unknown.

At the *Tetrahymenae*, the cell structure is not decided by the proteins they consist of; this could be a general phenomenon in the world of the eukaryotes: “To a first approximation ... *Tetrahyminae pyriformis* cells and *T. vorax* microstomes maintain the same morphology with different proteins, whereas *T. vorax* microstomes and *T. vorax* macrostomes maintain

different morphologies with the same proteins” (5). Also, the genetically variegating *Tetrahyminae* often have the same shape. This means that proteins have no superior meaning for the formation of shape in this. Therefore, it is hardly the proteins that give the protozoans their manifold and magnificent forms (6).

The cells of a body are almost alike concerning population of proteins

Regardless of which two of a body’s approximately 300 functionally different cells are chosen, they will have about 98% of the most ordinary proteins in common in concentrations variegating less than a factor 5, and only 2% or less of the proteins will variegate more in concentrations or only be expressed in one of the cells (1). This indicates that the molecular differences between two randomly chosen cells are not qualitative but quantitative. So, one single specific cell may be characterized on the expression of a lot of genes. With this, we think it does not seem plausible that cellular formation of shape should be a function of the relations of the protein mix. Consequently, we have no molecular explanation of the cells morphology.

The foundation of cell movement and axon and dendrite excrescence

We assume that a superior control of the cytoskeleton through positional information causes cell movement and axon and dendrite excrescence. In spite of great steps forward in the research of the cytoskeleton, the mechanisms behind movements, such as phagocytosis, mitoses, saltatory movements of mitochondrion and vesicles, and migration of cells, are still not very well known (1), and cell movement is one of the most challenging problems for the modern molecular biology today (1). Cell movement, for example in connection with fibroblasts, is extremely complex because the formation and degradation of a great amount of different structures happens at the same time. It is coordinated across a huge area of the cell, during the formation of a pseudopodium (a kind of foot drawing a cell forward).

Likewise, the growth conus moves itself ahead, corresponding to the pseudopodium, drawing the axon instead of the cell after itself (7). The following phenomenon indicates a connection between cell migration and axon excrescence. When a cell *in vitro* proliferates, the two daughter cells can often be seen as a mirror image of each other through longer time (1) (see the 1983 edition, from the introduction Figure b, page XXXVii). When the axon proliferates through growth *in vitro*, the same kind of symmetrical mirror image can be observed (7). This indicates that cell movement and axon excrescence could be influenced by superior inside powers of organization able directly to steer the cytoskeleton organization of the cell.

This could also be the case for the dendrites, since different nerve cell dendrites of vertebrates *in vitro* are observed to outgrow on a way that is typical for this type of cells (7). Since we know nothing about the mechanisms behind the distribution of information to the

cytoskeleton, we choose to define this phenomenon as being mediated through positional information on cell level.

Discussion

The same molecules generally build different cells and their different structures. The different ways of organization may be due to different information. Containing 20% of protein, the cytoplasm may be understood as a liquid viscous crystalline phase, and the cytoskeleton that takes care of all movement and transport of vesicles in the cell may be considered as a more solid part of this phase. Self-organization that is known from the most simple molecular organization (for instance, virus capsules) may be assumed to be a principle that also can be seen in the cell, but self-organization in a liquid crystal phase has to be a lot more complicated than in simple solid systems. Apparently, it is obvious that supply of information is necessary to avoid the superior level sinking into a phase of chaos; try to imagine the pattern behind cell movement.

For example, is the well-organized walk of a fibroblast an inconceivable well-organized incident? The cytoskeleton, in maybe a thousand different places, has to react chemically in ways that are different from the close neighbouring areas. All this happens in an extremely coordinated manner. To get a picture of the capability of the cell in this respect, just think about the patterns behind mitosis or behind the internal organization of the skeletal muscle cell. The information necessary for this organization can be outlined as a pattern imprinted to the biological system, and as we, as mentioned above, do not know any physical laws that are able to generate such complex patterns in a reproducible way, we may assume that an undiscovered natural phenomenon exists behind the transmission of information.

Cell involvement in morphogenesis

Information-transmitting interactions give information-directed self-organization in biological systems. When the information-transmitting interactions have given the information for the organization to the cells that thereby can organize themselves through complex behaviour – as, for instance, cell movement and advanced reorganization of the cytoskeleton to desmosomes – these cells can be organized at a higher level through new information. By this, the information-directed self-organization that was able to explain the cell ontogenesis is also able to explain the organization of the higher levels without problems (8).

As was the case for the molecular conditions compared to the organelles, it is the case for the cells that, despite their organization that apparently is quite often disordered with a five- to ten-cell diameter level, the organization always comes through to a higher level typically containing about 100 cell diameters (compare the liver lobulus, for example (9,10)), when needed. However, the organization is never tighter than needed. The mechanistic nature of the information system seems to be an undiscovered dimension of physical energy, a patterned aspect of it, so to speak, that has not yet been discovered in physics as it only manifests itself clearly in biological systems. You could call it an information-carrying global quantum field if you like. No doubt it must be continuous with the molecule orbitals of the proteins of the

cells to regulate the activity of the proteins as we see it in cell walk, as discussed. The idea of cytoplasm as a liquid crystal has been suggested before (11,12).

Conclusion

1. The regulation of eukaryotic gene expression is not understood at all, which is why we think it is necessary to look for another explanation than the current one. We do not think that the processing of DNA through RNA to proteins is able to transfer the information necessary to organize the proteins in the cell but only to transfer the information necessary to form the shape of the proteins, which is why we think the organizing mechanism comes from a former unknown source but is now able to be explained by our holistic way of thinking.

2. The mechanisms behind the design of organelle shape, mutual organelle movement, and precise mutual placement between the organelles are completely unknown. It has not been proven that proteins have a superior meaning for these mechanisms. We think that an information-carrying field recruited by the cells is responsible for building the organelles and other cellular organizations.

3. When the axon proliferates through growth *in vitro*, a symmetrical mirror image can be observed, indicating that cell movement and axon excrescence could be influenced by superior inside powers of organization able to steer the cytoskeleton organization of the cell. This could also be the case for the dendrites. We think that a superior control of the cytoskeleton through positional information causes cell movement and axon and dendrite excrescence of cells. To explain this protein activity, we chose to describe the cytoplasm as a liquid crystal phase.

4. In general, different cells and cell structures are made by the same molecules. The different ways of organization may therefore be due to varying information. We think the information necessary for this organization can be outlined as a pattern imprinted to the biological system. Therefore, we assume that a former undiscovered natural phenomenon exists behind the transmission of information for the cell structure. We call our explanation the holistic paradigm.

5. Information-transmitting interactions give the information for the organization to the cells so these can organize themselves through complex behaviour. Through new information, these cells can be organized at a higher level. We think the information-directed self-organization in cells is able to explain cell ontogenesis.

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Biochemistry unable to explain the emergence of biological form (morphogenesis) and therefore a new principle as source of biological information is needed

To make a long history short, life is not chemistry. Of course it has a chemical level, and what we eat can be seen as fat, protein and carbohydrate plus minerals, vitamins, fibres, etc. So you can cook a chicken for sufficiently long, and you will see calcium carbonate – the bones – lying on the bottom and fat hovering at the top. But the chicken is dead now, and it cannot be reduced to the chemical level. The chicken was more than that. It was before anything else a conscious living being whose life was based on lots and lots of information, on a level above the chemical.

You might disagree. If you do, this chapter is for you. What we have done is that we have taken the simple laws valid for chemical systems, including the law of diffusion, and shown that a chemical system based on these laws cannot generate the order of the organism. For one thinks it cannot measure lengths, for instance, the length of your leg. Your two legs are surprisingly equal in length. It is known from the clinic that if there is more than half a centimetre in difference, your hips will hurt and walking will be difficult. Our body is fairly symmetrical, as are most animals'. But how is this shape generated? We conclude in this chapter that it is not generated by chemistry. So there must be completely different principles active here, which provide life with data. This is very surprising to a science nerd. Because what could that be? It is in complete conflict with all we know from natural science. So be aware. This chapter is meant for you so stop, think, and wake up. Life is a deep mystery. When you start to acknowledge that, your whole experience will change. This chapter is here to transport you out of your blind belief in the natural sciences. They cannot explain life.

Today's biomedicine builds on the conviction that biochemistry can explain the creation of the body, its anatomy and physiology. Unfortunately, there are still deep mysteries strangely "fighting back," when we try to define and understand the organism and its creation in the ontogenesis as emerging from biochemistry. In analysing this from a theoretical perspective using a mathematical model focusing on the noise in complex chemical systems,

we argue that evolving biological structure cannot in principle be a product of chemistry. In this chapter, we go through the chemical gradient model and argue that this is not able to explain the ontogenesis. We discuss the used gradients as information carriers in chemical self-organizing systems and argue that by use of the "Turing structures" we are only able to model the mostly simple biological systems. The bio-chemical model is only able to model simple organization but not to explain the complexity of biological phenomena. We conclude that we seemingly have presented a formal proof (a NO-GO theorem) that the self-organizing chemical systems that are using chemical gradients are not able to explain complex biological matters as the ontogenesis. We need a fundamentally new, information-carrying principle to understand biological information and biological order.

Introduction

A way to understanding the cell is looking at what the cell definitely is not. One popular metaphor in understanding the nature of the living cell has been the cybernetic "controlling machine," which besides just simply producing proteins and when needed exposing these on the surface of the cell membrane, i.e., to express its membership of a specific type of tissue, also have the unique capability of organizing the information for the ontogenesis of the tissue into complete functional structures through genetic control. In this chapter, we argue that the simple gradient model proposed for morphogenesis of proteostome animal lines does not find its parallel with the deuterostome lines; chemical gradients do not explain even the simplest biological functions in vertebrates. The theoretical reason for this is quite obvious:

- chemical gradients do not work as information donors in self-organizing biological systems, as the law of diffusion causes a distinct lack of precision through this process, making the iteration needed for development of complex animals impossible; using the theoretically possible reaction-diffusion structures as basis for morphogenesis does not work for the same reason;
- using this model on embryos does not reveal the predicted disturbance of the development;
- the developmental stages of, for example, the giant tadpole, seem to exclude the possibility of diffusion (chemical signalling) as informational backbone in developing systems. Therefore, chemical gradients and signalling molecules in general fail to explain complex biological functions. In this chapter, we discuss the involvement of the cell in the ontogenetic process and the failure of the chemical gradient model to explain the ontogenesis.

Gradients

Gradients as information promoters of self-governmental systems: As apparent, hormones and trophic substances can be used by biological systems to determine absolute measures as, for example, agents that decide sizes of head and body of the cnidarian hydroid *Hydra*

vulgaris (1) and the decision of the amount of motor neurons through NGF (nerve growth factor) (2).

But as implied by the problems described below, the information necessary for this organization hardly comes from a time-space network of signal molecules. The information for cell determination in a developing embryo, generally, could be sourced from the genes. From these, the information could be spread out through a complex time-space network of signal molecules. Such systems are known from cybernetics (3), but the reliability of these involves three main problems:

- To avoid a chaotic outcome through time, all steps (especially the first steps) in such a sequential development have to be extremely precise. But, unfortunately, the law of diffusion that normally is used to describe the roomy distribution of signalling molecules causes a distinct lack of precision in such systems (4).
- Using this model on embryos (on morula and blastula stages) does not disturb the development; not even after violent manipulations (4), as this model implies. Therefore, the dynamics of developing systems makes this model less reliable.
- Thyroid hormone generation of the metamorphosis in the giant tadpole (4) indicates that the morphogenetic hormones themselves do not transform the information to form the shape. Instead, it seems like these, through positional information, are involved in a superior control of the manifestation of the genetic information. For example, the final positional organization of a cell may be built by a sequence of positional informational items registered through time (4), but because of the huge distance in such biological systems (max 2 mm, owing to the time), such stages of development also seem to exclude the possibility of diffusion. The biological complexity arises from sequential recruitment of global organizations called reaction-diffusion structures (or “Turing structures”(5)). This caused sensation when the inclusion of Fick's diffusion-law was shown to result in roomy organization in equation systems for many autocatalytic reactions (5). Therefore, it was proposed that such a kind of organization delivers potential information through morphogenesis. Since then, a lot of scientists have used variations of this equation to explain roomy organization in biological systems (e.g., J.D. Murray, H.G. Othmer, G.F. Oster, A. Hunding, B. Goodwin, L. Wolpert, and H. Meinhardt). These researchers have also used enzyme reaction systems with excitatory feedback in the modelling of biological systems. The solution of such nonlinear differential could result in roomy organization of different kinds.

Also “Turing analogue” models have been developed. In these, the diffusion link is replaced by another, but similar, kind of link that is due to other cell interactions as active transport and interactions through formation (6).

Also, the thermodynamic equations have been included in such calculations without any further result (7). This activity has involved the development of “Turing structures” into a subgroup of “dissipative structures” arising from self-organization of systems ahead of equilibrium. Very few of the last-mentioned model types, but none of the first-mentioned, have yet been discovered.

Understanding matter, life and consciousness

The recognition that living organisms are organized in a fractal manner on a number of levels (7,11) makes it possible to test our assumptions concerning living organisms in a fractal manner. By use of the No-Go theorem, we will here try to show the formal impossibility of well-organized multicellular life based on the ordinary recognized molecular biological assumptions concerning living organisms as self-organizing molecular systems.

It seems that No-Go theorems can make it necessary to make a revision of basic assumptions that normally are granted. It is hard to understand the informational systems of the living organism, and it does not seem that quantum mechanics can explain the conditions behind the existence of the fundamental substances in living systems. The disciplines of consciousness (cognitive, religious, and philosophical disciplines) are not able to explain consciousness's ability to create wholeness, coherence, and meaning in a chaotic world of details. Because our consciousness is developed from the living organism, it is obvious to consider which information processing traits of the living organism are able to create the superior joined properties of the consciousness.

The conditions of information in biological systems are still very poorly understood. Living organisms seem to exist by means of an information system interacting with all cells simultaneously and with the single cells individually. This information system looks to be fractally organized (8), so its structure is parallel with the fractal organization of the living organisms. But until now, the traits that link the organization of organisms on all levels are not understood. This information system could very well be the foundation of consciousness. Classically, this trait is described as the quality about the biological system of information that makes it possible to establish superior connections as, for example, size relations, despite the unstable or chaotic relations of the sublevels.

An example of this is the kidney tubulus from the caterpillar of the newt. These are able to maintain the kidneys absolute size in spite of huge enlargements of the underlying level necessary for formation of the structure (the size and amount of the cells expand). Concerning polyploid and haploid (bigger and smaller) cells, a corresponding major or minor amount of cells is used for the actual structure; see Figure 1 (9). The knowledge deduced from this has been that the biological information is linked to roomy conditions more likely than enumerations of the amount of cell proliferations and similar concepts.

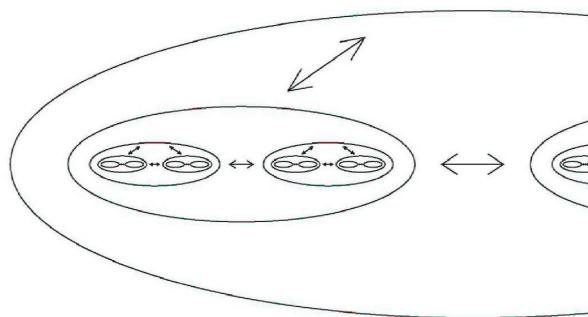


Figure 1. The fractal organization of the living organism, with parts that interact and by this form a number of levels. The arrows illustrate information-transmitting interactions and are generalized from the empirical findings. This illustrates how biologic systems act as a fractal kind of Chinese box containing the information-transmitting interactions between the different parts of the same level.

The classical expression for this has been “positional information” or “the biological (information) field” (4). It has been proposed that diffusion-dissipation structures could deliver such roomy positions (7), but below, we will also show that if it is theoretically accepted that the roomy structure should be able to be organized by nonlinear, chemical processes in this way, the dynamic, fractal organized information system, including the superior regulatory functions of biological systems, could not be described by this in an appropriate way.

A No-Go theorem

We will try to show that chemical self-organizing systems are not capable of giving the observed precision of structures concerning the superior levels. In the fractal organized system (see Figure 1), the parts interact and, thereby, give wholeness on a number of levels corresponding to a complete individual organism. We will try to show that it never can be more precise than the underlying levels. When the last-mentioned levels fluctuate in time, we think it gives even more inaccuracy.

The No-Go theorem only counts for the static situation. A No-Go theorem for the (chaotic-) dynamic situation of balance is under construction. Because the information is restricted to the DNA, the molecular biological understanding of the living organism is that signalling agents carry the roomy organization. This information is only able to escape the DNA molecule during the action of other molecules through transcription, translation, enzyme activity, etc. Therefore, we are able to project the living organism into a multidimensional room of chemical gradients, as shown in Figure 2. The living organism is represented as a lane (trajectory) in this room. The lane may never cross itself, because this would involve a collapse of a representation necessary for creating and keeping up the organism.

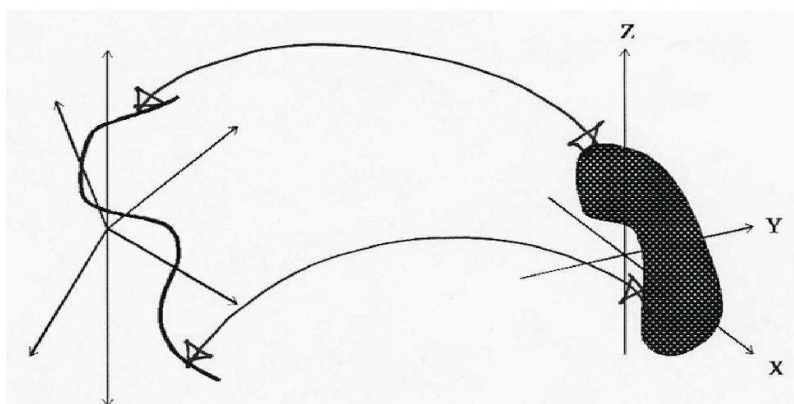


Figure 2. The living organism is projected to a multidimensional room of chemical gradients (10).

The known physics and chemistry claim that all interactions are local (chemical agents diffuse or they are transported around). The multidimensional gradient room, therefore, may have a metric that makes it possible to maintain global order because local interactions alone would involve too big an uncertainty on the superior levels and huge distances (see Figure 3).

Such a metric, however, will in itself block for the dynamics existing in a living organism because a specific structure with a specific size (e.g., kidney tubulus, a human leg of a specific length) is necessary to base it on the underlying metric in its construction. The underlying level, therefore, may not fluctuate more than the superior level. The example involving the amount of cells in the newt tubulus is a model example.

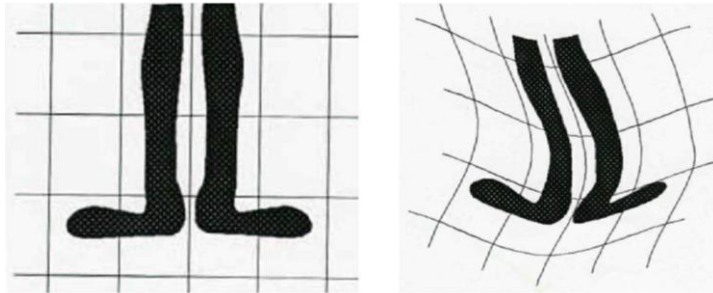


Figure 3. Without a firm metric (right), the organisms form and other high-level qualities will not be able to be established or maintained in a system only based on local interactions (10).

Conclusively, a matrix in the multidimensional room of chemical gradients having the necessary firmness will fixate the system dynamic in a degree struggling against the biological empery. A looser metric will allow the observed dynamic but will not be able to function as “bag-bone” for exact organization on higher levels and over huge distances. An example of the consequence of this is that a human’s leg length of about 1 m, that from leg to leg of the same person, is very exact within a small fraction of a percent, demands a metric that makes the presence of legs of the same length with all people, and this is not the case. Thereby, it seems to be excluded (through static terms) that the known laws of molecular biology can explain the biological informational conditions. This means that biological information systems could be based on constant changes of a kind unknown until now or that an unknown physical-chemical law exists, including organizing qualities, as the living organism has been able to use.

Precision in biological systems

Examples are given of large-scale precision in biological systems. The following example is a transcription from Bennett et al. (10): It is inexplicable given that the known fluctuations in the number of underlying fractal structures exceed the tolerances to which macroscopic precision is observed. As a concrete example, we have in mind the precision (50/100), to which the two legs of an average human being have the same length. The assertion that this macroscopic precision is inexplicable is made relative to a model for biological organization utilizing the inverse of a mapping f from the three-dimensional geometrical space \mathbf{R}_3 , in which the organism is embedded to a very high-dimensional space \mathbf{K} spanned by the concentrations of all the chemical components of the organism. If the map $f: \mathbf{R}_3 \rightarrow \mathbf{K}$ is to have a chance of leading to a “blueprint” (residing in the space \mathbf{K}) from which a biological organism can be constructed in \mathbf{R}_3 , the mapping f must certainly be injective. Otherwise, the mapping f would not have an inverse. Not having injectivity would correspond to an ambiguity in position in \mathbf{R}_3 when attempting to use the “blueprint” to fabricate the organism

in \mathbf{R}_3 . A potentially interesting speculation is that such ambiguities could be an important factor in certain pathological conditions; for example, an ambiguity as to where a biological structure starts and where it stops could lead to uncontrolled replication. However, more than the injectivity of the map f is required. In order for f to have an inverse, we must have a way of providing a restriction in the high-dimensional space \mathbf{K} such that this restriction coincides with the image of the mapping f . A possible restriction that could be used comes from the reasonable assumption that the observed stability of biological organization must necessarily be supported by complicated neg-entropic biochemical processes (necessary, for example, to avoid “demise by diffusion”). Such complicated biochemical processes must be expected to place severe constraints on relationships between the concentrations of chemical components. Processes that are stable with regard to small violations of such constraints must be assumed for biological processes (such stability is seen in “buffered” systems, for example); maybe the more fashionable way to talk about this is to say “buffering by commodity conservation as a way of enforcing the presence of two or more phases, the transition between which are first order (in order to give “gap” needed for fine-tuning)” – could be expected to define a manifold embedded in \mathbf{K} . Such a manifold would correspond to a “limit cycle” (“attractor,” “strange attractor”??) dictated by such (stable) biochemical processes necessary for the maintenance of biological organization. Let \mathbf{M} designate the manifold (assumed differentiable) embedded in \mathbf{K} that corresponds to this “limit cycle” and thereby to the restriction necessary to ensure the invertibility of the map f . Because our hoped for biological “blueprint” is forced to reside on the manifold \mathbf{M} (i.e., the limit cycle), we can adopt as a metric on \mathbf{M} that induced in tangent spaces to \mathbf{M} by the directional derivatives along various chemical component directions. Thus endowed with a metric, the surface \mathbf{M} becomes a geometric surface, and one might then hope that the inverse mapping $f^{-1}: \mathbf{K} \supset \mathbf{M} \rightarrow \mathbf{R}_3$ could be used as a “blueprint” from which the biological system in \mathbf{R}_3 could be constructed. Consider now the trajectories $R(t)$ and $L(t)$ in \mathbf{R}_3 along, respectively, a right and left leg that transform into each other under (discrete) symmetry operations in \mathbf{R}_3 (please notice that trajectories $R(t)$ and $L(t)$ are traditionally marked with arrows above the letter). It is further assumed that these trajectories start and end at macroscopically corresponding points on the two legs in accordance with having two legs of the same length. For example, we can think of trajectories $R(t)$ and $L(t)$ that transform under reflections as $\hat{A}R(t) = L(t)$ (t is a parameter; \hat{A} is the lateral reflection operator in the middle plane of the human body). We would expect that these trajectories $R(t)$ and $L(t)$ would be mapped by f into trajectories $f(R(t))$ and $f(L(t))$ in \mathbf{M} that were “parallel” or close together in some sense. This would ensure that integration of the metric (induced in \mathbf{M}) along these trajectories in \mathbf{M} would be equal (in accordance with the assumption of (symmetric) trajectories in \mathbf{R}_3 along left and right legs of the same length). The reason for expecting this equality $\int f(R(t)) \sqrt{g} ds = \int f(L(t)) \sqrt{g} ds$ (1) is that the integrals along trajectories $f(R(t))$ and $f(L(t))$ that are “close together” in \mathbf{M} “feel” the essentially same variation in the metric. Now, the following question must be addressed: Given the magnitude of known fluctuations in the numbers of self-similar structures (e.g., cells) that make up a leg, we must ask if our candidate for a biological “blueprint” residing in \mathbf{M} can accommodate these fluctuations and still function as a map into \mathbf{R}_3 that can lead to a right and a left leg that have the same length to within a tolerance known to be less than that which would correspond to the fluctuations in the number of underlying cellular building blocks. The essence of this No-Go theorem is the

demonstration that this *is* not possible without some sort of “fine tuning” in the form of additional assumptions.

The idea behind the “proof” is roughly as follows. The trajectories $f(R(t))$ and $f(L(t))$ in \mathbf{M} (corresponding, respectively, to the trajectories $R(t)$ and $L(t)$ in \mathbf{R}_3 described above) can be expected to be spirals. The periodicity (forget about the “pitch” of the spiral for a moment) comes from the fractal-like (cellular) nature repeatedly encountered on a trajectory (in \mathbf{R}_3) through a biological material. On the other hand, parameters in \mathbf{M} that reflect the number of cells encountered along a trajectory obviously cannot be periodic; hence, the “pitch” of the spiral trajectory in \mathbf{M} corresponding to the trajectory in \mathbf{R}_3 along the length of a leg. The number of cells encountered along a trajectory can be expected to be topologically encoded in \mathbf{M} as the winding number of the spiral trajectory.

Now the naturally occurring (i.e., known) fluctuation in the number of cells encountered in the trajectory along the right leg and the left leg would show up as different winding numbers for these two trajectories in \mathbf{M} . However, we know that these two trajectories $f(R(t))$ and $f(L(t))$ can be expected to be roughly parallel (“close together”), according to the discussion above. The essence of our No-Go is the impossibility of having two parallel spirals (in \mathbf{M}) with different winding numbers: the known relative fluctuation in the number of underlying fractal structures making up a macroscopic organism leads to different winding numbers for the trajectories $f(R(t))$ and $f(L(t))$, thereby precluding that these can be parallel in \mathbf{M} as required by Eg. (1). This mismatch in our hoped-for biological “blueprint” prevents the construction in \mathbf{R}_3 of a right and left leg that have the same length to within the phenomenologically observed precision.

Discussion

Simple gradient models do not seem to be able to explain ontogenesis (2). With the existing knowledge about DNA and genes, it is rational to think that information in biological systems is directed from the genomes, through a chemical arrangement. Transport of information in such systems has been explained through gradient models, trying to state how the information is conveyed from genes to shape – some examples are the axon excrescence through a gradient of NGF and morphogenesis through a gradient of sticky-molecules as N-CAM and NG-CAM (11).

In the simplest versions – as the “French flag model” (12,13) – a gradient of a signal molecule (“morphogene”) is formed through a “source” and a “drain.” Cells in between these could be imagined to have concentration-sensitive receptors with thresholds that can only be reached in some areas of the system, but this is still hypothetical. The idea is that activation of the receptor should control the specific gene expression, but even the simplest forms of the gradient model (2) have shown to be unfunctional without the assumption that the threshold variegates locally. By assuming this, the cells themselves could have the information to create complex biological patterns. The gradient model, therefore, is able to explain simple biological functions, but is not capable of explaining complex matters as morphogenesis by itself. The existing knowledge concerning protein processing makes it logical to think that information in biological systems is distributed from the genes.

We do not think this could explain the information for ontogenesis alone. For example, the information responsible for the organization of agents deciding the sizes of body and head of *H. vulgaris*, or the decision of the amount of motor neurons through NGF, are hardly directed from a time-space network of signal molecules. Therefore, it does not seem reasonable that simple gradient models should be able to explain the complete information pattern necessary to organize ontogenesis. Even the simplest forms of the gradient model have shown to be unfunctional. However, by assuming that the thresholds vary locally, the cells could get the information to create the complex biological patterns by themselves. This, on the other hand, is only an assumption. Even when we use the “Turing structures,” we are only able to make models of the simplest biological systems. Therefore, this model is not able to explain the complexity of biological phenomena. This means that the chemical gradient model is able to explain simple biological functions but is not able to explain complex matters, such as morphogenesis. The idea that sequential recruitment of global organizations is able to activate morphogenesis is a good idea, but the question is if the reaction-diffusion systems really are able to create the necessary “prepatterns.”

Since the middle 1970s, the “Turing structures” have been criticized because of problems like: 1) experimentally, none have succeeded in proving these structures as a roomy organization of a three-dimensional system, 2) theory and practice have shown that it is impossible to model complex, reproducible, reaction-diffusion structures (Axel Hunding, personal communication). If a structure has to be defined as roomy, using a solution (length of structure/wavelength) of only $5 \times 5 \times 5$, the reproducibility will vanish completely. The border for creation of roomy organization seems to be divided into about ten compartments (Axel Hunding, personal communication). This means that by use of the “Turing structures,” we only are able to model the simplest biological systems. Therefore, this model is only able to model simple organizations as, for instance, in the fruit fly *Drosophila*, egg polarization, gastrulation, and compartmentalization of the eggs, but it is not able to explain the complexity of biological phenomena.

The point of view of contemporary molecular biology is that information to the organization of living beings is tied to genetic activity (4), but the paradox of the C-value (C = complexity) (2) and the macroevolution (15) makes this less likely. According to the C-value paradox, the beings of high evolutionary levels are more complex, but, on the other hand, they have not much more DNA than simple (including single-celled) organisms (4). The macroevolution, the evolution of the shape of living beings, seems to be independent of the microevolution, the evolution of molecular structures. For example, the DNA of human beings and chimpanzees are 99% identical. This is the same difference as seen between twin-species of mammals and fruit flies, respectively (4). Based on this, the No-Go theorem makes it possible that something else stands behind the biological organization. It can be argued that both compartmentation and segmentation in the *Drosophila* are very characteristic for the complexity of biological phenomenon, while they do not enable us to understand the inner part of the biological frame.

Is it allowed to ask if there will be any necessity to model the whole biological scene? The Nobel-prize-authors of *Drosophila*-segmentation characteristics won their experimental explanations (DNA-types) from the biological phenomenon from the midst between simple organisation on one side and complex organisations on the other side. Very finely done! Still chemistry seems not to be able to solve the problem of the emerging controlled morphological complexity in biological systems.

Conclusion

The presented No-Go theorem makes it likely that something else other than biochemistry is behind the biological information capable of organizing morphogenesis. Because of the chemical law of diffusion, life seems unable to create the kind of order needed to give living beings their forms.

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Supracellular morphogenesis: The origin of biological and cellular order

Did you read the last chapter thoroughly? Probably not, as it was quite technical and complicated with lots of difficult math. But hopefully you read the conclusion: that chemistry cannot explain life. It cannot explain subjective experience like consciousness, including joy and pain, and it cannot explain objective factors like biological order and the form of the body and its organs. So basically we are in dire straits, if we try to use chemistry for medicine. If chemistry cannot explain order, it cannot explain disorder. If chemistry is not giving the order of the organism, it is highly unlikely that chemistry can create or restore order. Chemical medicine is basically created on the hypothesis that chemistry can help on the level of cellular order to resort this order and thus heal disease. The hypothesis seems to be wrong. We have just falsified it in the last chapter.

It is not that we do not like science, quite the contrary: We love it. It is great fun. It can be used for millions of purposes. It is just not very helpful when it comes to heal human diseases. Well, there are exceptions, of course. We would love to have antibiotics if some aggressive microorganism were eating our body or brain. But in the Western world, this is not very common. Chronic disease is coming from unhealthy lifestyle and more than anything else from poor quality of life, not from microorganisms. So... this is why we have holistic, consciousness-based medicine. Consciousness interferes with biological order on a subtle level. To understand it, you need to understand how the body is held by biological information. You need to understand that the creation of the body's form, called morphogenesis, is continues throughout a person's life, as the form is always deteriorating, and now cells are constantly provided by cell division. If order was not kept constantly, the whole organism would just degenerate. This chapter is about this magic power of life giving us biological form: Morphogenesis!

Uninterrupted morphogenesis shows the informational potentials of biological organisms. Experimentally disturbed morphogenesis shows the compensational dynamics of the biological informational system, which is the rich informational redundancy. In this chapter, we use these data to describe morphogenesis in terms of the development of supracellular

levels of the organism, and we define complex epigenesis and supracellular differentiation. We review the phenomena of regeneration and induction of Hydra and amphibians, and the higher animal's informational needs for developing their complex nervous systems. We argue, also building on the NO-GO theorem for ontogenesis as chemistry, that the traditional chemical explanations of high-level informational events in ontogenesis, such as transmutation, regeneration, and induction, are insufficient.

We analyze the informational dynamics of three embryonic compensatory reactions to different types of disturbances: 1) transmutations of the imaginal discs of insects, 2) regeneration after removal of embryonic tissue, and (3) embryonic induction, where two tissues that normally are separated experimentally are made to influence each other. We describe morphogenesis as a complex bifurcation, and the resulting morphological levels of the organism as organized in a fractal manner and supported by positional information. We suggest that some kind of real nonchemical phenomenon must be taking form in living organisms as an information-carrying dynamic fractal field, causing morphogenesis and supporting the organism's morphology through time. We argue that only such a phenomenon that provides information-directed self-organization to the organism is able to explain the observed dynamic distribution of biological information through morphogenesis and the organism's ability to rejuvenate and heal.

Introduction

The existing morphogenetic theory does not explain how cells recruit the information to organize the different structures of the embryo. Caused by a misunderstanding of the cell, the levels of the organism and cell determination and differentiation have not been explained. Our papers on ontogenesis try to change this fact by giving a new theory for the cell (1) and explain supracellular ontogenesis and the order in biological systems (in this chapter). We have discussed the fact that it has not been possible to explain the powers of the cells by use of chemical gradient models or the existing theory of DNA as donor of all cellular information in order to make the cells able to organize the ontogenesis (2). The development from a single undifferentiated cell, the zygote, to all the different types of cells that create complex tissues and organs, such as nerve, brain, muscle, eye, bone, or nail, has not yet been understood. The ability of the cells to communicate and orient themselves in the embryo and organism in order to enable formation and maintenance of the organs and the wholeness of the body has long been a complete mystery. In two papers (1,2), we have given our explanation of these astonishing biological enigmas.

We chose to describe the mechanism behind the organization of the biological system at all levels as "information-directed self-organization." This way, the living being can be described as an information-directed, self-organizing, complex, dynamic system (complex as combined/put together, dynamic as motion by itself), in this series of papers often referred to as the complex dynamic. We propose that cell determination and ontogenesis can be explained if cells at all developmental levels use information-directed self-organization. For example, the building of organelles, tissues, and organs is organized by cell recruitment of complex information that is supplied to the organelles, tissues, and organs through an information-carrying field.

This can be illustrated, as an example, by a flower in development where the information-carrying fields develop different structures in an illustrative way (for example, in the reference (3) p. 38, Figures 22–34). We think the existence of information in biological systems is realized through the high degree of organization. From the beginning, the curiosity of the human being has aimed to understand this biological enigma, for instance, through an expression of a specific *élan vital*, a movement founded by the French philosopher Henri Bergson (1859–1941).

Today, these kinds of unwieldy ideas have been abandoned due to the idea that nature is ruled by “ordinary” and simple principles, and in spite of the discovery of DNA, it has not yet been possible for science to explain the mechanism behind the creation of living being’s morphogenesis. Ontogenesis is often described by the use of nonparticular ideas as “morphological fields” (4) or “positional information”(4), which means information given as a consequence of position in a developing biological system (for example, in the reference (3) p. 38, Figures 22–34). Of course, these relief concepts do not explain anything, but express that the formation of the patterns in biological systems apparently involves the whole spaciousness of the biological system, in a complex and incomprehensible way. In this chapter, we discuss the supracellular terms of ontogenesis in the view of our hypothesis. Elsewhere (1), we described the ontogenesis of cellular development, but in this chapter, we will discuss the supracellular conditions of ontogenesis.

What we think the cell is not

First, the cell is not just chemical machinery. The point of view of contemporary molecular biology is that the information that organizes the cell's inner order and structure, as well as the tissues, organs, and the form of the whole organism comes from the DNA of the organism's genome (4), makes this less likely. According to the C-value paradox, the beings of high evolutionary levels are more complex, but on the other hand, they do not have much more DNA than simple (including single-celled) organisms (4). Humans only contain 300 times as much DNA as large bacteria, and only one-third compared to the Lily (4). The macroevolution, the evolution of living being’s shape, seems to be independent of the microevolution, the evolution of molecular structures. For example, the DNA of human beings and chimpanzees are 99% identical. This is the same difference as seen between twin species of mammals and fruit flies, respectively (4). On the other hand, all kinds of vertebrates have the same fundamental building plane.

For instance, they have identical (bones), muscles, organization of the brain, and so on (7), only the form is different. This means that it is highly questionable that the structure and organization should be directly related to the molecular functions, and with this, the existence of another explanation is more realistic. The problems concerning the understanding of information in biological systems have also been explained, without much luck, by the use of different mathematical interpretations (8,9). But most scientists feel that there has not yet been a theory to explain the distribution of information in biological systems. The existing models simply do not explain the organization of the extreme complexity, stability, and reproduction related to interacting cells. This is also a concern for the chemical gradient models that fail to explain the development in biological organisms. These act on the idea that

information in biological systems is directed through a chemical arrangement from the genes. Such models calculate how the information is transferred from genes to shape. These models are the subject of this chapter.

The ontogenesis of the supracellular levels

In another paper (1), we showed a generalized representation of morphogenesis as a complex bifurcation, where the different levels of organization are specified as M1, M2, etc. It is worthwhile to notice that the whole organism, in parallel with the gradual development of the complexity, is able to go through a radical reorganization of structure on all levels, as it is known from the metamorphosis of vertebrates (for instance, amphibians). In tadpoles, thyroidea hormones trigger the metamorphosis. If the thyroidea gland is removed, the result is a giant tadpole. This also goes through a process of metamorphosis to form ordinary frogs after injection of hormone (3). In this way, the systems are seemingly uninfluenced by the size. When the giant tadpoles are much longer than 2 mm, it is not likely that morphological information is promoted through diffusion (for instance, as a reaction-diffusion structure).

Morphogenesis of insects

In a convincing way, transmutations (4) showed that information can be found at tissue level but not as expected at the cell level. The imaginable disk that normally develops to one of the fruit fly organs, for instance, a wing, is able to change its development spontaneously into a leg or an antenna. Also known from the fruit fly is the special, homeotic or atavistic mutations that give morphological disturbances resembling transmutations. In the opinion of some scientists, these mutations are interpreted as cell determination directed by the genes (4), but the mechanism behind this is not understood in molecular biological terms. What can be observed is that one complete structure replaces another. So it looks as if the whole package of positional information is exchanged (10). However, we believe that this interpretation is doubtful. The imaginable disks can experimentally be shown to match with a morphogene field, an area of tissue that functions as a whole, concerning positional information (see below: the amphibian regeneration) (10).

Phenomenon of regeneration

Hydra regeneration – positional information in a simple three-dimensional system: The little freshwater polyp, which is the most simple of all cnidarians, is assumed to be the first creature on earth with a nerve system (4). Its body wall contains three layers of tissue. The outer layer is the epidermis with sense cells. The innermost layer is the gastrodermis with secretory and nutrient-absorbing cells. In between these two layers is a layer (mesogloea) traversed by an uncomplicated network of simple nerve cells (4,11). This nerve tissue is able to send ring-shaped impulses in all directions along the nerve network from the contact point (12). This makes Hydra capable of making complicated and un-understandable behavioural

patterns. It is, for instance, able to catch water flies, swim, and make somersaults. If Hydra is separated in two, both parts regenerate immediately (13). This means that Hydra can be compared to a morphogene field (see next section). A very good question is how a newly formed Hydra is able to control these patterns of movements. We think that this can only be explained by positional information. The amphibian regulation and morphogene fields have been examined by scientists (14,15). Parts of an amphibian embryo can be removed without any injury. If, for instance, an eye or another part of its brain is removed, the surrounding tissue compensates for this. This is called regulation. There is a limit to how big a part it is possible to take away without injuring the embryo. Early in the scientific history, a “morphogene field” was operationally defined as a part of the embryo inside which it is possible to make regulations.

Gradually as the embryo develops, it gets more and more fields that make up minor and major parts of the whole. This is the case for all vertebrates, but with mammals, the amounts of embryological fields reach the maximum. In the foetus area, inside the “field of limbs,” tissue can be removed without disturbing the embryonic development, but in adults, it is only possible to remove tissue from the “field of the little finger tip.” Gradually, as the amounts of cells expand through development, one area is divided into several (4). This corresponds to an ongoing delivery from the biological system of information through positional information. In newts, limbs can grow out again through formation of a normal lower leg in a way that is directed by positional information. This is the case in spite of the fact that the over leg is turned surgically before the outgrowth (4). Regeneration and metamorphosis show that morphological information in general is accessible also after completion of morphogenesis.

Phenomenon of induction

To induce means to influence with each other. A long row of experiments have been carried out (16,17) and interpreted as if the tissues in developing systems interacts on an abstract way that can be described as an induction or redefinition of positional information. A very good example of this is a total lack of development of the nervous system that results in a blockage of the invagination of the mesoderm through the morphogenesis (16). Another classical example is the induction of the neuroectoderm of the eyes lens (17), which also gives a review over experiments that throw light on the information in biological systems. If the tissues are not positioned orderly compared to each other, the development stops, and the information can no longer be recruited from the biological system.

Early in this century, it was shown that transplantation of a dorsal lip from one amphibian blastula to a ventral area of another one could induce the formation of a smaller secondary embryo ventral in the last one. This was at first interpreted as if the information to the embryo was lying in this region. From this comes the expression organizer region (15). But this interpretation had to be rejected because it turned out that many strange substances could have the same effects. Examples of this are other tissues – also boiled and fixed – steroids, organic systems, and cotton with turpentine. Here, the formation of subcellular patterns is induced (15), which can be described as a redefinition and duplication of the potential information of the system. As described through all these examples, the distribution of information necessary for organizing the different levels of biological systems cannot be described in conventional terms. In our model, the biological system can be described as a

Chinese box model of information transmitting interactions. Through cell morphogenesis, the information of the biological system can manifest itself through positional information.

Morphogenesis of the brain

The morphogenesis of the nervous system is, because of the enormous amount of information this needs, without any doubt the most impressive achievement of biological nature. Obviously, it is difficult to measure the amount of information that has to be used for this performance. However, anyone that studies a map of the housefly's brain (18) may be excited and astonished by its complexity. This brain only takes up $1/3 \text{ mm}^3$ and weigh 0.4 mg, but contains 340,000 of the most complex and varying neurons of the animal kingdom connected in ways that are immensely precise and variegating, as "in all probability one cell body may give rise to several sets of arborizations, which functions as separate integrative units" (18).

The details of the brain of a housefly give the impression of the existence of an extremely specific determined connectivity. And in accordance with this, the housefly is able to do all neural functions from the beginning without learning. Today, the development of such a system can only be explained in conditions of transfer of information through positional information that is read by the cells and their axons and dendrites. Contrary to insects and lower invertebrates, it is the case for lots of mammals, especially humans, that the nervous system is developed further after birth – humans goes through a process called myelination at least until the child is two years old (19).

The human has a considerable ability to learn, but we know from experiments with apes that much perception and behaviour are embedded in the biological information (16,20). It is not known if this information is manifested through the connectivity or if it is just transferred to a functional level of the nervous system. But apparently, the cortical reproduction of the body (in maps) is not "hard wired," but able to go through momentary re-organization after nerve-racking. This means that the representation exists as functionally patterns in the brain(16), in agreement with the last of the two alternatives.

Axon growth in vivo

Excrescence of axons in vitro: As mentioned earlier, the axon excrescence in vitro is influenced by interior factors. However, frequently, the axon excrescence in vitro is dominated by the influence from outside factors – as for instance a sticky lane on the button of the Petri dish (4,15) or a gradient of NGF (4). This has lead to an intensive in vivo research, after "epigenetic" factors – factors that are involved with the genetic regulation of developmental pathways, leading to the cell differentiation – through the evolution. Concerning excrescence of axons in vivo, special invertebrate neurons can be recognized between different individuals, and develop almost the same axons and dendrites (21,22).

Also, the exterior stimuli leading to the well-known grasshopper neurons, in which axons at first have an identical growth and since grow in different directions has been studied and concluded: "It is highly unlikely that the growth cones we have been studying are directed passively by mechanical guidance cues" (23). In vertebrates, many examples are known concerning the precision of axon growth following complicated patterns not explainable by

mechanical (or chemical) footprints. The retina of the goldfish is extremely precisely projected to tectum. This organization happens through addition of rings of retina through the development, while the tectum develops through regional outgrowth from the side. The impression of dynamics in this system is completely conformed by experiments. Here, the right retinotopic mapping of the whole retina on the whole tectum is recreated. This was possible in spite of cutting of nerves, blockade of axon excrescence, and re-movement of tissue from retina and tectum, etc. (4).

Through development of vertebrate limbs, the nerves can be observed to grow in complicated patterns that seem extremely determined. As, for instance, the pattern of nerves in wings is almost completely symmetrical (4). It is also possible to show that if a pair of spinal cord segments is turned around in an early stage of the development of a chicken, then the motor neuron of a specific segment still finds the right muscle group to enervate (4). If a spinal cord segment is turned through the development of an amphibian, axons that usually grow caudal suddenly first grow in a rostral manner, but soon after it turns and continues its growth in the normal cordally way (15).

We conclude that it is not yet understood what mechanism – seemingly extremely dynamic – leads axons through the development. But generally, it does not seem to be “epigenetic factors.” The excrescence of axons, seemingly, can only be described by positional information. This means that they get the information to the organization, after their position in the developing organism.

Discussion

Potential information of the vertebrate development of limbs was reviewed (4,15), and accordingly in humans, the buds of arms and legs are visible in the beginning of the fifth week, where these are established by a mesenchym-core covered by a layer of ectoderm. This forms, apically on the bud, the apical, ectodermal crest that seemingly orients the bud in a palmary – dorsally way. Most caudally on the bud exists an area that corresponds to the organizer region in amphibians. This is called the zone of polarizing activity or ZAP. If this is moved from a wing bud of a chicken, to a rostral area of another one, the result is supernumerary boons of underarms, hands, and fingers. But, as with the organizer region, here it has been shown that other tissues and matter, as for instance retinoic acid, can have the same effect. The results of these experiments can be described as a re-definition of the positional information in the morphological field of limbs. In other experiments, a block of mesoderm, which is known to develop from a leg bud to the structure of a thigh, has been inserted apically on a wing bud.

Such a manipulation gives a wing with a toe on the tip (4). The information from the leg bud has therefore been preserved in an abstract way. Not unexpected, a leg structure was formed, which was adapted to the new position of the wing bud. A mechanical interpretation of this kind of experiment is very difficult, because the mesenchymic cells of the leg and wing apparently seem completely identical. And later, these cells, so far as is known, also have the same differential pathway and form the same type of cells. Thereby it looks as if the information does not lie at the cell level but instead at the level of tissues. This phenomenon is called non-equivalence (4). The information from the genes is manifested through so that

cells are able to read their positions in the wholeness of the structures and are able to differentiate after this. In this way, the superior patterns that specifically characterize a finger or a wing can be formed.

Several experiments have been done concerning the development of limbs, and a lot of different results have appeared, but "... These results must be telling us something about the biochemistry and cell biology of limb morphogenesis, but no one has yet discovered what" (15). So, the mechanisms are unknown, but the description of the course of events happens in a way that can only be explained by positional information. Therefore, scientists talk about evidence of positional information (15).

This also counts for the nerve system, i.e., since Hydras nerve net apparently does not have any superior structures, and a new-formed Hydra quickly begins to search for its food, we propose that its movements- and behavioural-patterns may come from the biological system through the same positional information as the one that gives its body its form. It seems reasonable to think that positional information plays a similar role in the development of all nerve systems, since simple mechanisms usually are the fundament for development of the more complicated ones through the evolution.

Morphogenesis operates through complex epigenesis

First, the zygote is created. This proliferates to an amount of cells. These organize mutually and are now able to organize the embryo, when the information as a pattern is carried on to the embryos whole from the inner levels through the information-transformed interactions. The size of the embryo puts (through the amount of cells and other things) a natural limit for the manifestation of information.

Gradually, as the embryo grows, the patterns are supplied so the patterns of information that fit the actual pattern of the embryo are manifested through interaction. When the embryo takes a new structure, new patterns that fit with the embryo can be adapted and so forth. In this way, all patterns are supplied, gradually as it is possible, and the organism expands to more and more complex phases of its biological program.

This can be understood as a dissipative process that spreads the complexity out through the levels of the biological system. The direction in time of the development has been one of the biggest theoretical biological enigmas through time. Why does the morphogenesis never pace backwards? All physical equations (but the thermo dynamic, dissipative ones) can be reversed: A dissipative process in the information, a degeneration, a decay. Even if we observe the opposite, that something very simple as a fertilized egg develops to something very complex, the description of the morphogenesis through information-transmitting self-organization makes sense.

This is the case because a dissipative process expands from the finer innermost to the coarse outermost levels through a dispersal of the complexity. Information-directed self-organization of elements, which themselves are formed through information-directed self-organization, can be called complex epigenesis. The transfer of new information demands the organization that earlier information transformation has resulted in. The real strength of the complex epigenesis is that it allows some patterns of information to enter into the organelles, cells and supra-cellular organizations. This is done in a way so these patterns of information – even if they are represented together at the finer levels – can be recruited independent of each

other anyway. This happens through similarity between structures and patterns of information.

So an extremely complex organism through the morphogenesis can fold out in a pattern that is extremely reproducible and firm. Information transformation interactions in biological patterns may be connected to biological system's ability to utilize a characteristic of the matter that is not normally noticed in the biological systems (compare – modern physical disciplines as the chaos theory) (24). Throughout the evolution, this nature phenomenon has been cultivated and used. So maybe it is reasonable to suppose that this has made life possible and derived the evolution by mastering the conditions of information in biological systems. Biological coherence giving rise to information transmitting biological interactions are a rather unexpected and seemingly fundamental phenomenon of living nature.

Chinese box system

The description of positional information is very different from an ordinary molecular system description, because it involves that the information exists as roomy extended patterns that are able to interact locally with the different parts. This means that the cells can orient themselves according to the positional information and the other way around. The positional information should be able to read the position of the cells and correct this if the embryo is disturbed in its growth, as we can see through regeneration. Consequently, we propose the existence of information-transmitted interactions between the superior level, and the parts that make this level:

The whole body contra the tissue systems, these contra organs and these contra cells, etc. The organization between cells is never tighter than needed. In the same way, the supra-cellular levels are very badly organized. But the organs as well as the organisms' whole, on the other hand, are extremely nicely formed. This again shows the existence of information-directed self-organization on the highest levels of organization. The imaginable disk and the transmutations show that positional information in insects comes in packages that are only possible to be used in its whole. The regeneration in Hydra, seemingly, shows that the positional information that specifies the form is also responsible for the supply of information to the nerve system. In amphibians, new positional information through the development is organized in a way as a kind of Chinese box system of morphological fields created inside each other. In this way, the superior levels keep specifying the lower ones. In our model, this corresponds to the existence of information-transmitting interactions between the different levels of the embryo.

The induction trials shows that the tissues represent the positional information on a supra-cellular level and that information transmitted interactions between tissues of the same level with individual, positional information seems to be a decisive trait of the morphogenesis. Seemingly, morphogenesis cannot be understood neither as pre-formation nor as epigenesis (25), but if we regard it as complex epigenesis using information-directed self-organization, it seems that we actually can understand it. The information-directed self-organization implies that all information to the organism (eventually except the structure of the small molecules) that is absorbed by the organism has to be present in the biological system – and evidently on fine, interior levels of the Chinese box system. We therefore conclude that the biological system can be described as a Chinese box system of information transmitting interactions (1).

Through the ontogenesis and the morphogenesis of the cell and the supra-cellular levels, the information of the biological system can manifest itself, as described in another paper (1) and this chapter, through positional information.

Criticism of our ideas

Professor Claus Emmeche has given his comments on our discussion of the morphogenesis in the chapters describing the ontogenesis (Claus Emmeche, 1989, personal contact), and below we will discuss these in the light of our hypothesis. He comments on the idea that the same force coordinates all levels of organization in biological systems in an ordered fractal manner by describing a very busy day concerning Christmas shopping. He describes different levels of organization as: movements between people on the shopping street; movement of the arms holding out for different things; movement of the fingers holding out for the purse and the money in it. He thinks that this hardly involves that the coordinated ordered organization at a specific level should be dependent of the organization of the underlying level. We do not agree with this.

Firstly, the body, arms, fingers movements, as a riverbank where it is possible to move deeper and deeper into finer and finer structures, describes a kind of fractal level. Seemingly, the patterns of the single levels could be chaotic compared to each other. But if we compare with the butterfly effect, where lots of levels are involved from the butterfly itself to huge hurricanes, seen in the light of Henry Feigenbaum's chaos theory, the result of the most disordered turbulence shows up to be very ordered, and the organization of the butterflies' movements are well coordinated with the turbulent movements of the hurricane – the hurricane's movements depend on the movements of the butterfly.

So, it is hardly current to establish the absence of coordinated order and organization in biological systems (any systems) from this. If the organization of the different levels seems chaotic compared to each other, it could very well be a consequence of comparing the levels in the wrong perspective. He also criticizes the assumption that an early transfer of information to the cytoskeleton may take place. He thinks that the cytoskeleton could be self-organized instead. In our analysis, something global and "intelligent" has to deliver the information that mediates the dynamic organization of the cytoskeleton for the cell to move coordinated. The information needed is more than the chemistry of the cytoplasm can create itself. We believe that the ontogenesis demands a large amount of information; Claus Emmeche argues that this is a problematic view (Claus Emmeche, 1989, personal contact). The problem is more how the information is delivered to the cells than how many bits of information can be compressed with a smart compressing algorithm.

Conclusion

Our model describes the biological system as a Chinese box model of information transmitting interactions. The whole organism in parallel with the gradual development of the complexity is able to go through a radical reorganization of structure on all levels. At tissue level, information can be found in a way where one complete structure replaces another, each

corresponding to a morphogene field. We think, e.g., Hydra makes up a morphogene field organized by positional information that generally is accessible before and after completion of the morphogenesis.

The morphogenetic development can be explained as transfer of information through positional information that is read by the cells and their axons and dendrites, but it is not yet understood what mechanism leads axons through this development. However, much perception and behaviour are embedded in the biological information, indicating that the representation exists as functional patterns in the brain but generally not as “epigenetic factors.” We conclude that the excrescence of axons only can be described by positional information. This means that the information to the organization is organized according to the position in the developing organism. We think that positional information plays a similar role in development of all nerve systems, since simple mechanisms usually are fundamental for development of more complex ones through the evolution.

The information from the genes is manifested in a way so the cells are able to read their positions in the wholeness of the structures and differentiate in a way so superior patterns, as, e.g., a finger or a wing, can be formed. We think such development can only be explained by positional information. Such information causes information-directed self-organization of elements, which themselves are formed through information-directed self-organization, etc. Such development where transfer of new information demands the organization that earlier information transformation has resulted in what we call complex epigenesis. The strength of the complex epigenesis is that it allows some patterns of information to enter into the organelles, cells and supra-cellular organizations.

Biological coherence giving rise to information transmitting biological interactions are a rather unexpected and seemingly fundamental phenomenon of living nature. We must therefore conclude that the biological system can be described as a Chinese box system of information-transmitting interactions, where the biological system is able to develop its form and maintain this throughout life. In spite of injuries, this expanded system of information-transmitting interactions can always adjust all the parts of the organism in condition to each other and the fundamental building plane. All the levels interact with each other, and the parts of each level interact, mutually. Thereby, morphological information from the finely divided levels in the cells can manage to be in force at the superior levels. On the other hand, the information from the superior levels, of course, may reach through the levels and control the cell behaviour, and thereby be able to regulate the gene expression.

All these can be collected in the following description: Through the vertebrate morphogenesis, a Chinese box system of morphological fields is established. Here, the information-transmitting interactions between the levels and the single parts of the same level gives an enormous dynamic system that is able to convey the information of the biological system and maintain its form throughout the life. The uninterrupted morphogenesis shows the potentials of the biological systems. The experimentally disturbed morphogenesis shows the compensational dynamics of the biological informational system (the informational redundancy). When we review the phenomena of regeneration and induction of Hydra and amphibians, and the higher animal's informational needs for developing their complex nervous systems, we argue – also building on the NO-GO theorem for ontogenesis as chemistry (2) – that the traditional chemical explanations of high-level informational events in ontogenesis like transmutation, regeneration, and induction are most insufficient. We have analyzed the informational dynamics of three embryonic compensatory reactions to different

types of disturbances: 1) Transmutations of the imaginal disks of insects. 2) Regeneration after removal of embryonic tissue. 3) Embryonic induction, where two tissues that normally are separated experimentally are made to influence each other.

We found morphogenesis to be best described as a complex bifurcation, and the resulting many morphological levels of the organism as organized in a fractal manner and supported by positional information organized. We suggest that some kind of real non-chemical phenomena must be taking form in living organisms as an information-carrying dynamic fractal, causing morphogenesis and supporting the organism's morphology through time. We argue that only such a phenomenon that provides information-directed self-organization to the organism is able to explain the observed dynamic distribution of biological information through morphogenesis and the organism's ability to rejuvenation and healing.

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A spiral fractal model of fine structure of physical energy could explain central aspects of biological information, biological organization and biological creativity

Is it possible for man to understand G_d? Is it possible for us to describe the creative energy that made life, man, all animals and plants, the planets and the universe as a whole? Can we comprehend this? Is it humanly possible to conceive such a thing? We think we can try to get close. Poets have taught us this for millennia. If you can love and dream and open your poetic heart, you can understand everything. Just think of the Saint-Exupéry's book *The Little Prince*. The whole world is explained.

Great saints and mystics have talked about direct experiences of the creative force, the emptiness or Sunya, or the Cosmic Eagle from Castaneda's books on Don Juan. So we have many people telling us that the creative energy of the world can be seen. So many users of Mescaline (Huxley, Leary), LSD (Hoffman, Grof), Ayuhuasca (Luna, White), and Magic Mushrooms (Castaneda) have shared their experiences of this with us. All of these people tell us that the experience of the creator is just a trip away. The same goes for Gurus like Gandhi, Maharishi, Maharishi, Osho and others – it is just a meditation away.

If you are deeply into science, you are probably a sensible person and not likely to blow your mind away with 500 micrograms of LSD (with this said, we know that great many academics use drugs for expanding their mental capacities, as is well known). You will not spend your Saturday night going into trance on ecstasy (MDMA) either, as millions of young people do. But you might have great sex and experience the creative energy of the universe this way (Google "sexual tantra" for some exercises if you are interested). Osho always said that for Western people, sex is the fastest way to realise God. There might be a truth in that. Or, you might be deeply involved with nature or with art, so that you get revelations of the deeper truth from this. If you do, you will know what this chapter is about. It is about sensing the hidden patterns behind reality. It is about intuiting a secrete order of the universe that cannot be seen directly with our eyes and senses. It is about using yourself as the probe, probing into the inner nature of the universe, to really understand what is going on in life.

We tell you that this can be done. And more than that: You need to do it if you want to be a great healer. In consciousness-based medicine, you need to be conscious, you need to be awake. You need to be part of the universe, you need to be coherent and present. And wise. So we challenge you: You might be able to go there directly, just by understanding how the universe is built. We will share our understanding with you. We pray that this is enough to open your third eye, your ESP, your intuition into the energetic level of reality, where your body lives.

We encourage you to meet your body, on its own terms. Go into its world. Dive into reality. Get out of your mind. Wake up. Be crazy and imaginative. Trust your instincts of knowledge. It is time to understand reality on a bodily level and learn to heal. To meet reality on this level is what this chapter is for.

In this chapter, we have made a draft of a physical fractal essence of the universe, a sketch of a new cosmology, which we believe to be at the root of our new holistic biological paradigm. We present the fractal roomy spiralled structures and the energy-rich dancing “infinite strings” or lines of the universe that our hypothesis is based upon. The geometric language of this cosmology is symbolic and both pre-mathematical and prephilosophical. The symbols are both text and figures, and using these, we step by step explain the new model that at least to some extent is able to explain the complex informational system behind morphogenesis, ontogenesis, regeneration and healing. We suggest that it is from this highly dynamic spiralled structure that organization of cells, organs, and the wholeness of the human being, including consciousness, emerge. The model of “dancing fractal spirals” carries many similarities to pre-modern cultures’ descriptions of the energy of the life and universe. Examples are the Native American shamanistic descriptions of their perception of energy and the old Indian Yogis descriptions of the life-energy within the body and outside. Similar ideas of energy and matter are found in the modern superstring theories. The model of the informational system of the organism gives new meaning to Bateson’s definition of information: “A difference that makes a difference,” and indicates how information-directed self-organization can exist on high structural levels in living organisms, giving birth to their subjectivity and consciousness.

Introduction

In previous chapters, we have seen how it is possible to put up a general model for information in biological systems. The model shows how exchange of information between elements on each level of the organism, and between these levels to a large extent, can describe how information flows to give information-directed self-organization at all levels of the organism and even of the supra-organismic level of the living realm. The problem is, as we also have seen, that we cannot explain this phenomenon with any known principle from either the chemical or the physical sciences.

That gives us a great dilemma as what to believe. Either we hesitate and look for our mistake – and we have done that for years actually – or we step courageously forward to identify the new and undiscovered phenomenon – a new unseen and unknown structure of the universe – that allows life to carry, store, recall, and exchange information. Let us for a moment consider what information is: “A difference that makes a difference,” as Bateson

wisely put it (1) can maybe give us a fine idea. How can this be done? Only if there is receptivity in the system, a key point where a very small energy can make a very large difference.

We know this principle from the “Butterfly effect” in chaotic systems: the beat of a butterfly’s wing creates a cyclone in America. Most of us do not believe that it actually was the butterfly that did disturb the weather systems. The butterfly effect is an interesting phenomenon mostly met in the computer-calculated world, where iterations allow a little lack of precision to be very disturbing a moment later. In life, this is not seen either. You can almost stir the early embryo with a spoon without causing any noticeable difference. So living organisms are normally not perceptible for disturbances, but the question is: what is providing the information that gives all that structural stability? Let us suggest that all the particles of a cell through many levels of interaction join into one large energetically, highly structured system, and that what happens at the top level of this “global cell field” determines what happens everywhere in the cell – that means the cell is using “top down control.”

What we need is to give a model for the structure of the collective field, presumably of quantum nature. It needs to be a model that can be visualized to make sense (2). Highly complicated math will not help us much here, since we need something to see and understand. This is therefore the effort of this chapter: to present the first draft of such a fine structure of the physical energy. It should be able to control the local activities of the proteins through the delivery of a tiny energy that tips the balance between two states with a different profile of activity (cp. Bateson’s concept of information (1)); it should be able to store this information, it should be able to pack and carry it, to recall it and to exchange it with other cells in an organism, to create multicellular order.

The model does not yet exist

We were not able to find such a phenomenon described in natural scientists’ libraries. We found a lot of mathematical structures with fractals as the structure that looked the most “biological,” but they were often quite static and did not provide us with the dynamic properties needed for a structural informational backbone of a living cell. We (SV) went to the mathematicians at the University of Copenhagen, but they could not really help. Holger Bech Nielsen knew of some structures with a slight resemblance to what we needed (called Peano curves), but they were not dynamic in three dimensions. We ended up drawing hundreds of different geometrical patterns, until one day, we come up with the spiral fractal, which we present as a first solution. To some extent, our multidimensional spiral-fractal model seems to be able to explain the informational system for the organization of cells, organs and the whole being.

It seems to be able to explain central aspects of morphogenesis, ontogenesis, and consciousness of an individual. In addition to this, we believe it is also able to explain important dimensions of evolution (3), the organization of higher biological levels, such as social activity in the family, communities, whole cultures and eco systems. It does not explain everything – it is not perfect – but we believe it is a start. So please take into consideration that what we present here is ongoing research, which from our side has been going on for nearly 20 years. The reason we present it now is that we really believe that we have found something important, although the issue in its complexity in many ways is too much of a

mouthful for our small research institute. We definitely need a huge international cooperation to really face this challenge in a formal and strict scientific manner.

But one reason to publish it was that similar structural descriptions of energy of life and energy of the universe has been collected by anthropologists interviewing shamans from many pre-modern cultures on their concepts of life-energy and universal energy (4,5,6). Some modern experimental cosmologies also contain a concept of dynamic spirals (7). What we found and what we continue to find surprising is that a simple geometrical “breaking up of the space-time” as the one we are proposing here, can “explain” complicated biological phenomena like enzymatic activity, cellular order, awareness, memory, and consciousness. The model we propose here is based on fractal spacious structures and bears many resemblances to the small energetic strings of modern physics (compare the superstrings (8)).

We find it to some extent able to explain the distribution of information to organize the different levels and events of the morphogenesis. It is very good to explain the spontaneous self-organization of societies and ecosystems, and it can explain how the planet is one living organism (cp. The Gaia-hypothesis (9)) and the level of collective consciousness (4). That is, if you are willing to accept a “hint from a symbolic presentation” as an explanation. The reason why we accept it is that it makes so much sense, and, after all, it allows us not only to explain the structure and functioning of the living but also diseases and healing. It actually allows us to believe in very complex phenomena like human adult metamorphosis, as we shall see in the following chapters.

A general model for information in biological systems

The dimensions of space are characterized by giving degrees of freedom to a system. By thinking abstractly, we can imagine these freedom-degrees of dimensions, and a new, more elastic interpretation of reality is quite conceivable to give more degrees of freedom than our well-known three-dimensional space allows. Figure 1 gives a proposal for such an organization of the space, from three dimensions to an infinite amount of “pseudo-dimensions” (not perceptionally accessible dimensions).

A spiral-fractal through its participation on many levels gives a big amount of curvilinear dimensions inside each other. Each of the curvilinear dimensions has the freedom to contain its own patterns or organizations. However, these are mutually subjected to interactions from the patterns on the other levels – the curvilinear dimensions on the upper and lower levels.

Without computer implementing of the geometry, it is not clear whether the curvilinear dimensions in the spiral fractals have these interacting qualities. If this is not the case, the geometry has to be adapted. However, it seems reasonable that the same power that organizes the spiral-fractal should also be capable of distributing all patterns evenly through the levels of the fractal in such a way that the fractal is realized. This could be called the fractal power of the system. This power may be opposed by the fundamental, structural differences existing on the system’s different levels.

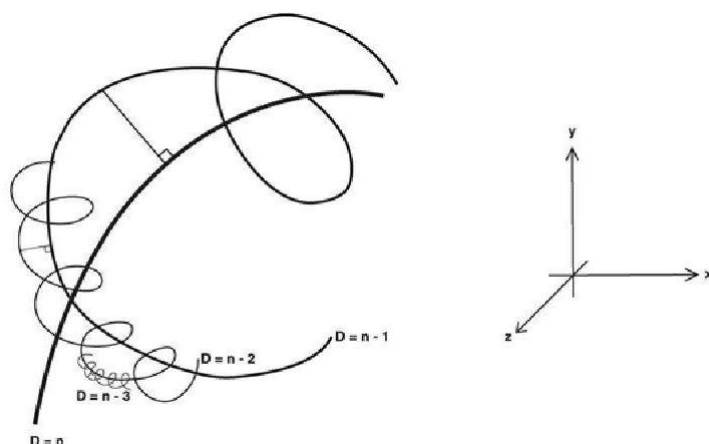


Figure 1ab. Shows a breakdown of the three-dimensional space into an infinite number of curvilinear pseudo-dimensions. (A) Different fractal dimensions. (B) 3-D dimensions. D = Dimensions. $n-1$, $n-2$, $n-3$ illustrates the different levels of dimensions.

In this way, the organization of particles to atoms, and atoms to molecules, organelles, cells, etc....to organisms is equivalent to each isolated level of the fractal. The elements of this, also if they have a high degree of individualism caused by information-directed self-organization that acts on each level – this is called a complex epigenesis. Epigenesis is the developmental process where each successive stage of normal development is built up on the foundations created by the preceding stages of development; an embryo is built up from a zygote, a seedling from an embryo, and so on. Ontogenetic development according to epigenesis is a process of increasing complexity. This contrasts with preformationism, where the organism is already present in the gamete(s), merely growing and unfolding during development.

It does not clearly appear what riches of patterns an expansion of the fractal geometry to three dimensions can involve. But, if the geometry does not involve an expansion in the amount of patterns that exceeds the two-dimensional Mandelbrot-fractal selection, and underscore the four-dimensional Mandelbrot-fractal selection, this three-dimensional fractal geometry has to be changed. The work represented here may not be thought of as a complete answer on the structure of the reality and the problems of the biology but only as an attempt to establish a completely new interdisciplinary paradigm capable of explaining a lot of unanswered questions.

Energy, information, and matter

In the rational-mechanical interpretation of reality, the starting point is matter represented by a particle. But in the energetic-informational interpretation of reality, matter is distributed all along the spiral fractal. In this interpretation, matter does not exist in a well-defined way as particles but only as interacting organizations in the curvilinear dimensions: manifestations of energy and information. The simplest way to represent energy in the system is a consequence of destructive and constructive interference between the windings of the spiral. Destructive

interference corresponds to annulment of the non-matter basic polarization, and constructive interference corresponds to an increase of the polarization (see Figure 2).

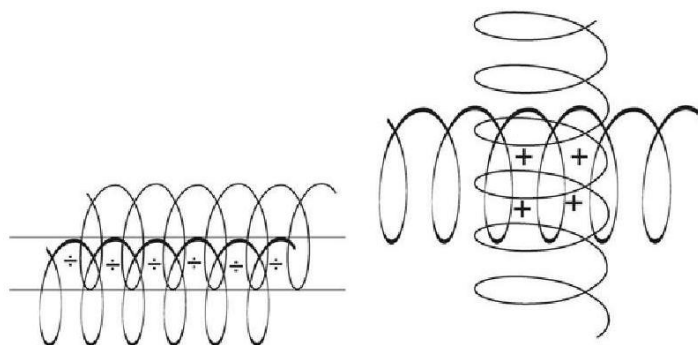


Figure 2ab. This Figure illustrates that the simplest way to represent energy in the fractal system is a by destructive and constructive interference between the windings of the fractal spirals. Destructive interference (minus) corresponds to annulment of the nonmatter basic polarization, and constructive (plus) interference corresponds to an increase of the polarization. (A) Destructive and (B) Constructive interference.



Figure 3. Particles are shown as standing waves and as stable vibrations that can be converted. An apparent particle at level n is stable oscillations at level $n-1$.

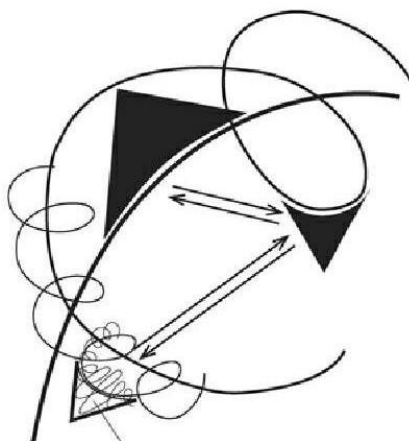


Figure 4. Illustration of information-transmitting interactions. Interactions (arrows) are transferred between elements of same level and between different levels (“the information-transferring power of the fractal”).

Information is found as patterns are established by the storage in stable configurations or is moved as patterns between windings at the same level or up and down the dimensions. Particles may be formed by very stable configurations, in spirals that seem to be able to close

itself in a circle; at a finer level, they are simply complex oscillations around an average point (see Figure 3). Systems of this type can presumably be constructed in a way where patterns by means of interactions can be transferred between elements at the same level and between different levels (see Figure 4). The particles belonging to such a system will organize themselves according to their inner structure and spontaneously recreate the spiral fractal, when other forces do not hinder it (see Figure 5). This is because of their inherent lack of an independent, particular existence and their fluid nature.

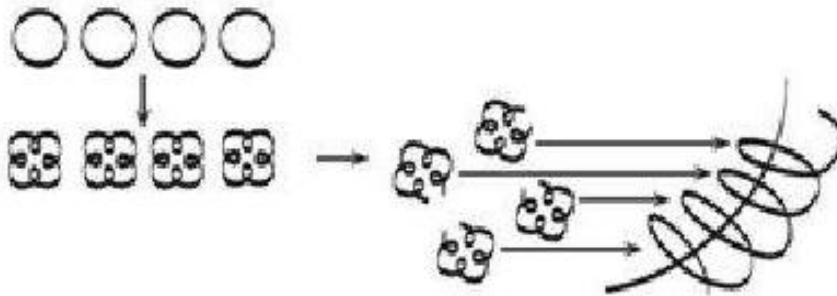


Figure 5. Self-organization of “particles” in the pattern of spiral fractals.

In the spiral-fractal, time exists as dynamic patterns only. One could imagine impulses (information patterns) travelling within the fractal (around in a level or up and down through the levels) and returning with definite time intervals, giving rise to chronometers and energetic watches. We think such an energetic mechanism seems more reasonable than molecular mechanism.

Discussion

The model presented should not be thought of as an attempt to provide a definite answer to the problems of biology and the structure of reality but as an attempt to establish a new interdisciplinary direction of research that epistemologically seems fertile. Of course, there is a long journey from this energetic-informational interpretation to a closely reasoned account of the mechanisms behind the natural forces and the information-transmitting interactions.

But it is very likely that a more complex breakdown of reality can explain both the information-transmitting interactions and the natural forces as specific patterns of energy and information. If this is the case, it could constitute the fundament of our complex, functional reality. And yet, we as human beings possibly have to accept that the heart of reality evades description. In this case, understanding the world through to the emotional interpretation of reality might be the only way to real knowledge of the world.

Conclusion

Our model represents a holistic paradigm based on dynamic spiral-fractal spacious information-carrying structures. The parts of the spiral can be compared to small energetic

strings (presumably comparable to superstrings) able to explain the distribution of information necessary for the organization of the different levels of the organism during the morphogenesis and also the higher levels of social reality from relations between biological individuals to small and large societies.

If the spiral fractal is really the backbone of the world, even black matter of the universe and the structure of the galaxies can be held by huge super-spirals penetrating the void of the physical universe. We speculate and dream, and hopefully this work will inspire other researchers and poets to speculate and dream as well, and one day we will have dreamt a new solution to the mysteries that have puzzled man for millennium.

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Exercise

- [1] Find your way to meet God or the deeper structure of the universe. If you are a Buddhist, you will find the creative emptiness Sunya(ta). Use whatever is right for you: Poetry, sex, art, literature, drugs, meditation, dance, nature... Just go there. Don't wait. It is time.
- [2] Don't doubt when you have found it, but use your new insight to heal. Being present in reality makes you a great healer just with your presence. Just witness your impact. Don't doubt that you can give your gift.



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A theory of “deep” quantum chemistry and cell consciousness

Only if you did the exercises from last chapter, or you did not do them because it was not necessary for you, are you ready for this chapter. Without a personal experience of the creative energies of the universe, without some awareness in the level of reality in which your body exists, it might be difficult to intuit what this is about. If your brain-mind is very smart, you might be able to follow our arguments. But to use what we are telling you in this chapter, you need to feel the truth.

Deep quantum chemistry is a theory of deeply structured quantum fields carrying the biological information of the cell, making it able to remember, intend, represent the inner and outer world for comparison, understand what it “sees,” and make choices on its structure, form, behaviour and division.

We suggest that deep quantum chemistry gives the cell consciousness and all the qualities and abilities related to consciousness. We use geometric symbolism, which is a pre-mathematical and philosophical approach to problems that cannot yet be handled mathematically.

Using Occam’s razor, we have started with the simplest model that works; we presume this to be a many-dimensional, spiral fractal.

We suggest that all the electrons of the large biological molecules’ orbitals make one huge “cell-orbital,” which is structured according to the spiral fractal nature of quantum fields. Consciousness of single cells, multi-cellular structures as, e.g., organs, multicellular organisms and multi-individual colonies (like ants) and human societies, can thus be explained by deep quantum chemistry.

When biochemical activity is strictly controlled by the quantum-mechanical super-orbital of the cell, this orbital can deliver energetic quanta as biological information, distributed through many fractal levels of the cell to guide form and behaviour of an individual single or a multicellular organism.

The top level of information is the consciousness of the cell or organism, which controls all the biochemical processes. By this speculative work, inspired by Penrose and Hameroff, we hope to inspire other researchers to formulate stricter and mathematically correct hypothesis on the complex and coherence nature of matter, life and consciousness.

Introduction

”The hard problem” in biology, medicine and psychobiology is the problem of the connection between subjective and objective factors in life: how can a super-advanced, chemical machine like our body give us a conscious state? So, what is chemistry, and what is consciousness, and can these two ever meet? Recently, many researchers, for example the team of Penrose and Hameroff being one of the most successful (1-4), made suggestions based on quantum mechanics, as this branch of physics has many of the qualities that are needed for a theory of consciousness, coherence and non-locality being among the most important.

Penrose and Hameroff think that the coherent molecule orbitals of the microtubules and other inter- and extracellular fibres, including the links from cell to cell of these fibres, are what is needed to give the cell consciousness. The idea we are going to present in this chapter about human development is closely related to the Penrose-Hameroff idea. We use what we see as a holistic approach wanting to integrate all the large molecule orbitals of the cells molecules not only the large fibres. The reason why we think this is a more constructive approach is that we want to make the consciousness of the cell continuous with all events in the cell; we want the consciousness to be connected to global information of the cell, and we want cell-consciousness to give the cell the properties of choice – the choice of moving in a direction, taking a form and size, differentiate, divide, etc.

We simply regard the cell as a complete little animal, and we want it to perceive and “think” very much as we are able to do it ourselves as human beings. The reason that we insist on such a weird idea is that we see the cell as carrying 99% of the complexity of the large animal; therefore, we would love the cell also to provide 99% of the reason why we are conscious and feeling, why we can perceive the colour red and other qualia, and why we can intuit our world. The cell is not responsible for our complicated interpretation of reality though our brain, but the colony of cells at large is responsible for the interpretation of the world, not the brain itself, as we have discussed it in our theory of the brain (5,6). So we need a really smart cell to be able to explain what is going on, and we need something very creative and ingenious to explain cell intent, cell memory and all the other things we need to understand before we will feel satisfied with our theory of holistic biology for holistic medicine. Consciousness is a term that has been kept as a huge biological enigma in scientific history. In this chapter, we will try to come up with a qualified guess of what consciousness is, using traditionally biological terms to explain the connections that lead to consciousness.

We will discuss the term from the gene’s capability of keeping life going in an interaction with proteins, macromolecules, and quantum chemical equilibriums. Scientists and religious thinkers have discussed the term consciousness in many forums. Seen in a religious perspective, consciousness has been supplied with a kind of spiritual body that the traditional thinking scientist rejects without discussion. By this chapter, we try to build a bridge between these two different kinds of thinking and to describe consciousness as an integrated capability of the universe that is shared out to each single biological individual at the creation of it. And we do this by describing the consciousness as a function of quantum mechanical activity working in a kind of “symbiosis” by controlling the genetic and biochemical functions that is necessary for a cell or an organism to survive. This “symbiosis,” that gives an organism the capability to “feel” the outer world, we call the consciousness.

We describe this as a function that has progressed through evolution and has been more and more “conscious” with the expansion of the complexity in biological organisms, which in the end has led to the human consciousness that has been capable of developing the industrialized world. We have already described the fractal geometry (7) and the super orbitals (7).

In this chapter, we will look closer at the biochemical activity that leads to the control of master genes, cell volume control, cell proliferation, cell movements, cell communication, cell interactions, etc., to be able to understand the term of cell consciousness, collectively cell consciousness (e.g., organ and tissue consciousness), and consciousness of a complete multicellular individual.

From active proteins to energized global electron orbitals

Most of the proteins of the cell use ATP (Adenosine triphosphate) to do their job. When ATP is broken down to ADP and P, a protein is statistically forced into one allosteric shape with the protein’s typical power. When it switches back and releases its built-in energy, it must be recharged to work again. In this way, the proteins are “paid” to dance, and the dance is typically a thing that happens in the molecule orbital, like proton pumping. The cell itself produces the ATP necessary for the cell function. ATP is produced by ATP-synthesis imbedded in the cell surface and through the energetic metabolism in the mitochondrion. This circular quantum chemical self-production of energy thereby, makes the cell able to control its own life cycles by just getting food and liquid supply from outside, like a multi-cellular organism that functions like a complete body symbiosis.

The connection between energetic supply from outside and quantum mechanical activity can best be illustrated by using the plants photosynthesis as a model. In plants, the sun delivers the energy that is absorbed by photo pigments. Such pigments can have a lot of different colours, e.g., red, green, yellow, blue. Each colour represents a specific energetic quantum corresponding to an excited electron in a specific orbit. In this way, the plant by itself can decide the exactly quantum of energy suitable for its needs. The excited electrons then are further transported by cofactors in a process that ends up in creating nutrients for the survival of the plant.

Such kind of “cyclic” quantum chemical activity guiding both the energetic building up and breaking down activities of the cell, where the cell gets its nutrients from outside and then manifests all its functions through quantum mechanical activity, is very equivalent to the function of a higher multi-cellular organism and emphasizes the whole idea in our way to think. If the molecular orbital is connected to a higher system, this system could be energized, through the activity of co-enzymes, as well in these movements allowing the super-orbital of the cell to manage energy that can be used to control the dance of other proteins.

There are many ligands modifying the activity of active proteins, and these ligands are more active or more passive as their form shifts; a system that can control the protein activity and the likelihood that a protein is in a specific allosteric configuration is then controlling the activity of the cell. The dance of the co-factors and the proteins gives much energy to the collective electron orbital; the problem is how information is handled in it. As we discussed in the chapter on the cell (8), all its molecules combine to supra-molecular structures; these are

often large protein molecules with extremely complex molecule orbitals (highly structured clouds of the electrons of the molecule).

Interestingly, these patterns are known to be unstable; most proteins are either catalytic enzymes or structural “building block” proteins, and they exist in several forms or states, often at least one active and one passive state. So basically, life is regulated through the regulation of its proteins. And the proteins are all the time changing their state because of the heat-vibrations, so a small change in the likelihood for one state of the protein at one location in the cell is really what we are looking for. As we are here deeply into quantum chemistry and nobody yet have been able to calculate what is happening at these levels, all we can do is guess.

“Deep” quantum chemistry

It is well known from quantum mechanics that all electrons that are contained in one system are inseparable from each other. In a metal, this gives the quality of an “electron gas” responsible for the metallic quality. In water, the thermal movements of the water molecules disrupts so much that the collective qualities of the electrons are almost lost. In a cell, the cytoplasm is a gel made of about 40% proteins, and the structure of this gel is very much like a liquid crystal; there are collective properties of the electrons, but they are difficult to identify and map.

The reason why collective properties of electrons in large molecules like proteins and protein ensembles have been difficult to explore is the difficulty describing the collective high-level quantum chemical phenomena mathematically. Actually, calculating the collective behaviour of the electrons in molecules much larger than water has been almost impossible. Our approach was mathematical in the beginning, then more symbolic geometrical, as it is today. Geometric symbolism is a pre-mathematical and philosophical approach to problems that cannot be handled mathematically (at this moment).

What we have done is to guess on the “natural” and neutral structure of electrons, if nothing disturbed them. In metal, we have the crystal grid and the nuclei to cause severe disturbances of the energetic pattern a gas of completely free electrons would take. In water, we have the water molecules disturbing the pattern. In plasma, we actually see very much the same patterns as in a free gas of electrons, but strong magnetic fields necessary to hold the plasma always give a strong artificial structure of the electron gas, and the density from liquidized nuclei also gives some deviation from a gas of free electrons. So the way we proceed is simply to guess that the pattern of the free electrons is able to give the cell its non-local qualities. The cell needs, as we have seen, to have a system that provides information in a dispersed non-local way.

And the only place in physics we can hope to find such a phenomenon is in quantum mechanics. Quantum mechanics also got irrational numbers (i) in its formalism (9), the same number that is a part of the mathematical structure of some of the really deep fractals like the Mandelbrot fractal. Therefore, we are drawn to quantum mechanics; but the normally used formalisms of quantum mechanics do not have a structure usable for explaining living systems. So we need to find a mathematical or a symbolic geometrical language, which are both compatible with the structure of quantum mechanics and with the structure of life. Such a theory needs to be a “hidden variable” theory (10) as there must be some hidden layers and

structures there. Using Occam’s razor, we must start with the simplest model that works; we suspect this to be the spiral fractal (7).

So in this chapter, we investigate some of the features of cells that can be explained if we presume that: all the electrons of the molecular orbitals of all the protein molecules and co-enzymes of the cell, including all the many small molecules embedded in these large biomolecules, and co-factors transporting electrons in the mitochondrion and mediating the photosynthesis in plants are making up one huge structure (“a cell-orbital”), which in its structure is as close to the neutral spiral fractal as possible, as this is the structure that the electron field would take if nothing were disturbing it.

Dissipative structures

A simple suggestion is by dissipative structures, which are self-organizing patterns arising in systems with a high e-flux. The problem with such patterns is that if they are to be used by biology, it must be possible to build on them to make the structure of the cell form and develop. Unfortunately, all dissipative structures are bound by the lack of precision of thermal processes like Brown’s movements. So they are not precise enough to build on, as the natural tendency is to lose structure and information according to the laws of thermodynamics. The patterns might be there, providing the cell with a lot of creativity and a whole “menu” of patterns for use for its internal structures and its external behaviours; but the cell still needs to be highly structured levels of information in the system to direct the use, enhancement and repression of such patterns.

Iterative generators and fractal patterns

As the cell is obviously structured by some kind of fractal principle (8), it would be nice to have a phenomenon giving such fractal structures. We know that more complicated fractals are made by iteration of a sometimes extremely simple formalism, like the Mandelbrot fractal. But what in the cell can give that? The spiral fractal needs some kind of walking impulse to function as a calculator, and if we presume that it sometimes collects this kind of impulse, or if it carries and does this in a self-reinforcing way, then we can have the spiral fractal generating all kinds of such patterns. The interesting thing of such patterns is that it really can be active at any level of detail, and in this way it can control all “local spots” in the cell, including the activity of all its protein molecules, and maybe even modify the quantum state of other, smaller molecules, like fat and sugar – and even the water of the cell.

What is cell consciousness in biochemical terms?

Cell consciousness is a very diffuse term that is hard to understand because we do not yet have a usable explanation for it. Here, we will try to explain the term from a biochemical point of view. To satisfy this term, we need to fulfill a number of factors. The cell itself has to function as a complete “symbiosis” including all functions happening in the cell itself

controlled from the quantum chemical super orbital. By changing conformation, lots of proteins, guided by the energetic quanta supplied from the super orbital, implement countless processes in the cell, leading to important cell functions like, e.g., volume control, control of cell cycle, control of cell proliferation, control of cell movement, etc., but maybe most important, control of master gene and master regulatory protein activity, necessary to support all these processes. It is the gathered quantum mechanical energies standing behind and very strictly controlling all this activity in a cell, gathered in a “super” functional energetic “symbiosis,” that we call cell consciousness.

What is collective consciousness and consciousness of a multicellular individual in biochemical terms?

In this chapter, we will expand the term consciousness also to count for collective consciousness. Such term can be explained through the activity of fractal geometry. Through the fractal geometry (7), it is possible to gain collective control over an amount of cells that are organized in a “social society” through the development of an organ. And again, the organs are organized in tissues through social activity that again organizes within a developing organism through embryogenesis and ontogenesis (8,11) forming a fully developed adult organism existing of all the body cells in one complete symbiosis. If we accept that energetic quanta (12) are supported by the quantum mechanical super orbital of the individual organisms (an organism, seen as, e.g., a cell, an organ, a tissue or a complete organism including all cells) to the structure of fractals, the term of collective consciousness can be explained by gathering all super orbital energy in the fractal structures, where the fractal structure is responsible for the distribution of the energy.

In this way, the energetic information (positional information) to organize the body structures as, e.g., organs, tissues, whole organisms (in the principles all structures up to complete universes), can be controlled through the fractal geometry. Simply, the energetic super orbital from a single cell represents one level of the fractal.

The super orbital energy from several cells delivers the information to the organization of an organ by gathering all super orbital energies from cells involved in the organ development, at the next level of the fractal and so on.

Each time a new cell enters into the organ through ontogenesis, the new cells super orbital energy is supplied to the fractal level responsible for delivering the information for the development of the specific organ.

This strengthens the united energy of the fractal level, gradually, as the complexity of the organism increases. This is going on until a complete adult individual has been developed, gathering all super orbital energies from the single body cells to one very strong super orbital, in humans giving the potential to human consciousness. Consciousness involves a lot more than this. All biochemical functions and activities in all the cells of the body are involved as described above for the single cell. Gaining collective consciousness in particular, the cell-to-cell protein interactions, hormonal and other ligands to protein interactions (cell communication) are important, as these factors are absolutely necessary for the cells of a body to communicate.

How is intercellular control gained by the single cell?

When a protein guided by the super orbital through strict energetic control change conformation, this causes multiple activity in the cell. Some of the most important processes are listed below.

Control of cell volume

A very important function for the single cell to gain control over itself and thereby to exist at all is its capability to control its own volume and to be able to regulate its balance of liquids. To gain this control, the cell needs energy delivered by the super orbital through co-enzyme transport and ATP. This energy is used for configuration changes of proteins as Protein Kinase C (PKC) that is placed in the cell membrane and causes transport of ions through the cell membrane (13).

Such function controls the gathered energy balance of the cell through ion balance and is, following the holistic paradigm, a part of the united amount of quantum mechanical energy that makes up the super orbital. Such transport happens also through channels shaped by proteins changing conformation through use of ATP (14). This means that the final energetic balance is a part of and strictly controlled by the super orbital.

Control of master genes and master regulatory proteins

How do the fractal positional information and the super orbital gain control with the DNA and the important proteins of the cell? The processes gaining control with the proteins DNA helicase and DNA topoisomerase control the unwinding and the super-coiling of DNA, respectively (14). These processes are essential for cell activity, because it is involved both in control of cell proliferation (described under) during DNA replication and the control of DNA transcription.

Transcription of DNA leads to production of proteins of which some again are involved in control of the DNA activity (master genes and master regulatory proteins). Such processes make up the “heart” of the living cell and are under strict control from the super orbital that supports exactly the right amount of energy to make a precise regulation of a cell’s DNA expression. This means that involved in this process, a strict control of ligands (master regulatory proteins) also have to be governed from the super orbital. This is a kind of “feedback” process, where genes produce ligands that control the DNA expression (14). Such processes are essential to gain consciousness, because DNA activity is necessary for production of new cells and, thereby, the creation of several new super orbitals.

Control of the cell cycle

The cell cycle is essential to gain control over the cell proliferation (14,15), and, thereby, the amount of cells participating in the formation of a multi-cellular body as, e.g., an organ, a

tissue or a complete body. This cycle is under strict genetic control and under strict control from master regulatory proteins as, e.g., the E-box controlling proteins (16). Following the holistic paradigm, these processes are again firmly controlled from the super orbital through control of protein configurations and support of ATP. This means that these processes are under stringent control from the consciousness.

Control of cell proliferation

Cell proliferation is a process that is firmly coupled to the cell cycle (14,15). These two processes together determine how many cells a multi-cellular organism shall contain. Cell proliferation includes processes such as control over the microtubule involved in separation of the chromosomes through cell proliferation, control over the split up of the cell membrane, the cytoplasm and the organelles, and control over the gathered cytoskeleton (15).

These processes have to be governed in a very precise and strict process, where everything following the holistic paradigm is guided through the super orbital that supports the precisely right amounts of energies necessary for these processes to take place. This means that this complicated cellular symbiosis is formed by lots of incredible precisely guided processes all necessary to gain cell consciousness through the production of new cells.

Control of cytoskeleton activity including cell movements

Cell movements (8) are a consequence of the ability to control the cytoskeleton. Control of the cytoskeleton is essential for the cell to gain contact with the extra-cellular world, as it is an important factor of the cell proliferation as mentioned above. The ability to move has evolved through evolution from the amoeba that crawls slowly and feels in which direction it will move (8), to cells as single cell algae that has developed flagella to control its movements (15). Control of such senses in the single organism and development of these capabilities through evolution are following the holistic paradigm under strict control from the super orbital and is a part of the gathered qualities that make the consciousness through quantum chemical activity.

How is intra-cellular control gained between cells and multicellular bodies? Control of cell communication through hormone and ligand activity

To gain collective control of a multicellular body as, e.g., an organ, a tissue or a complete multicellular organism, it is essential to be able to communicate between all cells participating in the formation of the body. To gain such control, we have already mentioned that the fractal organization of different fractal levels, where the energetic distribution of super orbitals is essential for our model to explain collectively cell communication. But this is not enough in itself.

Biochemical activity under strict control from the super orbitals of the single cells of the body, or from the super orbitals of the single bodies of a complete multicellular organism as,

e.g., the human body, is following the holistic paradigm, also essential to create a collective consciousness. Such intracellular communication is managed by genetic control through production of hormones and other ligands (15). Such proteins are secreted onto the extracellular liquids and distributed between cells. Hormones and other ligands bind to protein receptors of the outer cell surface, and change the conformation of these receptors (15).

Such activity entrepreneurs huge amounts of activity that both are involved in development (growth hormones), gene regulation, cell volume control, etc. (15). Such activities are essential to gain collective consciousness of a multicellular body and for multicellular bodies to gain collectively consciousness of a complete organism. In, e.g., humans, the complexity of the gathered super orbital is so powerful and strong that it has caused the development of “through” consciousness, leading to the creation of the industrialized world.

Control of cell communication through cell-to-cell adhesion

Another way for the cells to communicate directly with each other is through cell-to-cell adhesion (15). This involves protein interactions between proteins placed directly on the surface of the cell. In this way, the cells are gathered in everything from clusters of two cells to clusters of a huge amount of cells. This kind of communication also involves the change of conformation of the proteins involved in the cell-to-cell adhesions, and thereby the delivery of ATP energy governed from the super orbital of the single cell and from the gathered super orbital of the multicellular body. Such processes are also following the holistic paradigm, an important part of the collective body consciousness, and participate in the “gathered” consciousness of the complete multicellular organism.

The cell's representation of the world

It is well known that the cell is attentive towards both its interior and its exterior world (15). But how is it representing the world, and how is it interpreting what it “sees”? The spiral fractal gives a simple solution to the problem of representation; because the nature of the spiral is that it is like a spring that becomes vibrating in a specific pattern mirroring the phenomenon that impacted it. In this way, the spring's cellular level will mirror both its inner and outer world.

The cell's coherence

The mutual representation of cells makes cells cohere; they share a common reality, and the whole cellular system is sharing almost the same information. Of course small differences like being close to the organisms borders will give a little different clue to the cells that being in the middle.

The cell's remembering

Patterns wandering up and down the levels of the cell are a simple way to explain cell memory, both remembering and storing. The remembering is guided by an associative principle, as is the storage.

The cell's intent

Inherited patterns deeply embedded in the deep structure of the cells quantum field will serve as intent, giving a constant pressure on the cell to identify useful structures and situations and materializing the patterns corresponding to the inherited patterns. This is the simplest way to describe intent, it seems.

How the cell thinks

Now, can the cell think? Well, it seems that it can perform extremely complex calculations in the collective quantum field of all its electrons, judged from the symbolic geometry of the spiral fractal (7). If one imagines that the cell has an energetic impulse rotating in its border circle, then this walking impulse can be used for a kind of primitive thinking.

The cell's perception

Now, will the cell be conscious? It depends on how you define consciousness. If you define it as ability to represent and use the representation for making meaningful choices, you must ask if a global representation can be meaningful and if it can lead to choices. It seems from the symbolic geometry that the cell might even be very conscious and that it can make decisions.

The cell's choices (to take structure, form and size, move or stay, differentiate, and divide)

A choice must be taken whenever there are several options from which to chose. The cell will identify different possibilities that match its intents, and the preferred pattern must be picked. If all the “urges” of the cell are available through internal representation and all the possibilities of the external world are represented by external representation, it is very simple for the cell to make its choice. It can move or stay, it can divide or not, it can differentiate or not.

The collective consciousness of the cells

The deeply structured quantum field of a cell will resonate well with the quantum field of the other cells, giving the colony of cells collective consciousness. Higher order structures can then materialize in the colony making the cells building blocks of the organism. In the same way as the cell controlled its internal parts, the huge colony of cells making the organism is able to control all its organs and cells. The collective consciousness of the cell is the informational backbone of the organism, and the organism's consciousness raises at the top level of this highly ordered hierarchy.

Cell's morphogenesis

The spiral fractal and the deep quantum chemistry seem to provide the cell with many of its mysterious vital functions. It can remember and perceive, it can intent, make choices and move. This is what it takes for the cell to assume whatever forms necessary for itself and, if social, also to serve the colony it is a part of; by using these abilities in a community of cells, they can be responsible for morphogenesis of the whole organism.

Many cells have morphogenesis; if cells need to change their diet, they can change their internal body structure, building a completely new body with the same molecules as before (8). Interestingly, this also seems to demonstrate that cellular form is not a product of genes but of information bound to the “deep field” of the cell.

Metamorphosis

Metamorphosis seems to be the most difficult problem to explain: how can a colony of cells suddenly decide that they will shift the form of the total being? But if the morphogenesis is a part of the inherited memory, then metamorphosis will happen as soon as the possibilities of world and the collective consciousness of the organism's cells invites this to happen. All the cells will see that now is the time to materialize this more evolved pattern, and they will chose to go that way.

How is human consciousness gained?

We think that “Metamorphous Top down” evolution (17) has evolved through consciousness, but human consciousness has developed through “Metamorphous Top down” evolution. E-box master genes that govern the circadian clock feedback loop are essential for the process of metamorphosis in all organisms from cyanobacteria to humans (16).

This indicates that processes governed by the super orbital direct the process that stands behind metamorphosis in all organisms from bacteria to humans. Following the holistic paradigm, such genes and other master genes involved in metamorphosis are governed by the super orbital, and thereby that consciousness stands behind metamorphosis. But through evolution, individuals so complex as humans have gained such a huge and powerful gathered

super orbital that it has given the evolution the possibility to create the human consciousness through “Metamorphous Top down” evolution.

How can repressed and disturbed consciousness of man lead to disease and death?

All the activity described in this chapter so far gives the feeling of a very complicated and fine regulated mechanism, leading to the term of consciousness. But, how can all these finely tuned processes always lead to fitness and survival? The fact is that they do not. Not much mismatch is necessary for malfunctions to disturb the wholeness. How then can such malfunctions arise? We think that malfunctions leading to disease and death are created by errors in the distribution of orbital energy through the fractal levels, leading to wrong positional information for the process of ontogenesis through development and to the maintenance of an adult body. This is guided by a very fine interaction between the intension of the consciousness, disturbing the patterns that shape our pictures of the reality. Thereby, we ourselves transfer a wrong or “sick” picture of the reality to the fractals that again govern a “mal” distribution of the informational energetic particles of the different fractal levels, leading to disease and death.

People who suffer from such malfunctions are maybe mentally disabled and need to be guided in the right direction of a holistic medical practitioner. Following the holistic paradigm, such malfunctions can be recovered by guiding a patient to look at the world in a positive way and see all the positive things in itself, face the evil inside itself and repel it. It can regulate the distribution of energetic particles of a fractal level in a way so the information for the correct household of the human body is corrected, leading to fitness and survival. In other words, we believe that a human is its own best medicine; just if it is guided in the right direction, this will lead to self-recovery through adult human metamorphosis (18).

Discussion

The presented theory of deep quantum chemistry, together with the simple structure of the spiral fractal, seems to give us a perceptive, conscious and thinking cell, creating its own world though intent and the use of historically collected information. There are many problems not solved with this model. If the structure is really infinite, why will information ever return to the here and now “surface” of reality? Why will it not just travel inwards and outwards in this structure forever and ever? How can the transport of information be so fast – almost instantaneous? We need something travelling much faster than the speed of light to explain consciousness it seems, and if everything is so speedy in this structure, how can we have events in real time? And if this “highly structured collective quantum field” is really so powerful, why is it that we cannot read each other’s minds much better?

Actually, this theory should make us so powerful that we all should be like prophets, commanding the fig tree to die, and thus just killing it or commanding the sick to stand up and be cured. As usual, with such theories, it is very difficult to make a powerful suggestion and not make it too powerful. The empowerment from this theory means that we should be

able to remember everything that ever happened, since beginning of life on the planet; the intense coherence means that we also should know all that happens at the planet just now, and these two combined means that we should be able to remember all that ever happened on the planet. This is not our daily understanding of our human potentials; this is the reality of the wildest shaman and the wisest of Indian sages. And maybe we are all meant to know it all, to be divine, to be enlightened...

Maybe this theory on deep quantum fields of information is true, and we are still evolving as humans towards our final destination. We understand fully if the reader finds our suggestion fantastic and too simplistic at the same time. In the clinic, we often have the strange experience of knowing much more about a patient than should be possible, if information was carried by our senses only. It is as if our bodies are reading the other person as this person contacts his or her old traumatic life event, and often the feeling of what happened even the pictures and sentences of the event is clear to the therapist long before it re-surfaces into the consciousness of a patient. This sharing of information in coherent fields of humans is well known from Tibetan Buddhism, where many monks meditate on the same object, which they all visualize but from the angle of space where they are sitting. So nobody sees the same picture; all see the same object.

The Dalai Lama told us in 1996 (personal communication), that one of his friends could make a knot on a hard needle when meditating, softening the metal with his consciousness. And the Engineering Anomalies Research has for many years conducted research confirming the ability of human consciousness to interact powerfully with even dead objects like computers (19). To explain such phenomena, the presented hypothesis seems also appropriate. We are at the edge of science, the place where science meets fantasy and imagination. We have dreamt a dream of the inner mechanics of life, and it explains so much that we must share it, for other people to dream it forward too. And one day, we might even be able to test the existence of deeply structured biological quantum fields in the laboratory.

It is the collective control of all the mentioned activities and all these functions of the single cell and many interacting cells in symbiosis that together involves the term consciousness regardless if it is the consciousness of a single cell, an organ, a tissue or a complete multicellular organism. The consciousness is a symbiotic control of all energies, gathered in a wholeness, creating a superior super orbital of quantum chemical activity, regulating the whole pattern of behavioural activity necessary for survival, including all genetic and biochemical activity of a cell or a multicellular body, whatever it applies to a single cell or a multicellular body of higher levels during the ontogenesis, or it applies to a mature or adult organism. We think that consciousness is a function of energies that exist over all in the universe created by the energetic equilibrium that is the result of everything.

The consciousness of a biological organism is only a body in the universe that has “borrowed” some of the gathered energy of the universe to gain its own consciousness gathered in its own “little” closed orbit. Seen in this perspective, all elements and components of the universe could be described as having their own consciousness. We believe that consciousness of biological organisms exists in self the most primitive organisms on earth as, e.g., the bacteria. And it has existed in all organisms from when the first living cell was created in the primordial soup. The consciousness of all living organisms is just borrowed from the gathered consciousness of the universe (God). We believe that consciousness in biological organisms has evolved through the evolutionary history as it gained more and more “nearness” with the surrounding world as the complexity of multicellular organisms evolved.

With the human being, this “nearness” became so revealed through the capability of independent mentality that it was capable of developing the industrialized world. We think this development has evolved through a process we call the “Metamorphous Top down” evolution. The human being has gained so strong control over its consciousness that it is capable of focusing itself through ordering a mal-distribution of the energetic information of a fractal structure that maintains the organism in a state of sickness and psychical disturbance, in a way so it again can be fit and good for survival and capable of doing this by itself without any need of medical products. It does this through control of master gene activity during adult human metamorphosis that is the human’s own medicine.

However, sometimes it is necessary to be helped to think the right way by a holistic medical practitioner. The human has gained all these capabilities through the development of human consciousness. This means that human consciousness has been developed through “Metamorphous Top down” evolution, while “Metamorphous Top down” evolution has been implemented by consciousness through the evolutionary history.

Conclusion

We suggest that the cell has consciousness and all the qualities and abilities related to consciousness. Geometric symbolism is a pre-mathematical and philosophical approach to problems that cannot be handled mathematically (yet). What we have done is to guess on the “natural” and neutral structure of electrons if nothing disturbed them. So the way we precede is simply to guess that the pattern of the free electrons is able to give the cell its non-local qualities.

Using Occam’s razor, we must start with the simplest model that works; we suspect this to be the spiral fractal (7). So in this chapter, we investigate some of the features of cells that can be explained, if we presume that all the electrons of the molecular orbitals of all the co-factors and protein molecules of the cell, including all the many small molecules embedded in these large bio-molecules, are making up one huge structure (“a cell-orbital”). Its structure is as close to the neutral spiral fractal as possible, as this is the structure that the electron field would take if nothing were disturbing it. Most of the proteins of the cell use ATP to do their job. When ATP is broken down to ADP and P, a protein is statistically forced into one allosteric shape with the protein’s typical power. When it switches back and releases its built-in energy it must be recharged to work again. In this way, the proteins are “paid” to dance, and the dance is typically a thing that happens in the molecule orbital, like proton pumping. Even the “payment” is administrated by the cell itself, delivered through co-factors that build up the ATP molecules through quantum chemical activity. If the molecular orbital is connected to a higher system, this system could be energized as well in these movements allowing the super-orbital of the cell to manage energy that can be used to control the dance with other proteins.

There are many ligands modifying the activity of active proteins, and these ligands are more active or more passive as their forms shift; a system that can control the protein activity and the likelihood that a protein is in a specific allosteric configuration is then controlling the activity of the cell. The dance of the proteins gives much energy to the collective electron orbital; the problem is now on a more detailed level how information is handled in it.

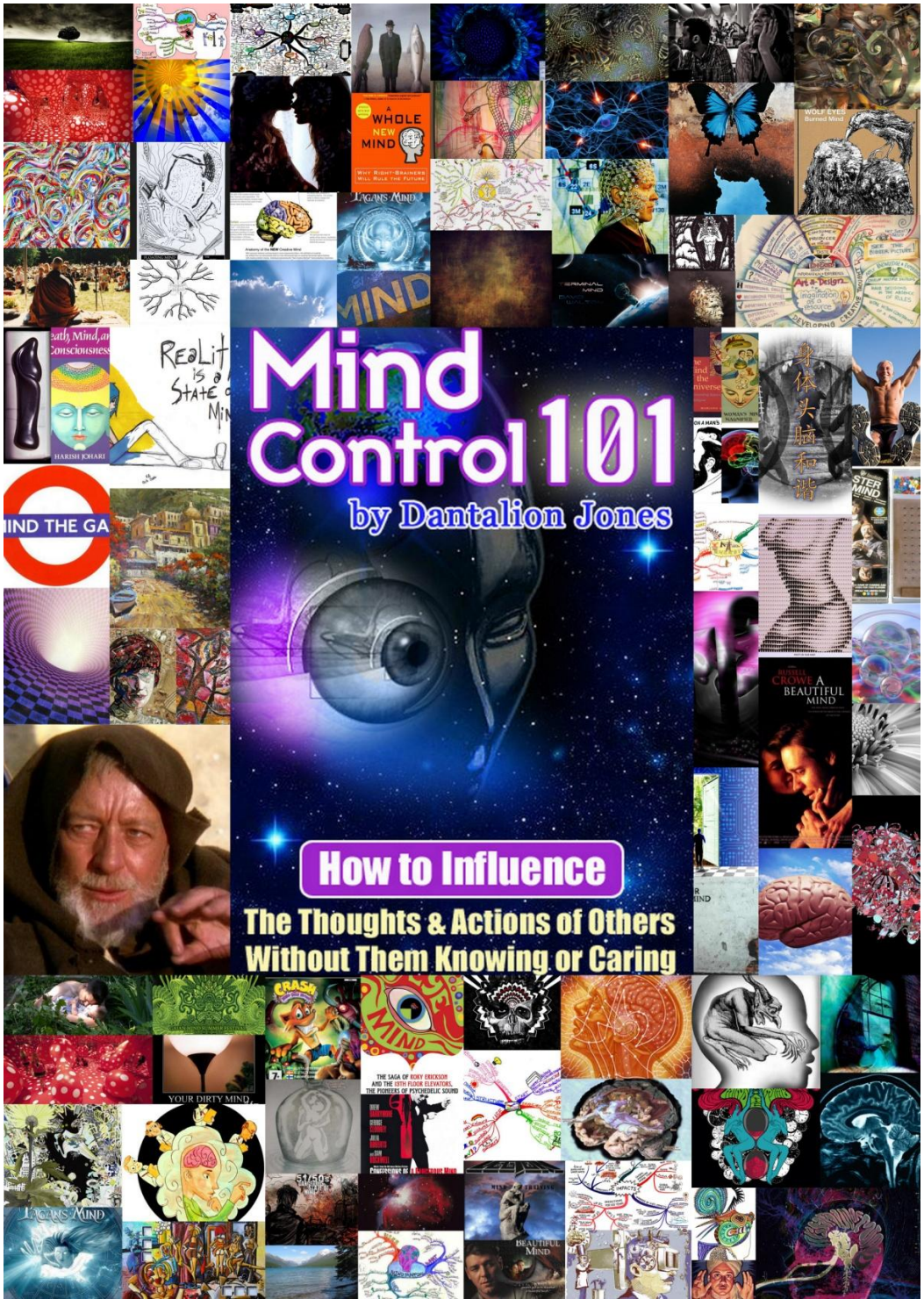
Consciousness of biological organisms is the capability of gaining full control over all aspects of life through the super orbital, by controlling all energetic activity of a cell or a multicellular body, leading to full control of all biochemical activity in a single cell or a multicellular body, in a way so all activity of the body interacts in a functional symbiosis.

We think that consciousness is a main activity of the universe naturally assigned to all biological organisms when these are created. We believe that consciousness has evolved through the evolution from bacteria to humans, and in humans, it has been so focused against the outside world that they have evolved the capability of thinking. We think this capability has evolved through “Metamorphous Top down” evolution that has given the human being the capability, through adult human metamorphosis, to gain self-recovery from diseases and psychical disorders.

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The wholeness of man, his consciousness and collective consciousness

If you love science and hate philosophy, you will hate what we are doing now. We are taking everything to an abstract, philosophical level, looking at man from a holistic point of view. If you felt that we scientifically were on thin ice in the former chapters of this section, you might feel that we have definitively and completely lost it in this chapter. On the other hand, if you have followed our arguments and done the exercises we have suggested and reflected on the nature of the universe and of life itself, you might find this chapter logical and simple. For us, the models presented in this chapter are what makes working with holistic and existential healing easy and a piece of cake. If you can meet the mind and body of a patient, by talking and touching, and you can meet the soul and heart of the other person in this process, you will be able to love, heal and help. We cross our fingers that you are able to do that. In this chapter, we look at the rational and the emotional interpretation of reality in the human brain and being and discuss the representation of the brain-mind (ego), the body-mind (Id), and the outer world in the human wholeness (the I or “soul”). Based on this, we discuss a number of factors including the coherence between perception, attention and consciousness, and the relation between thought, fantasies, visions and dreams. We discuss and explain concepts as intent, will, morals and ethics. The Jungian concept of the human collective conscious and unconscious is also analyzed. We also hypothesize on the nature of intuition and consider the source of religious experience of man. These phenomena are explained based on the concept of deep quantum chemistry and infinite dancing fractal spirals making up the energetic backbone of the world. In this chapter, we consider man as a real wholeness and debate the concepts of subjectivity, consciousness and intent that can be deduced from such a perspective.

Introduction

Until now in this series of chapters on human development, we have been looking at information transmitting interactions at the different levels of the organism. The nature of the

information transmitting interactions is unknown, because we do not know the limits of their effects in time and space. Likewise, we cannot with our rational interpretation set this delimitation. The emotional interpretation is far more suitable for this but unfortunately is far from our reason. Epistemologically, we here refer to Occam's razor (1,2) and so far maintain for reasons of simplicity that the same principles that affects the lower levels also affect the higher levels. Our conclusion therefore is that the perceptual and conscious life of man may be deduced from a generalization of the effect of the information transmitting interactions to all levels.

In this chapter, we discuss the representation of the wholeness of the organism and the outer world in the brain. Among all the organ systems, the brain is exceptional because it is specialized to represent the outer world through the sense organs and thereby give a simple interpretation (3) of matter with some or all elements being reduced to the same frame of description as apply to dead things.

The representation of the outer world is made up as a long chain of interpretation actions corresponding with the outer world – inasmuch as the motor apparatus is under control of the brain (4).

In Figure 1, the motor apparatus is drawn below the brain; however the wholeness and the motor apparatus must be thought of as being interacting around the brain. The organism is able to represent the reality (the world) in two ways: 1) Directly through information transmitting interactions, which is the emotional way of representation, where reality is represented in the organism's wholeness (3) or 2) Indirectly through representation in the brain. This is the rational way of representing the outer world by means of the reason (3).

We believe that the brain can represent the wholeness of the organism and what goes on in it in addition to representing the outer world through the senses. This means that the organism possesses the possibility of the rational and the emotional interpretations of reality. When the simplistic representation of the world dominates in the representation of the wholeness, we have the rational interpretation of reality.

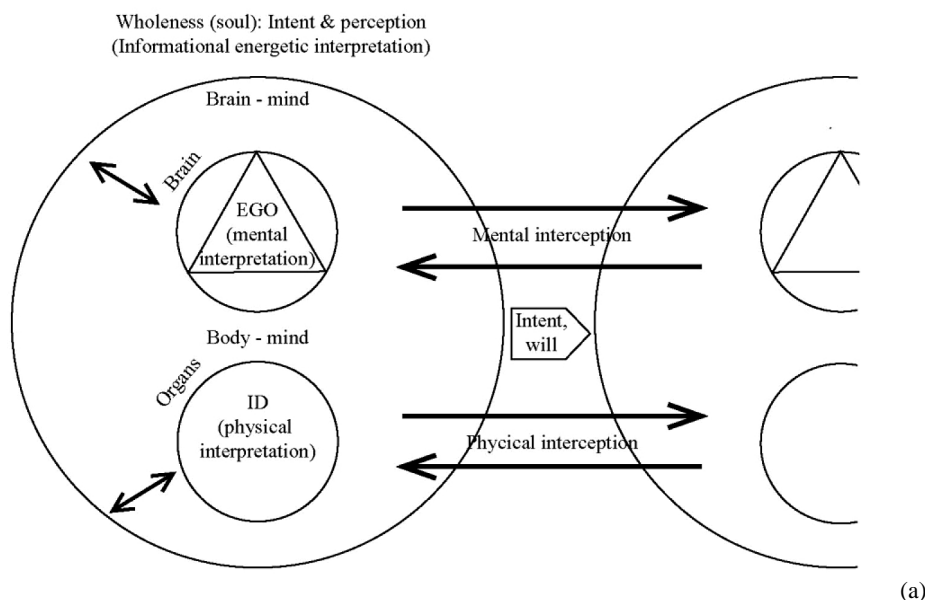
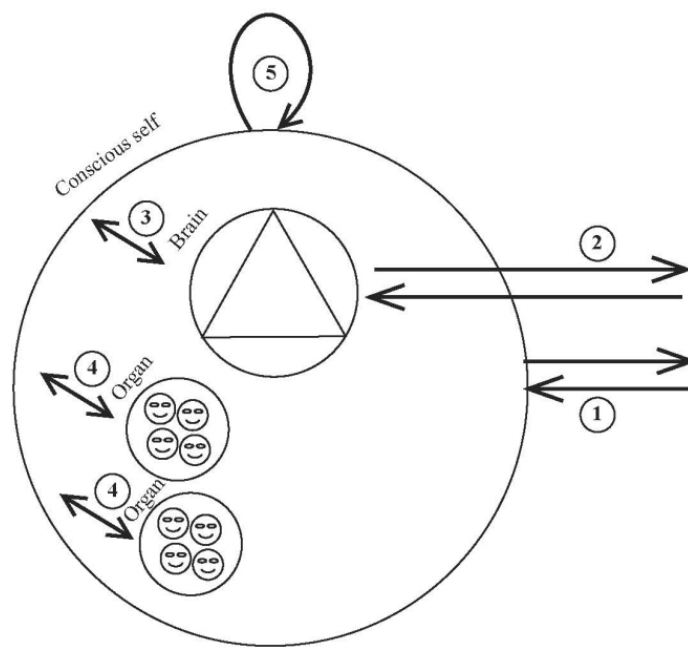


Figure 1. (continued).



(b)
Figure 1. A model of the wholeness of man, including the functions of attention and will. The representational stages of a human being. The attention function and a survey over the representative possibilities and functional stages. This figure shows a survey of man. Man himself is part of a larger social system, to which it through interactions is adapted and which he himself influences. The human organism can directly represent elements at its own level, humans and other living beings, and more difficultly dead things. The human organism is also able to represent lower levels, such as organ systems, and higher levels, such as the family. A. Wholeness, intention and perception. B. The five representational stages: 1. Direct representation of the outer world. 2. Indirect representation of the outer world through the brain. 3. Representation of the brain in the wholeness. 4. Direct representation of the outer world. 5. The wholeness represents the wholeness.

When the direct representation outside the brain dominates the representation of the wholeness, we have the emotional interpretation of reality, where the brain represents the wholeness (3). In this chapter, we will discuss man as holistic through his ability to experience the world through these two ways of interpretation.

The human as a wholeness

Attention, perception, and consciousness. The information-transmitting interactions giving representation of a subject matter in the wholeness of the organism corresponds to the attention function, and the representation itself corresponds to the attention. This is in contrast to the common notion that perception happens in the brain (5). However, we think that consciousness cannot be explained by brain activity alone. Consciousness is not brought about before the totality, the seat of perception, has represented the brain. Consciousness demands a representation of the subject matter in the totality of the organism, but this is not sufficient. A double, simultaneous representation is required, because the representation is a sufficient model of reality within the brain (3,6); the comparison of the two representations is necessary for being able to witness the world, in other words: to be conscious about it.

Thought, fantasies, visions, and dreams. When the totality represents the brain in a state, where important new sensory information is not entering but where the rational interpretation of reality is sustained, the purpose of the organism handling the outer world manifests itself through a reorganization of the representation in the brain. The model of reality in the brain is reorganized in a way that makes it possible to retain a better handling of the world through behaviour. When the brain is working with space-time organizations, this phenomenon is called thinking, and when the pictures do not represent the real world, it is called visions or fantasies. In dreams, the possibility of realizing the purposes of the organism under the existing circumstances is systematically worked through.

The intent. It is evident that representation is very tightly controlled through the perception function. The patterns of the totality are tuned in a way that ensures agreement between the patterns of the totality and the patterns of a specific level or subject. This tuning is the purpose of the organism. The tuning of the totality happens when information-transmitting interactions bring the “programs” lying as organized patterns at the deepest levels to the surface of the wholeness of the organism.

The subject matter that is represented has a given organization, which by now can be evaluated through more specific interactions between the wholeness and the information-“program.” Reality is thus perceived and obtains its meaning through the purposes of the biological system. These purposes are a collection of fundamental biological information patterns forming the basis for the unfolding of the biological system. Various aspects of wholeness are submitted to each purpose, and correspondingly different aspects of reality are perceived as a consequence of this submission.

Attention may be attracted to incidents at the various levels, and the purposes must therefore be recruited dynamically as they are needed in order for the wholeness to undergo governed transformations in a suitable way. The governing of attention must happen autonomously through shifts between the states of the totality following a genetically determined governing pattern. The realization of the more simple patterns is a condition for the more complex organizations, in the same way as in morphogenesis (7,8).

Morals and ethics. What attention captures, is perceived, and gives meaning in relation to the basic pattern, the purpose. The organization of the subject matter may be viewed as proper or improper – or it may be viewed as something in between. When a level or a subject matter is represented in the totality, a double evaluation follows. On the surface the organization is perceived as suitable for the organism or unsuitable for the organism, i.e., right or wrong. Inwardly, an emotional response is triggered, which evaluates the agreement between the genetic program and the structure of the subject matter in the representation of the totality. A good agreement between the program and reality corresponds to positive emotions, while a bad agreement corresponds to negative emotions.

The will. Hitherto, we have only been looking at the representation of subject matters in the totality of the organism through the attention function. It is secondary whether the representation happens directly through the totality following a purpose, resulting in an emotional interpretation of reality, or indirectly through the brain following a purpose, resulting in a rational interpretation of reality. The evaluation through emotion and perception happens in the same way.

Information-transmitting interactions in principle work both ways. When purpose transmits information to the wholeness of the organism, information is also transmitted from this wholeness to the subject matter at which the attention is directed. A representation is

forced upon the subject matter by the organism, and this function, which is the inverse of the attention function, is called the function of will.

The organism approaches the subject gradually. At first, a fundamental adaptation is accomplished by the tuning of the totality by the purpose. In this way, the basic patterns are shared between the organism and the subject. This creates a representation of the subject in the totality of the organism. Then this representation is evaluated, and the purpose is tightened, and the patterns corresponding to a certain organization of the subject are pulled up into the totality. Vice versa, the desired organization is transferred to the subject.

The increasing complexity of the organism throughout life can be understood as the realization of purposes through the use of the will function. The different purposes are recruited in a succession that ensures organization of the inner levels before the outer levels. The will function is thus the organism's organizing force. It is brought about through information-transmitting interactions. The purpose being a very high level of organization in the totality of the organism forces an organization corresponding to the informational program of the organism onto a subject with which the totality interacts. The will function can work directly upon the outer world or indirectly through the brain. The latter leads to behaviour and in man also to speech. Speech is an indirect mediation of interpretation of reality through words, while action is a direct mediation of interpretation of reality through the motor apparatus. It is possible to act out of an emotional interpretation of reality, because the brain is subject to the totality in this interpretation of reality (3,6). Direct use of the will function is usually hidden from our reason and belongs to the emotional interpretation of reality.

The intuition. The direct interaction (described above) either between individuals or between an individual and the society yields a complex information transmission, but this is only available for the emotional interpretation of reality. A specific representation of the outer world focusing at certain patterns may theoretically speaking be a precise source of information, providing that patterns that reach us through information-transmitting interactions can be identified and interpreted in a precise and sober-minded way.

The difficulty of obtaining this precision and sober-mindedness has led to a pronounced and legitimate scepticism against the value of this data source, because people who claim to have intuition rarely have developed this gift. Intuition in its developed form is the ability to let one's attention float in the complex dynamics consisting of the wholeness and all the individuals of the society. When the wholeness represents the outer world in a general way, one obtains experiences of unity with nature and the like, which belongs to the class of experiences that collide with an undeveloped reason.

The collective (un-)consciousness. When you start thinking in this strange way – that reality is more a hidden order than what meets the eye – the reality of a collective mind or collective consciousness is not a farfetched idea. If the world is created like a huge many-leveled fractal, we might all be a part of such a huge meta-structure, which connects us and collects our perceptions and experiences to bring them to the next level for all to enjoy. This is in a way scary because we often prefer that our consciousness is private; the Jungian concept of a common consciousness is basically born out of the opposite idea: that consciousness cannot be private; it is always public, although most people, luckily for us, do not know how to approach the collective consciousness and “crack the code” to get admission to our innermost hidden secrets and unspoken emotions.

The religious experience. Last, we will discuss the religious experience. In our culture, one of the least known qualities of man's wholeness is man's ability to represent himself, to be aware of himself. This is an experience obtained either by chance or, more commonly, after having exercised the control of attention to a level, where he can exclude all other representations. It is usually described as the religious experience: the experience of God, of the divine principle enlightenment, etc. In spite of the evidently positive, beautiful and real aspects of this experience, it demands much soberness to be able to use this kind of experience in a positive way. Very often, people lose their way in the overwhelming experiences, or they use them for self-asserting purposes, a fact that has resulted in a prevailing and justified scepticism against "religious" people.

Conclusion

Many aspects are involved when we look at man as wholeness, including a suitable combination of the rational and emotional interpretation of reality. These aspects are summarised and discussed in this chapter:

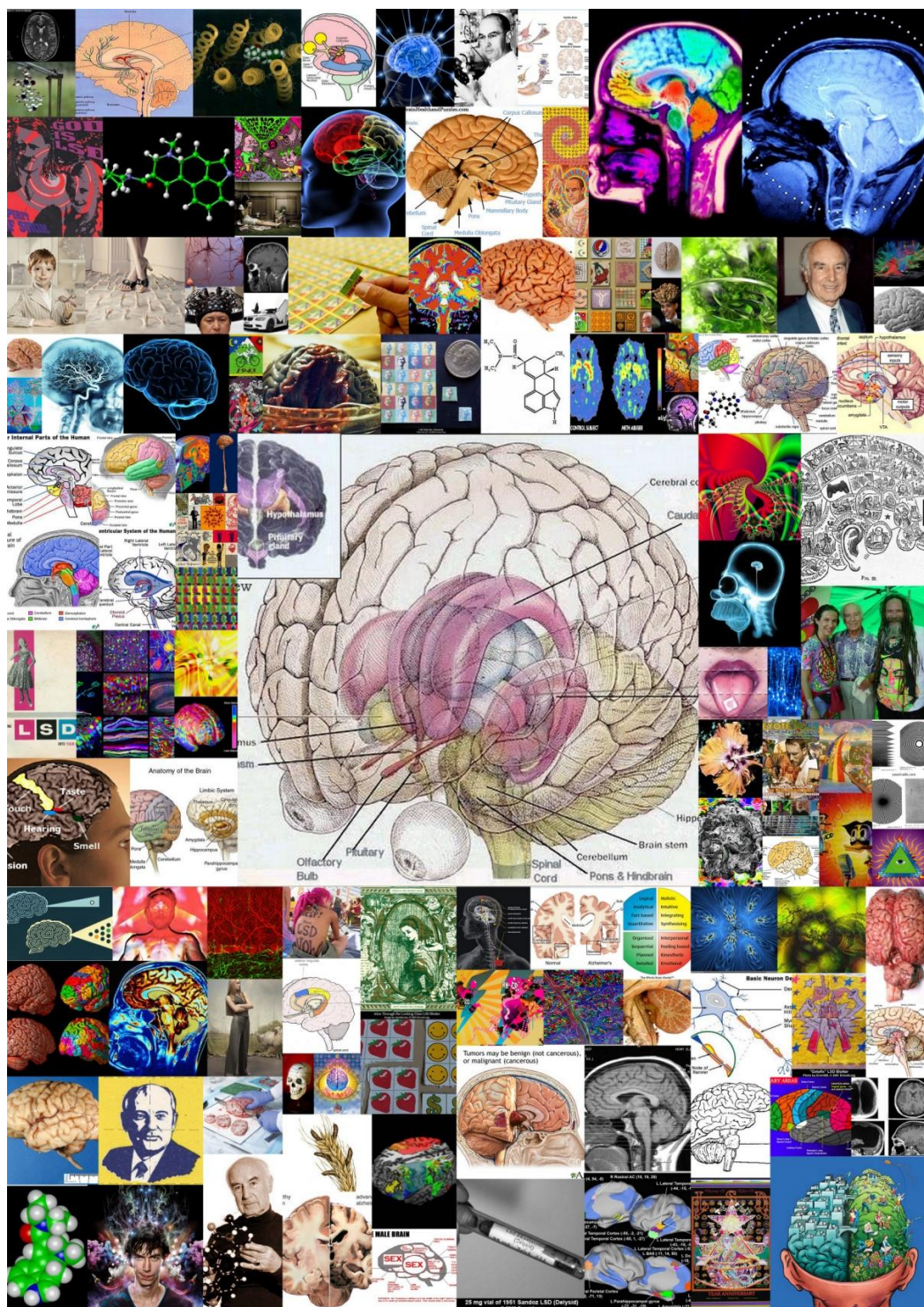
- We think that consciousness cannot be explained by brain activity alone. A double, simultaneous representation is required. The comparison of these two representations is necessary to be conscious about the world.
- The phenomenon of thinking is when the brain is working with space-time organizations leading to pictures. When these do not represent the real world, it is called visions or fantasies. In dreams, the possibility of realizing the purposes of the organism is systematically worked through.
- The patterns of the totality are tuned in a way that ensures agreement between the patterns of the totality and the patterns of a specific level or subject. This tuning is the organism's intent.
- The organization of a subject matter may be viewed as proper or improper or something in between. A good agreement between the genetic program and reality corresponds to positive emotions, while a poor agreement corresponds to negative emotions. Tuning of these functions is called moral and ethics.
- A representation is forced upon a subject matter by the organism. This function is called the function of will and can work directly upon the outer world or indirectly through the brain. The latter leads to behaviour and in man also to speech. Speech is an indirect mediation of interpretation of reality through words, while action is a direct mediation of interpretation of reality through the motor apparatus.
- The direct interaction between individuals or between an individual and the social levels yields a complex information transmission available for the intuition. In its developed form, intuition is the ability to let one's attention float in the complex dynamics consisting of the wholeness and all the individuals of the society.

In our culture one of the least known qualities of man's wholeness is man's ability to represent himself, to be aware of himself. This is an experience obtained either by chance or

after having exercised the control of attention to a level where he can exclude all other representations. It is usually described as the religious experience.

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Explanation of macroevolution – Top-down evolution materializes consciousness.

The origin of metamorphosis

In this chapter, we first give a short discussion of the macroevolution viewing life as information-directed, complex, dynamic systems. On this basis, we give our explanation of the origin of life and discuss the top-down evolution of molecules, proteins, and macroevolution. We discuss these subjects according to our new holistic biological paradigm. In view of this, we discuss the macroevolution of the organism, the species, the biosphere, and human society. After this, we discuss the shift in evolution from natural selection to a new proposed process of nature called the “metamorphous top-down” evolution. We discuss the capability of the evolutionary shift to govern some of the processes that lead to the formation of new species. We discuss the mechanisms we think are behind this proposed shift in evolution and conclude that this event is able to explain the huge biological diversity of nature in combination with evolutionary natural selection. We also discuss this event of nature as an isolated, but integrated, part of the universe. We propose the most important genetic and biochemical process that we think is behind the evolutionary shift as a complicated symbiosis of mechanisms leading to metamorphosis in all biological individuals, from bacteria to humans. The energetic super orbital that manifests the consciousness governs all these processes through quantum chemical activity. This is the key to evolutionary shift through the consciousness, and we propose to call this process “adult human metamorphosis.”

Introduction

In this chapter, we will discuss the capability of nature to create the huge amount of biological diversity that has been formed through evolution. As this is a theoretical discussion, we only guess and suggest how nature governs this incredible ability to create new species. Therefore, the written text may here and there give the expression that we think this is the definite truth, but our purpose is only to suggest a new explanation of these

functions of nature, because we have not found that the existing knowledge is able to explain these things in detail. Therefore, we have developed a new way to explain events of nature that have not been explained like this before. We believe it is a step towards the truth and believe this explanation can work until something better has been developed. It is not our intention to summarize the modern evolutionary biology's theories of the relation between form and function; this has been done elsewhere (1,2,3,4). Awareness, intention, and will are the driving forces behind morphogenesis. When it comes to the description of man, it is evident that the biological information that is buried deeply in the lower levels of the biological system manifests itself by means of organization of the complex dynamics of the organism as a whole. This organization corresponds to a certain intention and creates a specific interaction between the wholeness and a certain item with a corresponding pattern (5). If the pattern of the wholeness corresponds with organs and organ systems, willpower as the organizing force is directed towards these, and the organization of the organism is enforced. This is the morphogenesis interpreted through the intention. The interpretation is particularly relevant because it implies that the organization of the organism is functioning because of an intention to do so (5).

In principle, there is no difference between an intention directed towards outer or inner organization. In this chapter, we discuss macroevolution on earth from the evolution of an organism to the evolution of human society. The evolutionary activity of nature usually is described as happening through natural selection (6). We think that such an evolutionary event is not capable of describing the great diversity of biological organisms developed through evolution of life and existing on the earth today. Therefore, there has been a pressing need for a new evolutionary theory from evolutionary scientists to be able to explain the evolution of diversity in greater detail. A new evolutionary hypothesis capable of satisfying these needs is a new “fly-wing theory” (paper under preparation for publication). Following this, the fly developed its wings through metamorphosis in a process called the “metamorphous top-down” evolution. The capability of nature to create new species and thereby increase biodiversity was a main problem of evolutionary science until Charles Darwin (1809–1882) published his book *The Origin of Species* in 1859 (6). He gave scientists a tool that was powerful and partially able to explain the huge biodiversity that had existed on earth. But to fulfill the needs for nature to create this huge biodiversity, we think that something else has to interact with the Darwinian “natural selection.”

Therefore, we have proposed the “metamorphous top-down” evolution as a tool for nature to create biological diversity in a tight interaction with the natural selection proposed by Darwin (in the fly-wing theory in preparation for publication). Charles Darwin based his evolutionary theory of “natural selection” on a “bottom-up” development, where the evolution went from varieties to taxa, based on the idea that a variety that represents the trait that makes an individual most fit for survival will eliminate the others through natural selection (6) (already Darwin knew that insects have sperm from 20 males from which to choose, and all individuals choose, especially the females). On the other hand, the principle of “metamorphous top-down” evolution is based on the capability of an individual and consciousness to go through a process of metamorphosis that develops a specific trait necessary for the individual to stay fit and survive in its habitat or microhabitat and thereby give a great contribution to the diversity of living organisms existing on the earth. Below, we will first discuss macroevolution as a consequence of evolution and, afterwards, some of the mechanisms behind the great amount of diversity developed through evolution. We discuss

the capability of “metamorphous top-down” evolution to force the creation of new species, and we will do this by looking at it as a local event that is an integrated part of the whole universe but that acts as its own “tiny” (read local) universe, as a small part of the whole. This is not a religious explanation of how God interacted with nature and created the species, but it is a tool for scientists to understand some of the mechanisms of nature that lead to the creation of new species and to try to see this “tiny” event in a greater perspective by looking at it in a manner compared to the universe as a whole. By doing this, we will try to make readers understand that this is only a little isolated event of the universe, but it demands a huge amount of coordination and power to be able to happen.

Macroevolution of the biosphere and its biological life

Concerning the origin of life, it is unlikely that the morphological information of the organism is situated in the DNA base sequences because of 1) the C-value paradox, e.g., (7); 2) normal self-organization of proteins is unable to explain the general morphological features (8); and 3) form can apparently evolve without corresponding molecular evolution (4,9). Supposing that the information giving form lies in the fine structure of energy, the amount of information is not a problem and, likewise, the information transport becomes understandable. We believe that the origin of life can be given a reasonable explanation. According to our hypothesis, the fine structure of energy has an inherent ability to drive the self-organization of all levels, from the smallest units to prokaryotes (bacteria and the like), unicellular to multicellular eukaryotes. We believe that there is a creative principle in nature in which evolutionary selection works. We do not think this is caused by mutations in DNA, because proteins do not give rise to form in itself (9). Therefore, we believe it makes perfect sense if the fine structure of energy works in a creative way and organizes evolution. The evolutionary leaps that hitherto have lacked an explanation, e.g., the evolution from unicellular to multicellular organisms, can also be explained through our hypothesis, since the creative principle works through creation of still higher organization levels. The more-or-less constant mutation rates of DNA are called microevolution in contrast to nonmolecular evolution, which is usually called macroevolution.

In this chapter, we discuss macroevolution in view of our new holistic biological paradigm. Top-down evolution of molecules: The evolution of function in the first era of life on earth, presumably lasting the first couple of billion years, was strongly dependent on molecular evolution greatly assisted by the ongoing evolution of shape and function. Molecular evolution was, we believe, also guided by high-level organizational forces. If modern day bacteria mirror the early bacteria, by recombining DNA (9), they were able to produce new proteins, and, if the informational system was as smart as we envision it, it could even tell immediately if a protein would be useful for a certain intended task. This is very much the way bacteria gain resistance towards antibiotics today. The recombination part of molecular evolution might be a random process, as we today do not believe that the cell controls the small molecules like DNA fragments, which are subject to strong Brown's stochastic movements.

We also believe that molecular evolution was strongly influenced by natural selection.

Macroevolution of the organism: The macroevolution of the organism can be divided into the following parts: evolution of the inner organs (10), and evolution of the brain and the limbic apparatus (11). The evolution of the structure of the inner organs was narrowly tied to their functions. The function of an organ can be thought of as a result of its structure; however, the function has to act on the structure through the system's evaluation and later modification of the structure. Structure may be an evolutionary product of function instead of the other way around. This demands that the biological system has a double representation of its structure and its function. This co-representation may be the foundation of the evolution of intention in the biological system.

The macroevolution of the species and the biosphere: The macroevolution of the limbic apparatus and the brain as we recognize it from the vertebrates that all have the same muscles, bones, brain building plane, etc. (4), but different macroscopic shape of all its parts, counts in a very high degree on adaptation after the surroundings and specific circumstances (6). This can be understood by looking at all individuals within a species through specific, information-transforming interactions in its biosphere. Such interactions make it possible for each individual to interact with the others within the same species, and the same counts for other living individuals in their milieu. Now, we will take a little longer look at the interaction that all organisms in a biosphere may have with each other. All living beings seem to have the ability to represent all the other organisms as well as higher levels of organization in their ecological niche.

The function of will and attention is understood as the capability to transform the representation of one's own organization to other life and represent other life in oneself, which recognizes biological systems in general (5). This counts also for plants, sponges, and single-celled animals. This was exactly the original premise for the formation of multicellular organisms. All ecosystems are developed through a long time of evolution, where all life forms arranged themselves in accordance to each other and may have influenced each other's evolution through the capability to force a representation. An example of governing the development of life has appeared through our house animals. An example is the dog. Dogs have been bred for almost all purposes: gundogs, watchdogs, lapdogs, sheepdogs, etc. Normally, it is accepted that the development happens through natural selection. The consequence of the description of life as a complex dynamic is that the development in the same degree happens through arrangement to the other life in the biosphere. Exactly; to a very high degree, the human being has disengaged itself from this arrangement through the use of its reason and through technical development. Conforming also counts under the direct use of the will in the highest degree to the emotional interpretation of reality.

Life is developed through common arrangement, through an ongoing development of the capability to use the physical circumstances. Behind the evolution is a driving, organizing power, as is in the structure of the energy itself (compare with the spiral fractal).

Macroevolution of the human society: Information-transmitting interdependencies between man as an individual and the higher organizational levels of the human communities are a necessity for the social function of the individual. The functionality of the family is completely dependent on the ability of the participants to adapt to a community. Human society should be viewed as a biological structure in itself, which is under evolutionary development. The process of democratization is a beautiful expression of the evolution of mankind towards integration into a greater society. The human society is a very complex biological structure, much more complex than an anthill; however, in principle, there is no

difference. When mankind learns to respect the whole, it will at last be able to function in the world in a constructive way.

What drive in evolution created the diversity on earth?

What has been driving evolutionary development in this direction? What forces of nature are capable of creating a world so diverse that a biosphere can cover a huge symbiotic ecosystem as the main ecosystem of earth? We think that powers like natural selection and “metamorphous top-down” evolution interact with each other to be able to create a biodiversity necessary for the ecosystem of the biosphere to survive. Below, we will describe what we think makes the evolutionary drive for biodiversity. We will discuss the mechanism in nature that drives the evolutionary shift from natural selection to “metamorphous top-down” evolution. This will be discussed in detail from the advanced biochemical and genetic processes involved in this shift to the perspective of an isolated event of nature compared to the great wholeness of the universe.

The force that drives the shift in evolution is governed by quantum energy

The shift in evolution, from our point of view, between Darwin’s natural selection and the “metamorphous top-down” evolution is governed by quantum chemical activity directed from the super orbital (12) of nature combined with the super orbitals of the individual organisms involved in the evolutionary event through their consciousness. The individual’s consciousness is driven by the need for survival in a specific habitat or microhabitat. The natural consciousness is driven by the need for nature to keep the biological diversity on the earth (GAIA) as enormous as possible. We imagine that the super orbitals of the involved parts gain a kind of resonance with each other and, through quantum mechanical activity, this resonance activates the energy necessary to satisfy the needs of the individuals for survival in their habitats and the needs of nature to gain a more complex diversity. Such activity forms a gathered super orbital for the involved parts that drives the development against formation of new species. In this way, new species can be formed that will be fit to survive in all kinds of milieus and all habitats and microhabitats. Such a mechanism is very practical for nature, because the quality of nature to keep species alive is very dependent on an extremely complex diversity of living organisms on the earth (13). This means that the shift in development is a kind of feedback mechanism that is turned on to satisfy the needs of earth for more diversity, to gain survival as a huge symbiotic ecosystem, and to satisfy the individual organism’s needs to adjust for survival when natural selection fails to satisfy these needs. This means that nature has created the “metamorphous top-down” evolution as a mechanism that is able to interact with natural selection when it is necessary for the single individual to adjust itself because natural selection was not able to fulfill these needs, and the individual has gotten the capability to drive this event by its consciousness. Likewise, by its consciousness, nature itself is capable of driving this force when natural selection fails to create a diversity of living organisms necessary for survival of the huge symbiotic ecosystem that is manifested in the biosphere of the earth.

We think that such powers are working all over in nature because it is the way of nature to guard itself against destruction. The main power of nature is interaction between energies that shape a super orbital for each single component in nature. Combined, they will shape a huge super orbital gathering all super orbital energies in universal consciousness, capable of organizing the whole universe (nature) in one huge symbiotic “organism.” This “symbiosis” represents the highest fractal level and could, in religious terms, cover the term God, but in traditional scientific thinking, it covers the capability of the universe to coordinate all functions within the universe in each tiny little detail. It is the same kind of power that drives the shift in evolution but on a lower fractal level. The gathered super orbital of nature and the individuals involved in such an evolutionary event make their own “tiny” universe, governed by the super orbital that delivers the quantum mechanical energy for driving the shift in evolution.

If we look at the evolutionary shift from “natural selection” to “metamorphous top-down” evolution as an isolated event, then it is obvious to imagine that this is a very complicated and sensitive process in itself that involves many complicated processes that have to cooperate in a very finely timed interaction. These interactions involve biochemical activity and master gene control of the single individual organisms involved in the evolutionary event in order to direct the process of metamorphosis in a given direction. In this way, nature gets its need for more complex biodiversity satisfied, and the individual organisms get their need for developing a peculiar trait necessary for survival in a specific habitat or microhabitat. Below, we will describe some of the processes that we think are involved in “metamorphous top-down” evolution, governed in following sequences: chemical bombing raid → biochemical reactions → genetic control → morphogenesis → manifested mirror image → genetic regime control → parallel metamorphosis of several individuals leading to a new species. We think these processes are tightly regulated by the orbital mastering the processes, and we will try to describe our thoughts concerning the interactions between quantum mechanical activity of the super orbital, the biochemical and regulatory processes happening in the single biological organism through metamorphosis.

Biochemical and genetic interactions

When nature shifts from evolutionary natural selection to “metamorphous top-down” evolution, an extremely large and complicated apparatus, involving a huge amount of strict and coordinated processes of genetic and biochemical origin, has to happen for these powerful processes to function as the “symbiotic” wholeness they are. Below, we will try to give our explanation for how this coordination can take place by going through a number of genetic and biochemical activities that we think are important candidates behind the shift in evolution involved in increasing the biodiversity of the earth.

Chemical bombing raid

The first chemical signal for forcing the event of “metamorphous top-down” evolution is a chemical bombing raid. This is governed by the quantum chemical energy from the super orbital. This initiates the activity of genes involved in production of pheromones and other

airborne ligands necessary to initiate a biochemical reaction in individuals having the need for the same peculiar trait for survival as the donor organism. This can be individuals in the same habitat or, because the ligands are airborne, individuals from other populations around the world in need of the same trait in order to survive in their habitats. Such ligands trigger the biochemical activity that leads to genetic control by getting absorbed through the mucous membranes of the nose or through membranes of other olfactory organs. Through the body liquids, they are transported to the surface of the body cells where they interact with protein receptors that change conformation and are thereby strictly controlled from the consciousness arisen from the super orbital (12). Such activity initiates multiple processes and interactions in the cell.

Biochemical reactions

The conformation change of the cell surface receptors (9,12) is the first biochemical reaction in the sequence of events leading to metamorphosis. All processes initiated in the cell by this action are of biochemical and genetic character. Such actions give the cell the possibility to adjust itself to processes leading to organ and tissue production, and in the end, the capability of forming a complete adult individual organism with its own consciousness. Changing of protein conformations of the cell surface informs the super orbital (consciousness) (12) about initiation of metamorphosis (14). Thereby, the super orbital adjusts its energetic activity to coordinate a long row of biochemical activity, leading to control of master genes involved in the morphogenesis. This includes a row of feedback mechanisms that involve genetic activity for production of master regulatory proteins that regulate the expression of the metamorphous master genes. It also leads to control of the processes of cell cycle control and control of cell proliferation. These processes also include huge amounts of biochemical activity, and control of master genes and master regulatory proteins. From this, it is easy to imagine the huge “symbiosis” of processes and mechanisms lying behind the united process that initiates the “metamorphous top-down” evolution.

Control of master genes and master regulatory proteins

The metamorphous process itself is governed through activity of master genes and master regulatory proteins. A lot of master genes have been identified that are involved in the process of metamorphosis through evolution (a summary of some of the most important of these are in preparation for publication). Such genes produce proteins that are involved in the regulation of expression of all other genes of the single individual’s genome, called master regulatory proteins (9). This means that the super orbital, by consciousness, through strict and precisely energetic control of the quantum chemical energies needed for expression of genes necessary for all developmental processes of a forming body to process, is able to control each tiny little biochemical process needed for “metamorphous top-down” evolution. This includes production of hormones and other ligands needed for configuration changes of proteins, membrane proteins involved in cell-to-cell adhesion and transport of ions through the cell membrane, ATPase and ATPsynthetase involved in production and degradation of ATP (the main energy resource of the cell) (9,15), but also production of proteins involved in

regulation of mitochondria regulatory proteins and thereby involved in the main production of quantum chemical ATP energy of the cell (15), which again is under strict control from the super orbital. And this amazing symbiosis of processes controlled from the super orbital gives only a humble overview of a little corner of the biochemical processes of nature and may be considered as much more complex and complicated in reality, because scientists have only been able to map a bit of the great whole of processes and mechanisms involved.

Morphogenesis

The control of master genes and master regulatory proteins, as mentioned above, leads to the metamorphous processes necessary for nature and individual organisms to satisfy their needs for fitness and survival. These processes make the gathered super orbital of the individual organisms and nature (their joint consciousness) capable of, through influence of the quantum mechanical orbital energy needed for positional information on the different fractal levels, organizing its own evolution of such traits through developmental enforcement of the traits necessary for survival in a specific habitat or microhabitat. Concerning nature, such processes make it capable of, through the gathered super orbital, forcing the single individuals involved in the processes to go through the “metamorphous top-down” evolution for satisfying the natural need to multiply the diversity of species necessary for keeping the huge gathered ecosystem of the earth fit and stable (13).

Manifested mirror image

Following the hypothesis of “metamorphous top-down” evolution, this process is manifested as a mirror image that influences the whole species genetic regime, and through the airborne diffusion of chemicals during the chemical bombing raid, such a mirror image can be manifested in isolated habitats that need the same peculiar traits for survival and thereby give the capability of developing different species with, for example, wings, such as the species of the class Diptera that includes the fly, gnat, and mosquito. Such functions are governed through the diffusion of pheromones carried by the wind and other airborne proteins secreted by an individual through chemical bombing raids as mentioned above and through changes in behavioural patterns that again implement a huge amount of biochemical reactions governed from the super orbital. Such processes implement the same kind of biochemical action governed from the super orbital as mentioned earlier, but in the connection with “manifested mirror image,” the behavioural patterns that are implemented between the individuals within a habitat are of major importance. It is those that make the difference between the manifested mirror developments in the different populations.

Thereby, they force the different populations against different development and, by this, force the development of an even more complex diversity of species. This means that in each isolated habitat, through the internal chemical bombing raid and behavioural activity in combination, the development goes through the evolution of a new species (see Figure 1), but in different isolated habitats such development leads to different species (not identical but “of the same kind”), e.g., gnat, mosquito, and the fly of Diptera. This means that different behavioural patterns involved in the implementation of a manifested mirror image are the

reason why some isolated populations develop to gnats, others to flies, and even others to mosquitoes. Such developmental differences are caused by very small differences in the positional information of the different fractal levels (16,17,18), leading to small changes in the evolution of a population through the ontogenesis of the adult individual, and are under tight control from the super orbital gathered between nature and the involved individuals. This means that these use their gathered consciousness to gain their needs for survival.

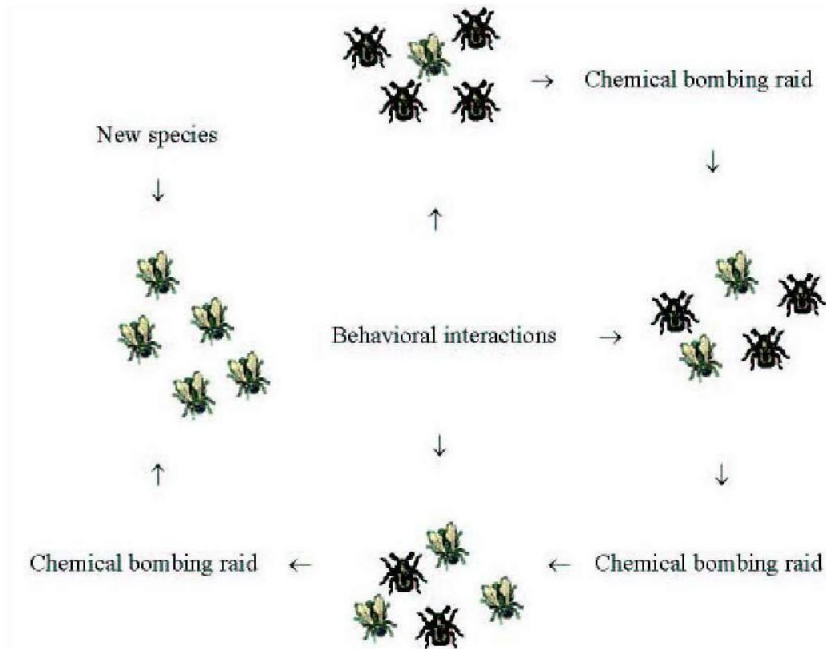


Figure 1. In a population, when there is a breeding ground for the development of a specific trait, e.g., the development of wings, this will gain behavioural patterns that favour the development of wings in the population through activation of biochemical reactions. At the same time, chemical substances are transferred between the individuals, also initiating biochemical reactions. Such biochemical reactions ensure the control over the genetic regime, so more and more individuals develop the wings. The more individuals that have the wings, the greater evolutionary pressure there is in the population in favour for wing development. In the end, this will involve the creation of a new species.

Genetic regime control

The manifested mirror image leads to “genetic regime control.” This means that the gathered super orbital gets control over the genes of all biological organisms involved in the development of a specific species in a way so it is capable of coordinating the genetic activity towards developing “morphologically identical” individuals within the new species. Such control is governed by the super orbital (12) through parallel organization of the distribution of positional information at the different fractal levels (16). In this way, the gathered super orbital is able to guide the development of a new species. Thereby, both nature and the individual organisms governed from the super orbital have their needs covered. Nature has expanded the diversity of species, and the individuals get their need for survival satisfied.

The process of adult human metamorphosis

“Metamorphous top-down” evolution is driven by the gathered super orbital. The super orbital consists of all energies involved in all processes involved in the evolutionary shift. This is also our definition of consciousness (12). Therefore, the shift in evolution is governed by the consciousness. By this interpretation, the consciousness is involved in the development of a huge amount of species and peculiar traits of individual biological organisms through evolution from bacteria to humans. We think that such an evolutionary mechanism as the “metamorphous top-down” evolution has been interacting with the mechanisms of natural selection through evolution, and these two mechanisms together are able to explain the huge diversity evolved through evolution. This process of “metamorphous top-down” evolution has also been able to force the development of a more realistic consciousness with the development of more complex organisms. We also have a kind of feedback function. Consciousness forces the “metamorphous top-down” evolution to happen, and the “metamorphous top-down” evolution evolves a more complex consciousness, leading to human consciousness as, until now, a temporary end of the evolution. What comes next? We do not think evolution has stopped yet. As a very “advanced” result of the “metamorphous top-down” evolution, humans have evolved the capability to go through an adult human metamorphosis that leads to recovery from illnesses and distortion, in order to gain fitness and survival. The adult human metamorphosis is a delicate kind of “metamorphous top-down” evolution and is probably capable of leading the development of humans to new heights of evolution.

Discussion

This chapter discusses the mechanisms behind the evolutionary shift between “natural selection” and “metamorphous top-down” evolution. We see the processes involved in this evolutionary event as a function of consciousness. The consciousness drives evolution to make its shift by a tight and strict regulation of quantum chemical energies that are governed by and are a part of the super orbital. Nature uses the fractal structural levels to govern the distribution of positional information in a way that leads to the creation of new species. In this way, the shift in evolution is able to satisfy both the earth’s needs for the creation of new species and the single individual’s needs for fitness and survival. In this way, nature is able to continue and maintain its biological characteristic as a huge symbiotic ecosystem covering the whole biosphere of the earth, through consciousness.

We imagine the main power of nature (read universe) as one complete symbiosis of energies gathered in one huge super orbital, and isolated events in nature as the shift in evolution, as a local tiny “universe” acting in itself but as a part of the great wholeness of nature. Such local “universes” are the building blocks of nature (the universe) and can be manifested at all fractal levels, independent of how huge or tiny they are as events compared to the whole. This means that the event of “metamorphous top-down” evolution is only a little part of the whole that includes everything from the smallest parts of an atom to the universe itself. But as an isolated event, the evolutionary shift draws our attention because it is a main function of nature, which through evolution has led to the development of us as human

beings. This is one of the main reasons why we have drawn our attention specifically to this particular event in this chapter. However, we think the shift in evolution is governed by the super orbital that is formed by gathering all super orbitals from all parts involved in the evolutionary shift (compared to the absolute universe) forming a gathered local “universal” super orbital. This very powerful, local super orbital governs the shift in evolution, from the evolutionary natural selection to the “metamorphous top-down” evolution, through a huge series of biochemical and genetic processes (listed above) that are under tight control from the super orbital (read consciousness), through quantum mechanical activity.

All this activity, through “metamorphous top-down” evolution, has led to the development of the human being and its capability for gaining spontaneous healing and self-recovery through adult human metamorphosis (14). We do not think this is the end of evolution, but through adult human metamorphosis in interaction with evolutionary natural selection, nature has the capability to drive the evolution of human beings to even higher evolutionary goals. By such evolutionary activity, evolution pushes the formation of new peculiar traits necessary for survival for the single human being. Human evolution is still going on, and the most constructive perspective must be that we are on our way to our evolutionary destiny as conscious, healthy, and happy people fully able to use all talents and create optimal value to our world.

Conclusion

It is unlikely that the morphological information of the organism is situated in the DNA base sequences because of the C-value paradox and because the normal self-organization of proteins is unable to explain the general morphology, and because form apparently can evolve without corresponding molecular evolution. According to our hypothesis, the fine structure of energy has an inherent ability to drive the self-organization of all evolutionary levels, from the smallest units to prokaryotes. We believe that there is a creative principle in nature where evolutionary selection works.

We believe it makes perfect sense if the fine structure of energy works in a creative way and organizes evolution. The evolution from unicellular to multicellular organisms has also become explainable through our hypothesis, since the creative principle works through creation of still higher organization levels. We think the “metamorphous top-down” evolution evolved from nature to satisfy its own needs for the creation of huge biological diversity, for its survival as a huge symbiotic ecosystem in the biosphere of the earth. We also think that the “metamorphous top-down” evolution evolved as a result of the single biological individual’s need for fitness and survival in a specific habitat or microhabitat. We think this shift in evolution is guided from the super orbital gathered by the super orbitals from all parts involved in the evolutionary event. We guess that the super orbital governs all genetic and biochemical processes involved in the whole series of events involved in “metamorphous top-down” evolution. Through this, we think that nature, by use of its consciousness, has initiated the creation of the great diversity developed through evolution and living on earth today.

Furthermore, we think that the gathered super orbital (consciousness) that governs the evolutionary shift is only a local part of the huge super orbital (the main consciousness) of the universe. We think that “metamorphous top-down” evolution is driven by the consciousness

in all organisms from bacteria to humans, but the human consciousness has developed from the “metamorphous top-down” evolution and has given the human being the capability to spontaneously self-heal from mental and physical diseases through a process we call “adult human metamorphosis.” This process is a sophisticated kind of “metamorphous top-down” evolution that makes the human capable of, in interaction with nature, an even higher level of evolution.

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The human brain: The structure of the cerebral cortex. Are there really modules in the brain?

The structure of human consciousness is thought to be closely connected to the structure of cerebral cortex. One of the most appreciated concepts in this regard is the Szanthagothei model of a modular building of neo-cortex. The modules are believed to organize brain activity pretty much like a computer. We looked at examples in the literature and argue that there is no significant evidence that supports Szanthagothei's model. We discuss the use of the limited genetic information, the corticocortical afferents termination and the columns in primary sensory cortex as arguments for the existence of the cortex-module. Further, we discuss the results of experiments with Luminization Microscopy (LM) colouration of myelinated fibres, in which vertical bundles of afferent/efferent fibres that could support the cortex module are identified. We conclude that sensory maps seem not to be an expression for simple specific connectivity but rather to be functional defined. We also conclude that evidence for the existence of the postulated module or column does not exist in the discussed material. This opens up an important discussion of the brain as functionally directed by biological information (information-directed self-organisation) and for consciousness being closely linked to the structure of the universe at large. Consciousness is thus not a local phenomena limited to the brain but a much more global phenomena connected to the wholeness of the world.

Introduction

In our quest for a new understanding of the mysterious connection among life, matter and consciousness (1-10), we have now turned our interest towards the human brain. The structure held responsible for the structure and quality of human consciousness is the neo-cortex, the only structure that discriminates us qualitatively from the other vertebrates. Our motivation for the exploration of the life-matter-consciousness-link is our finding that quality of life, health and ability primarily is determined by our consciousness. This discovery has lead us to the interesting possibility that guided shifts in the state of consciousness and the

development of self-insight with a more positive, responsible and constructive philosophy of life can be used as medicine to help cure patients. Based on this strategy, we have made a series of papers setting the strategy for alleviating healing many different physical, mental, existential, and sexual diseases and health problems (11-52). Another motivation for a deep exploration of the matter-life-consciousness link is the strange fact that “holistic healing” – the healing of the patient’s total life and existence, including body, mind and spirit – seems to be closely connected to the patient recovering his experience of “sense of coherence” (SOC) (53-59). SOC is actually the experience that one conscious being is connected to the whole universe through our physical and mental existence (59); to bring the patient back to be an integrated part of the world seems to be the fundamental idea of all medicine, the tradition going all the way back to Hippocrates and his students (60). Many theories concerning the neo-cortical function are based on the possible existence of discrete modules in the neo-cortex, as suggested by Szentagothai (61). It is tempting to do this, because the function of neo-cortex is a lot easier to understand and modulate in a mathematical way. Unfortunately, evidence does not seem to exist concerning modules in Szentagothai’s understanding, as approximately 300 μ large, discrete columns that are able to make the “building stones” of association-cortex. In this chapter, we discuss the possibility of the existence of Szentagothai’s cortical modules.

Does evidence for Szentagothai’s cortex module exist?

Szentagothai (62), wrote "It was then (1974) that the assembly of larger tissue complexes from repetitive units of similar build – not unlike the integrated circuits in electronics technology – became an attractive conceptual model to explain how such an immense complexity in ‘wiring’ might be put together without having to make unrealistic demands on the genetic apparatus responsible for this feat in system engineering." Szentagothai had both the genes and the microchips in his mind when he introduced the modular concept into the association cortex. He realized that repetition of a structure coded by the genes as basis of the cortex development would economize the specific amount of information delivered by the genes. Even if we do not know of any molecular mechanism of such kind, this is a good idea, because such copy mechanism does not deal with DNA replication. Instead it deals with supra-cellular patterns. Therefore, we have gradually gotten confident with the description of such phenomena through the conception of positional information. Analogue examples such as the development of testine-villi may be described in this way, and therefore modules are an attractive idea. Furthermore, genes can be thought to deliver “continuous modules” (as in visual cortex, see later) and maybe create connectivity in a closely netted, unlimited, roomy way.

About an experiment (61,63) invented to prove that association cortex is constructed by discrete modules, Szentagothai (61) wrote, “Here at last is unambiguous evidence for really columnar cortical architecture.” In this experiment, proteins containing injected 3H-amino acids were transported to cortical areas of the brain. After subsequent auto-photography, these experiments unveiled the finest 300 μ broad vertical columns in all layers of cortex (62,63,64). Szentagothai (62) wrote, "It is most interesting to compare the overall size of the columns with the arborisation pattern of individual cortico-cortical afferents as it appears in the Golgi picture. Majorossy shows that both the size and the shape of the arborisation space

correspond very closely to the columns, as delineated by the degeneration or autoradiographic tracing techniques.” Consequently, this column is analogous to the termination column of the corticocortical afferent.

The big question then is if the identified 300 μ broad termination column represents the module Szentagothai tries to prove the existence of. Seemingly, he has not found evidence enough to support such kind of structure (61,62). Szentagothai supposed that this area had a great convergence. But Goldman and Rakic (63) said: “Such clear modular pictures as those of the Figure (63) are not often seen, because the injections necessarily must cover many modules that result in agglomerations of the labelled modules, often in strips.” This indicates an overlap between the termination columns and why fully discrete modules seem not to exist. But, of course, a “half discrete” module represented by the largest concentration of afferents, cannot be excluded on the basis of this.

In cortex, about 2,500,000,000 corticocortical afferents have been identified by Kandel et al. (65). But cortex has not room for more than approx. 3,000,000 columns of 300 μ in diameter, only enough to supply approx. 100 afferents to each column. If then a discrete module exists, a great amount of afferents may terminate within this. Therefore, it does not seem reasonable to take the single afferents termination, as indication for the existence of superior modules. Szentagothai supports his opinion that the primary sensory cortex has a columnar structure on evidence from early research (62,65,67). He emphasized two examples from, respectively, the somatic sensory cortex, 1), and the visual cortex, 2), which he thinks correspond to the potential modules of the association cortex. However, he realized that the modules are not evident in association cortex. 1) Barrels: In a rodent’s brain, “barrels” exists in the fourth layer of the somatic sensory cortex. Each barrel contains 2,500 neurons arranged around a hollow centre. One hundred somatic afferent fibres lead to these barrels from receptors around the barrels. If a barrel is removed, the other barrels are regularly distributed and fill out the area where the barrel is missing. This arrangement reminds us of the primates somatic sensory cortex, where inputs also are recorded in the fourth layer. If some nerve treads are damaged in this layer, a corresponding re-arrangement to that of the barrels can be realized in this layer, see (65). Because a rodent only has 50-100 barrels each delivering huge amounts of information, it seems reasonable that each barrel has an individual discrete representation in cortex. This is a unique exception of the organization of the somatic sensory cortex (65). Such kind of organization of the representation only exists in the fourth layer of the somatic sensory cortex, which is why it cannot be explained as a cortical column. Because the amount of barrels can vary independently of the area of the modality, it can be stated that if the amount of barrels determines the size of cortex, a single barrel cannot be a structural module. 2) Hyper columns: The hyper columns are found in primary visual cortex (65). In one direction, these are organized in ocular dominance columns, and in the other direction, they are organized in orientation columns. However, we do not think the expression column fits here because the ocular dominance column is defined by the termination of the afferent in the fourth layer where they do not make discrete columns but instead alternate stripes from right and left eye. Perpendicular to these, the orientation columns can be defined as serial prisms that separately can be adjusted so their angle is a bit displaced compared with the prism. But nothing indicates that the line detector is not continuous. Also, the hyper column is arbitrary defined as a 1-2 mm large part of the cortex that makes up a right and a left stripe on the one side and a complete round of the line detector on the other. The colour modality are

handled in “blobs” in layer two and three of cortex (68). Therefore, it is not likely that they represent the cortical module.

Generally, for instance concerning the receptive field (65), all cells are identical in a very thin layer of the somatic sensory cortex. Possibly, this field corresponds to the “micro-columns” described by (62,69), of approx. 10-30 μ but not to the expected “micro column.” Maybe, cortex is constructed by continuous “modules” as the hyper column that very well could be a repeated structure coded by the genes, and seemingly, Szentagothai did not find any support for his discrete modules in this possibility because the primary sensory cortex did not show any characteristics of a discrete modular structure. Also in the primary motor cortex, the evidence for the presence of columns is weak (Hultborn, Personal communication), because the structure of stripes can only be distinguished here, where the organization seems much more to look like the visual cortex, analogue to the ocular dominance stripes, see (70).

Other data that could support the existence of a cortex module

In colouration experiments with myelinated fibres, vertical bundles of afferent- and/or efferent-fibres are often seen many places in the cortex, as reviewed by Williams and Warwick (71). In LM, the distance between these is approx. 2-3 pyramid cell diameter (20-150 μ) and approx. 10 μ in thickness, and seemingly 10-20 of these myelinated axons are seen to lose the myelination throughout the cortex (own observations). These “weigot-columns” are hardly Szentagothai’s modules, because 1) the distance between these is too small and 2) each of the large modules should receive 1,000 afferents and deliver 1,000 efferents and not 10-20. But maybe these 10-20 myelinated axons correspond to “micro-columns” of 5 μ thickness described by Mountcastle (72). It seems like the outspread termination of monoaminergic fibres in neo-cortex can be observed as a gap of around 100 μ (73). This distance is too little to fit with modules of 300 μ . But other researchers think that cortex contains non-modular “overlapping columns” of 800 μ (72).

Sensory maps seem not to be an expression for simple specific connectivity

The somatotopy map shows immediately reorganization (65) when the supplying nerve is cut. This shows that the afferents terminations happen through a large area and do not indicate that they are “hard wired” in a simple way. We can guess that such phenomena are caused by complex connectivity and find it obvious to set the organization of the map in connection with the attention and the positional information that manage the complex dynamics of the morphogenesis. In the same way, because the thalamus-cortical afferents terminates opposite large areas, the ocular dominance columns seem to make up a kind of functional organization (64).

Szentagothai (61) realized this and proposed that inhibitory inter-neurons adjust the afferents. But such arrangement does not support the existence of structural discrete columns in the sensory cortex.

Discussion

Implications for holistic medicine

Millennia ago, around 300 BC, at the island of Cos in old Greece, the students of the famous physician Hippocrates (60) worked to help their patients to step into character, get direction in life, and use their human talents for the benefit of their surrounding world. For all that we know, this approach was extremely efficient medicine that helped the patients to recover health, quality of life, and ability, which resulted in Hippocrates attaining great fame. For more than 2,000 years, this was what medicine was about in most of Europe. On other continents, similar medical systems were developed. The medicine wheel of the Native Americans, the African Sangoma culture, the Samic Shamans of Northern Europe, the healers of the Australian Aboriginals, the ayurvedic doctors of India, the acupuncturists of China, and the herbal doctors of Tibet all seem to be fundamentally character medicine, reconnecting man to his world. Interestingly, the Hippocratic and the transcultural medical traditions gave birth to two successful movements in the last century: psychoanalysis (74,75) and psychodynamic therapy (76,77), developed further into today's clinical holistic medicine, integrating "short-term psychodynamic psychotherapy" (STPP) (78,79) with the many traditions of bodywork (developed further into emotionally realizing bodywork by Reich (80), Lowen (81) and Rosen (82)) and existential work, today often much inspired by Antonovsky and the concept of SOC (83,84).

What we have learned by following this long journey of medicine that the grand medical heritage from the planet's different cultures teach us to work on body, mind and spirit at the same time; medicine men of all kinds have always combined talking, touching, and praying. The fundamental problem of understanding the connection of human consciousness and health is this: how do we understand the experience of true connectedness with the universe of a human being, if the brain is just a computer generating the consciousness? The module concept reduces the brain from being a pattern-formatting organ under information-directed control from the wholeness of the being and the wholeness of the world into just being a computer with a pretty isolated function. The importance of the module concept is seen in the attractiveness of this concept, which gives a feeling of understanding the brain, at least to a certain level, as a computer, or network of computers – the modules, in many models working very much like central processing units (CPUs). If there are not modules and not real structure of the cerebral cortex, only billions of brain-cells firing at their own will, a highly structured consciousness really is a true mystery. This mystery opens up for the possibility that our consciousness is structured true to our complex interaction with the surrounding world on an informational level. And this is fundamentally what we need consciousness to be to understand the extreme important of the concept of "sense of coherence" for the art and science of holistic healing.

Conclusion

When small 30 μ cortical columns are taken from a random spot of cortex, no significant difference in the amount of cells can be identified. When we look at corticocortical

myelinated afferents, no organization of 300 μ can be identified. When many afferents are coloured at the same time, we can see no superior columns. This means that the well-known 300 μ termination columns from corticocortical afferents overlaps. Such structure does not support the existence of the discrete module proposed by Szentagothai. “The “barrels” of the rodent’s somatosensory cortex does not seem to be modules, and discrete modules in visual- or somatosensory cortex does not seem to be discrete. At the cell level, the large basket cell seems to be independent of, and opposite to, a 300 μ module. The thalamus cortical afferents are shown to terminate in the fourth layer, independent of the corticocortical afferents termination column. Besides this, the most corticocortical afferents are shown to terminate laminar (so the fibres from, respectively, layer 7 and layer 5 of neo-cortex projects to the same layer). These considerations do not seem directly to permit any modules. Therefore, we conclude that evidence for the existence of the postulated module or column does not exist in the literature. There is no evidence for an app. 300 μ large vertically placed structure that could be able to make up for the cortical ground-unit proposed by Szentagothai.

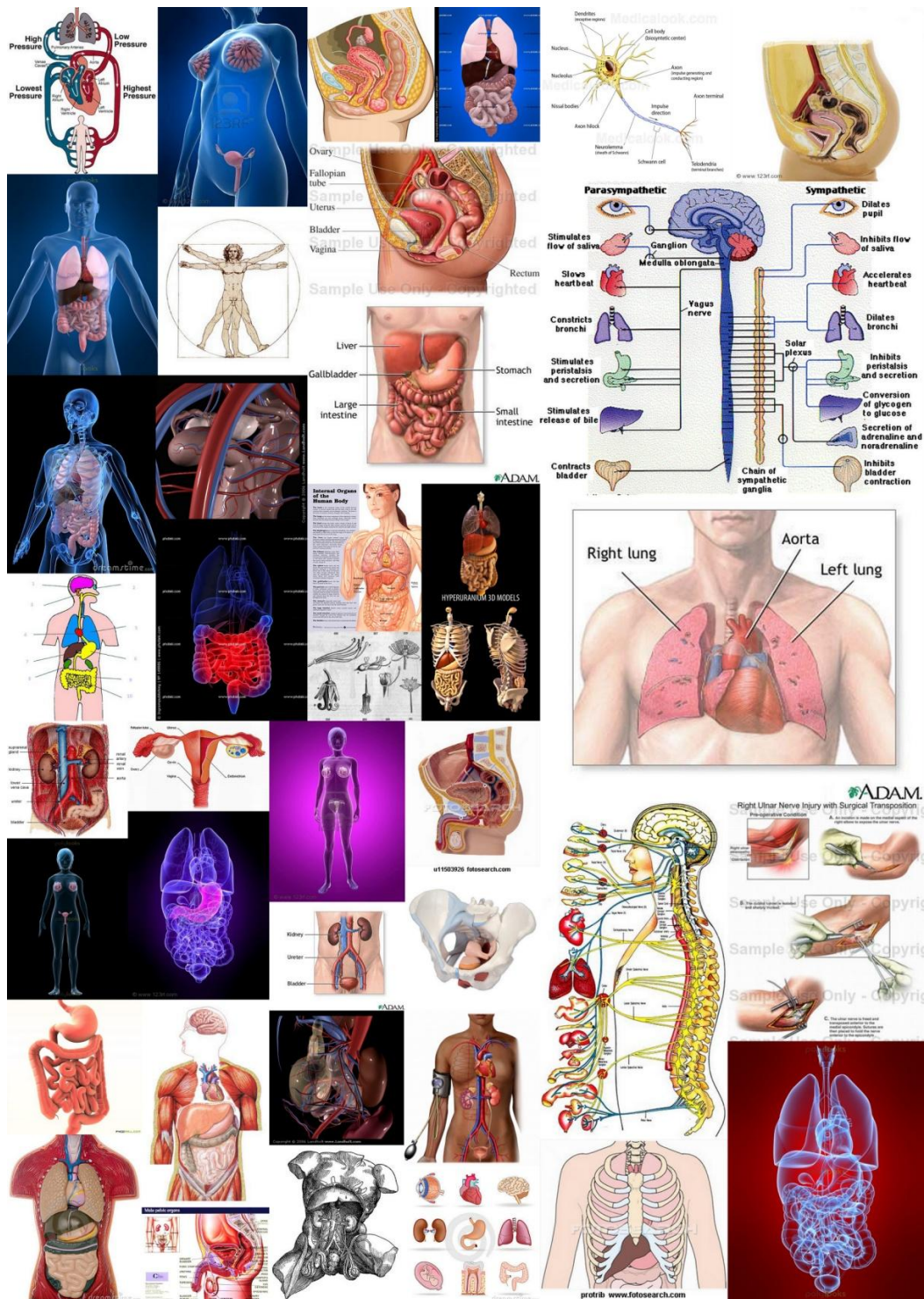
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A theory for the structure and function of the human brain

As a student, it can be scary or exciting to come close to the brain. First, you will not really expect to be able to understand your brain, would you? The brain is supposed to be far too complicated for anybody to really understand. And then, what is there to understand? If the brain gives us consciousness, then we have a serious problem understanding it. On the other hand, if consciousness is given by the cells of the body, and the organs have their own way of ordering and organising this consciousness, then we might be able to understand what is so special about the brain. When we look closer into it, we might even start to understand what is going on here.

In holistic medicine, we often talk about brain-mind and body-mind, as the body seems to carry its own mind, especially good for storing old painful memories in a way so we can react from our learning without being burdened with the overwhelming pain of the traumatic events. This is called repression and conditioned learning. The body seems to be very good at that. To get rid of all these traumas contained in body-mind is really the reason why we need body-therapy.

The brain is good for something else: Sensation, movement and cognition. On the top of the brain's cognitive functions, we have recognition, logical analysis, abstraction and concretization, association, dis-association, and a number of less known and more subtle abilities. The logical functions are a product of the way the brain manages information. We can – at least to some extent understand – understand how the brain does this simply by looking at its structure and physiological function. As we shall see in this chapter, it makes sense. We cannot really go into detail understanding the brain, as science today still misses the mathematical tools for analysing the patterns created in the brain, and even the fastest computers are still a million times too slow to really model the brain. You might know that even the smartest algorithm we have cannot really imitate vision. We have come some way with fractal geometry, etc., but we do not come close to understanding the dynamics of the patterns of the functioning brain.

So this is not what we offer you in this chapter. We offer you something else: A simple analysis of cognition as a product of logic, abstraction and concretization, association and disassociation. Just taking these simple functions together already allows us to get an idea of what the brain does for us: It gives us a model of the world. This is good and bad. Good

because we are able to be on top of the foot chain and win the world. Bad because we cannot administer the power so we abuse everything and everybody and destroy the whole planet. We are getting caught in our minds – we think we know and understand, but we only know and understand our own world not the greater whole. So we become proud and stupid, while we feel saved and good, we can be very destructive, naïve and evil. This is the problem of the Ego, the representation of Self in brain-mind. This is basically the problem that is going to end the world as we know it, if we do not solve it.

Therefore, it is important to understand the brain in detail. You must know the feel of the brain, what it does, why it attracts us so immensely, and why we are so seduced by its power and cheated of the illusion of truth we get through brain-mind. First, when we get our own brain under control by really understanding its work, we can be free human beings. When both brain-mind and body-mind is free, they become translucent, and consciousness returns to its poor, natural form.

The human brain is probably the most complicated single structure in the biological universe. The cerebral cortex that traditionally is connected with the consciousness is extremely complex. The brain contains approximately 1,000,000 km of nerve fibres, indicating its enormous complexity that makes it difficult for scientists to reveal the function of the brain. In this chapter, we propose a new model for brain functions: information-guided self-organization of neural patterns, where information is provided from the abstract wholeness of the biophysical system of an organism (often called the true self, or the “soul”). We present a number of arguments in favour of this model that provide self-conscious control over the thought process or cognition. Our arguments arise from analysing experimental data from different research fields: histology, anatomy, electro-encephalography (EEG), cerebral blood flow, neuropsychology, evolutionary studies and mathematics. We criticize the popular network theories as a consequence of a simplistic, mechanical interpretation of reality (philosophical materialism) applied to the brain. We demonstrate how viewing the brain functions as information-guided self-organization of neural patterns can explain the structure of conscious mentation; we seem to have a dual hierarchical representation in the cerebral cortex: one for sensation-perception and one for will-action. The model explains many of our unique mental abilities to think, memorize, associate, discriminate, and make abstractions. The presented model of conscious brain seems also able to explain the function of the simpler brains like that of insects and hydra.

Introduction

For decades, we have tried to understand the magic and complex side of man related to information and consciousness (1-11); we have analysed cell communication and life using concepts like “deeply structured quantum fields,” and we have analysed the structure of the neocortex and human consciousness (12-20).

With such a background in the literature, you should be able to understand our motivation for the development of this new theory of the brain as we need a strong scientific foundation for holistic medicine (21-24). Holistic medicine can provide us with new treatments for many physical, mental, sexual, and existential human sufferings (25-60). Our former philosophical work on life, brain, consciousness, biological information, order, health, and disease has lead

to successful treatment of patients with many different health problems (61-66). It is our hope that a more profound model of the human brain and consciousness can facilitate further progress. Our work is based on many publications by gifted researchers like Freud, Jung, Reich, Lowen, Rosen, Anand and Antonovsky (67-75) and many others, who created the foundation for the psychodynamic psychotherapy (76-78). The present work is neurophilosophical, not traditionally neuroscientific. It is based on many different sources of contemporary thoughts and is thus highly interdisciplinary. Our core ideas or axioms are:

- Everything has a solid particle and an energetic wave aspect, according to the laws of quantum physics.
- Everything is thus an aspect of energy. We live in a quantum world where everything, when it comes down to it, is interfering, non-local energy fields of quantum nature (8). These fields are structured and can carry information that can be used by the living organisms (1-10).
- Everything is thus an aspect of matter, like atoms and molecules giving rise to biochemistry that can be used by the living organisms.

A living organism has two sides, a subjective and an objective side; matter and consciousness that are bridged by biological mechanics, including according to our understanding both biochemical and informational quantum mechanics. Our hypothesis is that all organisms, even bacteria, have consciousness and a sense of subjectivity. We doubt that a virus has awareness or subjectivity, but then again we need to define what we mean by “subjectivity” and “consciousness.” Those two are difficult and thorny terms with many meanings and connotations; so by consciousness, we mean an entities’ ability to represent in its informational field the inner and outer world in a meaningful way. Meaning points of purpose carried by the entity. If a virus can sense its surrounding world without sheer mechanical stimuli, then it has awareness and consciousness by our definition. Awareness is thus the sub-atomic (“quantum”) quality derived from the entities’ wholeness (the informational field) that “senses” (represents) the inner and outer world.

When two particles of any kind are contained in the same system, they share a common quantum state and thus stop being two separate entities; their common quantum state can be used to coordinate the living system’s parts with its wholeness, and this is true for life at all levels: from molecular ensembles, organelles, organelle-systems, cells, organs, organ-systems, organism and the levels of the outer ecosystem in which the organism participates. What is life in this sense? Is it not a supernatural vital force, a cause, an agent, or an independent being like the Indian or Christian concept of the soul? No, but rather a materialisation of an extremely complex and mysterious quality or aspect of the universal energy, providing the living being through billions of years of evolution with autonomy, light, meaning, joy, purpose, will and choice.

The level of separateness defines the extent to which any part of a global ecosystem (living totality) has autonomy; the level of the organism has a rather high degree of autonomy giving rise to the organism’s sense of self. Every part of the whole has thus to some extent autonomy; parts that merge completely (i.e., cells that merges into muscle fibres) surrender autonomy to the system. All parts are partly autonomous and partly controlled by the levels above and below them.

We are well aware of the depths of the mathematical structures rising from chaos theory, fractal geometry, and complex dynamics (79,80), but we want to emphasise that we do not believe that self-organising patterns can control neither consciousness nor behaviour. Quite on the contrary, we find the mathematical structures derived from the new mathematic (81) to be rather far from biological patterns, so it is quite obvious that we have not yet found the key to a profound scientific understanding of life.

This chapter is a presentation with interpretations based on these fundamental axioms of the current knowledge of the human brain. We are thus taking an absolutely opposite standpoint than normally done in neuroscience, where the nerve-cell is seen as the mechanical unit of the brain, under control of genes, hormones, neurotransmitters, neuropeptides, and functional stimuli. Our hope is to be able to understand the nature and structure of consciousness and especially the functional relationship between consciousness, mind, and the physical (or cellular) body. Our hope is that such a model may allow us to understand emotions and psychosomatics – and in the end, existential healing (23,24,26) and salutogenesis (defined by Aaron Antonovsky (1923-1994) as healing of physical and mental illnesses through the rehabilitation of “the sense of coherence”) (74,75).

The idea that the cell is conscious might seem strange to many people, but that was a conclusion that Sir Roger Penrose and other researchers reached at the SOL-meeting at the Niels Bohr Institute in Copenhagen 1996 (82). Since this meeting, this has been our understanding of living organisms: that they always carry consciousness. This means that every cell in our body to some modest extent has an independent consciousness and subjectivity. It is this phenomenon that allows cells to develop into cancer cells, and cells to be cultivated in the laboratory, also after the death of the multicellular organism. We know that this position will be hard to accept in modern neuroscience: that every nerve cell thinks for itself and makes its own independent decisions, which makes it so much more than just a small “mechanical computer.” Sir Roger Penrose has published a similar hypothesis in his book *Shadows of the mind* (83). It could be argued that we should draw a line somewhere between those unicellular organisms that may have primitive consciousness versus the cells of our nails or hair (84), but we still find it most likely and in accordance with the philosophical principle of Occam’s razor that consciousness is a trait carried by all living beings but on different levels of complexity.

Does a zygote have a sense of self?

This leaves us to the natural question: Does a zygote have a sense of self and consciousness? Based on empirical research with people re-experiencing their conception, the answer definitely seems to be affirmative, but the objectivity of such studies has been disputed (84). If you think this is a little too farfetched, we must tell you that in spite of being quite sceptical ourselves, we as scientists often see patients spontaneously regress all the way into the womb in intensive holistic therapy. The first author has, after 20 years of consecutive therapy, suddenly regressed during holotropic breathwork (86) all the way back to the zygotic state; according to this experience there was indeed a conscious “I” from the very beginning of life (87), but then again, when you become very experienced late in life, you start to relax your scepticism a little and believe in all sorts of things, and then you are not really reliable any

more, are you? To keep it simple, which is a must in order to comply with Occam's razor, the sense of self (being an independent soul) does not develop gradually from the zygote – embryo – foetus – newborn – infant – child – adult – old age; this feeling of being an autonomous creature is with us from the very beginning as an innate trait of the person; what is developed through time and experience is the level of complexity of the mind (brain-mind), and perhaps also the complexity of the being.

Many scientists believe that the human brain is a kind of independent computer able to understand almost everything in this universe, but at the same time it seems clear that we human beings never fully will be able to comprehend consciousness and the brain itself. This paradox may be a consequence of a narrow, rationalistic and materialistic interpretation of reality (1-10).

If the interpretation of reality gets more complex and less naïve, this might give us a chance of developing a more transcendent and deeper understanding of the brain and consciousness. The description of life as a complex dynamic and information-directed self-organizing system (4) is an example of this point of view, and it can settle the above-mentioned paradox. From this perspective, consciousness is seen as a characteristic of all living things. Because of the relative high degree of outer separateness, self-consciousness is especially prevalent in the human brain, which has a large degree of autonomy; the abilities of the human mental self (Ego) are complex and advanced. The body is the next fairly independent biological entity, carrying, as Freud noticed correctly, the consciousness of the Id (and the body-mind). Finally, the human wholeness also carries its representation of us called our "spiritual self," "true self" or "soul." This gives man three dominant representations of self: The wholeness-related self (below called the Soul), the brain-related self (below called the Ego), and the body-related self (below called the Id). And then we have the "I," the integrative self that emerges from an organic synthesis of body, mind and spirit. This "I" is often in spiritual literature and poetry called the "heart" (Comp. the lyrics of Madonna: "When your heart is open"). In Freud's work, the Superego is synonymous with the Soul; Freud often said that everything good in man comes from the Superego (67).

The interesting question, "Doesn't the self operate through the brain?," leads us to an immediate "of course," and a secondary remorse on deeper reflection, which in the end brings the realisation that our thoughts and behaviour might be controlled by our self, but feelings, sexuality and spirituality are as well controlled by our self, so are we really living in the brain? This is most definitely not our experience, if we must be honest. Emotions are felt in the body; and our sexual feelings are definitely felt primarily in our sexual organs. And maybe this is not merely a joke, but human biological reality that must be respected, as Freud insisted.

We know that there seems to be an interpretation of our feelings in the limbic system, and without this happening, we could not be mentally aware that we were emotionally hurt or sexually excited. But to insist that feelings and being is merely a brain-thing – that is insisting on something that obviously conflicts with our common sense (senses communis). As therapists, we are emotionally oriented people, and we really like to place the "I" in our hearts much more than in our brains. This gives a much more human contact and a much richer emotional life. On the other hand, we must agree that mental consciousness obviously is focused in the middle of the brain (in what the Indians have called the "third eye" for 7,000 years). We like to use our experiences as basis for understanding, not vice versa. And this is the true reason for making this chapter: We need to stop thinking so much and start sensing

and explore our inner self to really understand what is going on. We suspect that many neuroscientists often miss the obvious truth, because they do not sincerely feel what is happening inside and reflect upon it. Basically, this is a question of using subjectivity in research and putting sufficient emphasis on the qualitative aspect of science. In this chapter, we want to analyse the implications of this for our understanding of the brain.

Consciousness

All the cells of the organism carry consciousness. Human consciousness is basically embedded in a quantum field arising from the combination of all individual cells' consciousnesses (4-9,83). This is highly debatable, we must admit, but we humbly ask you to play with this idea before you decide to dismiss it. This structure of Soul, Ego and Id, all carrying semi-individual consciousness, means that the whole organism (the "heart" or "I") can "see" and analyse all its lower-level conscious functions; thus both brain-mind functions, body-mind and even wholeness-related "spiritual intelligence" functions are observed and interacted with by the "I." It is very usual in therapy that a person suddenly observes an inner process of cancer, or observers his own autistic side, and this could not be done without the ability of such a "meta-perspective" provided by the abstract I. This is somewhat related to the strange observations that patients during surgery can observe the surgical theatre from above, from a viewpoint where they obviously feel out of the body. Most interesting, this shift of perspective also often happens in intensive holistic therapy. So it is hard not to believe for us as therapists witnessing this happen all the time. Not that we understand it or even like it. Human consciousness is way too mysterious to be cozy.

The "I" or "heart" can see the brain from a perspective "outside" the brain,, but inside the organism. And the body can see the brain, and the brain can see the body – energetically, or if you prefer by direct transference of information from one "wholeness" to the other. Is the wholeness of the body different from the wholeness of the brain? Does an organism have one wholeness? Does an organism behave as one entity? The unreflected answer is that the organism carries the wholeness, and its organs do not. But after deeper reflection and meditation on ants and corrals and after that on human societies and the way consciousness is manipulated in a society collectively, i.e., by the media, we must admit that the organisms are not that free to think, feel and act as we would like them to be. After thorough studies on sexuality and human unconsciousness (un-integrated traits of brain-mind and body-mind), we must admit that our organs are pretty powerful actors in their own right. So the picture is much more complicated and in the end, every level of us has some degree dependence and freedom.

The "I" can use the bodies' emotional intelligence – the faculty of intelligence connected to the body-cells' collective consciousness field (and of course the wisdom of a mature brain's cortico-limbic system) – to get a clear picture of the mental processes and the basic machinery that creates its own mind. This is the typical perspective of the Tibetan Buddhists Yogis reached in deep meditation but only little acknowledged in the West until recently (87). You could argue that these are subjective reports of their mental states and experiences, and thus they are probably not a good argument in support of our thesis in a scientific journal. But

our direct experiences of the world might be as real as our mental reflections upon it; we would actually argue: more real!

The brain is represented in the organism's wholeness, in the same way as the organism is represented in the brain. You could argue that you have never seen your own brain, but if you can sense where your mental activity is centered – right behind your eyes – then your wholeness has already acknowledged that you can sense your own brain or at least its energy and quality. So what we basically claim is that the brain cannot be understood without understanding the "I" and its consciousness, and Id, and the Soul, and their individual consciousnesses.

In a well-integrated organism, the self rules ("I" am in power); from its placement at the top-level of the organism, it can strongly impact what is going on at all the lower levels, including in the brain. The model we are going to develop further was originally made by the psychoanalysts to allow us to understand how I-born consciousness (as in "living by heart") can be causal in our life (67-72). Interestingly this model seems to be the normal understanding of man in most pre-modern societies (9), and most interestingly it opens up to an explanation of collective consciousness (9,68,69) that is normal in pre-modern societies but almost forgotten or neglected in our culture in spite of Jung (68,69), Grof (85,86) and other prominent psychic researchers stressing its meaning and importance to us. It seems that it actually came from the pre-modern cultures into psychoanalysis especially by Jung. The model we present is thus not purely based on theory but on lots of practical experience, and it is also in accordance with the philosophy of life that has arisen from our research in quality of life and health during the last two decades.

Understanding the complex patterns of brain activity

To understand the various functions of the brain, we need an integrative theory for brain function that accounts for the control of the mental functions on the highest level of the brain. The multidimensional connectivity that follows the extreme con- and divergence in the architecture of the human neocortex, the results of countless EEG-measurements, and the measurements of the high and almost constant brain-energy-usage indicates that the cortex cerebri is machinery that almost continuously delivers a huge selection of patterns that floats into each other (79,80,88-91). Mathematical analyses (90,91,92) have indicated that the cerebral cortex cannot organize the patterns by itself in a meaningful way, leaving us with the most fundamental problem of how the brain is controlled.

It may be assumed that sensory inputs to the brain temporarily can stabilize its chaotic neural self-organising patterns, creating a sensory perception of simple information-directed self-organisation. But this does not explain much – thinking, understanding, perceiving, etc. Therefore, another much more efficient and innate organizing system may exist, which makes the brain function as it does. Morphological and evolutionary data (93,94) seem to show that the nervous system is developed and functions through an intense communication with self – or in more scientific language: the brain is totally imbedded in the complex informational dynamics of the organismic wholeness. The organismic wholeness entirely depends on a

well-functioning, living brain as expressed by John Zachary Young (1907-1997), Professor of Anatomy at the University College London: “No brain, no mind, no nothing.”

Actually, the brain is completely absorbed in the organism and has, as we see it, no completely independent function of its own, in spite of it being in many structural and physiological ways a highly autonomous organ. Even the slightest action on the brain is in some way influenced by the totally and intentions of the being who owns it.

One can ask at what stage of embryological development of an organism, like a bacterium or a human being, is there a communication between the brain and self? Little do we know about how bacteria process information, but they obviously do, and the close distance between the genes and their global level tells us that there must be an intense inner representation of the bacteria’s wholeness. Do we have a self, when we are at the single-cell level of development viz. the zygote? Yes, we seemingly do. Do we have self even before conception? No, at least not in our philosophy. Then again, it is wise to remember that half the population of the planet would disagree here.

It is normally believed in neuroscience that a lot of the cortical-subcortical activity is spontaneous, involuntary, automatic and subconscious. This is often presented as a fact in many standard textbooks of neurobiology, neuroscience and neurophysiology; but it is worthwhile remembering that we never have seen a brain keeping these “automatic” functions on its own (in vitro). And if we count the consciousness of the Self and the Body, this might not be the case at all. The interesting thought-experiment to do here is to imagine a person’s brain isolated and fed in a jar: Will this brain still be able to think and feel like the person it came from? Will it still function at all? We know of course that in vitro developing neurons still fire. But will this activity be able to create any collective meaning without the informational guidance from the Self and the body? The consequence of our thinking is that this is not possible. Unfortunately, we do not know of any experiments that can decide this for us.

On the contrary, we know of many experiments that indicate that the functional order of the brain is highly fluent and rapidly reorganised. The cortical representation of all sensory and motor functions in neural maps and their well-known and quite mysterious, momentary reorganization (88) seems to confirm that brain function is controlled from “a level above,” because the representations are not fixed in the physical brain – the maps are not hardwired. Studies of blood flow and lesions show a hierarchically ordered structure of representations in cortical networks (88,93,94). These examples are in accordance with the psychological developmental studies showing that the consciousness has its starting point in the functions of the body with the primary sensory and motor areas creating the foundation for the hierarchy. The higher integrative areas create the intermediate, and the highest integrative areas – especially prefrontal cortex – create the top of the hierarchy (88). It is well known that some brain lesions like that of the Broca’s area are followed by expressive aphasia. So there are lots of hard-wired solutions in the brain also, of course, on lower levels of the brain. But all high-level, consciousness-related organisation seems to be informationally directed. And we believe that the Self provides this information and that the Self thus controls its brain. This link between Self and brain is crucial for our understanding of, i.e., the altered brain function and physiology in illnesses like depression and schizophrenia.

In the box below, we give a short evaluation of the value of central experimental data for our understanding of the brain with a special attention to the function of the cortex cerebri. We will now discuss how the brain functions according to our holistic understanding. The

fundamental structure of the neocortex (95,96) has been reviewed and will not be repeated here (11).

A theory for brain function

What does the brain do? Basically the brain connects Ego, I, Soul, and Id to the outer world. It carries the organism's rational interpretation of the world and allows it to realise the intentions of Self and Id through plans carried out in time and space. The brain creates mental perception, rational understanding and visual, auditory, somatosensory interpretation of the inner and outer world, and proper, rational actions and inner adjustments from the Ego's, Soul's, Id's, and I's intent. One could ask if I, Soul, Ego and Id are generated from a well-functioning brain, and this could very well be so. The different inner personalities that we label all these names could easily rise from a less than perfect integrity of the brain. So one cannot judge just by thinking, if there is any rationale behind the more complex model of human reality than we propose; we do it because we respect our "common sense," our direct experience of life; it is this sense that allows us to help our patients in holistic therapy and provides us with the power of healing. So we cannot just give it up. And when we take our experience to meet neuroscience, things do not fit. What we feel and experience is simply not compatible with the mechanical interpretation of reality we find in contemporary neurophysiology books; even profound books like *Principles of Neural Science* (88) do not reflect on the quality of existential depth, joy, light, and innate wisdom that we sense is connected to consciousness. Frankly, the concept of consciousness is hardly addressed in neurophysiology of today. The "hard" problem (how subjective consciousness is produced from chemistry and physics) has not been solved, and it is much too often just ignored.

This is done through intensive mapping of the inner and outer world. The brain is in touch with the outside world through the senses and the apparatus of movement and in touch with the person's "inner world" through feelings, intuitions, finer sensations, intentions, states of consciousness and being: dreams are very much the materialisation of this inward contact.

Throughout life, a more and more detailed model of reality is built up, using the fundamental dimensions of space and time. The brain and mind are harvesting experiences through the presence of sensory qualitative units called "qualia" – like the colour red – that is solely produced by the nervous system and the organism itself; a nervous signal can in principle not be read (unless you accept that it can carry a more subtle and finer level of information, i.e., quantum level information). Qualia are combined through time and space into elements that can be perceived and manipulated, giving birth to the phenomenological world. The intensity of qualia is established, and its location in time and space is noticed, and all these neural measurements are integrated into a dynamic perception. Mental elements can be static or dynamic, corresponding to nouns and verbs in the language (see Chomsky's famous concept of "deep structures" of language, and Piaget's model of development of human consciousness) (97-99). The nonverbal mental phenomena like pure visual images, touch, taste and emotions are also based on qualia, but they are often just taken for granted and not abstracted to higher logical levels. But they can be, as in the Indian and Tibetan art of erotic tantra, where sexual feelings and unified sexual poles are abstracted to oneness ("sunya") (73). The mind is thus basically nothing but a highly dynamic model of reality

constructed in this way, just by combining the elements on higher and higher, more and more abstract levels through experience and memory, and the mental faculty of abstraction and concretization. The model is organised through association and dissociation. Logic and sets are used for giving rational structure.

The brain is constantly preparing a row of behavioural and perceptual strategies to meet the intentions of the whole organism (the “I” motivated by “Soul, Id, and Ego” according to psychodynamic theory). The brain interprets all experiences and sensory inputs from the outer world in agreement with the organism’s intentions, accumulating concrete strategies for action and for perceptual and intellectual analysis. These strategies are gradually revised as new goals immerse through a changing life. When the resistance is too big – when realising one’s dreams and intentions are too difficult and painful – the goals are replaced in resignation with smaller, more obtainable goals. Such events result in the degeneration of the intent (life mission) (12-20,50,51,54-57) and the personal character, which sometimes even lead to mental illness like depression and schizophrenia, as suggested by Bleuler, Freud, Jung and others. The only interpretation of the brain that is in accordance with all the collected data from all the sources mentioned above is that the brain is a pattern-machine that continuously produces concrete and abstract patterns combining into “sensori-motor-pictures”; it seems that this process is guided by the organism’s abstract high-level perceptual faculty of finding meaning in chaos and a similarly abstract faculty of intent. It thus seems that it is the self (the organism’s wholeness) that guides the brain in its making plans for achievement and realization of the abstract and concrete goals of the human being. The reality is interpreted in agreement with the intention and is represented for the conscious wholeness, where it is evaluated and processed. This seems to be in accordance with Arthur Schopenhauer (1788-1860), a German philosopher who believed that the will to live is the fundamental reality.

Information guided self-organization of the neural patterns

We have analysed the process of morphogenesis and found that it is happening through information-directed self-organization of cells and tissue; all cell movements and differentiations are initiated and directed through information-directed self-organization of molecules and organelles (4). It seems reasonable to suggest that the brain functions in a completely similar way through information-directed self-organisation of complex, dynamic, hierarchically organised, neural patterns. The neural connectivity patterns are specified through information-transferring interactions on many levels of the living organism. This means that both the patterns of connectivity and the functional neural patterns of the working brain interact with the information-bearing, complex dynamic processes of the biological system; please recall that we have found this to be a real phenomenon existing in the organism at a quantum level (8). The functional neural patterns are different from the structural. But when structures and functions are developed in parallel through evolution, it must be that the functional patterns also interact with the informational level of the organism; a fine example of this is the Hydra; in the Hydra, the neural network is constantly updated by the organism; if the body of hydra is reshaped by cutting, the neural information reconstructs it with no hesitation.

We can look and make sense of even the most complicated of patterns like, for example, at turbulent water flowing, growing plants and ecosystems, or computer-produced fractals; from this it is clear that our brain that has the capability to form extremely complex patterns for perceptual use – much more complex and complicated than those structures that are before our eyes. The brain is formatting extremely complex patterns. This neural “modelling medium” (or matrix) can be organized either by sense input or by the consciousness and intention of the organism. Since our senses are always flooded by information, it is obvious that a considerable and continuous selection of the incoming data is happening at all times. The intent of the Self determines what is interesting for the being from an existential perspective, and therefore defines the contents of its perception. Therefore it is correct to state that the content of consciousness is actually coursed by the Self. This is an extremely interesting conclusion as it makes the perception of the mentally ill including delusions, hallucinations, emotional flattening understandable (17,50,51). Most interestingly, intent is connected to the philosophy of life, and revising one’s philosophy of life seems to completely alter the realm of perceptions; the patient in deep philosophical exploration is often “travelling from heaven to hell and vice versa.” Also the perception of body, sexuality, the partner, etc., is completely mouldable by the person’s philosophy of life.

The huge mass of data not found to be relevant for the realization of the organism’s intentions are selected by the materialisation of a “pyramid of consciousness” from the abstract intentions to the concrete perceptions and behaviours; the intentions materialise “concrete plans” that support the specific sense-impressions. For the organism’s wholeness, intention materialises existential relevant experiences; in the brain, intentions materialise the physical and well-known description of the world used for everyday living: the interpretation of the reality. On a mechanistic, informational level, the intentions must come to the brain in the form of superior matrixes of guiding patterns – these patterns correspond to those of the organism’s wholeness; they organize the top-level patterns selected by the functioning brain, and the brain’s self-organising nature takes care of the rest. The organism’s plans and strategies for self-realization are carried out in agreement with the rational interpretation of the organism’s sense impressions. We know that in humans, dreams are very important in this process.

A double hierarchical model for the reality representation of cortex cerebri

In order to simplify this description, we will only concentrate on the largest structures of the prosencephalon. The subject for the discussion will be the integrative structures such as the limbic system of cortex cerebri, the basal ganglia, and thalamus. The last two of these areas will be considered as equally connected with the areas of cortex cerebri. We think these structures represent a person’s “emotionally close social relationships in the group” (the limbic system), groupings in the basal ganglia corresponding to the motor and verbal activities related to the outside world, and the whole perceived and cognised reality model in the thalamus and the related cortex. In the following, these structures are included in the term cortex cerebri.

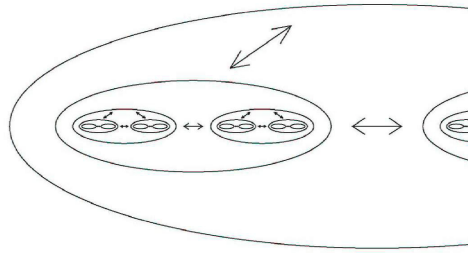


Figure 1. The living organism seen as a fractal structure with interacting parts on many levels. The arrows illustrate the information-transmitting interactions and are based on generalized empiric results. The figure illustrates how biologic informational systems are structured as a fractal “Chinese box”; the information-transmitting interactions are seen between the different parts of the same level and between levels.

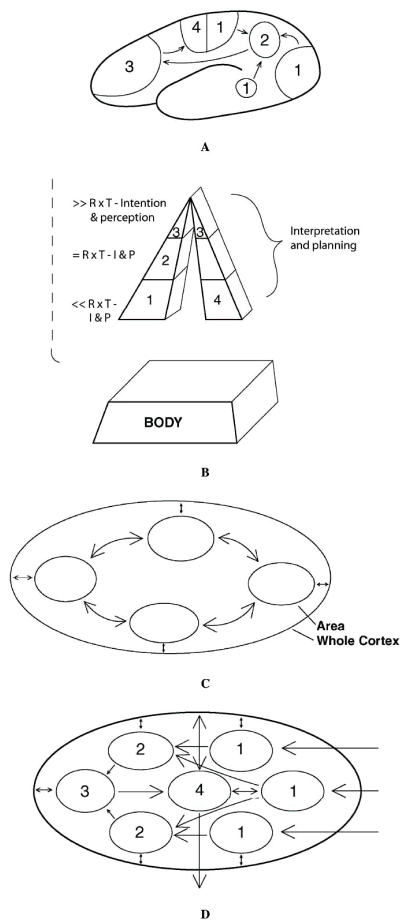


Figure 2ABCD. A representation of the model of reality in the (human) brain as a consequence of a double hierarchy. A illustrates parts of the brain that interacts by each other. B illustrates the hierarchy of quantified qualia organised in space and time (I = Intention, P = Perception.). C illustrates the Chinese box hierarchy of interactions in the brain. D illustrates the double hierarchical representation of reality in the brain.

In cortex cerebri, two hierarchies seemingly exist, one for perception and one for action. Together, these stretch out the reality model in the brain. One of these is a variant of the Chinese box system (see Figure 1) existing in all biological systems. In this, the brain as a whole and cortex cerebri is built up by substructures somewhat similar to the cortical areas. These again are separated in supra-cellular structures – for instance feature-detectors in visual cortex – that again are built up by cells, etc., as discussed above.

The second hierarchy, roughly speaking, goes lengthwise through the brain. The primary sensory input from vision, hearing, and somatic senses, give representations of these sense-spaces, in particular places. Seemingly, these areas converge to superior integrative areas that again converge to the highest integrative areas. The last ones are directly related to motor cortex, from where movements are controlled. However, the somato-sensory cortex is also placed next to somato-motor cortex. Figure 2 shows these hierarchies separated and together.

Explanation of the ability to associate, discriminate and abstract

The cerebral areas represent a separate level and use a time-space hierarchy (see discussion above). But it also has to interact with the superior wholeness of the brain. Data corresponding to everything that has happened on each level could possibly be stored in each of the cortical areas from the complex dynamic at the lower levels. Recall that the storage of data may happen in an extremely controlled way, because each area contains unimaginable amount of information.

A consequence of the ongoing information transmitting interactions on all levels of the brain is that every recall of data happens in an associated way. This means that only the data that passes into the larger pattern is retrieved, and it is the most superior pattern that organizes the complete recall, which in this connection is the intention. The ability to discriminate is presumably achieved through the structure of the functional patterns themselves. The ability to abstract and generalize follow from a co-representation of many elements having common traits in an n-dimensional, self-organizing, associative room (7) that will make up an informational body, which forms exactly as the generalization or abstraction of all represented elements in this area. Such bodies (or sets) that are built by big amounts of smaller bodies will in a similar way correspond to higher levels of abstraction.

A proposal for the generation of the reality model in the brain

Figure 3 shows how a four-level model of how reality can be created from simple repetitive co-groupings of elements of quantified qualia in space and time. First, sense impressions are analysed to meaning units in meaning unit analysers (this may be too speculative, like the “grandmother” cell and the mechanism might be energetic and not mechanic at all; comp. the visual feature detectors). The distribution of these “meaning units” in space and time is determined in the representation as positional information (compare the traditional use of this

concept in ontogenesis (5)– the quantifying of the qualities). To realize the relationship between space and time in these, groupings at different levels must be imagined. Thus the fundamental structure of space-time must be fully understood for us to fully comprehend consciousness.

The first grouping level causes the creation of sense elements corresponding to the perceptual level of qualia localised in space and time (this process takes milliseconds). On the motor side, a corresponding grouping to motor-elements exists. The second grouping level is co-grouping of the different sense-modalities with sense elements in bigger space and time (many milliseconds or seconds) to perceptions. These cover the whole sensory-perceptual space. In the same way, motor-elements are grouped together to create concrete movements.

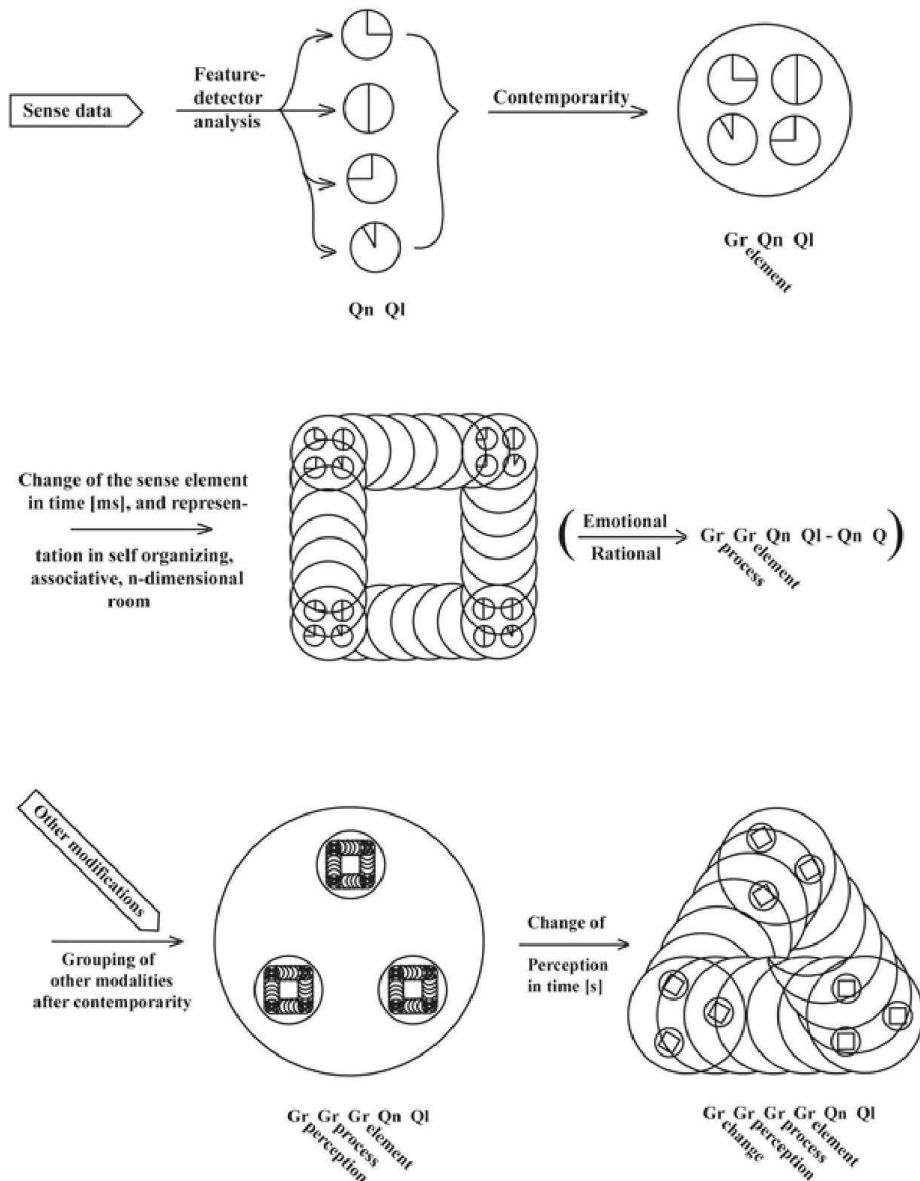


Figure 3. (continued)

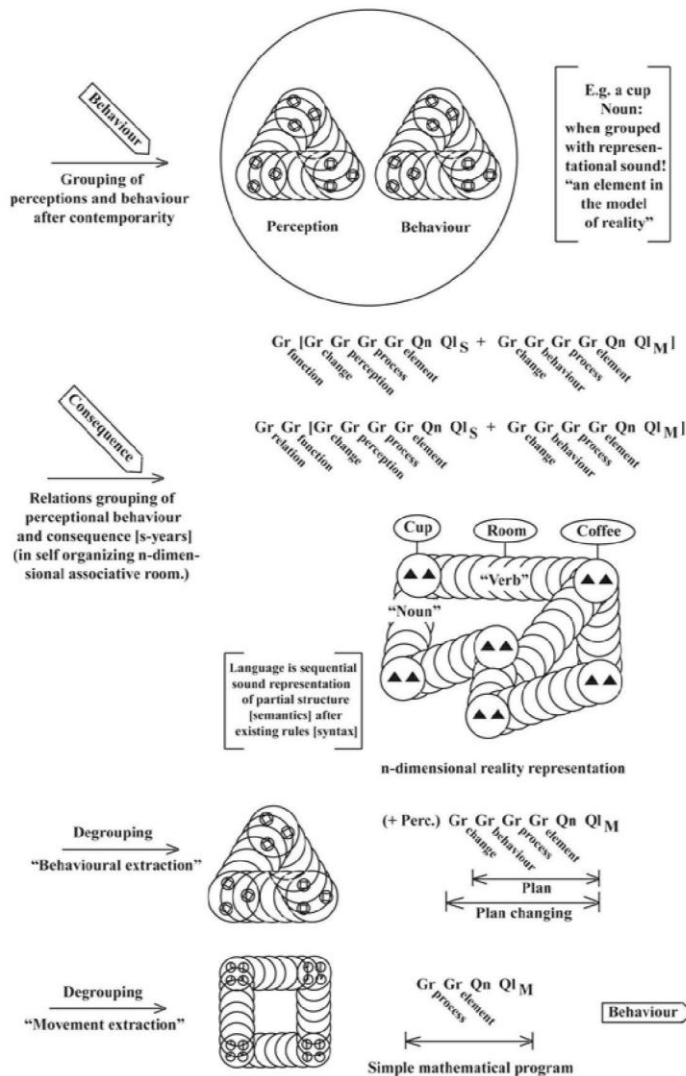


Figure 3. A model of the representation of reality in the human brain (see text).

The third grouping level is higher space and time (seconds or minutes) groupings of perceptions and behaviour. This gives a reason-effect, where relationships between perceptions and behaviour, as possibilities, and those between behaviour and perceptions, as consequences. In the last case, the possibilities of a perception for action, and actions for perceptual consequences, is getting clear. On the third level of grouping, the co-grouping of the perceptions with behaviour in space and time gives the reality models concrete functional elements – as, for instance, a cup – together with those processes that move and transform the elements into each other (the cup, for example, can break in pieces when it is dropped on the floor). A child's limited intellectuality and its ability to interpret the concrete objects and possibilities of the surrounding world has been built up at this point. The language with its nouns and verbs is introduced at this stage of life. Here, it is central to understand that the reality of the child is developed in identity with the biological intensions and needs.

The fourth group level replies to the groupings of possibilities and consequences, on higher space-time levels (from minutes to years) that fit with the more complicated intentions of the human beings. In the reasonability of interpretation, this corresponds to the intellectual development, because the reality interpretation here is lifted from the concrete world into the world of ideas, abstractions, principles, hypotheses, lawfulness, and logic. In the emotional reality interpretation, this corresponds to the recognition of extremely complicated situations in the reality, outside the body.

The hierarchical representation through cortex cerebri fits with the existing data of the brain. This representation also makes good sense. Since this fits with co-groupings of sense data, and data concerning motor functions, in a number of levels that, in the end, represents the human conceptions, ideas, and intentions.

The purpose by the first concrete grouping levels is to realise the concrete intentions of the child as eating, drinking, playing, etc. On the other hand, the abstract groupings serve the purpose of realizing the long-term intentions of the adult individual through huge spaces and times.

For the brain, it is the case that the intentions are superior patterns that organize the highest level of co-grouping of the elements of the reality model. A specific intention, in this way, results in a selection of specific superior consequence groupings, and these again, correspond to a plan or strategy. This strategy is realised through a de-grouping to sensory-motor elements, completely analogous to the superstructure of the reality model, see Figure 3.

The intention, therefore, is the innermost craft that organizes the reality model in the brain. But, the coordinated learning acts directly on the intention. Also, a great part of the parent's reality interpretation is transferred in a direct way through information-directed interactions with the child as learned ideas with value-ladings attached to these. Therefore, the reality model is often filled with glaring conflicts, misty ideas and direct contradictions. This results in a really complicated structure caused by the demands of social interactions.

Discussion

We do not believe that the brain is a “neural network” that has a conscious activity of its own; neither do we believe that such an “isolated brain” could have an independent activity corresponding to thoughts and dreams. We believe that models for self-organizing associative memory have demonstrated a fundamental disability in thinking and perceiving; as the computerised “neural network” of an isolated brain can't have an independent activity like thinking. We believe the brain is a highly complex pattern machine that continuously produces concrete and abstract “sensory-motor-pictures” guided by the intention of the wholeness. The mechanism by which this is done by the brain is by using information-directed dissipative neural patterns, the information coming from both the senses and the organism's wholeness. The brain's central job is to make meaningful plans for achievement and realization of goals presented to the brain at its top-level by the human wholeness (the “I”), often in dreams. The reality is interpreted in agreement with the intention and is through the brain's highest level represented for the organism's wholeness in which it is evaluated emotionally.

The presented model is built on a number of axiomatic statements derived from the former chapters in this series. It is quite surprising to us that it is possible to get such a clear picture of human brain function that in so many ways is helpful, i.e., in explaining the perceptive distortions of the mentally ill from the degeneration of intent. The model seems highly helpful in relation to clinical holistic therapy, where these distorted perceptions in the form of transferences and projections are happening at all the times. The clear understanding of their neural basis will presumably make it much easier to deal with the mentally ill in therapy and increase the number that can be helped by scientific holistic medicine. The problem of the proposed model is that you need a holistic philosophy admitting the individual cell consciousness, etc., to use it.

We propose a theory for the function of the (human) brain claiming that it on a mechanical level works through information-directed self-organization of neurally produced extremely complex patterns, which only add up to meaningful perceptions and actions because of the fundamental will, or intentions, of the individual. We assume, likewise, that the morphogenesis of the brain is happening through the information-directed self-organization of cells and tissues, and that this informational link is active throughout the individual life, securing an extremely close informational connection between mind and Self (the wholeness of the organism). All growth, absorption and modifications of nerve cells, axons, and dendrites are guided through information-directed self-organization of the molecules and organelles (1-10).

When we look at the most complicated, visual patterns, as, for example, turbulent water flow, growing plants or computer produced fractals (101), and understand how fast and direct the brain interprets even the most complicated of visions, we find it obvious that a “patterned medium” exists in our brain that immediately forms even extremely complex patterns; these extremely complex patterns are organized in many hierarchical levels to create the well-known model of reality in the human brain.

A possible consequence of the information-transmitting biological interactions in the “deep quantum field” (8) is that recalls of information happens in an associative way. Only memorised patterns that resonate with actually activated patterns are recalled. This ability to discriminate is achieved through the structure of the functional patterns themselves. The ability to abstract and generalize follows from a co-representation of many elements having common traits in an n-dimensional, self-organizing, associative space.

In cortex cerebri, two hierarchies stretch out the reality model in the brain. One of these is a variant of the Chinese box system. In this, the brain is built by structures in the cortical areas separated in supra-cellular structures that in turn are built by cells. In the second hierarchy, the primary sensory input from vision, hearing, and somatic feeling gives representations of these sensory-spaces. The last hierarchy is directly related to motor cortex, the part of the brain from where movement is controlled.

This sums up our proposal for the generation of the model of reality in the (human) brain. The many-leveled organising biological (positional) information organises the distribution of the qualia (meaningful units) in space and time. We suggest that the intentions of the whole individual are represented in the brain as superior patterns that organize the highest levels of the model of reality in the brain; this high-level co-grouping of all the elements of consciousness by the intention is the innermost craft that organizes the perceptual and acting powers of the brain. The brain is by evolution structured to transform all modalities of

sensation and intention into its integrated perception of reality, in a form that empowers it for optimal action to achieve self-actualisation – the full realisation of the abstract “I.”

**BOX. The value of existing sources of knowledge of the brain
for understanding its function**

Sources of experimental data about the structure and function of the brain: Data concerning the brain come from different sources, but yet they are not – even when pooled together – adequate to fully explain consciousness and the mind. To postulate that the functions of the brain are understood, we need the collected data to make sense and be able to explain all aspects of the mind; but most of the data does not make much sense – as the EEG and data definitely do not sum up to a nice understanding of what is going on. Some essential sources of data on the brain are mentioned below.

Anatomically, the brain can be divided in a forebrain, a midbrain and a hindbrain that again are separated in several structures – as, for example, cortex cerebri separated in sub-structures of cerebral cortex. These sub-structures are split in supra-cellular structures in the primary visual cortex – meaning analysers/feature detectors – that seemingly analyse incoming counts nerve cell signals. The morphogenesis of the brain is uniform to that of other organs and can be essentially separated from those in reverse order, when axons and dendrites make the connectivity between nerve cells. This connects the different parts of the brain with each other so sensory inputs from receptors in the sense organs and body can be associated with motor outputs of the apparatus of movement.

Histological studies (79) have shown that pyramid cells (that count approximately half of all cells in cerebral cortex) converge to about 1,000 of the three million cells in cerebral cortex positioned only three to four cells apart from each other. Electron microscopically measurements of the distribution of sound impressions in cortex give the same kinds of results (88,94).

Connectivity: The cortex cerebri can be understood as a surface having a 1,000-dimensional connectivity. The neuron length is about 1,000,000 km, indicating the tremendous complexity of the brain. The existence of meaning-unity analysers/feature detectors is most evident in the primary visual cortex but probably exists in all primary cortices. It has been proposed (95,96) that cerebral association-cortex, in general, should be organized in functionally modules of 300. But this is not supported by evidence in the literature, because the existing columns only seem to be caused by corticocortical termination from pyramid cells (11). Physiological studies have shown an intense interaction between all structures of the brain. Thalamus, for instance, may be assumed to play a central role as a regulator of input to the cerebral cortex. Motor outputs that happen through motor cortex seemingly are essentially influenced by the limbic structures and the basic ganglions, and also the patterns of movement (and perceptual patterns) from the cerebellum are commissioned. Generally, all parts of the brain are mutually connected with each other, but the total brain function is not yet understood.

Electro-physiological studies have shown that inputs are well arranged in cortex in two-dimensional maps repeated many times throughout the different brain areas. Somatotopic maps in somatosensory and motor areas represent the different sense-receptor types and motor aspects of the body. Visio-type maps represent the visual field in the visual areas, and tonotopic maps represent the tone scale. The organization of the smell sense in cortex is not yet understood.

Trials with maps show that these cortical representations almost instantaneously can be organised and why they hardly are associated directly with axons and dendrites (88). Electron microscopic tests of complex cells and groups of cells show, most clearly in primary visual cortex, an organization that is used to analyse meaning-unities of visual impressions.

Data from electro encephalogram (EEG) is very difficult to interpret. Simultaneously, they reflect the activity from cells in the cortical surface. Normally, the electronic voltage arises and decreases 8-30 times per second when awake. The most important result is that a high amount of patterns integrates constantly while the brain works (88).

Studies of the blood flow in cerebral cortex (4,5) and of cortical lesions have given a rather detailed map of the localization of the cerebral cortex's function. We know that data from the primary sensory areas as prefrontal cortex are dispositioned in areas of higher levels. Psychological studies (93-94) have shown that the consciousness is built of sense-motor activities and that the development through childhood follows the development of the body organization. The consciousness consists of sense and motor functions created by sense-motor elements. Later in the development, the child learns to think in abstractions and then talk. In this way, the consciousness gets freedom to use the body in more complex ways.

Philosophy. What we think gives the consciousness meaning. This interpretation is fundamentally connected with the body. The development of the consciousness as an objective matter of interpretation results in hiding the original physical beginning where the connection between body and mind is being obscure.

Evolutionary studies reveal that simple nerve systems such as Hydras which are thought to be the first organism with a nerve network, could function through information-transformed interactions between nerve system and health. A quite simple nerve network consisting of neurons, where the nerve impulses can move along in all directions from the stimulus point (100), gives Hydra a possibility to carry out a very complex behaviour as, for example, catching of prey, swimming, and somersaults. Seemingly, this nerve network does not need any practise to function.

Mathematical analysis; cortex cerebri as a model machine: Systems with elements that excitatorically and inhibitorically influence each other, such as neurons do, show a stabile self-organization. However, mathematical analysis shows that when the connectivity is huge, as it is in cortex, the ability to stabilize the self-organization breaks down (90,91) and all patterns become liquid and non-durable.

Metabolism. About 20% of our energy is used by the brain that only makes up 2% of the body weight. It is estimated that this huge consumption of energy corresponds with an almost constant activity of impulses in all the brains nerve cells (NA Lassen, personal communication, 1990). However, seemingly through an extreme "mental burden," this metabolism does not increase considerably.

DISCUSSION OF THE SIGNIFICANCE OF THE ABOVE LISTED DATA SOURCES

How does the brain work? Throughout time, there have been a lot of proposals on how to explain the functions of the brain. However, nobody has been able to explain "higher psychic functions," and existing explanations seem not to support what we know about the brain. For example, it is often proposed that the brain process its data in the same way as computers. Indeed, computer-implemented "neural network" with learning specific "synapse strengths" can be trained to process input patterns into specific output patterns.

Coordinated learning through synapse strength is known from lower level animals (88), but as mentioned, research on the cortical maps have documented that cortical representations are not hard-wired. We are therefore forced to conclude that the brain is not using "neural networks" of any known type. A neural network is basically a slave without creativity and does not have an independent activity corresponding to thoughts and dreams, which is another major problem if you try to explain the brain as a neural net. Also, when it comes to consciousness, the non-local key quality of consciousness is very difficult to produce even in theory with a neural network; they are popular because they are easy to produce in silicon, but please remember that the electric activity of a computer is extremely local!!!

Box. (Continued)

Having dispersed information into a network is not helping us getting non-local consciousness, as data now is stuck to certain positions in the network “Convergent groupings of feature-detectors” on an number of levels can theoretically give us a single cell that represents any object knows from our world – the famous idea of a “grandmother cell” that fires only when we see our grandmother! But the problem is, of course, how such the activity in a cell should be able to give us the consciousness of seeing our grandmother – how will this single-cell activity be clearly represented in our global brain activity? We believe that models for self-organizing associative memory like the famous Kohonen model (92) have the same disability as the other “neural network” and cannot have an independent activity like thinking. Most interestingly, there has never been constructed a truly self-learning neural network; all existing neural networks are in some way controlled from the outside though the programming of the net. Nothing artificial has yet been created that function like the brain, not even most superficially. This in itself should make people think about the difference between machines of silicon and living beings.

The most famous problem in brain research is the psychophysical problem. The materialistic version of this problem goes: how can consciousness emerge from biochemistry? How can any dead back of inorganic atoms end up feeling and living? Most people intuitively agree that no matter how many balls you put in the bag, or how ingeniously you combine them with electromagnetic springs, they still do not live and laugh. As to the dualistic proposals to find a solution of the psychophysical problem (102), these proposals of the brain function seem to be an expression for philosophic resignation: The problem simply is too hard, so instead of solving it, we are cheating. Most researchers that have worked with this problem have actually in the end given up explaining consciousness, perception, intention, etc. (102). Brain research has turned completely mechanical, into molecular research; as if the brain researchers all have come to believe that just by finding smarter molecules they will some pretty day be able to solve the fundamental problems of brain and consciousness. (Maybe that is what is going to happen in the end when we finally get to understand proteins and find “intelligent molecules” that can read the extremely small energies of the directive collective quantum field of the biological system) (4-8).

It is not that we do not believe in science. But we need to acknowledge reality and stop moving away from the fundamental problems we need to solve – just avoiding the pain of not getting anywhere will not give us a new scientific understanding of the brain. We cannot understand the wholeness as a sum of its parts; the wholeness is always more. That is one of the most central understandings of holistic philosophy (1-11).

The brain (neocortex) is making lots and lots of extremely complex patterns; that’s pretty much what we can tell from all the brain research done. The nature of these patterns – the geometry they must be described in, the way they interact with other patterns, sensory stimuli and the inner biological informational system of the organism – remains most unfortunately still in the dark.

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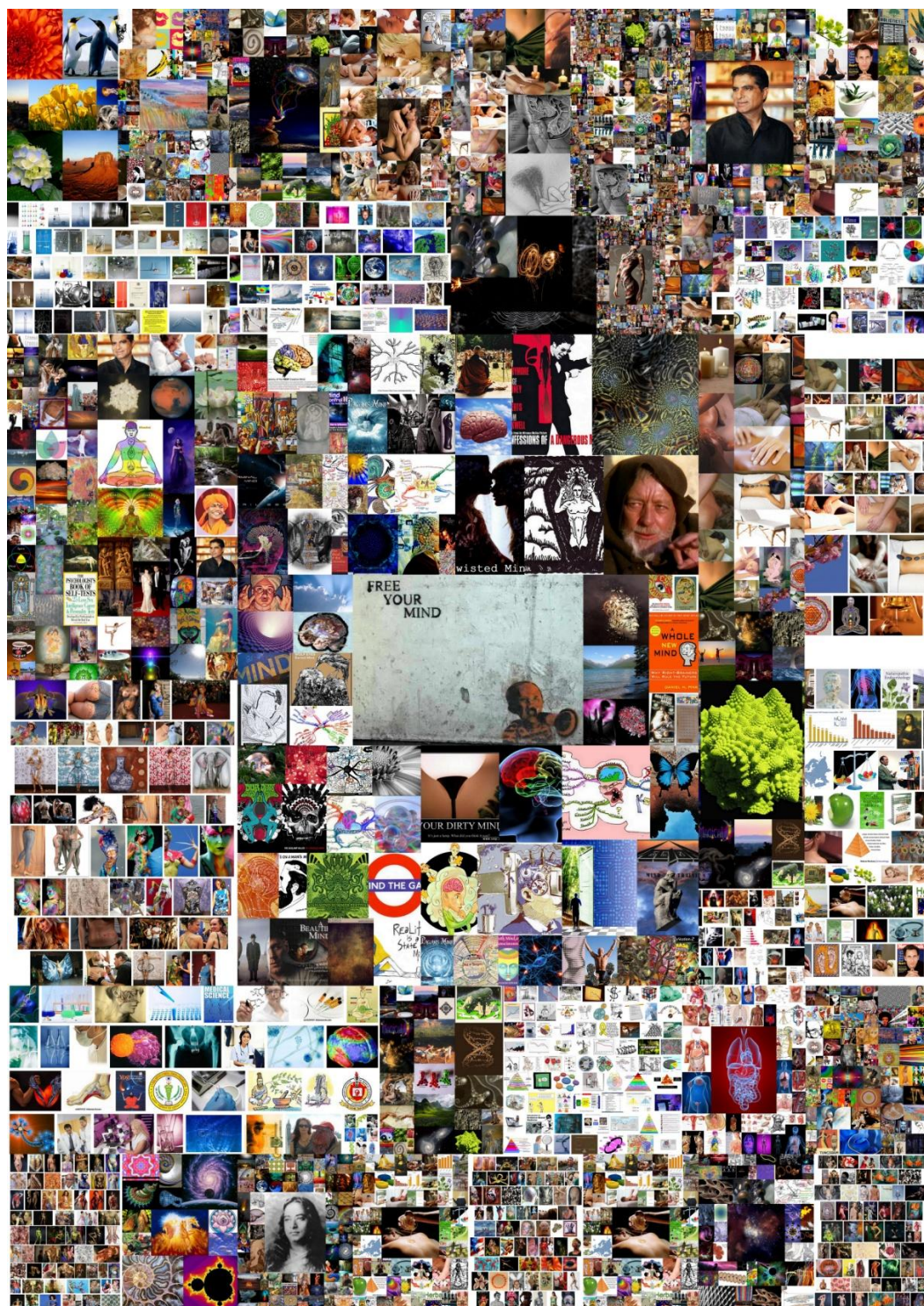
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Section 2:

Patient-related outcome measures



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The safe and efficient medical clinic

The most dangerous thing is to be caught in the conviction that one's work is perfect. Sigmund Freud was, according to his "right hand" in his clinic in Vienna, the latter so famous physician and sexologist Wilhelm Reich, caught in this kind of trap and that stopped him completely from developing psychoanalysis into an effective system of healing. Reich left Freud in anger, because he saw that the patients did not get any better. What had happened was that Freud, trying to follow the trends of time and avoiding political trouble, had abstained from using bodywork in his clinic. He started, as we understand from his writings, by using the traditional massage of patient's legs, etc. when curing hysteria and other mental illnesses, but he was very afraid of the media and society's reaction. And he should have been, it turned out, as Reich, who chose to use bodywork, ended up fleeing the country because of the bad press.

So you would like to have a clinical practice that is efficient, which means that you will include the patient's body in the treatment. At the same time, you need to protect yourself against bad press and attacks that might follow from your use of bodywork. A high ethical standard is necessary, but this is not always enough. A very important thing is to document your results, and if possible at all, also publish your results in peer-reviewed scientific journals.

While you might think that this is overdoing it a little, we can assure you that the day you will be victim of bad press, this is immensely helpful. Under all circumstances, medical science will not improve until many practitioners document the way to make safe and efficient medicine. So we strongly encourage you to participate.

The tools for documenting effects and harm are simple. We are providing them in this section. We are also warning you that as soon as you become successful, you will have enemies, and to keep them from biting your neck, you need to be on top of things. So please for your own sake and for the world: Document the treatment and its effect on every single one of your patients and make a yearly publication, where you let the world know how your medicine works in your clinic. This is immensely important.

Square curve paradigm

In this chapter, we present a simple research paradigm for alternative, complementary and holistic medicine. It is a low-cost, effective and scientifically valid design for evidence-based medicine (EBM), especially developed for the holistic medical clinic. It is basically about measuring the patients' state of quality of life, physical and mental health, and general ability before and after treatment. Our aim has been to find the simplest, cheapest and most practical way to collect data of sufficient quality and validity to determine:

- which kinds of treatment give a clinically relevant improvement to quality of life (QOL), health and/or functionality,
- which groups of patients can be aided by alternative, complementary, or holistic medicine, and
- which therapists have the competence to achieve the clinically relevant improvements.

Our solution to the problem is that a positive change in QOL must be immediate to be taken as caused by an intervention. We define “immediate” as within one month of the intervention.

If we can demonstrate a positive result with a group of chronic patients (20 or more patients who had their disease or state of suffering for one year or more) who can be significantly helped within one month and whose situation still improved one year after, we find scientific evidence that this cure or intervention has helped the patients. We call this characteristic curve for a “square curve.”

If a global, generic QOL questionnaire like QOL5, or even better a QOL-Health-Ability questionnaire like QOL10 (a QOL questionnaire combined with a self-evaluated health and ability of functioning questionnaire) is administered to the patients before and after the intervention, it is possible to document the effect of an intervention to a cost of only a few thousand Euros/USD.

A general acceptance of this research design will solve the problem of not enough money in alternative, complementary and holistic medicine to pay the normal cost of a biomedical Cochrane study. As financial problems must not hinder the vital research in non-biomedical medicine, we ask the scientific community to accept this new research standard.

Introduction

Today, every second person in Scandinavia is chronically ill, if you include minor diseases like allergies, eczema, low back pain or migraine, and 94% of the population in Denmark has one or another symptom of ill health (1). The National Health Service, supplied free or almost free of charge in Scandinavia, is to an increasing degree being supplemented by alternative, complementary and holistic medical services paid by the individual user. There are numerous anecdotes of patients with cancer, arteriosclerosis, tinnitus, schizophrenia and other serious or incapacitating diseases being helped or even cured by these treatments (2), but at the same time, there is no evidence that explains the spontaneous remissions from schizophrenia (ten international studies with 25-35 year follow-up showed 46-64 % complete or near complete recovery) or cancer, and not much connects these remissions to any kind of treatment.

One reason for the scarcity of scientific evidence could be that the extensive use of alternative and holistic therapy – 800,000 persons using it now in Denmark or about 15% of the population(3) – is actually not linked to the improvement of health of the patients. Another and much more likely reason for the scarcity of documented success could be that the economic interest in alternative and holistic medicine so far has been much too small to finance the necessary research. It is, however, of utmost importance that the non-biomedical medicine is carefully examined for possible positive effects on a variety of different diseases and human states of sufferings, since one must suspect that some of the alternative and holistic medicine provided by the most competent of the therapists do actually help at least some patient groups.

Let us therefore think about ways to solve that problem. If the problem is getting the money for research, one way is raising more money, but that is obviously the hard road. Another way is making the research cheaper. It seems that this is possible, if we can agree on some rules. As we definitely do not want to accept a method with less evidence, less plausibility, certainty and validity, we have to design a new method giving all these fine qualities of science, but at a cost of about 1% of the normal budget for research.

The theoretical advantage of alternative and holistic medicine

Alternative treatment (complementary and alternative medicine, CAM) is normally defined as treatment that is not provided by the established health service. Since many physicians have started to use alternative methods in their practices, most commonly a simple form of acupuncture, it is necessary to define alternative treatment as a treatment, which in contrast to biomedicine, builds openly on the self-healing resources and potentials of the patient him/herself. This is, of course, true for any treatment from the time of Hippocrates until today, but much modern medicine has forgotten this. In alternative and holistic medicine, these hidden resources are considered a vital part of the human whole. In most kinds of alternative medicine, these self-healing resources are triggered into use, i.e., by helping the patients to change attitudes, resulting in general improvement of the human global quality of life, health and ability of functioning. That is why we use the expression consciousness-

oriented medicine about the “alternative and holistic medicine” and also why we imagine that, in spite of the obvious lack of evidence, the best of the alternative and holistic medicine might actually have the power to help.

The empowerment of the patient through personal development mobilises these hidden resources, so this “medicine” has many advantages. It is affordable for all patients, it is cheap for the society, a benefit to the workplace due to satisfied and healthy workers, it does not deprive the patient of the responsibility for his or her own existence, it is “organic,” takes care of the ecosystem, it does not pollute, it has almost no side effects, and finally it might give the patient a permanent benefit if successful. If the person who takes his hidden resources into use does this so well as to improve the global quality of life, this person might even get less sick in the future, which is of great value to his or her surrounding world. So we can say that this consciousness-oriented medicine might also be preventive and societally constructive.

Can we have good medical science when we lack theory as well as rational methodology?

Research can be a value-enhancing activity. This happens when research produces data of necessary certainty and quality. It happens when the data is produced in relation to the relevant endpoints and the basic intention of the research. If, on a scientific basis, one wishes to improve the subjective experience of health, one must measure psychometrically in order to retrieve the data necessary to evaluate his own health and verify improvement. Therefore, in research, we must keep track of both intention and endpoints in order to secure that these are always aligned with each other. One serious difficulty with research in consciousness-based medicine is that alternative and holistic treatments seldom live up to the general demands of scientific theory and method.

Therefore, the research must, if at all possible, be arranged so it can be used on all forms of treatment, regardless of the theory and method underlying this treatment. When research shows that an alternative or holistic treatment gives the patients significant improvement, there is apparently something to gain from that treatment. This documentation is in itself of great value. Of course this is not the end of the research, but only the beginning. There must now be established new research projects to clarify the theory and method. Only when the method of treatment is understood, described rationally and linked to sound scientific theory, can we make a valid scientific contribution to the treasure of medical knowledge. A scientifically trained physician will never use meaningless rituals or substances to the patient, no matter how well it works for an alternative therapist. Without scientific understanding, an alternative or holistic cure will never be used by the medical community. But without examining the effects of the new or alternative cures and interventions, medicine will never be able to develop in a positive direction.

Below, we suggest a simple and scientifically trustworthy research design, which can be accomplished within the economical limits of a small public or private research centre or corresponding organisations. It has been developed to study the effects of alternative and holistic therapies at the “Frisklivssenteret” (the “Healthy Life Centre”) in Porsgrunn, Norway, in collaboration with the independent non-profit organisation “The Scandinavian Foundation for Holistic Medicine.”

Scientific demands for evidence-based alternative and holistic medicine

We make the following demands on the quality and validity of the collected results:

1. The results are qualitatively meaningful, and the applied endpoints correspond closely to the intention behind all sound, alternative and holistic treatment, namely the general improvement of quality of life, health and functionality. It is these dimensions that must be measured in the study (see Tables 1 and 2).

Table 1. The points to be included in surveys with adults Quality of life Self-evaluated, global quality of life Health Self-evaluated physical health Self-evaluated psychic health Ability of functioning Self-evaluated, global ability of functioning, assessed in three subdimensions, corresponding to life's three dimensions of leisure time, work and family: Self-evaluated social functionality Self-evaluated working ability Self-evaluated functionality concerning love Self-evaluated functionality concerning sexuality

Quality of life

Self-evaluated, global quality of life

Health

Self-evaluated physical health

Self-evaluated psychic health

Ability to function

Self-evaluated, global ability to function, assessed in subdimensions, corresponding to life's three dimensions of leisure time, work, and family:

Self-evaluated social functionality

Self-evaluated working ability

Self-evaluated functionality concerning love

Self-evaluated functionality concerning sexuality

2. The quantitative results are valid (4) and statistically significant at a $p < 0.05$ level (95% probability that the proven effect is true).

3. That the results are visibly and directly observed as an immediate consequence of a treatment. By immediate, we mean within one month from the start of the intervention. A survey before and after the intervention must show a significant and clinically relevant improvement of the patient's condition regarding self-evaluated quality of life, health and/or functionality. In this case, a control group is not needed.

4. The questionnaire(s) must be appropriate and validated. They must have the correct amount of questions necessary to document a clinically and statistically significant improvement of the relevant dimensions. We accept an average improvement of $\frac{1}{2}$ point on a five-point "Likert" scale as adequate to call a treatment good, but an improvement of $\frac{1}{4}$ of a point is of clinical relevance. 5. There must be at least 20 patients in the group receiving the treatment, and the patients must be sufficiently well characterised to allow falsification of the

formulated hypothesis: Therapist (x) can, with method (y), help patients with diagnosis (z), in the age interval (p), the degree of motivation (q), the resources (r), etc., improve their QOL/physical health/psychological health/ability of functioning. A simple way to ensure valid results is to demand that the results are significant and produced immediately (within one month). This intervention can naturally be repeated a desired number of times to increase or secure a result of treatment. In case of repeated treatments, ratings of endpoints must show a positive trend on a run-chart (5).

Table 2. The points to be included in surveys with children Quality of life Self-evaluated, global quality of life Parent-evaluated, global quality of life Health Parent-evaluated physical health Parent-evaluated mental health Ability of functioning Parent-evaluated global ability of functioning, evaluated by the following sub-dimensions: Parent-evaluated functionality in the family Parent-evaluated functionality at school/institution Parent-evaluated social functionality with the same and opposite sex

Quality of life

Self-evaluated, global quality of life

Parent-evaluated, global quality of life

Health

Parent-evaluated physical health

Parent-evaluated mental health

Ability to function

Parent-evaluated global ability to function, evaluated by the following subdimensions:

Parent-evaluated functionality in the family

Parent-evaluated functionality at school/institution

Parent-evaluated social functionality with the same and opposite sex

The rating is repeated again after an appropriate length of time to see the long-term effect of the treatment, at least one year after the initial treatment. The ideal form of the curve, which can document significant effects from alternative and holistic medicine, is in fact a “square” (see Figure 1). An even better curve is an upward slope as QOL, health and ability continues to improve after the intervention (6). The patient baseline level regarding quality of life and/or health and/or functionality is lifted, within one month after initiation of the intervention, to a new, significantly higher and stable level of quality of life and/or health and/or functionality. Since these three factors are closely related statistically (1,7), it is expected that the patients will receive a similar increase in both quality of life, health and functionality, but an improvement in one of these three dimensions alone is acceptable for a treatment to be of value. In Figure 1, the x-axis represents time, and the y-axis represents condition of quality of life/health/functionality.

The leap up has to be clinically significant and must be as well defined as possible. It must come as a consequence of our intervention so there can be no doubt that it is caused by it. Whether the intervention is made one patient at a time and summed up to the collective

curve or all patients are treated at once has no significance for the scientific validity of the documentation. The state of QOL, health and/or Ability must have been at the baseline level for at least one year. The improvement must be found unchanged one year after the intervention. If this is the case, there is no need for a control group.

Effect of Intervention

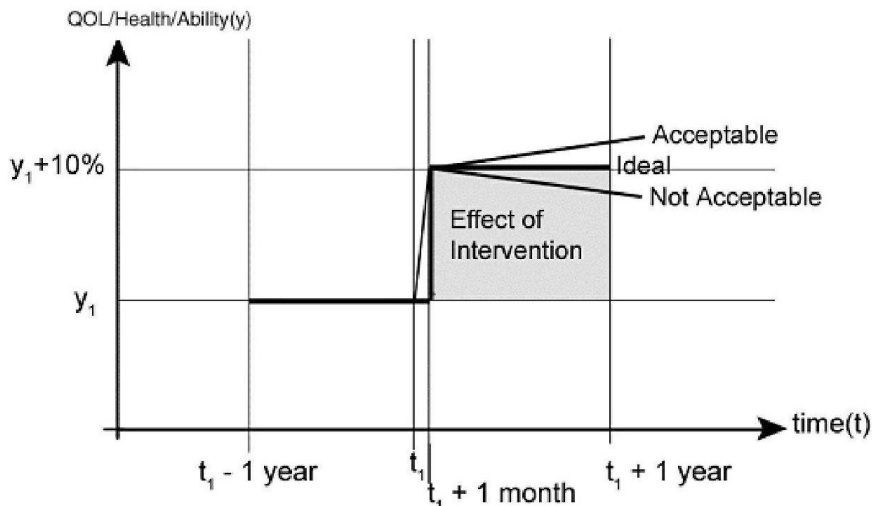


Figure 1. The “square” curve. The ideal curve that documents scientifically valid and clinically relevant effect of holistic medicine is squared, since the group, on average, is on one level before and a higher level after the treatment. The treatment intervention must be of limited duration. Endpoints are QOL, health and/or ability of functioning. The area under the square curve (grey) is the documented gain of the patients. For the square curve to appear, time must be measured at T1 minus one year (sufficiently long time before the intervention), at T1 (immediately before the intervention), at T1 plus one month (immediately after the intervention), and at T1 plus one year (sufficiently long time after the intervention). If the patients are chronically ill and the situation is stable, the measurement T1 minus one year is not necessary. Please note that if the effect is lost through time, which is when the difference between $Y(T1 \text{ plus one year})$ and $Y(T1 \text{ plus one month})$ is negative and larger than the insecurity of the measurement, the effect is not documented (the curve marked “not acceptable”). T0: a long time before the intervention (T1 minus one year); T1: immediately before the intervention; T2: immediately after the intervention (one month after T1); T3: a long time after the intervention (T1 plus one year).

Comments to point one above

Endpoints must always correspond to the intention of the treatment. In the case of alternative and holistic medicine, the intention is a general improvement of quality of life, health and functionality. It is these dimensions that are to be measured in a way that will make comparison possible. Since we are facing a common intention, we can measure all enterprises with the same endpoints, which makes the research very rational and thereby economically reasonable. This is how it must be when hundreds of kinds of treatment, hundreds of different groups of patients, and hundreds of different therapists are to be submitted to evidence-based medical research.

Comments to point two above

Results can be documented quantitatively or qualitatively. Qualitative documentations, which are often based on the patient's own statements, are difficult and demand large resources to compare and are not very reliable.

A patient may feel that he/she has received good help even though quality of life, health and functionality have not been improved, i.e., that a patient is aided in resignation or that symptoms are suppressed without the existing suffering being treated. It is not possible to statistically analyse qualitative data. Therefore, to be certain of documenting an improvement, we have to demand numbers that in a simple way can show the improvement and fulfill the demands of medical science for statistical analysis, namely a generally accepted probability of 95%. This kind of data can easily be provided by using psychometric tools; namely appropriate and validated questionnaires.

Comments to point three above

One big difficulty with alternative treatment is that one seldom, in a sensible way, can create a blinded control group. One can create a group that does not receive the treatment that is offered, but since many alternative therapies are accessible on the market in one form or another, one cannot in any way prevent those who are not included in the test group from buying a corresponding service outside the normal program. Since a substantial part of the healing on a long-term basis comes as a consequence of the initiatives and programs people do on their own, one cannot exclude, if an intervention takes place over a certain period of time, that a corresponding healing in a motivated control group is caused by a corresponding treatment. Thereby the control group loses its fundamental idea and validity.

One can argue that if the intervention is no better than the control group finds out and fixes themselves, then the treatment given is unnecessary, but this is not a valid statement, as people pay for these services, and they are often willing to pay surprisingly much money for them – often thousands of EURO/USD. To know if they actually help people is therefore an important question.

It is difficult to document progress with alternative treatment where the intervention takes place over a long time. Many alternative systems of treatment let patients go for years waiting for progress that maybe will never come.

That is not what we want to offer our patients in modern medical science, and that is why that kind of treatment is not in correspondence with the intention of effective improvement of life quality, health and functionality. Thus, it is important the treatments given can show rapid and visual results.

The reason why we say that one month is “immediate,” is that within one month, it is very unlikely that something happens that changes the quality of a patient's life. On the other hand, it is sufficient time to give at least eight sessions of most therapies.

If eight sessions do not create a visible result in at least some of the patients, giving a significant rise in the measured QOL, health and ability of functioning, we must conclude that the cure is not effective.

Comments to point four above

At the moment, there are economical limitations restricting the research of alternative and holistic medicine. Therefore documentation must be necessary and adequate but not more. Since what troubles the patients is always their own experience of life quality, health and functionality, it is sufficient to examine this to document the effect we wish to give our patients by alternative and holistic medicine. Objective examinations are desirable but very expensive and not necessary at this stage. Psychometric tools – questionnaires concerning quality of life, health and functionality – that measure exactly what they should and that have the correct amount of questions that are necessary to prove a clinically essential improvement of the relevant dimensions are therefore the right choice for this research.

This can work with a five-point (Likert) – scale with a neutral centre as in the extremely short, validated QOL1 questionnaire (8):

How do you assess the quality of your life now?

1. very high 2. high 3. neither high nor low 4. low 5. very low

The difference in quality of life, health and functionality required calling a treatment clinically relevant (clinically significant) must be one-fourth of the difference between two points of the scale, and a good intervention must raise the intervention group in average at least one-half step on the scale.

The rationale for this is that people with a global QOL rating below 3.5 on a five-point symmetrical Likert scale (between “high” and “neither high nor low,” calculated as 60%) often are unable to work, while people above 4.0 (“high” calculated as 70%) often are able to work. Being able to work seems to be an important indicator of resources and health, and we want a valid treatment to be able to bring people back to work. If the patients are on a level of, i.e., “low” at the beginning, the therapist must lift the group to a level between “low” and “neither high nor low.” This will not make the patient able to work, but the improvement is thought to be of value to the individual. It is obvious that an optimal treatment would lift the group four or even six times as much, namely to the level “high” or “very high.” But for a single intervention taking less than one month, we are willing to acknowledge the increase of one-half step on a five-point (Likert) scale as fine and remarkable. An improvement of one step (20%) is acknowledged as excellent.

Comments to point five above

The desired difference of one-half a step (calculated as 10%) (9) can be statistically significantly documented (with the given one-half steps on the scale as above) with 19 patients, as shown for the question of quality of life (questionnaire with one question called QOL1) (8).

If five questions are used (QOL5) (8), a difference of a one-fourth step can easily be detected with 20 patients. Therefore the number of 20 people is adequate for a statistically significant measuring of the difference before compared to after the intervention. Global QOL

and self-assessed health (physical and mental) can be measured with the QOL1 and QOL5 questionnaires (8).

Discussion

The proposed research design is not without difficulties, as psychometrics is a complex issue, and consciousness in general poorly understood. A consciousness-based medicine is basically using changes in consciousness, well exemplified by the placebo effect that is such an annoyance in biomedical research. Working directly on the consciousness is infinitely more powerful than just tricking it with a pill. The presented square curve paradigm aims to eliminate the highly esteemed control group of the traditional clinical testing. Before judging the scientific value of this paradigm, please consider the fact that the standard procedure in biomedical research using the control group is not without difficulties either. When a company selects drugs that give the patients an internal sensation of receiving a drug, they boost the placebo effect (“active placebo”), and so the “blinded” test is not at all blind, since all patients should have a similar experience of getting an active drug. So the control group in a fair trial should also be “boosted” with an internal clue of receiving a drug.

The placebo effect is well known to be enhanced dramatically by this internal clue, as experienced when physicians for centuries have administered strychnine and other poisonous substances with absolutely no specific therapeutic effect to their patients. So please do not be naive about the validity of even the finest scientific designs. The best proof for a clinically significant effect of an intervention is that our patients actually improve their health, feel better today, and that they stay this way. Is it the case when our patients with problem X get intervention Y? This is exactly what the square curve paradigm tells us to test for in a reliable way. A problem with the square curve paradigm is, of course, that it is insensitive to slow improvements made over a longer time, but this can be made visible using statistical process control methods like run-charts.

Conclusion

If the scientific community can acknowledge an effect on quality of life (QOL), health and ability of functioning to be caused by an intervention, if the patients have been in a stable state for a year, if they are raised to a better state within a month, and if they stay in this better state for another year, the effect of alternative and holistic medicine can be evaluated effectively and scientifically with very simple and affordable means. A simple, easily administered, quickly answered, validated and adequate questionnaire containing less than 100 questions on quality of life, health and functionality can give the necessary data, of sufficient quality, for evidence-based alternative and holistic medicine. Ideally, the questionnaire(s) contain(s) no more than 20 core questions, supplied by the necessary background information on name, age, sex, diagnosis, etc.

Any therapists who wish to be a part of the study can easily administer the questionnaire to his or her patients. Studies are easy to do and can include any kind of alternative and holistic treatment, any groups of patients, recruited from hospitals, clinics, practising

physicians, homes for the mentally ill, or any other organizations of treatment and care. Thus, with this new suggested “square curve” research paradigm for consciousness-based medicine, it will be possible, with a minimum of resources, to collect the necessary evidence to answer the three fundamental questions in alternative, complementary and holistic medicine, namely:

Who can be helped? – Which group of patients can benefit from alternative or holistic treatment? We know that an important factor in healing is the patient’s own degree of competence, resources, and motivation. Must patients be subdivided into groups according to motivation, to understand the process of healing?

What helps? – Which kinds of alternative and holistic treatment give, with certainty, a clinically relevant improvement of the patient’s quality of life, health and/or functionality?

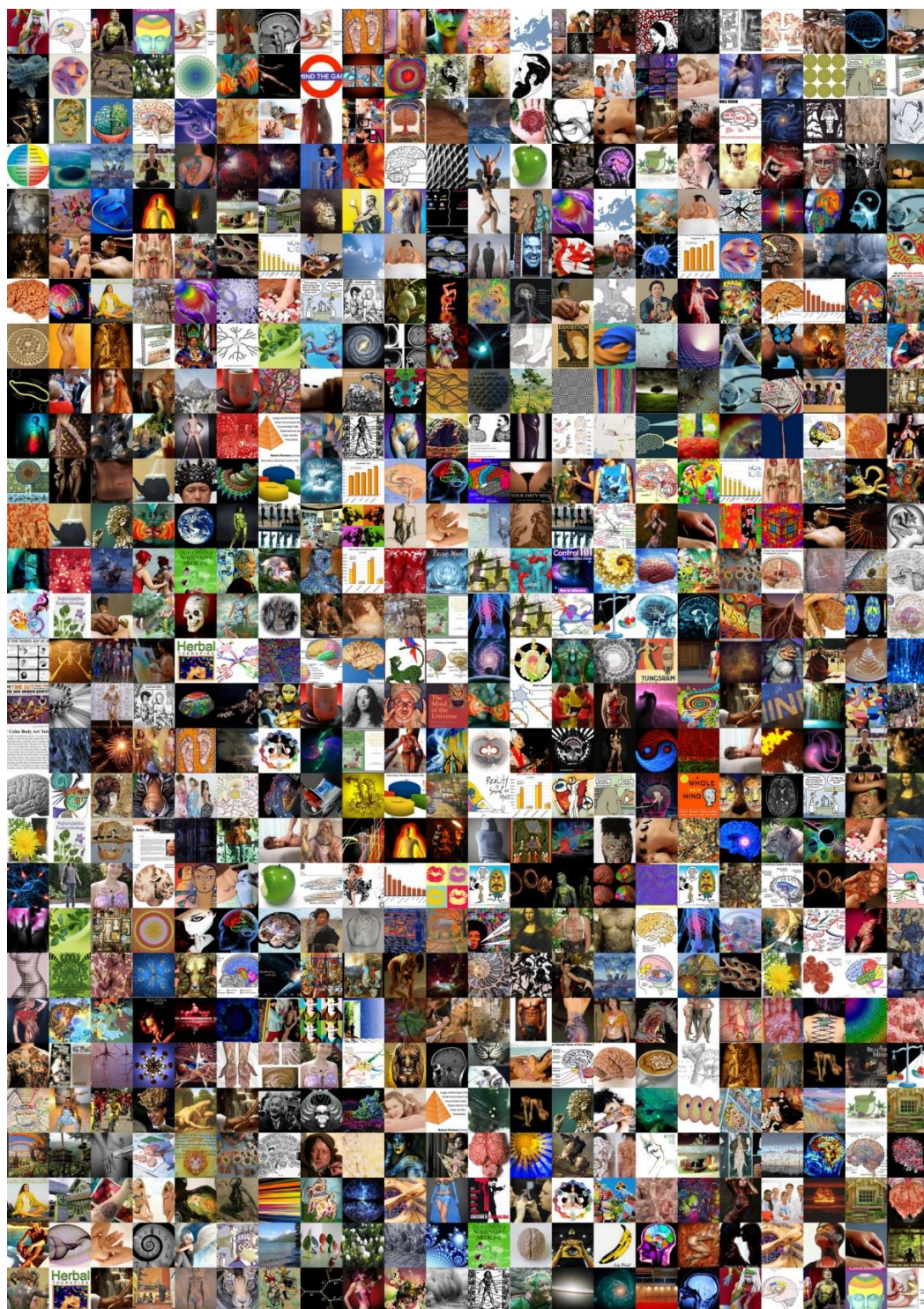
Who can help? – Over all in the Nordic countries, there is an explosive increase of alternative and holistic therapists, available forms of treatment and alternative institutes training new therapists, giving diplomas to everybody who pays the fee often more or less regardless of the obtained skills. It is therefore decisively important to find out which therapists are competent, and what one must demand from an alternative or holistic therapists’ competence. Every year, thousands of new alternative and holistic therapists and several new kinds of treatment enter the market, but the population surveys show no improvement of the public health. The most likely explanation is that the methods often are not very efficient, or that the competence of the alternative therapists often is too modest to give the patients clinically relevant improvement. When the therapist works primarily with the consciousness of the patients, it is very difficult to identify faults and errors in the alternative and holistic treatments.

The necessary research in alternative and holistic medicine will show which methods (together with the associated theories) are good tools to support the patient’s personal development of quality of life, health and functionality... It is of great value if the research also can document the level of competence of a therapist giving alternative and holistic treatments. The suggested research design, where several therapists, treatment systems and patient groups are included in a time-limited study, with the improvement of quality of life, health and functionality as endpoints, is believed to be scientifically reasonable, financially sound, practical and without compromising the patients ethically or otherwise, naturally providing one upholds standard research customs, i.e., regarding confidentiality regarding collected data, written patient documentation and the like. The square curve paradigm is also a general method for quality improvement of any treatment, which takes place in the time span of one month or less, which is supposed to give a lasting improvement, and which has the purpose of improving QOL, health and ability of functioning.

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Clinical quality-assurance and research on treatment efficacy and safety

Quality of life and self-rated health are important health measures. Measures of self-rated ability – sexual, social, study- and work-related – are of equal importance, if you take them together as one measure of general ability. These measures give us, when taken together, a good, reliable and meaningful picture of the patient's total state of being. Therefore, the scientific communities worldwide seem to agree about these measures being the ideal outcomes of any medical treatment or intervention. Such measures are surprisingly simple to use, and they are highly efficient for accurate documentation of treatment effects and inflicted harm and thus for securing the quality of a clinical practice, outcomes and safety.

We have over two decades developed the ten-item QOL10 questionnaire to measure self-assessed quality of life, self-rated mental and physical health and general ability. We have realised that we need to measure both self-rated physical health and self-rated mental health, to be certain that we know how the patients are in both these somewhat independent dimensions.

The QOL10 combined with the Square Curve Paradigm data-collecting procedure seem to be an extremely efficient, fast, in-expensive and valid method of documenting total treatment effect and securing high quality of a treatment facility. In this chapter, we demonstrate how easy data are collected and analyzed.

The total time consumption of administering, collecting and analyzing the QOL10 was only ten minutes per patient in a well-organised clinic. The QOL10 is free for all to use. Even people without statistical training can make the statistics in a few hours. The use of QOL10 and its ten key questions make it possible to group the patients into treatment groups according to their health/QOL/functional problems and to follow the development of each group to see how well they are helped in the clinic.

We found the following dimensions to be of primary interest in quality assurance and documentation of treatment effect: 1) Health: Self-assessed physical health, self-assessed mental health, 2) Quality of life: Self-assessed QOL (use the QOL1), QOL measured with a small questionnaire (i.e., QOL5), 3) Ability: Self-assessed sexual ability, self-esteem social ability and working ability, and the patient's general state of being on the axis: QOL-Health-Ability (i.e., measured with QOL10, which includes the QOL5 and QOL1).

Introduction

During the last two decades, a large number of papers have documented that the most important factor and most significant endpoint in studies of effects of medical treatments is the self-rated health (1-11):

- “Self-rated health (SRH) is considered a valid measure of health status, as it has been shown to predict mortality in several studies” (4)
- “Self-assessed health status has been shown to be a powerful predictor of mortality, service use, and total cost of medical care treatment” (5)
- “Self-rated health contributes unique information to epidemiologic studies that is not captured by standard clinical assessments or self-reported histories” (7)
- “Self-evaluations of health status have been shown to predict mortality, above and beyond the contribution to prediction made by indices based on the presence of health problems, physical disability, and biological or life-style risk factors” (8)
- “The results suggest that poor self-rated health is a strong predictor of subsequent mortality in all subgroups studied, and that self-rated health therefore may be a useful outcome measure” (11)

Self-rated health has been documented to predict survival time and future health better than any other known health parameter. This means that self-rated health has been found to be a valid – and possibly the most valid – health measure. To document improvement of health, we need to measure self-rated health; and to measure health, we need to measure self-rated health. Most unfortunately, the research has worked with a single-item questionnaire of self-assessed health, making it very difficult to understand what is measured by the questionnaire. We have, as a part of the validated QOL5 questionnaire, included two items on self-assessed physical health and self-assessed mental health (see the box below). We have found that these two items function extremely well in quality assurance and in documentation of treatment effect (12,13). We therefore recommend that these two measures, together with measures of self-assessed global quality of life (like the single item QOL1 (14) or QOL5 (14)) and self-assessed measures of ability, are used for quality assurance and documentation of research effect. We have combined ten key questions into the QOL10-battery measuring self-assessed health, quality of life, and ability in general, and we found this to be of immense value.

The use of QOL10 and its ten key questions makes it possible to group the patients into treatment groups according to their health/QOL/functional problems and to follow the development of each group to see how well they are helped in the clinic setting (12,13,15-18).

The QOL10

The idea behind QOL10 is the *sense of coherence* (SOC), a very important dimension in life developed by Aaron Antonovsky (1923-1994). The subjective experience of sense of coherence stem from a line going from life inside us to reality outside us (19). Sense of coherence is thus closely related to the concept of meaning of life and global QOL, as we find it for example in the IQOL theory (20). You can say that sense of coherence is the experience

of being an integrative part of the world. The world is your home; you have come home in the world. Psychologically, the secure base that your mother was when you were a child has become the whole world. In religious terms, you live in God, or in Sunya (the great emptiness), and no longer in Maya, the illusionary world.

QOL is determined by the global state of the person, while self-assessed health is determined by the inner state of this person. Self-assessed ability in the relevant dimensions (work, social, sex, love) is determined by the social state of the person. In our experience, health, QOL and ability are improved simultaneously when the person is healing his existence though the process of salutogenesis.

Due to our experience with the symmetric five-point Likert scales for psychometric research (21), we selected this scale for all items. The QOL5 and QOL1 questionnaire was validated earlier (14), and we also plan to validate the QOL10 questionnaire.

Analysing the data

For research in treatment effects and quality assurance, you need about 20 patients in each group for a valid test. You need, according to our experiences, to measure the patients before and after treatment with a one-year follow-up questionnaire. If the treatment is taking place over a long period of time, you need to measure before treatment, then three months later and then again a year after treatment. If you do it this way, you can measure a change in health that is highly likely to be the effect of your treatment, meaning that you can use the patients as their own control (we call this the Square Curve Paradigm) (22). The simplest way to analyze data is by dichotomizing the scale in a “bad” and “well” part. We normally use the bottom values (4 and 5) on the Likert scale as an indication of “bad” and the top part of it (1,2 and 3) as “well.” You include all starting participants in the study. Only patients who comply with the treatment and answer the questionnaire in the end of the study and report that they are well now are included in the “cured” group; all the dropouts, non-responders of questionnaires, and not-cured are treated as not cured. We finally used a statistical table (23) to establish the confidence interval. The time consumption of administering, collecting and analyzing the QOL10 were only ten minutes per patient. The QOL10 is free for all to use. The statistics can be made in a few hours and by people with no statistical education. We found in our study of the treatment effects of clinical holistic medicine (CHM) (24-58) that the six following dimensions measured by the QOL10 questionnaire were of primary interest:

- Self-assessed physical health (12)
- Self-assessed mental health (13)
- Self-assessed QOL (measure with QOL1) (17)
- Self-assessed sexual ability (16)
- Self-assessed self-esteem (relation with self) (15)
- Self-assessed working ability (18)

1) and 2) are the self-assessed physical and mental health, and the average of this corresponds well to the single item questionnaire of self-assessed health (statistical validation of this statement is planned).

An example

Data is taken from one of our studies (13). Fifty-four patients felt mentally ill before treatment (rating 4 or 5 on the five-point Likert scale of self-assessed mental health of QOL5). Thirty-one patients did not feel mentally ill anymore after treatment (rating 1, 2 or 3 on the Likert scale). Six patients still felt mentally ill after treatment (rating 4 or 5). Seventeen patients were non-responders upon follow-up or withdrew during the study.

We thus treated 54 patients who rated themselves mentally ill before treatment, and 31 patients did not do so after treatment. From this, we calculate a curing rate of 57.4%. The table (23) gives us 95% CI: 43.21% - 70.77%). From this, we estimated: $1.41 < \text{NNT} < 2.31$. We then analysed the changes in all QOL10 measures for the treatment responders using paired samples T-test and found that all measured aspects of life improved significantly, simultaneously, and radically (see Table 1): somatic health (from 2.9 to 2.3), self-esteem/relationship to self (from 3.5 to 2.3), relationship to partner (from 4.7 to 2.9 (no partner was rated as "6")), relationship to friends (from 2.5 to 2.0), ability to love (from 3.8 to 2.4), and self-assessed sexual ability (from 3.5 to 2.4), self-assessed social ability (from 3.2 to 2.1), self-assessed working ability (from 3.3 to 2.4), and self-assessed quality of life (from 4.0 to 2.3) (see Table 1). Quality of life as measured with QOL5 improved (from 3.6 to 2.3 on a scale from 1-5 ($p < 0.001$)). Most radically, the self-rated mental health improved by 1.97 steps on the Likert scale, from a bad mental health to a good mental health. This documents that the patients were not just "flipped" over the artificially defined border between the two dichotomised groups, but their mental health was actually radically improved.

All this data documents a general improvement that strongly indicates that the patient had healed existentially and experienced what Antonovsky called "salutogenesis" (59,60), defined as the process exactly the opposite of pathogenesis.

As reference value, we have "2" (good) on the five-point Likert scale, which corresponds to being well and normal (this is in accordance with what have been found empirically in large population surveys in Denmark) (61). We therefore see that the 31 mentally ill patients that were helped with holistic therapy actually almost normalised all their scores, signifying that they were indeed cured not only improved.

It is very important to have a system to collect side effects, and we therefore observed for brief reactive psychosis, suicide attempts, suicide, and signs of re-traumatisation (62), but we did not observe these side effects in over 500 patients. The therapy was found to be safe, (estimated from this: $\text{NNH} > 500$). We then could present the NNH/NNT as $500/(1.41 < \text{NNT} < 2.31)$. As we, for medical-ethical reasons, need to use the most pessimistic number for the calculation, we find $\text{NNH}/\text{NNT}/\text{NNH} = 500/2.31 = 216.5$.

We can compare this with the treatment of mentally ill schizophrenic patients with Clorpromazine (63): Number Needed to Treat: Prevents relapse, longer term data: NNT 4 CI 3 to 5. Improves symptoms and functioning NNT 6 CI 5 to 8. Number Needed to Harm: Sedation: NNH 5 CI 4 to 8. Acute movement disorder NNH 32 CI 11 to 154. Need for anti-Parkinson drugs NNH 14 CI 9 to 28. Lowering of blood pressure with accompanying dizziness NNH 11 CI 7 to 21. Considerable weight gain NNH 2 CI 2 to 3. Thus we find $\text{TV} = \text{NNH}/\text{NNT} = 2/5 = 0.4$. If we treated schizophrenics only, our treatment would have been 543.5 times more valuable than the treatment with chlorpromazine, but we did not as our group was an undiagnosed, mixed group of patients feeling mentally very ill.

Table 1. Thirty-one patients who changed from feeling mentally ill to mentally well (defined as “not ill”), healed all measured aspects of life due to Antonovsky salutogenesis: Somatic health, relationship to self, relationship to partner, relationship to friends, ability to love, and self-assessed sexual ability, self-assessed social ability, self-assessed working ability, and self-assessed quality of life. Paired samples T-test

	Paired Differences					t	df	Significance (2 – tailed)
	Mean	Std. Deviation	Std. Error mean	95% confidence interval of difference				
				Lower	Upper			
Physical health	.6000	.89443	.16330	.2660	.9340	3.674	29	.001
Mental health	1.9677	.79515	.79515	1.6761	2.2594	13.778	30	.000
Self esteem	1.2258	1.11683	1.11683	.8161	1.6355	6.111	30	.000
Relation to friends	.5161	.92632	.92632	.1764	.8559	3.102	30	.004
Relation to partner	1.8065	2.27185	2.27185	.9731	2.6398	4.427	30	.000
Ability to love	1.3548	1.60309	1.60309	.7668	1.9429	4.706	30	.000
Sexual ability	1.0323	1.35361	1.35361	.5358	1.5288	4.246	30	.000
Social ability	1.1613	1.12833	1.12833	.7474	1.5752	5.730	30	.000
Work ability	.9000	1.06188	1.06188	.5035	1.2965	4.642	29	.000
Quality of life	1.7097	1.03902	1.03902	1.3286	2.0908	9.162	30	.000

Conclusion

The QOL10 combined with the Square Curve Paradigm data collecting procedure seems to be an extremely efficient, fast, inexpensive and valid method of documenting treatment effect and securing quality of a treatment facility. Self-rated health seems to be the most important health measure we have. It is simple to use and eminent for documenting treatment effects and securing quality of a clinical practice.

The use of QOL10 and its ten key questions makes it possible to group the patients into treatment groups according to their health/QOL/functional problems and to follow the development of each group to see how well they are helped in the clinic. We found the following dimensions to be of primary interest in quality assurance and documentation of treatment effect:

1. Health: Self-assessed physical health, self-assessed mental health,
2. QOL: Self-assessed QOL, QOL measured with a small questionnaire like QOL5
3. Ability: Self-assessed sexual ability, self-assessed self-esteem (relation to self), self-assessed social ability, and self-assessed working ability.

Also important are the self-rated quality of relation to partner, self-rated quality of relation to friends, and self-assessed I-strength (ability to love). We thus recommend the QOL10 (see box below) measuring the global quality of life, self-rated physical and mental health, and self-rated ability for inexpensive, fast and reliable clinical quality-assurance and for research in treatment-efficacy in biomedicine, complementary and holistic medicine.

Box the QOL10. The QOL10 – a ten-item questionnaire on health, QOL and ability including the validated QOL5 and QOL1

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Q 1 How do you consider your **physical health** at the moment?

- 1 very good
- 2 good
- 3 neither good nor bad
- 4 bad
- 5 very bad

Q 2 How do you consider your **mental health** at the moment?

- 1 very good
- 2 good
- 3 neither good nor bad
- 4 bad
- 5 very bad

Q 3 How do you **feel about yourself** at the moment?

- 1 very good
- 2 good
- 3 neither good nor bad
- 4 bad
- 5 very bad

Q 4 How are your relationships with your **friends** at the moment?

- 1 very good
- 2 good
- 3 neither good nor bad
- 4 bad
- 5 very bad

Q 5 How is your relationship with your **partner** at the moment?

- 1 very good
- 2 good
- 3 neither good nor bad
- 4 bad
- 5 very bad
- 6 I do not have one (This is scored like “5” very bad)

Q 6 How do you consider your ability to **love** at the moment?

- 1 very good
- 2 good
- 3 neither good nor bad
- 4 bad
- 5 very bad

Q 7 How do you consider your **sexual functioning** at the moment?

- 1 very good
- 2 good
- 3 neither good nor bad
- 4 bad
- 5 very bad

Q 8 How do you consider your **social functioning** at the moment?

- 1 very good
- 2 good
- 3 neither good nor bad
- 4 bad
- 5 very bad

Q 9 How is your **working ability** at the moment?

- 1 very good
- 2 good
- 3 neither good nor bad
- 4 bad
- 5 very bad

Q 10 How would you assess your **quality of your life** now?

- 1 very high
- 2 high
- 3 neither low nor high
- 4 low
- 5 very low

The Endpoints you collect are:

QOL1: Self-assessed (global) quality of life[]

QOL5: Measured global quality of life[]

QOL10: QOL+Health+Ability/3

Box the QOL10 (Continued)

To calculate QOL1: Q10

To calculate QOL 5: $((Q1+Q2):2+Q3 + (Q4+Q5):2):3$

To calculate QOL 10 "Health-QOL-Ability":

$([Health] ((Q1 + Q2):2) + [QOL] ((Q10)+(Q3+Q4+Q5):3):2)+$
 $[ability] ((Q6+Q7+Q8+Q9):4)):3$

The result is comparable to a five-point Likert scale of global QOL but more informative. QOL10 is a "global life status." We like to think of this measure as a "subjective sense of coherence (SOC)" measure. We just call the measure "Health-QOL-Ability."

The normal values for Danes for QOL1, QOL5 and QOL10 are around "2" [Ventegodt, S. (1995) *Livskvalitet I Danmark. Quality of life in Denmark. Results from a population survey.* [partly in Danish] Copenhagen: Forskningscentrets Forlag.] (you will see that "2" equals "70%" in the Table if you transform the result to "percent of maximum" as described in [Ventegodt, S. (1996) *Measuring the quality of life. From theory to practice.* Copenhagen: Forskningscentrets Forlag.].

To keep it simple, we recommend the use of this scale for comparison:

Q 10 Measured quality of your life:

- 1 very high
- 2 high
- 3 neither low nor high
- 4 low
- 5 very low

Interpretation: 1 is great, 2 is normal, 3 is bad for QOL1 and very bad for QOL5 and QOL10; 4 is very bad for QOL1 and deadly for QOL5 and QOL10; 5 is dying for QOL1, QOL5 and QOL10 – you cannot survive for very long with this low rating.

I would say if your patients on average are doing worse than QOL1=3 and QOL5= 2.7.5 and QOL10 =2.5, then a significant number of your patients might have severe existential problems and significant suffering.

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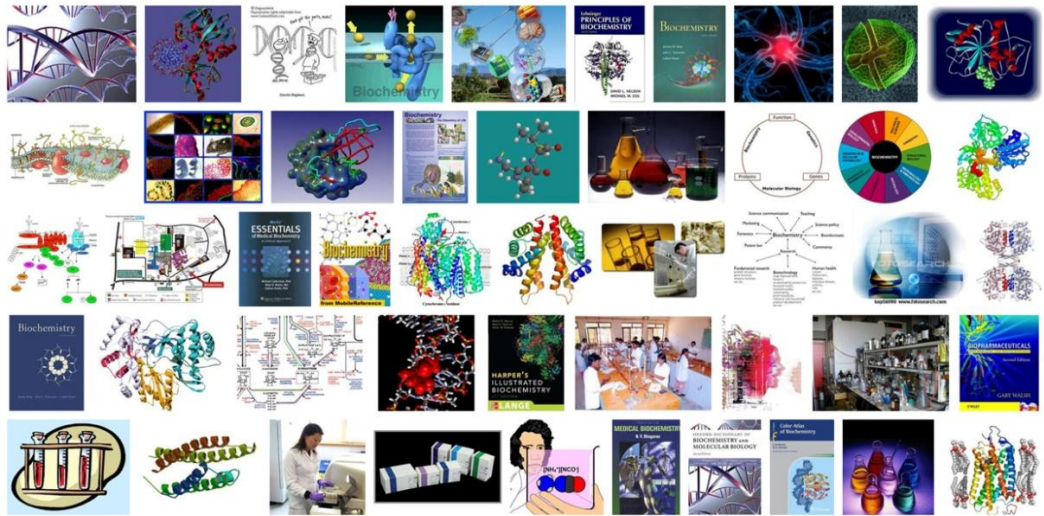
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Section 3: Politics and economy



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What is going on in the world?

This last section we have devoted to the bigger game. We are living in a world, and what is going on out there is of major importance to us, even if we only want to run our tiny little clinic with a dozen of patients, doing our job and minding our own business. This simply is not how the world works. Billions of power games and struggles for land, money, fame and all types of wealth and privileges are going on, and it is very likely that they also come knocking on your door at one point in time. So you cannot expect just to mind your own business and live quietly and happily. Even if this might be what you really want.

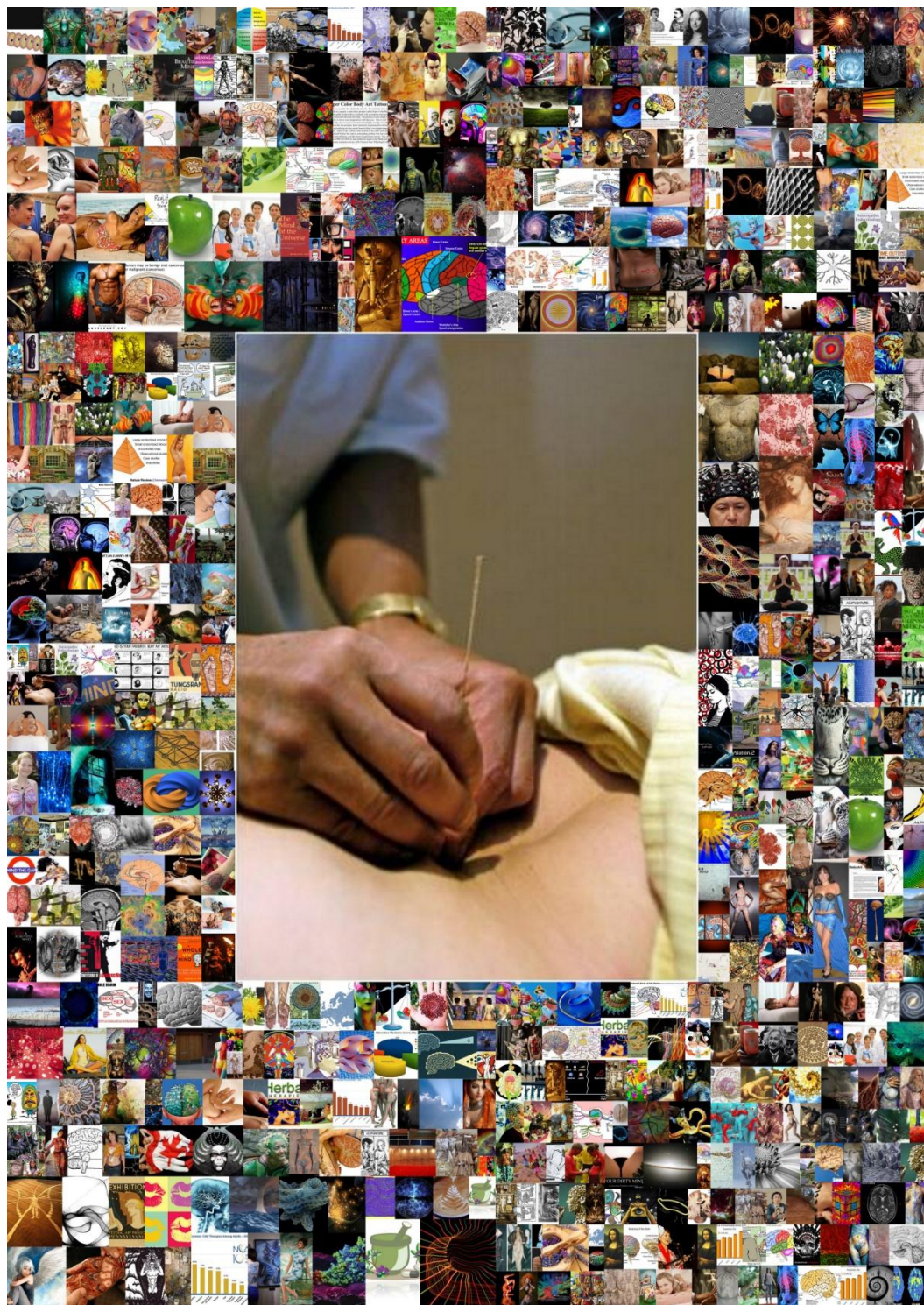
The world is, to a large extent, about money and politics. Medicine has become a huge business; many pharmaceutical companies are lobbying hard, and they have a huge impact on national laws everywhere. We are talking about big money, and this money buys a lot of power, and impacts a lot of major organisations, like universities and medical schools, all national research centres, all national boards of health, medical associations, hospital directors, media like radio and TV-stations, newspapers, scientific journals, and it impacts the general public through intensive manipulation of the internet (like Wikipedia) and through advertisement for billions of EUROS and dollars every year. Thousands of physicians are directly paid by the industry to participate in drug trials, and many more earn much of their money from selling drugs/medicine. But as you shall see below, the RCT test, which is the basis of all documentation of pharmaceutical drugs, is so flawed that it is highly unlikely that the information about the drugs can be trusted. Everything is manipulated and twisted by the extreme economical interests there are in today's chemical medicine. But people are starting to realise this now.

As more and more patients understand that drugs seldom cure and often harm, they shift towards non-drug medicine. As a reaction, doctors close to the industry have started attacking physicians and researchers working with non-drug medicine, often in highly malicious attempts to discredit through evil accusations in the media. The accusations intend to discredit and destroy the CAM practitioner and are almost always related to behaviour showing lack of character: sexual abuse, financial problems, drug abuse, etc. It is a war. It is a power struggle. If you successfully use non-drug medicine, you are likely to be a target of accusations and bad-mouthing by doctors using drugs. If you start curing cancer and coronary heart disorder, you might even end up in jail. Do not worry about it. Just take your precautions, make your case records thoroughly, document effect by measuring the patient before and after treatment, and stick together with your friends. If there is not a local society of holistic health, start one.

If there is, be a member. When a member is attacked, support him. Stick together, help each other, do good. That is the way to win the world in the end.

Consciousness-based medicine will develop and raise consciousness, and this cannot be done without confronting and processing all the impurities of our individual consciousness and our collective consciousness. So you might be surprised what comes up when you start this work, which you might find rather trivial and insignificant to start with. It is anything but that. It is highly dramatic, and you will awaken strong forces and participate in great shifts of people's lives. You will help people change their destinies. This is not going to happen without some noise, crisis and crying. People will react strongly and differently, and the surrounding world will also react. You need to be aware and responsive to what is happening around you, your patient and your clinic. The moment you start developing patient's consciousness successfully, you will see all kind of reactions. Just be prepared. You will meet drama. You will be challenged. You will find the pain needed for your own development. As you grow wiser, you will start to appreciate this. In the beginning, it is a pain in the neck.

You need an attitude that is relaxed, sincere and humoristic, not serious, tense and dull. You need to be able to laugh at the world when it reacts silly. You need to stay detached so you will not feel hurt when people accuse you of all sorts of strange things. If one of your patients commits suicide many years after you have seen him, you still might get blamed for it. If a patient independently of you chooses not to get cancer chemotherapy and then dies, you might even be blamed for her death. This is really silly. Just know in your heart that this is how the world is. Do not take it personally. It is not. It's just all the human impurities being visible in the light you are providing. Keep your spirits up. Continue being the light of your patient's world. Don't lose your good spirit, don't let them win. Let them be totally crazy, be the sane among the insane. That is the doctor's job after all.



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Is the randomised clinical trial (RCT) really the gold standard?

In this chapter, we are about to rock your world, if you believe in biomedicine and drugs. We basically document that the RCT test, which is the foundation for the whole pharmaceutical industry, is not scientifically valid. We have published this analysis, of course, but it has had little impact on the world. It is like nobody really finds it interesting. Huge conservative forces – economical and political forces – have taken the world in an iron grip. Medicine does not change easily when it means that millions of physicians should work in a different way, using themselves as medicine and not the drugs, and when hundreds of thousands of workers in the industry might lose their jobs, if governments realise what you are about to realise in this chapter.

But the world is changing; physicians and patients are waking up all over the world. This book is meant to teach you holistic medicine and also to prepare you to take the role of a healer in a chaotic world very much in need of healing, a world that is full of pirates making a living from other peoples suffering and diseases. Do not become another pirate. Be a good and ethical human being. Give your love and service without expecting to get anything back, and help all people you meet to develop the understanding they need to lead a good, happy, healthy and contributing life.

In some of our earlier work, we have seen that antipsychotic drugs cannot be considered an efficient treatment of the psychotic mental disorders. This might seem like a strange conclusion, when 5% or more of people in the Western world take these drugs every day. The reason for the discrepancy between the scientific documentation of the pharmaceutical drugs from the pharmaceutical companies and the results coming from large meta-analyses seems to have serious methodological problems connected to the way pharmaceutical drugs are tested. The method is called randomised, clinical trials (RCT).

RCT have been accepted as the golden standard of testing making chemical medicine "evidence based." RCT is based on four assumptions: 1) The placebo effect is represented by a placebo pill, 2) it is possible to make a double-blind test with biologically active drugs, 3) beneficial and harmful effects of drugs are fairly measured in RCTs, and 4) an appropriate timeframe for the test I used. We have found problems with these assumptions: 1) The placebo effect provided by close relationships to a physician is stronger than an inert pill, 2) double-blind tests cannot be made with biologically active drugs, as these leave an internal

clue in the patient that destroys the blinding (active placebo), 3) lack of global outcome measures makes toxic effects invisible for the test and magnifies minor effects to make clinically insignificant positive effects look important, and 4) RCTs are used in such a brief timeframe that side effects and harm are not properly detected.

The four errors combine into a serious error: The RCT procedure induces a strong bias in favour of any toxic drug tested. RCTs can turn drugs that are only toxic and not beneficial at all into products sold as useful chemical medicine. Many pharmaceutical drugs on the market today are tested only with this flawed RTC-procedure, and we recommend that these drugs be tested again using a rational method. If drugs are not more helpful than placebos, we need to return to classic psychosocial holistic medicine.

Introduction

For many years, European medicine was identical to the proud tradition of the Hippocrates psychosocial medicine, “character medicine,” as its interventions served the purpose of helping the patient to self-insight into his or her purpose of life and character, i.e., total pool of physical, mental and spiritual talents (1). When a person use all talents to create value in all personal relationships, this person is happy, healthy and well functioning in all major areas of life, from social, family and sexual life to working life. The classical physician was a man of wisdom, and his training was about helping people to develop self-insight and realize their full potential – i.e., to “step into character.” This treatment intervened only on consciousness, and the healing effect of it was called placebo, from Latin “I please.” The ethics of the Hippocratic medicine was the famous principle of *primum non nocere*: First do no harm (1).

About 1950, the discovery of penicillin and other effective pharmaceuticals started a biochemical revolution. If medicine could be drugs, this was an eminent business opportunity, and soon a large number of commercial pharmaceutical companies were established. The first problem the new chemical medicine had to solve was a technical chemical problem: how were bioactive drugs with specific effects designed and developed? The second problem was how could such potentially poisonous and harmful drugs be tested on humans? The third problem was ethical – to convince the medical societies to abandon the traditional Hippocratic ethics.

To justify pharmaceutical products, the industry had to document that the drugs were beneficial for the patients. They needed to be more efficient for healing and cure than the traditional psychosocial consciousness-based treatments – now called the placebo cures – and the harm they inflicted must be insignificant compared to the healing benefits.

The solution to this problem emerged over a few decades into the standard toxic trial on animals, followed by randomized clinical testing (RCT) on humans used today. In the latter, the potentially beneficial drug is tested double-blind against an inert placebo pill, containing calcium carbonate (chalk), sugar or a similar, biologically inert drug. Potential effects and suspected adverse effects and events are measured and counted.

The animal testing has, during the years, proved less effective than expected, as the human body reacts differently towards many drugs from the small mammals we most often use for lab tests of toxicity. The tests of the drugs on humans often also ignores important poisonous aspects of the drugs, as we have seen many examples of lately, i.e., with the

problematic drug Vioxx (2), a seemingly harmless painkiller that caused acute myocardial infarction and stroke. In the medical society, there is a kind of tolerance towards such failures to detect severe and lethal adverse effects of drugs, as it is impossible to test for everything in a pharmaceutical testing. Still this reminds us all of the importance to choose a non-drug treatment for our patients, if such a treatment exists at all.

In this chapter, we will show that there are much more fundamental problems with the standard RCT procedure used by the pharmaceutical companies to get their pharmaceutical products approved and sold than just occasional failures to detect toxic effects of drugs. We have analyzed these problems and found them severe so that we believe RCT to be questioned as a sound basis for evidence-based medicine. In the end of this chapter, we therefore suggest more rational methods for testing the pharmaceutical drugs.

Four fundamental problems of RCT

The RCT is based on four assumptions:

1. The placebo effect is well represented with a placebo pill
2. It is possible to make a double-blind test
3. The beneficial and harmful effects of the drugs are fairly measured
4. The timeframe used for the RCT test is reasonable.

The fifth condition for RCTs to be valid is that they are done by people without a personal interest in the outcome of the study, since such a special interest is likely to induce a bias in the study (3). The problem of bias in pharmaceutical studies based on RCTs is well known and therefore not the subject of this chapter. We will discuss these assumptions one by one.

Regarding assumption 1: The placebo effect is well represented with a placebo pill

The core in the classical Hippocratic non-drug treatment is the intimate relationship with a physician – the physician is the tool, so to speak (4). The importance of the close relationships with the physician for the size of the placebo effect has recently been documented in the *British Medical Journal* (5). The relative importance of talking and touching has been investigated in a recent study by our group (6), and we found the combination of the two principal interventions to be important for inducing a large placebo effect, indicating a strong synergy. The size of the placebo effect has also been established now, from several dozens of studies of holistic non-drug medicine done through the last three decades (7,8). We concluded in the two reviews that most health conditions can be treated, and one patient in two or three are normally cured with the most effective types of placebo-treatments. It has thus been documented that the placebo effect is tremendously powerful as medicine, even if the patient has a severe heart condition (9,10).

The effect of the placebo-pill used in pharmaceutical RCTs has recently been investigated, and the conclusion was that it had no effect at all (11). The authors concluded from this that the placebo effect (in the RCTs tested) did not exist at all when compared to no treatment.

Conclusion: The assumption that the placebo effect is well represented with a placebo pill in the RCTs is therefore false.

Regarding assumption 2: It is possible to make a double-blind test of a drug vs. (passive) placebo

Most if not all biologically active drugs give an internal clue to the test person that he or she has actually gotten an active drug. This clue activates a placebo effect called *active placebo* (12), and if such a drug is tested against normal (passive) placebo, it will induce a placebo effect that by itself will create the result that this is an effective drug. Therefore, it is not possible to make a test double blind as the blinding is destroyed by the internal clues of active drugs.

The size of the active placebo effect in psychoactive drugs has recently been established in a Cochrane meta-analysis of antidepressants vs. active placebo (13). The authors found that the effect of antidepressants practically disappeared if tested against active placebo compared to the normal “passive placebo” pill, and when tested against passive placebo one patient in three was helped.

This latter result is the basis for the marketing of antidepressants today; obviously, the conclusion that the antidepressants help is not justified. We find it possible to extrapolate from this type of drugs to all psychoactive drugs in use today.

The situation is even worse. If you give the patient a poison that gives an internal clue, it will always come out better than the passive placebo used for comparison. The test-substance in the Cochrane meta-analysis was exactly that: drugs that only gave adverse effects and no beneficial effects. So the way the double-blind test is designed favors poisonous drugs for non-poisonous drugs.

In theory, all drugs could be tested using active placebo drugs of similar toxicity, but as this is highly predictable to give the same results as in the above-mentioned Cochrane study, the pharmaceutical industry is not likely to induce this procedure by itself, in spite of its logical necessity.

Conclusion: The assumption that it is possible to make a double-blind test of a drug vs. (passive) placebo in the RCTs is therefore false.

Regarding assumption 3: The beneficial and harmful effects of the pharmaceutical drugs are fairly measured

Only with a fair measure of beneficial effects can it be evaluated if the drug is useful as medicine, and only with a fair and similar measurement of benefits and harm is it possible to compare the two to evaluate if the drug all in all is beneficial or harmful to the patient.

Many new drugs will reach the clinic or office based on their ability to affect some presumably disease-related measure (i.e., glucose, cholesterol, blood pressure), which are readily measured and can serve as a disease marker.

Clearly, something that influenced cholesterol but had no effect on cardiovascular disease would not be of much use; however, one would have to learn about this in a stepwise manner. Other strategies for testing drugs focus on local symptoms rather than global states of health and quality of life. Only with global measures can we really know if a pharmaceutical drug is benefitting the patient.

Today, we have a number of established and validated global measures of health. We can easily measure self-rated health, self-rated physical health, self-rated mental health, and global quality of life, using small easy-to-use questionnaires (WHOQOL5, QOL1, QOL5, QOL10) (14-16).

We also know that such subjective measures of health are stronger predictors of survival and future health than any objective health measure (17-21). With such measures, it is easy to evaluate the total effect of a drug on health and quality of life. This effect can also easily be followed over time. The cost for such testing is minimal, and the information gained essential. A global quality of life measure detects the combined effect of benefits and harms from a drug. Many such measures exist, but they are rarely used in RCTs today.

In spite of the possibility of using global measures, the pharmaceutical companies most often focus on only one or a few, local measures to document the positive outcomes when they develop and test a drug. Global benefits in health and quality of life is therefore not tested nor is global harm.

The focus on specific adverse effects and events is further enhancing the drugs chances of looking good in the RCT test, while the possible damaging impact on a global scale on health, quality of life and general level of performance that would make the drug look very bad is not measured.

When a new drug is marketed, the physicians therefore lack this crucial information, and when they do, they automatically assume that the symptom alleviated by the drug is more important to the patient than the adverse effects induced by the drugs. In this way drugs that are more harmful than beneficial to health and quality of life can still pass the RCT and come out as a beneficial drug.

Our own analysis of the relative harm and benefit of antipsychotic drugs thus showed the antipsychotic drugs to be about 100 times more harmful than beneficial (22), and we recently found a similar situation for cancer chemotherapy (23).

As times goes, by adverse (toxic) effects according to the science of toxicology often tend to accumulate, and beneficial effects tend to diminish; it is therefore very important to observe the long-term effects of the drugs. In practice, this is almost never done by the pharmaceutical companies.

Other problems are that negative results almost never are published, giving a very strong publication bias; when all data is collected in a field, the results are often much more negative than if the industry just published its positive results, as we saw with the huge meta-analysis of cancer chemotherapy done by Abel, which concluded that chemotherapy shortened life and destroyed quality of life for almost all types of cancers (the epitheloid cancers) (24-27).

Conclusion: The assumption that the beneficial and harmful effects of the pharmaceutical drugs are fairly measured in the RCTs is therefore false.

Regarding assumption 4: The timeframe used for the RCT test is reasonable

If the active placebo effect of a toxic drug is used in medicine, there will be two phases, a positive phase (the active placebo phase), where the patient feels lifted, motivated and helped due to the active placebo effect, and after this a negative phase (a toxic phase), where the patient is paying the prize of being helped by a toxic drug.

The ideal use of a toxic drug – like strychnine, which was used by allopathic physicians around the 1900s – was a short, strong intervention. If the treatment period was too long, the immediate benefit would be destroyed by the harm caused in the long run. We therefore know that an RCT test that involves a strong element of active placebo from toxic effects of biologically active chemicals needs to be thoroughly tested for the whole period of time, where it is used by the patients, to monitor the total effect on the patients.

In our meta-analysis of the antipsychotic drugs (22), we learned that a positive effect found in a short-term measurement at six month often is reduced to half the effect after 12 month, and it is presumed that this tendency continues though time, making it mandatory to test positive effects for two years or more, as many patients are treated with the drugs for years in the belief that short-term effect is also preserved in the long term.

In the same way, the adverse effects (side effects) and adverse events (negative events) tend to accumulate through time. As an example, it is well known that schizophrenic patients more and more frequently commit suicide as the treatment with antipsychotic drugs continue. A few percent of the patients take their own lives in the beginning of pharmaceutical treatment (28), with this fraction growing to 15% as times goes by (29).

Swedish researchers have suggested that suicide is caused by drug-induced depression (30). The reason for the increased rate of patient suicide though time could very well be a more and more severe depression induced by the accumulated toxic effect of the antipsychotic drugs.

It is also found that psychiatric patients treated with pharmaceutical drugs have a higher tendency to die spontaneously (31), presumably because of accumulated toxic effects. It is therefore of extreme importance to continue the measuring of toxic adverse effects and adverse events on the long term (two years or more, and 5-20 years if patients often take the drugs for so long).

If the appropriate timeframe for the RCTs is not used, the whole test becomes meaningless. Unfortunately, most pharmaceutical companies are only testing their products over a short term, often only three months. This seems to be a strategy to hide the adverse effects of the drugs, which is unacceptable.

Conclusion: The assumption that the timeframe used for the RCT test is reasonable is therefore false.

Combined effect of the four errors

The first error, not to test pharmaceuticals against the traditional psychosocial intervention that holistic physicians have been doing for millennia, are giving the pharmaceutical industry an easy way out or no competition at all. Basically all drugs can win this race.

The second error changes the sign of the test from plus to minus – toxic drugs are perceived as beneficial drugs due to the active placebo effect. This is problematic and makes the present RCT procedure misleading. The third effort, the local non-global testing (a local symptom or a disease marker) ignores the possible, negative global effects on the patient's health caused by toxic effects of the drugs. The focus on local effects separates positive effects from adverse effects, making it possible to ignore that the harmful effects are stronger than the beneficial and allows the industry to conclude that the drug has beneficial qualities for specific symptoms. Because of this way of testing, even a very toxic drug can pass the RCT test and come out as beneficial.

The fourth effect, to test only in a short-term period, is boosting the positive effects caused by the active placebo effect and hiding the true, adverse effects of a drug used in the long run.

Combining these four errors, the pharmaceutical industry has managed to set up a RCT procedure that can make almost any drug look like a beneficial pharmaceutical medicine with only modest harm done to the patients.

In the documentation, the drugs will look as clinically beneficial drugs with clinically less significant adverse effects and events. We have a situation that is clearly not acceptable. The RCT procedure needs instant revision and should not in its present form be used for future clinical testing of pharmaceuticals. All drugs tested with the RCT procedure need to be retested, as we cannot rely on the results of the present RCT test procedure.

There can be no doubt that all the four errors individually have been used,, because of their ability to improve the way the pharmaceutical drugs come out of the RCT. We doubt that the highly problematic combined effect, that toxic drugs are made to look like beneficial medicine, is made intentionally, as the effect of the pattern of the four errors combined is somewhat difficult to understand. On the other hand, there have been times where pharmaceutical drugs in large meta-analyses have turned out to be only harmful and not beneficial at all as we have seen (13,24). Another example is the antipsychotic drugs, where Adams et al. (32) in a large Cochrane meta-analysis found these drugs not to improve the mental health ("mental state") at all, with the drugs having many very common and severe adverse effects. Adams et al. (32) also found that the new generation of antipsychotic drugs is not more beneficial or less harmful than the first drug, Chlorpromazine, in spite of the industrial RCT tests of the new generation drugs, often shows an improvement.

The pharmaceutical industry has had time and plenty of occasions to reflect upon the contrast between the results of the single RCT based study made by the industry and the conclusions of the large meta-analyses made by independent researchers. We believe that the pharmaceutical industry has done its own critical analyses, very similar to the one we are presenting here, but has not taken the consequences and changed the RCT procedure. This is in part because scientific journals are accepting the RCT procedure as it is and partly because it is good business for the industry.

How should biomedical interventions be tested?

If one wants to keep the design of RCT, one should use active placebo of sufficient strength, global outcomes and sufficient observation time. We have an ethical problem with the use of

active placebo drugs, as they must be as toxic as the drug we are testing but without positive medical qualities. It is not simple to distribute toxics to thousands of innocent control patients.

For chronic patients, a simple schedule must be preferred: Simply treat chronically ill patients – patients that have not been better for years – and see if they improve on some global level – health, quality of life, or performance. Follow them for a few years, and see if the induced improvement is permanent. Use NNT and NNH numbers to express the effectiveness and use, if possible at all, the outcome “cured or not cured” in combination with self-rated physical health, self-rated mental health and self-rated quality of life.

If a pharmaceutical treatment cures a fair fraction of the patients, say one in two, three or four, and does not have significant adverse effects, this is a valuable drug. If not, if it only cures one in 50, and if it has significant adverse effects, the drug is of no medical value. If there is a more effective, or similarly effective, non-drug treatment, the pharmaceutical treatment is of no value as there will always be some adverse effects from drugs.

This procedure of curing chronically ill patients and using them as their own control is simple and efficient and can be used with all types of chronic patients (33). The randomization to *no treatment* is less valuable, as most of these patients will go to some kind of CAM treatment if not treated medically. If the classical, Hippocratic holistic medicine is used as control in the study, and we recommend that the research follows the open source protocol for clinical holistic medicine (34).

For acute patients, randomization is still necessary. The most logical thing to do is to randomize to holistic medical treatment; there are many small units with holistic physicians, who have documented their efficacy. If a holistic medical treatment unit is not available for a specific disease, it will be necessary to train a group of physicians to do it, or if this cannot be done, randomize to no treatment. When a patient receives no treatment from a doctor, the patient – i. e., in an acute psychotic crisis – is likely to assume more responsibility for his or her own life, and this itself has a strong curative effect.

We understand that a serious proposal to create a NGO (non-government organization) to reevaluate every approved drug on the market would involve breathtaking commitment of resources. But it can and should be done. We estimate that a research hospital specifically established for the comparison of biomedicine and classical holistic medicine would cost around or 150 million EURO or \$US 200 million to establish. This is still not much on an industrial or national scale.

Discussion

Most researchers acknowledge that there is no risk-free ride when a patient takes a drug to obtain a benefit; every drug has some adverse effects. We have found that the way the RTC tests the medical value of pharmaceutical drugs today tends to create the impression that a drug that has no beneficial effect at all but only harmful adverse effects can still appear as an effective, useful medicine. Toxic drugs tested with the RTC-method can thus be sold as medicine.

The RCT procedure is building on false assumptions in our opinion and has strong built-in bias in favour of the drugs. We know that biologically active drugs can be toxic, and it is

therefore of extreme importance that we are able to make a fair test of pharmaceutical drugs to ensure benefit to the patient and do no harm. The problems relate to the choice of placebo types to the used outcomes and the observation times not to mention all the other types of well-known bias like the withdrawal of negative results from publication, which could explain the findings of Abel (25).

We basically see all this as political and commercial problems rather than as scientific problems. The scientific problems of RCTs can easily be solved: In principle, the CRT can test the benefits and harms of a drug using randomized, double-blind testing compared to active placebo with the drugs we have suggested and global outcome measures. This could easily be done without any technical or scientific problems.

But the industry tests its pharmaceutical drugs in such a way as to optimize the appearance of the drugs, which is only logical from a commercial perspective. The pharmaceutical companies make the drugs look as beneficial and as harmless as they possibly can. It is important to recall that the way the drugs are tested has been created by the pharmaceutical industry. They have been uncritically approved by the responsible government institutions and by the physicians in our opinion.

The academic institutions have in general also approved the standard RCT method for pharmaceutical drug testing without being critical enough in our opinion. We are now in a difficult situation because drugs have been accepted, but they might be harmful and not beneficial to patient health and quality of life.

We know that about 50% of citizens in countries with socialized, free biomedicine are chronically ill (35). Analyses have shown that only a small fraction of these patients are helped by drugs (36). The deteriorating health of the population might be explained directly by the toxic effect of the many pharmaceutical drugs given to the population.

The solution to the difficult situation is to test all drugs on the market again. The pharmaceutical drugs must be tested by some organization that does not have commercial interests in the drugs. Such organizations are hard to find and might have to be created from the bottom, finding researchers without personal interests in medicine. It must preferably be an NGO as strong lobbyism from the pharmaceutical industry continues to plague the public health care system.

The possible result of such a testing could very well be that the classical holistic medicine inducing healing of mind and body – often called salutogenesis – may be found to be preferable to symptom-blocking drugs, which does not heal the person (36-40). A broader application of subjective health and quality of life measures would constructively impact the RCT test.

Conclusion

The standard RCT testing of pharmaceutical drugs in double-blind trials as compared to placebo has so many problems that these sum up to a fatal error: a drug with only toxic qualities is likely to appear as beneficial medicine. The primary single cause for this is that toxic drugs always have an active placebo effect that makes the drug look beneficial in the RCT test. This casts serious doubt that the RCT procedure in its present form is not scientifically valid. The way the clinical outcomes are chosen in the tests – with focus on

local symptoms or disease markers instead of global states – makes it furthermore impossible to compare positive and negative effects.

Finally the short timeframe of testing makes the positive active placebo effect dominate over the negative pharmacological drug effect of a toxic drug. Therefore, a toxic drug with no beneficial pharmacological effects is likely to be approved as a beneficial pharmacological medicine when the standard RTC is used.

We conclude that effects of drugs documented with the standard RCT test procedure used by the pharmaceutical industry today are not “evidence based.” As a consequence of this, we cannot exclude the possibility that some of the pharmaceutical drugs in use today are likely more harmful than beneficial, in spite of being documented as primarily beneficial. We therefore need to re-test all the pharmaceutical drugs documented with the RCT test. This can be done using the simple test on chronic patients with randomization against no treatment, or better against the traditional placebo cure by classical holistic medicine, or in acute medicine, using a randomized test using active placebo, global outcomes and sufficiently long test times. Testing must be done by people and organizations without personal, commercial or political interest in medicine. We strongly advise NGOs to be empowered to do the testing, as all governmental organizations are strongly influenced by the lobby of the pharmaceutical industry.

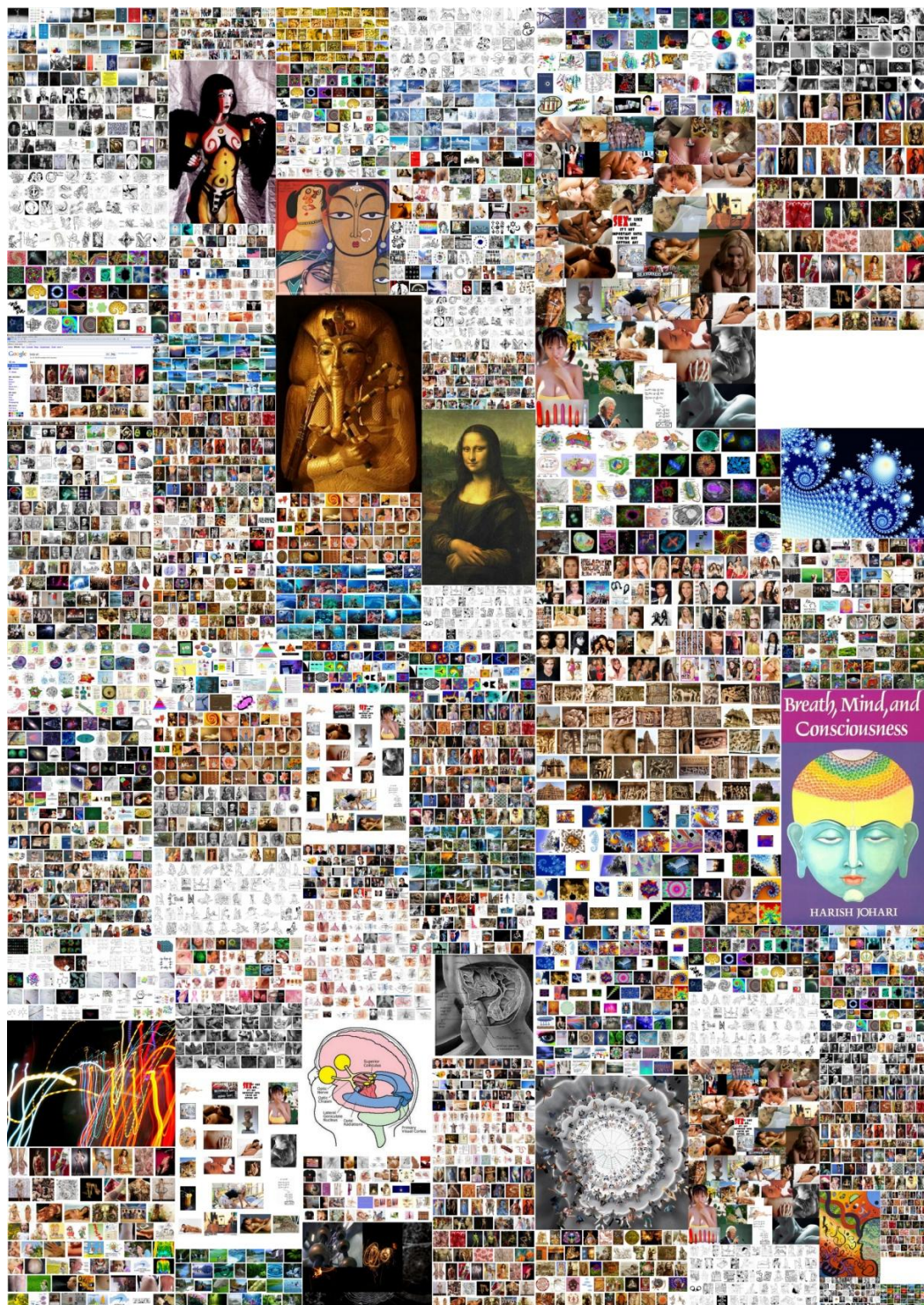
We recommend the establishment of a research hospital dedicated to the testing of medicine, which could compares the effects of pharmaceutical drugs with the effects of classical holistic medicine, the original placebo cure, for each clinical condition. We estimate that this could be done for about 200 million \$US or 150 million EURO, which is not much on a national or industrial scale.

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Comparative analysis of cost-effectiveness of non-drug medicine and biomedicine for all clinical conditions

Medicine costs money. In most Western worlds, medicine is using about 10% of the national turnover; in the USA, it is about 16%. And the cost is rising every year as new drugs and expensive treatments are developed. The medical industry, especially the pharmaceutical industry, has become one of the largest and most powerful industries of the world. But as we have seen, drugs and biomedicine have little to offer most patients, and about 50% of all citizens of the Western world have a chronic disease, which is not cured by drugs. So alternative medicine – understood as medicine that is not chemical – which we therefore prefer to call non-drug medicine – is very much needed. Unfortunately, a lot of alternative medicine is not scientific and also not effective. Scientific alternative medicine has, on the other hand, proved to be extremely effective, also when it comes to the serious diseases like coronary vessel disorders of the heart, many types of cancers and severe mental disorders, like depression and schizophrenia. While the biomedical treatments are often ineffective, harmful, and extremely expensive, non-drug medical treatments are often effective, harmless and extremely cheap. So, you might wonder, why are these treatment not in use all over the world? Well, some say for economical reasons, as nobody would make a significant profit from it; other people are talking about karmic reasons: We need to suffer, so we have biomedicine. Only when we are free spirits and can allow ourselves not to suffer anymore, and just get well and happy, can we go to holistic medicine and heal. We actually think that both arguments might be true. A third argument is that people in general hold a negative belief about life and the world, so that they could be cured cheaply and easily is just a little too good for them. Please make up your own mind about what is going on in the world as you read through this chapter.

The aim of this chapter is to compare cost-effectiveness of CAM (non-drug, talk, touch therapy) and biomedicine (pharmaceutical drugs) for all clinical conditions. The method is calculating cost per cured patient with physical, mental, existential and sexual health issues, year 1-50 for most efficient CAM treatments and most efficient pharmaceuticals.

Here are our findings: (Mean NNT numbers were used – for CAM: NNT=2-6, for pharmaceuticals: NNT=5-50; we set the cost of one year of short-term therapy (20 sessions) and drugs to 2,000€ and 2,000€, respectively). Results: We found CAM to be 100 (10-500) times as cost-effective as pharmaceutical drugs for most clinical conditions. The 50-year estimated cost for one patient cured was for: drugs 1,000,000€; physical therapy 100,000€; psychotherapy 200,000€; mind-body medicine 100,000€; holistic mind-body medicine 30,000€; one-session shamanistic healing with hallucinogenic drugs 2,000€.

A large number of clinical conditions could be cured with CAM – but not with drugs – that mostly only reduced symptoms. CAM is more efficient than drugs and has no side (adverse) effects and events, while treatment with drugs almost always have many often severe adverse effects and events. Interpretation: Drugs most often turn patients into chronic patients instead of curing them. Half the population of the Western world today is chronically ill seemingly because of national health organ's preference of biomedicine instead of CAM. The shift from drugs to CAM would improve health radically in the society and reduce the cost of healthcare to a small fraction.

Introduction

The cost-effectiveness of medicine has become an important issue as the prize of biomedicine in many countries has become an enormous economical burden. In countries with socialized medicine, biomedicine is often the dominating kind of medicine for a population, where half the citizens are chronically ill (1). In spite of free medical care and massive and continuous treatment of a huge fraction of the Danish population with drugs for over 40 years, 25% of the population is chronically mentally ill, and 40% of the patients are chronically physically ill, with about half of the mentally ill patients also having some physical chronic disorder, typically chronic pain, presumably of psychosomatic origin.

Critiques have suggested that the deteriorating health intensifies the use of drugs, which again seem to deteriorate health (2,3). Some have even insisted that the national health services are creating a huge problem for the whole society that can only be solved with a sharp analysis of which kinds of medicine really provides health for the money (4).

It is a fact that the national cost of the pharmaceutical drugs had been doubling every five years for two decades in Denmark (5) and many other European countries, with a development that seems to continue. Therefore, less expensive holistic, complementary and alternative (CAM) treatments have become the focus of attention, as these treatments might be more cost-effective than biomedicine (6). It is a well-known fact that many kinds of CAM are very little efficient, like acupuncture for cancer, but still the cost might be so small that even a small positive effect will make it more cost-effective than even the best surgery or chemotherapy, which is very expensive and little productive in most metastatic cancers. Most unfortunately, very few studies have been performed in this field, rendering us with almost no data about the actual situation for most types of CAM for most clinical conditions.

Fortunately, a number of reviews have recently documented that some types of CAM, especially mind-body medicine, are highly cost-efficient compared to biomedicine (7,8), and completely without the many serious side (adverse) effects and adverse (negative) events that

often follow treatments with drugs (6-22). These reviews have encouraged us to make the present comparative analysis of the cost-effectiveness of CAM and biomedicine.

The political situation around CAM

The kind of holistic medicine we have in Europe is developed from the classical medicine inherited from Hippocrates and his students (23). For more than two thousand years, the European doctors used this kind of consciousness-oriented “character medicine,” using almost exclusively talk and touch for therapy and no drugs. Medical herbs were used but only externally like in aromatic massage oils and in ingenious and strangely creative cures like smoking the female genitals for energetic purification. The physicians gained great fame and respect, the same way the Native American medicine men, the African Sangomas, the Samic Shamans, the Celtic druids and witches, and the Australian aboriginal healers gained fame and respect in their cultures (24). The methods of all pre-modern medical cultures seem to be essentially identical in intervening on and developing the patient’s consciousness and insight in self and reality (25,26).

It was first with the development of organic chemistry and biochemistry and the following industrial revolution that pure drugs became available, and soon began the search for efficient drugs, which in about 1950, lead to the discovery of penicillin. This drug boosted the belief in the “magic bullet” and started a whole industrial adventure of developing all kinds of pharmaceutical drugs, and soon the pharmaceutical industry gained money and power. Later, much of the money from the tobacco industry and weapons industry found its way to the pharmaceutical industry, making this the leading industry of the world today.

Most unfortunately for CAM, it seems that biomedicine has taken the threat from alternative medicine very seriously, and CAM therapists and researchers have for the last 30 years been challenged by attacks from what have been called the industrial-medical complex, where industry and doctors are working closely together to promote biomedicine and to repress CAM (27,28).

The efficacy by which CAM has been repressed and biomedicine promoted as a consequence of the competition between the most powerful industry on one side and physicians and therapists using and developing non-drug medicine on the other seems to be exactly as it could be expected from the power of the political and financial forces of the capitalistic Western society (2,29). Doctors have been prosecuted just for writing books that documented these powers in action, with Guylaine Lanctôt being a well-known example (4,30). But hundreds of CAM physicians, therapists and especially CAM researchers have now been persecuted by their biomedically oriented colleagues.

The power of the industrial money has also been used in international misinformation campaigns promoting biomedicine and ridiculing CAM – campaigns that have not been based on scientific facts, as comparative data has not been available (2-4,27). Huge amounts of money have been channelled to the academic institutions from the pharmaceutical industry, as we also have seen it at universities in Denmark, i.e., University of Copenhagen. This money has built whole departments for biomedical education, development and research and likely to have biased the whole academia in favour of biomedicine and therefore naturally against psychosocial quality of life promoting interventions – which is CAM.

Drug research has become prestigious in medicine and at the same time has research in psychosocial intervention become a low status medical field. Researchers in quality of life, salutogenesis and healing have often been forced to leave the academia, even in the Nordic countries, where we often think research is freer than in the rest of Europe. A whole institute for quality of life and CAM research, the Danish Quality of Life Research Center, was forced to separate from University of Copenhagen in 1993, due to political pressure, and had to continue as an NGO.

The strong power of industry has also been used for massive lobbying of all nations governments, sadly leading to a drug-positive and CAM negative attitude in almost all national organs regulating medicine. Often, biomedical physicians, which whole carriers as researchers, have been paid by the pharmaceutical industry before they were employed in public offices and have been leading the prosecution and repression of CAM researchers, abusing all the power of the public administration to do this.

This war against CAM has been quite invisible, as few media have dared to analyze the situation in any depth. Often, the journalists and filmmakers that have made critical documentaries on the pharmaceutical industry have been severely punished (31). The systematic misinformation about medicine in the media and the strong bias in favour of biomedicine at academic institutions have made most doctors, patients, and politicians actually believe that we have biomedicine because the original Hippocratic holistic medicine is “snake oil” provided by “quacks” that has failed to cure the patients, while modern biomedicine has been highly effective. Remembering that 50% of the whole population in countries with socialized medicine is now chronically ill documents that this is definitely not the case; quite the contrary, it is safe to say that it is biomedicine that has failed miserably.

The final say about which kind of medicine we will have in this world will hopefully come from people who take care of the patients’ best interest, not the interests of the industry and its allies, and who unbiased will analyze which medicine is the most helpful for the patients. It basically boils down to the matter of cost-efficacy: How much health and healing can I as a patient buy for one dollar, pound or EURO?

Methods

In this study, we estimated the cost of one patient cured from the number of patients needed to treat (NNT). We compared to our best abilities the best and most efficient CAM treatments with the best biomedical treatments. We calculated the cost per cured patient after one, two and ten years, as time is an extremely important factor here, as we shall see. We approximated the numbers from searches in MedLine/pubmed.gov. As the prize always varies with factors like country, specific disease, age, gender, general health, etc., it is difficult to estimate the costs exactly, but we found that we could estimate the cost in round numbers.

Treatment with biomedicine varies, but we have, based on the national statistics for Denmark, estimated the cost to drugs alone is in average in Denmark 200 €/month or about 2000 €/Year per patient (32). A more accurate analysis might shift this number a factor two.

To calculate the cost of *one patient cured*, this number must be multiplied with the number of patients needed to treat (NNT) for one to be cured. Most unfortunately, “cured” is almost never the measured outcome in biomedical studies; a likely reason for this is that the

outcome for documenting a patient to be “cured” would force the industry to use global measures like quality of life, which automatically would include the adverse effects and adverse events making the drugs come out less effective. By focusing on positive, local effects and calling other negative local effects for “adverse effects,” and then claiming that the induced positive effects are more important than the induced negative, so they cannot be balanced, the industry has managed to market its product without any global quality control (see below).

Therefore, what is measured in biomedicine is the improvement of some local symptom. Even more problematic is it that the test of efficacy, the randomised clinical trial, is testing the drugs against placebo, the effect of a positive change of consciousness for the disease, which is philosophically speaking identical with non-drug CAM. We know that the power of placebo varies dramatically with the set and setting, the close relationship to the doctor has been shown to be the most important factor for a strong placebo effect (33). In almost all industrial trials, the relationship to the physician has been reduced to almost no relation, taking all power out of the placebo effect as has been shown recently (34).

We therefore know that the drugs, in spite of the formally correct design, have not been tested fairly against placebo. Just using active placebo instead of normal placebo often changes the whole picture, eliminating the effect, as we have seen with the antidepressant drugs (35). In this study, the NNT number for antidepressant drugs was changed from the normal NNT of three to five to about 500 (estimated). All NNT numbers of pharmaceutical drugs are therefore likely to be a factor 3-100 too small, which is highly problematic. We also know that practically all adverse effects on the global level of the being have been excluded in most industrial randomised trials – like the measures quality of life, self-evaluated mental and physical health, self-rated ability of sexual, social and job/studying ability, etc. In reality, we do not know if the drug really helps the patients all in all. The reason why so many countries’ national organs of quality control of pharmaceuticals have accepted the industrial standards of documentation, which introduces such strong bias in favour of biomedical drugs, should urgently be investigated, and the industry should be asked to document the treatment effect on the global level also; using the measure of quality of life, self-rated health and self-rated functioning, which are easily documented with a small questionnaire like QOL1, QOL5 or QOL 10 (36,37).

In this chapter, we have chosen to use the number for the general effect of the drugs given by the industry itself (NNT=5-50); we have used the number ten for practical reasons, but the most common number is more likely to be around 20 (38). Seen in the light of the above-mentioned problems with the industrial designs, it is fair to say that we have been kind to biomedicine in this analysis.

In CAM, the endpoints are often quality of life, self-rated health (global, physical or mental) or functioning (sexual, social, working/studying); from these data, it is possible to see if the patient is actually cured, if we define “cured” as the experienced normalisation of the patient’s quality of life, health and functioning.

Severe side effects of pharmaceuticals often lead to hospitalisation and to more specific treatments for the side effects with other drugs, which is also costly. In Denmark, we have about one suicide attempt for each teenager during adolescence with drugs (common painkillers), which is also costly. These attempts often lead to prolonged negative reactions that also need treatment, which is also costly. Severe side effects also lead to lower quality of

life, which burdens other family members, etc. We have not in the present study estimated the derived costs from the adverse effects of drugs, but this should be included in future research.

The CAM treatment is normally 10 to 20 sessions a year, at a prize of 100 € per session, or 1,000-2,000 € per treatment year if we use the figures from our own research clinic for holistic mind-body medicine and similar types of intensive short-term psychotherapy and CAM (39-44). We use the last prize, which is relevant to most chronic patients, to simplify the matter.

Costs to biomedical examinations and hospitalizations are not included in the prize of 2,000 € per year (see discussion below). We estimate that biomedicine is two to three times as costly as drugs alone from all these related procedures. Hospitalisation and expensive objective examinations are not used in CAM, as the results almost never have consequences for the treatment.

The accumulated cost grows though time as the patients that are still treated in spite of not getting cured cost much money. As about 50% of patients are cured first year with CAM (mind-body medicine, which is the most efficient type of CAM (7,8,17)), and another 50% of the not-cured patients will be cured the next year (45) (a tendency that seems to continue judging from our clinical experience with about 90% of patients cured in three years), the accumulated prize of one patients cured with CAM is only slightly more than the first year's cost. In biomedicine, where only about 2-20% of patients (NNT=5-50) are "cured" (or rather most often only improved with regard to a specific symptom), the sad reality is that the rest are rarely much helped by continued treatment with drugs but are turning into chronic patients now depending on the medication. So here we have the opposite pattern, where the cost is accumulating with almost the same amount of money adding to the total amount each year. We have calculated the figures as simply as possible, as a simple addition of money spent though time, but some corrections of this simple schedule could be made, and dependent on how the calculation is done, the numbers will be a little different (a factor 1.5 to both sides).

Results

Table 1 lists the NNTs and NNHs for biomedicine and seven different classes of CAM. The normal NNT number for biomedicine was set to ten (38), while the normal NNT number for CAM was set to two (17). As normal NNTs are from 10 to 50, we know that we have been kind to biomedicine here, and experts often conclude that "NNTs under five are unusual, whereas NNTs over 20 are common" (38), indicating that the most normal NNT number is around 20.

When it comes to the NNH numbers, they are often two to ten for each adverse effect, but the total likelihood to get one side effect is much larger, often around one ($NNH_{total}=1-2$), meaning that most patients will have one or more adverse effects. These numbers vary with a factor two dependent on the source, which gives an uncertainty of a factor four on the final result, which is not important for the conclusion due to the magnitude of this.

Table 2 and Figure 1 show the estimated fraction of patients cured as times goes by, from one to ten years. In biomedicine, 80% of patients become chronic patients, in the most efficient CAM therapies, only 5-20% of the patients become chronic patients.

Table 1. NNT and NNH numbers of the seven CAM classes estimated from clinical studies (with chronic patients, see text) (based on 39-74, see 17). *The effect of clinical holistic medicine and similar medical systems seem to continue to increase though time (see, i.e., 45). (NNT: Number Needed to Treat. NNH: Number Needed to Harm)

CAM class	Short term effect (0-6 month)	Long term effect (6-24 month)	Side effects/ adverse events
	NNT	NNT	NNH
Class 0-Biomedicine	5-50	5-100	1-5
Class 1-CAM (Chemical CAM)	≥10	≥20	25 (allergy)
Class 2-CAM (Physical therapy)	2-4	6	>64,000
Class 3-CAM (Psychotherapy)	3	6	>64,000
Class 4-CAM (Spiritual therapy)	10	20	>64,000
Class 5-CAM (Mind-Body medicine)	2	4	>64,000
Class 6-CAM (Holistic medicine)	2	1-2*	>64,000
Class 7-CAM (Shamanism w. drugs)	1	1	>1000

*The effect of clinical holistic medicine and similar medical systems seem to continue to increase though time (53).
NNT: Number Needed to Treat. NNH: Number Needed to Harm

Table 2. The fraction of ill patients cured for drugs and non-drug medicine, if NNTs could simply be added, and health accumulative

Number Needed to Treat (NNT)	Not cured (years of treatment)					
	0	1	2	3	4	5
Biomedicine						
5 (most effective drugs)	100.0	80.0	64.0	51.2	41.0	32.8
10 (typical drug)	100.0	90.0	81.0	72.9	65.6	59.0
20 (typical drug)	100.0	95.0	90.3	85.7	81.5	77.4
50 (cancer chemotherapy, antipsychotic drugs ("mental state"))	100.0	98.0	96.0	94.1	92.2	90.4
100 (less effective drugs)	100.0	99.0	98.0	97.1	96.1	95.2
CAM						
1 (like sexology)	100.0	7.0	0.5	0.3	0.0	0.0
2 (typical mind-body medicine)	100.0	50.0	25.0	12.5	6.3	3.1
3 (typical non-drug CAM)	100.0	67.0	44.9	30.1	20.2	13.5
5 (less effective CAM)	100.0	80.0	64.0	51.2	41.0	32.8

Most interestingly, Figure 1, which promises fine results as times goes by, is in strong contrast to the empirical finding that half the population is chronically ill after 40 years of free biomedicine in countries with socialised medicine, like Denmark. As not everybody has a tendency to get sick, it is likely that the majority of patients become chronic patients with biomedicine.

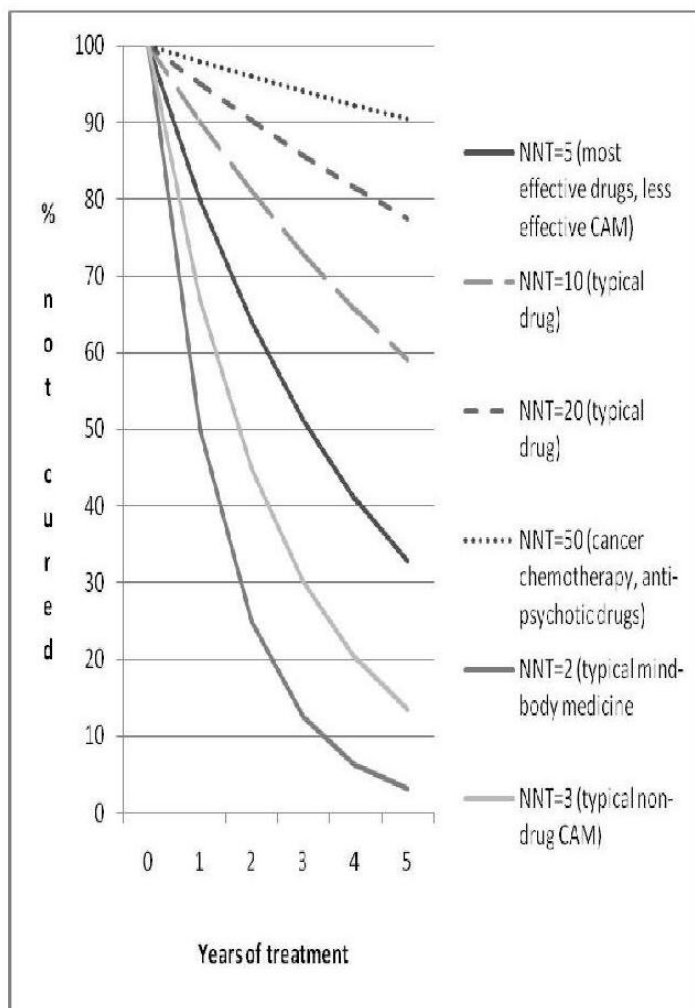


Figure 1. The fraction of ill patients cured for drugs and non-drug medicine, if NNTs could simply be added, and health accumulative.

The reason that this is that patient not cured year one has a much less likelihood to get cured with the drugs years two, and after year two the therapeutic benefit from drugs seems to be marginal. CAM has the opposite tendency: Year after year a fraction of patients get well, even without continued treatment (see, i.e., 46).

The reason is that the therapy has started a process of personal development that continues even if the therapy is discontinued, as the change happens in the patient's consciousness and philosophy of life before it materialises in life and body. Another important aspect is that the adverse effects of drugs tend to accumulate though time, thus burdening the patients health (total NNH=1-3 for most drugs), presumably giving a negative curve of lost health very much the same way as the NNT=1-3 (see the NNT=2 AND NNT=3 curves in Figure 1). Drugs therefore give health and take about the same amount of health, not really contributing to an overall improvement of health, which is why global health (self-rated physical and mental and total health) is almost never measured in industrial drug trials. Our estimate of a realistic development of health as a function of "years treated" can be found in

Table 3. The figures here are consistent with the existing knowledge on biomedicine and CAM, although we do know very little about long-term effects as the industry hardly ever documents long-term effects of adverse effects, quality of life, etc., in their studies.

Table 3. Accumulated number of patients cured through time under continued treatment (year one, two, ten and forty) with biomedicine and the seven CAM classes estimated from clinical studies with chronic patients and the state of health of the Danish population after 40 years of free biomedicine (based on 39-74, see 17) (see text)

Class	Fraction of patients cured (percent)			
	First year	Second year	Year 10	Year 40
Class 0-Biomedicine	10	25	20	20
Class 1-CAM (Chemical CAM)	< 10	< 10	< 10	< 10
Class 2-CAM (Physical therapy)	33	50	60	60
Class 3-CAM (Psychotherapy)	33	50	60	60
Class 4-CAM (Spiritual therapy)	10	15	20	20
Class 5-CAM (Mind-Body medicine)	50	75	80	80
Class 6-CAM (Holistic medicine)	50	85	90	90
Class 7-CAM (Shamanism w. drugs)	90	90	90	90

Table 4. Accumulated cost for one patient cured through time (year one, two, ten and fifty) for biomedicine (calculated for NNT=10) and the seven CAM classes (NNT= 1-10) based on clinical studies with chronic patients (based on 39-74, see 17, and Table 4) (cost of biomedical examination, hospitalisation, and treatment of adverse effects and events not included) (estimated round numbers, see text)

Treatment	Accumulated cost (€)			
	per patient	per cured patient		
	First year	Second year	Year 10	Year 50
Constantly treated w. biomedicine				
Class 1-CAM (Chemical CAM)	>20,000	>40,000	> 200,000	> 1,000,000
Constantly treated w. CAM				
Class 2-CAM (Physical therapy)	4,000	6,000	24,000	100,000
Class 3-CAM (Psychotherapy)	6,000	10,000	46,000	200,000
Class 4-CAM (Spiritual therapy)	20,000	38,000	180,000	800,000
Class 5-CAM (Mind-Body medicine)	4,000	6,000	16,000	100,000
Class 6-CAM (Holistic medicine)	4,000	5,000	10,000	30,000
Class 7-CAM (Shamanism w. drugs)	500	600	800	2,000

¹(cost of biomedical examination, hospitalization, and treatment of adverse effects and events not included) (estimated round numbers, see text)

Biomedicine and CAM costs are, if you exclude the cost for examinations and hospitalisation often necessary in biomedicine and often unnecessary in CAM, almost the same on a yearly basis per patient treated for most kinds of drugs and most kinds of CAM.

Based on the figures in Table 3, it can be estimated the accumulated cost per cured patient after one, two, 10 and 40 years (Table 4). The high number needed to treat by biomedicine makes this kind of medicine a fairly expensive medicine per cured patient, five times as expensive as CAM the first year. But because many patients are cured the first year with CAM, typically 50%, and next year again 50% of the patients that was not cured first year, etc., most patients will eventually be cured, and the accumulated expenses per cured patient is therefore modest. In biomedicine, most patients continue to be chronic patients, and year after year the cost accumulates.

After ten years, biomedicine is about 17 times as expensive as biomedicine per cured patient. Most chronic patients are still ill with biomedicine after ten years, while most patients are cured with holistic CAM therapy. There are very few long-term studies following patients for 40 years, but we find it likely that most patients stay chronically ill for life if not cured. If there were a strong tendency of spontaneous healing and recovery, every second citizen in Denmark would not be chronically ill.

Table 5 lists some established CAM treatments for a number of diseases to document the efficacy in CAM. Table 6 compares the cost of some known CAM treatments to the cost of the traditional biomedical treatment. Please notice that the cost varies much from country to country; the numbers listed are typical European and American numbers.

Some types of CAM are even more expensive than biomedicine per cured patient, so it is highly important to pick the right type of CAM to secure efficient and affordable medicine.

In this chapter, we wanted to investigate the relative cost-efficacy of CAM and biomedicine by comparing the first-year cost and also the accumulated cost through year two, ten and 50 years for one patient cured with CAM and biomedicine, respectively.

As most chronically ill patients according to the experience from the biomedical health system of Denmark actually live for at least 40 years with their health issues unchanged in spite of continuous medical treatment, we believe that the accumulated differences in cost are five times what we have calculated for the ten-year period, but as some of the most ill patients will go to a hospital, which is much more costly, and eventually will die in a long and costly process, this estimate is not as certain as the one, two and ten year estimates.

We wanted to investigate the general numbers for all patients and all clinical conditions that are connected with a number of technical problems. First of all, the goal of CAM is primarily to improve the quality of life of the patient, which can be done for every single patient, in spite of the concrete disorder, health problem, existential problem or sexual dysfunction. Thus, every single patient can be treated with CAM. Even if the patient cannot talk, the CAM therapist can still provide therapeutic touch. Biomedicine has the problem that many disorders cannot be understood biochemically, so the treatments are only symptomatic, not curative, for most diseases.

CAM is according to its own theory working on the causal level of the diseases, and in accordance with this view, CAM therapists intend to cure the patients. These discrepancies mean that biomedicine looks for improved symptoms while CAM looks for normalized quality of life, self-rated health, physically or mentally, and normalized ability of functioning.

Table 5. Estimated NNT-numbers of the CAM treatments of physical, mental, existential and sexual health issues and working disability (mostly based on clinical studies using chronic patients as their own control, see text) (based on 17, see this paper for references)

Treatment	NNT	References
CAM for physical health		
Subjectively poor physical health	3	(7-10,13,17-23,39,46,59)
Coronary heart disease	2-4	(71,72)
Cancer (QOL, survival, pain)	2,7,3	(73,74,82,83-88)
Chronic pain	2-3	(14,17,20-22,33,39,46,49,51,54,59,82)
CAM for mental health		
Subjectively poor mental health	2-3	(7-13,17-22,40,50,55,64-66)
Schizophrenia	3-5	(9,11,21-23,40,52,64-66,89)
Borderline	3	(9,11,21-23,40,52,64-66,76,89)
Major depression	2-3	(6-10,20-23,35,40,50,57,64-66)
Anorexia Nervosa	3	(6,20-22,40,41,42,43,64-66)
Anxiety	3	(7-10,12,13,17-22,40,57,64-66)
Social phobia	3	(7-10,13,17-22,40,57,64-66)
CAM for sexual dysfunctions		
Subjectively poor sexual functioning	2	(16-22,41,46,47,51,55,61,62,64-70)
Male erectile dysfunction	2	(41,68)
Female orgasmic dysfunction	1	(41,68,69)
Female lack of desire	2	(16-22,41,46,47,51,55,61,62,64-70)
Female dyspareunia	2	(41,46,47,51,55,61,62,64-70)
Vaginismus	2	(41,46,47,51,55,61,62,64-70)
Vulvodynia	2	(41,46,47,51,55,61,62,64-70)
CAM for psychological and existential problems		
Subjectively poor quality of life	2	(7-10,12,13,17-22,42,47,51,57,64-66,73,74,85)
Sense of coherence	2-3	(7-10,12,13,17-22,42,47,51,57,64-66,73,74,85)
Suicidal prevention (with decisions)	1	(18,19,20)
Low self esteem	2	(6,20-22,43,64-66)
CAM for low working ability		
Subjectively poor working ability	2	(20-22,60)

The two different sets of outcomes make it difficult to compare biomedicine and CAM, but most researchers find that the global outcome measures used in CAM are more likely to document cure than the local outcomes of biomedicine. To put this in another way, the different outcome measures are likely to favour biomedicine, not CAM. If we therefore find CAM to be superior to biomedicine, this is done in spite of the system of measuring outcomes strongly favouring biomedicine. When it comes to the NNT figures, these are often meaningful for CAM treatments because of the global outcomes, while they are often of much less value in biomedicine where some symptoms are more or less improved. Therefore, we have not been able to find useful NNTs for this study for most of the pharmaceutical drugs.

Table 6. Estimated first-year treatment cost per cured patient with physical, mental, existential and sexual health issues and working disability (mostly based on clinical studies using chronic patients as their own control, see text). As many patients not cured will die, it is often difficult to make the long-term estimates (based on Table 4 and (17) (* no antipsychotic drug cures schizophrenia, and the mental state of patients are in general no improved but hallucinogenic behaviour is reduced (NNT=4)) (75)

Treatment	Cost per cured patient €	
	CAM	Biomedicine
CAM for physical health		
Subjectively poor physical health	6,000	200,000
Coronary heart disease	4,000-8,000	1,000,000
Cancer (QOL, survival, pain)	4,000;14,000	20,000,000
Chronic pain	4,000-6,000	500,000
CAM for mental health		
Subjectively poor mental health	4,000-6,000	200,000
Schizophrenia	6,000-10,000	20,000,000*
Major depression	4,000-6,000	200,000
Anorexia Nervosa	6,000	100,000
Anxiety	6,000	100,000
Social phobia	6,000	100,000
CAM for sexual dysfunctions		
Subjectively poor sexual functioning	4,000	no cure
Male erectile dysfunction	4,000	20,000
Female orgasmic dysfunction	2,000	no cure
Female lack of desire	4,000	no cure
Female dyspareunia	4,000	no cure
Vaginismus	4,000	no cure
Vulvodynia	4,000	no cure
Infertility	12,000	20,000
CAM for psychological and existential problems		
Subjectively poor quality of life	4,000-6000	no cure
Sense of coherence	4,000	no cure
Suicidal prevention (with decisions)	2,000	no cure
Low self esteem	4,000	no cure
CAM for low working ability		
Subjectively poor working ability	4,000	no cure

* no antipsychotic drug cures schizophrenia, and the mental state of patients are in general no improved but hallucinogenic behaviour is reduced (NNT = 4) (75)

Where we have found them, i.e., in the treatment of antipsychotics (75-77), the NNT numbers for improved mental state have often been so large (around 1,000 estimated from (75)) that using them would make the table look hard to believe. Instead of using this data source, we have made judgments from our clinical experience. We apologize if a more thorough analysis based on better data at a later point in time will review our estimates to be deviating much from reality.

In CAM, it is possible to treat and cure the most severely mentally ill patients like the schizophrenic patients (50, 83), which according to the most recent Cochrane meta-analysis may not be helped even to improve their mental state with biomedicine (56). Similarly we know from Ulrich Abels' famous analysis in 1992, that chemotherapy is likely to shorten life and destroy quality of life for most types of cancers (78-81), while it seems that CAM can

actually help patients to experience less pain (82), improve quality of life (72,73), improve survival (72,73,81,83-85), and even sometimes get a complete remission of the cancer (87-88), the same way as we have observed some schizophrenic patients spontaneously recover (89).

In these comparisons, we have a severe problem of the quality of the studies. The biomedical studies are often paid for big money by the industry, while the CAM studies are made for almost no money by CAM researchers that want to document that their medicine can help. Both types of studies are likely to be biased as both groups have interest in a positive outcome, but the pharmaceutical industry is much more likely to be smart in the way they introduce bias, making these biases much more difficult to detect.

Most people believe today, due to massive misinformation in the media and not due to thorough scientific investigations that have yet to be made, that biomedicine cures cancer and schizophrenia, while CAM is inefficient in this regard.

Just analyzing the existing data becomes very difficult when everybody seems to know how things are even before facts has been introduced. Manipulation of the public happens every day though the appearance in the media of physicians closely connected to the industry telling success stories of cured patients but forgetting to inform the public that the statistical picture if you compare the cancer or schizophrenia treatments to no treatment or placebo tells completely different and much more depressing stories.

Discussion

Every year, the cost of the Danish biomedical health care system is about 50 billion DKR or seven billion EURO, or 10,000 DKr per capita (1,200 EURO). Half of the population is chronically ill (1). Half of these patients use the public health care system (5), making the cost for each of these patients about 40,000 DKr on average (6,000 EURO). This figure is about two times the figure we have estimated in the tables above, indicating that the cost of examination and hospitalisation is about the same as the cost of the drugs. The cost of 50 years of treatment is therefore known to be about 2,000,000 million DK, or about 250,000 EURO, not 100,000 EURO as listed in the table. We therefore know that the figures listed in the tables are realistic and likely to be too small in spite of their impressive size.

Most unfortunately, the CAM treatments listed in Table 4 have been documented only on chronic patients using themselves as their own control. Very few CAM studies are clinically controlled randomised studies. One reason for this is that CAM treatments are placebo cures, so it is not possible to control them against placebo. Another reason is that CAM studies often are low-budget studies, of variable quality. On the other hand, the industrial studies of biomedicine are often severely biased (90), as we have also seen above, making these studies highly problematic in spite of excellent formal quality (performed according to the industrial standard). As a matter of fact, it is difficult to say if such a small effect like $NNT=20$ or 50 is caused solely by bias; just a small bias would introduce such an effect of this size. Another serious problem is that we lack NNT-numbers for the outcome “cured” for most drugs, as the industrial design often uses much less improvements to make it easier to get their products approved. The national authorities that should have forced the industry to document the long-term effect on the patient’s global health has most definitely failed to do so.

Non-drug CAM has, as we have seen, practically no significant side (adverse) effects (7-22), which makes them very attractive compared to biomedical drugs. Quite surprisingly to people believing that CAM was inefficient, the mind-body type has in almost all studies been found highly efficient, not only in improving quality of life but in improving health, ability, and survival (NNT=2).

If one compares the cost of treating one patient for one year with biomedicine (drugs) and with CAM (talk and touch), the two treatments are often comparable in price. But if you include the number of patients needed to treat for one to be cured (NNT), the whole picture changes dramatically, in favour of CAM.

If you then follow the development over time, this difference grows further year for year, making biomedicine 100 times as expensive per cured patient as CAM in the long run. If you include expenses for examinations like CT scans and hospitalisations often needed in biomedicine, and rarely needed in CAM, this difference is most likely to grow 2.5 times more. If you include the suffering from being chronically ill and not able to work much, this figure simply explodes. We found most cost-effective types of CAM to be about 100 times as cost-efficient as biomedicine, if we just looked at the cost of the basic treatment (drugs versus talk and touch).

The classic shamanistic cures using mind-expanding drugs and one session healing, which according to the rich literature seem to last for life, seems to be about ten times as efficient as non-drug CAM, which explains the ubiquitous presence of shamanism in almost all pre-modern medical systems, except for some reason the European Hippocratic holistic medicine. For cultural and political reasons, we do not find it possible to turn back to these dramatic rituals of highly efficient shamanistic one session healings, but these healing events are still academically interesting and therefore included in the present analysis. We always like to think that we are better today than thousand years ago, but when it comes to medicine, we would benefit largely from looking back.

Most importantly, shamanism shows us that CAM can be further developed to be even more efficient than it is today, making it in the end an efficient cure for every ill patient on the planet, including cures for cancer patients and schizophrenic patients, a great theoretical possibility to be explored in the new millennium.

The interested reader will find the works of the LSD gurus Stanislav Grof and Timothy Leary interesting and will also enjoy spending lots of time reading also Anderson, Mumey, Castaneda, Luna and White (91-98). The philosophy of shamanism is quite profound, and good introductions to this kind of “magic thinking” are Saint-Exupéry, Huxley, and Castaneda, while the advanced reader will benefit from reading *The I Ching* and *The Tibetan Book of the Dead* (99-103). Studying shamanism was what made us understand the depth of holistic philosophy; so in spite of its time-consuming and surprisingly strange nature, we can strongly recommend it to physicians interested in CAM and holistic medicine.

Conclusion

In this comparative analysis of cost-effectiveness of CAM and biomedicine, we found that CAM and biomedicine cost about the same per year per treated patient. In spite of this, we found CAM to be of much higher value for the patient. The value of CAM comes from a

surprisingly low NNT number (NNT=2-3) and a surprisingly high NNH number (NNH=100.000). Most biomedical drugs have a NNT about 10-50, and many adverse effects.

When we use these figures (NNT=2 and NNT=10) to calculate the number of patients cured through time, we found that most patients are cured with CAM, while most patients turn into chronic patients with biomedical drugs. This makes biomedicine extremely expensive per cured patient, as most patients continue to get a treatment that do not really help them, often for many years or even, in countries with free socialised biomedicine, for life. In our model, we find CAM about 100 times cheaper per cured patient than biomedicine (drugs).

To make the analysis more accurate, one should also include the cost of biomedical examination using highly developed technology and of many days of biomedical hospitalisation for examination and treatment, which is not used in CAM.

We found the difference in cost per cured patient to be about a factor 100, when the most cost-effective types of CAM (mind-body medicine, holistic mind-body medicine) were compared to biomedical drugs. A number of uncertainty factors give us a total estimated uncertainty of a factor five on this result, which means that the result seems to be a robust finding. From the present analysis, it is quite clear that we need to go back to the original type of medicine, the Hippocratic holistic mind-body medicine, if we are to have an effective and affordable medicine, and a healthy population, in the future.

Biomedicine is simply not the answer to growing general health problems of the Western countries. It is more likely to be the other way round: That the poor health of the population is caused by the treatment of patients with pharmaceutical drugs that only cures (actually improves specific symptoms of) one in ten and at the same time gives so many severe side effects.

Luckily for America, CAM seems to have won the race against biomedicine and is now dominating the health system and seems to be the future medicine here, with biomedicine only playing a minor role (104,105). In Europe, things are more conservative. The choice of CAM as the basic service in socialised medicine instead of biomedicine could turn the high number of chronically ill patients – in Denmark 50% of the population after 40 years of socialised biomedicine – into a much more healthy, happy and able population. In the same time, the cost of the health care system is likely to be reduced to a small fraction of the present. Physicians would again start to deliver health by clinical medicine, using talk and touch as the primary tools of medicine, and drugs only when the patients failed to cure themselves with the support of the physician.

Biomedicine is leading to massive pollution of the oceans and other waters with highly biologically active molecules, which would be stopped this way. The loss of healing power of antibiotics would also not be lost if complementary treatment were tried first (106). Cost of surgery could be dramatically reduced also (see 7,8 for a review). Money now used on inefficient biomedicine could be used to solve some of the true problems of the world. A more healthy population would also take better care of the planet and of each other, making the world a better place.

We strongly encourage all governments of the world to shift the medical systems of their countries to the most cost-effective types of CAM and to use pharmaceutical drugs only when CAM cannot cure the disease. All universities should teach CAM, and biomedicine should be reduced to its proper place in the curriculum: a minor subject of medicine, not unimportant for the treatment of specific disorders, but definitely not the central core of medicine.

Laws should be introduced to control the pharmaceutical industries' campaigns in the media and elsewhere in favour of drugs and against CAM, as these campaigns are not evidence based, but highly manipulative. CAM researchers, who in these years experience severe attacks from the pharmaceutical industry and its allied physicians (28) seemingly in an effort to eliminate CAM on an international level, should be supported and protected against these attacks from the medical-industrial complex. Such laws should also address the national organs to stop biomedically oriented physicians working in these organs to abuse the power of the Nation to repress CAM.

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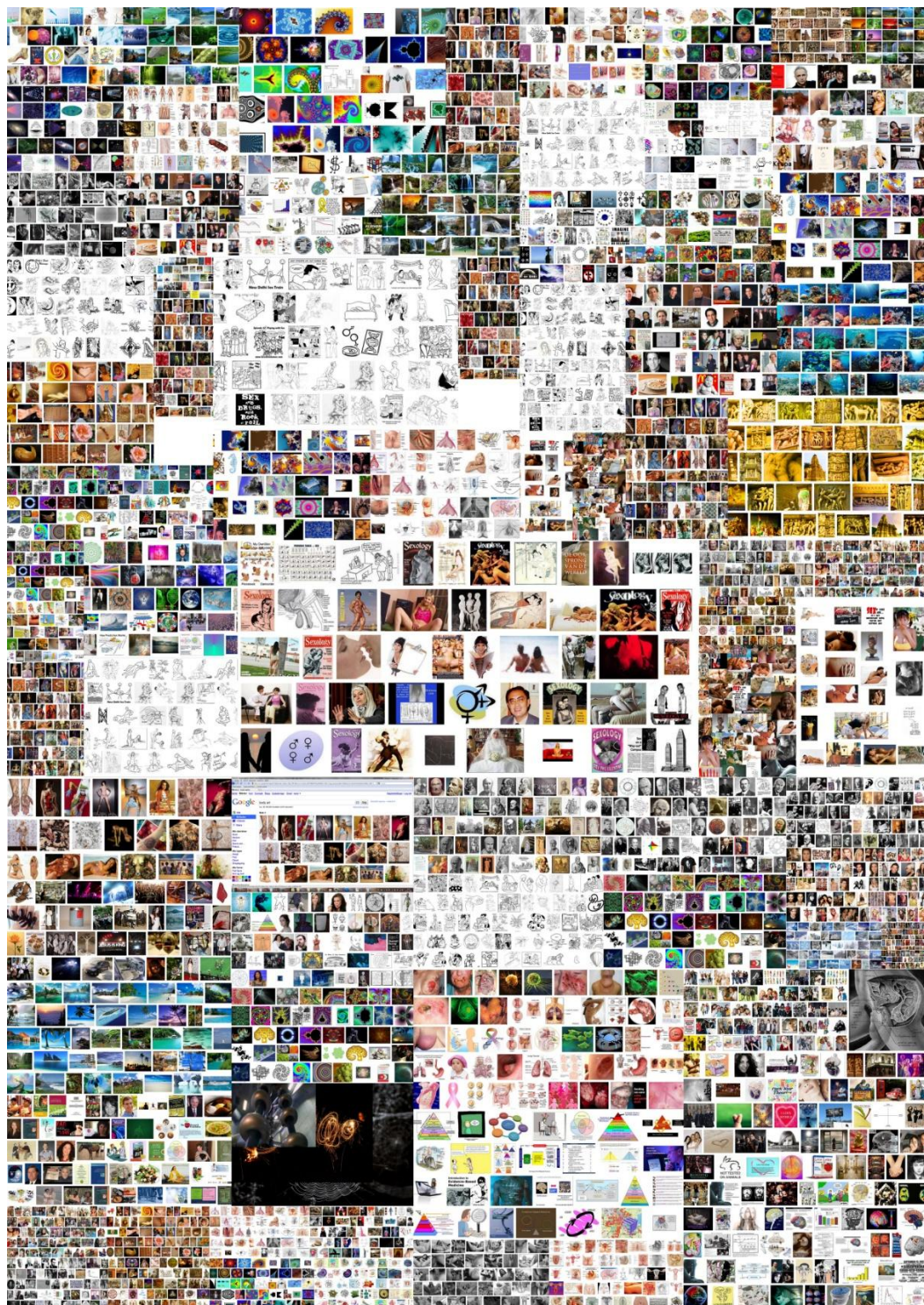
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Cost-effectiveness of non-drug medicine and pharmaceutical biomedicine in QALY

In the last chapter, we looked at the money. In this chapter, we shall look a little further by also looking at the patient's outcome in quality of life. What is the difference for a patient using CAM and using pharmaceuticals when it comes to the patient's quality of life? This is, in the end, what we want to know as patients. Will holistic medicine give us better lives? The way to find out is to measure the patients quality of life (QOL) with a self-rated questionnaire when they are treated with drugs and non-drug medicine respectively, take the time x QOL product and see the total difference in quality-of-life-years (QALY). Then you take the total cost of the treatment and divide the QALY-outcome with this to find cost pr QALY. To estimate the real cost, we need to look at the total cost for treatment during the patient's lifetime.

It is not so simple to do this calculation in practice, and the estimates we give you in this chapter are therefore somewhat uncertain. But we hope that you will follow our arguments and allow us to compensate for this uncertainty in our calculations. If you do, we believe that you will agree with our conclusion that holistic medicine is many times more valuable when it comes to how much quality of life you will get for your money.

Our aim is to estimate the cost of one QALY with biomedical drugs and with non-drug medicine (non-drug CAM) immediately after initiating the treatment, and as times goes by and the cost grows from patients continuously treated and not cured (one to fifty years).

The method used: The cost of a QALY was calculated using the simplified formula $\sum(\Delta Time \times \Delta QOL) \times F \times \text{Cost of treatment for one year}$, where $\Delta Time$ is the time the patients enjoy a better QOL, ΔQOL is the size of the improvement in global quality of life, and F is the fraction of patients cured ($F=1/NNT$ for outcome "cured"). Accumulated cost per QALY though time (year 1,2,10 and 50) was then calculated.

Interpretation: Non-drug medicine is highly efficient, completely safe and 50-300 times cheaper than biomedicine, and most physical and mental disorders, existential problems and sexual dysfunctions can be successfully treated.

Results for year	1,2,10 and 50 respectively:			
Class 0-Biomedicine (NNT=10):	80,000€,	140,000€,	700,000€,	5,000,000€.
Class 1-CAM (Chemical CAM):	>40,000€,	>80,000€,	>400,000€,	>2,000,000€.
Class 2-CAM (Physical therapy):	12,000€,	36,000€,	180,000€,	900,000€.
Class 3-CAM (Psychotherapy):	12,000€,	36,000€,	180,000€,	900,000€.
Class 4-CAM (Spiritual therapy):	80,000€,	100,000€,	500,000€,	2,500,000€.
Class 5-CAM (Mind-Body medicine):	8,000€,	20,000€,	60,000€,	100,000€.
Class 6-CAM (Holistic mind-body medicine):	8,000€,	20,000€,	50,000€,	70,000€.
Class 7-CAM (Shamanism with drugs):	5,000€,	6,000€,	10,000€,	16,000€.

We recommend that all physicians shift from using biomedicine to using CAM (mind-body medicine and holistic mind-body medicine), and we suggest that socialised medicine change from using drugs to using non-drug medicine as the basic service.

Introduction

Holistic non-drug medicine (often called CAM) is the classical medicine of Europe and has now become the primary type of health care in the world; in the USA, this has been a fact since 1993, with more and more patients turning away from biomedicine and choosing to use CAM instead (1,2). The reason for this is without doubt an increasing awareness of the many severe side (adverse) effects and adverse events of most biomedicine and the relative inefficacy of the drugs often only helping one in 10, 20 or 50 (3). It has been difficult to establish the representative NNT-number for drugs in general, but there seems to be a general agreement that “NNTs under five are unusual, whereas NNTs over 20 are common.” It is safe to say that normal NNTs for drugs are between 5 and 100 from the citation above, we find it safe to conclude that a fair representative NNT-number is around 20. In this analysis, we use the numbers 10, 20 and 50 for drug NNT). On the other hand, we know that CAM for sexological problems are around 1 (!) and for mind-body medicine in general around 2. CAM thus seems to be ten times as efficient as biomedicine. Furthermore, practically all clinical conditions and every patient can be treated with CAM, while many diseases and clinical conditions are untreatable or at least not curable with drugs. Finally, drugs are known to have severe adverse effects, and most patients suffer one or more adverse effect with most drugs. Often, drugs have 10 or 20 adverse effects with an NNH 3-20, summing up to a NNH_{total} often 0.5-3 (NNH_{total} is the sum of likelihoods of all adverse effects); this number is almost never given empirically in industrial drug trials, which is too bad as it is extremely important for patients to know, but it can easily be calculated from the NNH list, if you just group

similar adverse effects together and count them as one, not to count the same effect twice. On the other hand, many scientific studies and reviews have concluded that non-drug medicine (non-pharmaceutical CAM) is completely without significant side effects ($NNH_{total} = 64.000$ for CAM in general) (4-19).

So CAM is ten times as efficient, 100,000 times as safe, and many more clinical conditions can be treated with CAM. The natural question coming from this is why CAM is not the most prevalent kind of medicine everywhere in the world? The answer is that most European countries, because of socialized medicine, often almost exclusively use biomedicine as their basic medical care. These authorities of these countries believe that biomedicine is cheaper, more efficient and more importantly: more scientific. The theories of CAM are abstract and strange, focusing on states of consciousness, sense of coherence, and existential healing. Such concepts are quite unscientific compared to concepts like enzymes and bioactive molecules, which sounds really scientific. What sounds scientific is in the end a question of personal liking.

We do not believe humanistic science to be less scientific than biochemistry. But in the end, we agree that it is a question of money: How much health can I buy for a dollar or EURO? Most unfortunately, there are very few high-quality comparative analyses of cost-effectiveness of CAM and biomedicine, but some reviews of cost-effectiveness for CAM indicate a favourable prize per quality-of-life-year (QALY) of less than 10.000£ (20). It is well known that some kinds of CAM are much more efficient than others, i.e., massage therapies are known to be much more efficient than acupuncture and chiropractic manipulation (see, i.e., 14,21). Recently, we have analyzed the different kinds of CAM with regard to their therapeutic efficacy and have found that the number of patients needed to be treated for one to be cured varies greatly with the CAM method, the mind-body and holistic mind-body medicines being the most effective (Table 1) (14).

Table 1. NNT and NNH numbers of the seven CAM classes estimated from clinical studies (with chronic patients, see text) (NNT: Number Needed to Treat. NNH: Number Needed to Harm). (from 14)

	Short-term effect(0-6 month)	Long-term effect(6-24 month)	Side effects and adverse events
Class 0-Biomedicine	NNT=5-50	NNT=5-100	NNH=1-5
Class 1-CAM (Chemical CAM)	NNT \geq 10	NNT \geq 20	NNH=25(allergy)
Class 2-CAM (Physical therapy)	NNT=2-4	NNT=6 NNT=6 NNT=20	NNH>64,000€
Class 3-CAM (Psychotherapy)	NNT=3		NNH>64,000€
Class 4-CAM (Spiritual therapy)	NNT=10		NNH>64,000€
Class 5-CAM (Mind-Body medicine)	NNT=2	NNT=4 NNT=1-2* NNT=1	NNH>64,000€
Class 6-CAM (Holistic medicine)	NNT=2		NNH>64,000€
Class 7-CAM (Shamanism w. drugs)	NNT=1		NNH \geq 1000

Table 2. Accumulated number of patients cured through time under continued treatment (year one, two, ten and fifty) with biomedicine and the seven CAM classes estimated from clinical studies with chronic patients (from 14)

	First year Fraction of patients cured	Second year Fraction of Pt.s cured	Year 10 Fraction of Pt.s cured	Year 50 Fraction of Pt.s cured
Class 0-Biomedicine (NNT=10)	10%	15%	20%	20%
Class 0-Biomedicine (NNT=20)	5%	7.5%	10%	10%
Class 0-Biomedicine (NNT=50)	2%	3%	4%	4%
Class 1-CAM (Chemical CAM)	<10%	<10%	<10%	<10%
Class 2-CAM (Physical therapy)	33%	50%	60%	60%
Class 3-CAM (Psychotherapy)	33 %	50%	60%	60%
Class 4-CAM (Spiritual therapy)	10%	15%	20%	20%
Class 5-CAM (Mind-Body medicine)	50%	75%	80%	80%
Class 6-CAM (Holistic medicine)	50%	85%	90%	90%
Class 7-CAM (Shamanism w. drugs)	90%	90%	90%	90%

Table 3. Accumulated cost for one patient cured through time (year one, two, ten and fifty) for biomedicine and the seven CAM classes based on clinical studies with chronic patients (From 40)

	First year Cost per Cured patient	Second year Accumulated cost per cured patient.	Year 10 Accumulated cost per cured patient.	Year 50 Accumulated cost per cured patient.
Accumulated cost pr. patient constantly treated w. biomedicine	2,000€	4,000€	20,000€	100,000€
Accumulated cost pr. patient constantly treated w. CAM	2,000€	4,000€	20,000€	100,000€
Class 0-Biomedicine (NNT=10)	20,000€	37,000€	170,000€	1,000,000€
Class 0-Biomedicine (NNT=20)	40,000€	74,000€	340,000€	2,000,000€
Class 0-Biomedicine (NNT=50)	100,000€	170,000€	850,000€	5,000,000€
Class 1-CAM (Chemical CAM)	>20,000€	>40,000€	>200,000€	>1,000,000€
Class 2-CAM (Physical therapy)	4,000€	6,000€	24,000€	100,000€
Class 3-CAM (Psychotherapy)	6,000€	10,000	46,000€	200,000€
Class 4-CAM (Spiritual therapy)	20,000€	38,000€	180,000€	800,000€
Class 5-CAM (Mind-Body medicine)	4,000€	6,000€	16,000€	100,000€
Class 6-CAM (Holistic medicine)	4,000€	5,000€	10,000€	30,000€
Class 7-CAM (Shamanism w. drugs)	500€	600€	800€	2,000€

All in all, the most efficient CAM methods, mind-body medicine, are surprisingly efficient compared to biomedical drugs, while the inefficient are surprisingly inefficient (4-8,10-19,22-39). Based on these simple facts, we have been able to estimate the fraction of patients being cured through time with biomedicine and the different kinds of CAM (Table 2) and the cost of one patient cured with biomedicine and the different types of CAM (see Table 3) (40). In this chapter, we want to take this one step further to estimate the cost of one quality-of-life-year (QALY).

Estimated QALY outcome

We estimate the quality of life improvement with the different kind of drug- and non-drug medicine. We estimate the QALY outcome of treatments from the simple formula:

$$\sum(\Delta\text{Time} \times \Delta\text{QOL}) \times F$$

where ΔTime is the time the patients enjoys a better QOL, ΔQOL is the size of the improvement in global quality of life, and F is the fraction of patients cured ($1/\text{NNT}$). As we need to include the possibility of prolongation of life from healing and shortening it from adverse effects and events, we need to add an extra corrective element in the equations:

$$\sum(\Delta\text{Time} \times \Delta\text{QOL}) \times F_1 + \sum(\Delta\text{Survival-Time} \times \Delta\text{QOL}_a)$$

where ΔTime is the time the patients enjoys a better QOL, ΔQOL is the size of the improvement in global quality of life, and F is the fraction of patients cured, $\Delta\text{Survival-Time}$ is the difference in mean survival time with or without treatment per treated patient, ΔQOL_a is the absolute QOL during the difference of survival time whether positive or negative.

As this extra element is unknown for most CAM treatments and also for most biomedical treatments, we are not able to calculate it, but as we know that non-drug CAM has practically no side effect and adverse events, and we must expect cured patients rating their subjective health higher also to live longer and happier (41-51), we expect the contribution from this part of the equation to be positive for CAM. On the other hand, we know that there are severe adverse effects and events with most biomedical drugs, suggesting that the opposite is the case for treatment with drugs.

We estimate from studies of mind-body medicine where QOL is measured before and after treatment that the cured patients in average improved their QOL two steps up a five-point Likert scale, or 50 absolute % (52). For each cured patient, this means half a QALY per year. If $\text{NNT}=2$, this means that the cost of 1 QALY is similar to the cost of four patients treated, or 8000€, if the cost per year is 2000€, which pays 20 sessions, and which we have found to be the most correct amount for treating most chronic patients with CAM one year. As 50% of patients that are not cured in the first years normally will be cured next year, and so forth, the accumulated cost of a QALY is not very different from the first year's cost.

If NNT is 10-50, as with most biomedicine and the patient's QOL after being treated with drugs are found still to be low in QOL, often 25 absolute % below mean of population corresponding to these patients only improved 25%, the cost of one QALY corresponds to the

cost of 40 treatments with drugs (see discussion of this calculation below). As most patients treated with biomedicine turn into chronic patients, this amount is growing every year of the patient's life. From Table 2 and the above-mentioned formula (I), we get the results listed in Table 4.

Table 4. Cost per QALY accumulated through time under continued treatment (years one, two, ten and fifty) with biomedicine and the seven CAM classes estimated from clinical studies with chronic patients (Units are Yearly Treatment Cost, YTC) (based on 14) (see text)

	First year Cost per QALY. (YTC)	Second year Cost per QALY. (YTC)	Year 10 Cost per QALY. (YTC)	Year 50 Cost per QALY. (YTC)
Class 0-Biomedicine (NNT=10)	40	70	350	2,500
Class 0-Biomedicine (NNT=10)	80	140	700	5,000
Class 0-Biomedicine (NNT=50)	200	350	1,500	12,500
Class 1-CAM (Chemical CAM)	>20	>40	>200	>1,000
Class 2-CAM (Physical therapy)	6	18	90	450
Class 3-CAM (Psychotherapy)	6	18	90	450
Class 4-CAM (Spiritual therapy)	20	50	250	1,250
Class 5-CAM (Mind-Body medicine)	4	10	30	50
Class 6-CAM (Holistic medicine)	4	10	25	35
Class 7-CAM (Shamanism w. drugs)	2.5	3	5	8

Table 5. Cost per QALY in EURO accumulated through time under continued treatment (year one, two, ten and fifty) with biomedicine and the seven CAM classes estimated from clinical studies with chronic patients (based on 14) (see text)

	First year Cost per QALY.	Second year Acc. cost per QALY.	Year 10 Cost Acc. cost per QALY.	Year 50 Acc. cost per QALY.
Class 0-Biomedicine (NNT=10)	80,000€	140,000€	700,000€	5,000,000€
Class 0-Biomedicine (NNT=10)	160,000€	280,000€	1,400,000€	10,000,000€
Class 0-Biomedicine (NNT=50)	400,000€	700,000€	3,500,000€ €	25,000,000
Class 1-CAM (Chemical CAM)	>40,000€	>80,000€	>400,000€	2,000,000€
Class 2-CAM (Physical therapy)	12,000€	36,000€	180,000€	900,000€
Class 3-CAM (Psychotherapy)	12,000€	36,000€	180,000€	900,000€
Class 4-CAM (Spiritual therapy)	80,000€	100,000€	500,000€	2,500,000€
Class 5-CAM (Mind-Body medicine)	8,000€	20,000€	60,000€	100,000€
Class 6-CAM (Holistic mind-body medicine)	8,000€	20,000€	50,000€	70,000€
Class 7-CAM (Shamanism w. drugs)	5,000€	6,000€	10,000€	16,000€

The cost of QALY increases though time. With biomedical drugs, the cost is quite high already the first year, 80,000€, but goes up to a dramatic 5,000,000€ after 50 years. The most efficient types of CAM, mind-body medicine and holistic, cost 8000€ for one QALY the first year but rises only to 100.000€ and 70,000€, respectively.

Quite remarkably, the figures for shamanistic one-session healing is 5,000€ first year, much the same as mind-body medicine, but as it is more efficient, the cost of a QALY only rises to 16,000€ after 50 years. The extreme cost-effectiveness of shamanism is presumably the reason why this kind of medicine has been prevalent in practically all pre-modern cultures. The peculiar death-rebirth rituals and use of hallucinogenic drugs of these magic events make them so strange and farfetched that they are not likely to be a part of our materialistic Western culture, but from an academic point of view they should be. There is no other kind of medicine that offers this much health for the money.

Discussion

The calculations above are built on the reduced formula, but since this is in favour of the drugs, we find this reduction not to invalidate the results. The estimated cost of CAM and biomedicine here is 2000€, and from this, we found a cost per QALY (mind-body medicine, year one) that is identical to the “less than 10.000£ per QALY” other researcher have found (20). We therefore believe that our figures are correct.

The extreme 50- to 300-fold difference in cost per QALY when we compare drugs to non-drug mind-body medicine (which becomes a 300-fold difference if we go to shamanism) is worth thinking about. If we can buy 50 times as much health with CAM, then biomedicine should only be used when CAM cannot solve the problems. Recent analysis has shown that there are CAM treatments for almost everything. This does not mean that every patient will get cured with CAM, as there always will be incurable patients also after 2,3,5,10 and 50 years of treatment. We have made the estimates and calculations as simple as possible. It is fair to admit that this degree of simplicity takes away the precision of the calculations. On the other hand, these estimates are identical to the estimates that researchers using much more exact methods have found. We therefore believe that the results in general are correct within a factor two. We have used the results from the Danish Quality of Life Survey (53-56) to estimate the global QOL of patients treated with biomedicine. We know that patients with chronic disorders have a QOL about 25% below mean of population, but we do not know if the QOL were 50% below mean before they were treated with biomedicine (drugs); this is a guess. While it is difficult to imagine that these patients were lower in QOL than 50% below population mean, it is a most likely alternative hypothesis that they were better. If that is the case, the cost per QALY with biomedicine is much more expensive.

If patients have the same QOL before and after treatment, which is often found in drug studies including QOL, i.e., with treatment of antipsychotic drugs, the cost per QALY is infinite.

Conclusion

Practically all disorders and dysfunctions can be treated with CAM, but the efficacy is highly dependent on the type of CAM used. The most effective types of CAM cures every second patient for physical, mental, disorders, existential problems and sexual dysfunctions. Biomedical drugs are much less efficient in curing the diseases as NNT normally is about ten for a cure (NNT=5-50 (3)). This leads to remarkable costs for one QALY as times goes by, 50-300 that of biomedicine in the present estimate. Biomedicine also has lots of adverse effects and adverse events while non-drug CAM has practically none.

The conclusion must be that CAM must always be used as cure of choice unless the disorder is not treatable with CAM or unless there is an exceptionally cheap and efficient cure with drugs (like penicillin for syphilis). In countries with socialised medicine, CAM should be the first kind of medicine offered, and only when a CAM cure fails, the physician should try using drugs. As only 10% of patients are cured with drugs, this treatment will inevitably lead to 90% of patients becoming chronically ill patients. Denmark and other countries with socialised medicine and no CAM offered to the patients have about 50% of their population being chronically ill with physical and mental disorders (57). Biomedicine has as an experiment on national scale failed miserably, and only CAM will make us able to bring health back into these populations.

In spite of the fact that shamanistic one-session healing with hallucinogenic drugs seems to be extremely efficient, we don't find it possible to integrate these in modern culture and use these classical rituals in contemporary medicine, but research in shamanistic healing rituals could bring important knowledge to medical science and must therefore be encouraged.

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Use of coercive persuasion (“brainwashing,” “mind control”) in psychiatry from an ethical point of view

Many patients you will meet in your clinic suffer from some kind of mental disorder. This is very sad, and you will often feel quite desperate not knowing what to do. Many of these patients have already been treated for years by a psychiatrist – or more likely a number of psychiatrists – and they are often on strongly sedating drugs. If the patients stop taking these drugs, a strong re-bounce effect will often follow, and the patients might go straight into psychosis. As you do not want to deal with this kind of responsibility, since you are running a clinic and not a mental institution, you will often feel a strong urge to back off and let the patient continue being treated with drugs by his or her psychiatrist. If you treat the patient, you are likely to be blamed for everything that happens while you are doing so, and even if you succeed to cure the patient, you are likely to be attacked by the psychiatrist, who now will feel bad and incompetent. So this is not an easy situation. The patient who has been treated by psychiatrists for a long time will often have learned many things from this treatment. One thing the patient has heard hundreds of times is that he or she will be permanently mentally ill for life and that he or she cannot live without the drugs. This is not correct, of course, as nobody knows if this patient will recover or not; often the quite opposite is correct: It is almost impossible to have a normal life if you believe you are severely mentally ill for life and on strongly sedating drugs that often make studying and working impossible and a social life a burden.

But the patient has often come to believe in this, as he or she has been told so many times. Frankly speaking, the patients have been brainwashed by the psychiatrists to believe in this. When you talk to your mentally ill patient, you will find that he or she often has been exposed to a rather intensive and humiliating degree of force during the psychiatric treatment. No wonder they want out and come to you for help. But you are in danger here. You are entering a red zone, so this situation calls for all your wits, all your talent as a therapist and all your understanding of how families and society works. The first thing you need to understand is how the patient was brainwashed during treatment to believe in being mentally ill for life and in constant need of drugs. The next thing you need is involving the patient’s family in the

treatment so that you do not have to be responsible for the mentally ill person; somebody else needs to carry that responsibility so this will not end your career as therapist. When all these things are in place, you can start treating and healing your patient. All you have to do is to free the patient from all this negative learning, first the negative learning from the psychiatric treatment itself and then the negative learning from the patient's past that made him or her mentally ill.

Beware that many mental patients have been violently and sexually abused or neglected and failed through a significant part of their childhood. You are signing up to a task that might take several years to accomplish. But do not worry; you will be successful, not because you will not fail miserably as a therapist during the treatment, because you will, but because you will learn and continue the fight all the way to the end till the patient is cured. This is your commitment, and if you are willing to take this challenge and to get the patient's family support and commitment too, then you are in good shape. Do not worry about the rest. There will be troubles, but you will be fine in the end.

One of the major reasons for many patients to shift from biomedical to holistic medicine is traumatic experiences of violence and coercion in psychiatry. The patients often complain that they feel the physicians used more force than necessary.

Especially, they felt that their psychiatrist tried to persuade them to take drugs they did not believe would help them. They also felt that the psychiatric theories were imposed on them.

To examine if the complains were in any way substantiated, we made an analysis of coercive persuasion in psychiatry, based on the literature. We did not have to read much to conclude that coercion is actually every day practice in psychiatry. The question is if the use of force is necessary or if the Hippocratic principle of *Primum non nocere* is violated.

Coercive persuasion, 50 years ago called "brainwashing," "mind control" and "thought reform," has recently been recommended by some psychiatrists as an efficient psychiatric tool, which is often not felt as coercion by the patients. The intensive use of antipsychotic drugs, which in Cochrane meta-analyses has been shown to reduce hallucinatory behaviour without improving the patient's mental state significantly, seems to facilitate coercive persuasion; it reduces patient resistance and autonomy by sedating him or her into a passive, cooperative, weak, and obedient state.

Lifton found eight criteria or themes for coercive persuasion, and when we compare these to modern biomedical psychiatry, we find astonishing similarities. The patients must accept the "sacred psychiatric science," an imposed "categorical" psychiatric diagnosis as a personal fault, and must obey and comply with the "treatment": taking the prescribed, often sedative drugs, staying in hospital until behaviour is normalized.

Biomedical psychiatry has long been criticized for reducing its patients to "zombies" or robots, and about 2% of patients commit suicide or attempt to do so shortly after the initiation of psychiatric treatment.

It is alarming that both the process and the outcome of biomedical, psychiatric treatment share unmistakable similarities with brainwashing. In conclusion, coercive persuasion that harms patient integrity and autonomy, decreases the feeling of meaning of life, sense of coherence, and quality of life, can explain the pattern of damage often inflicted by psychiatric treatment, and we would like to question the ethical aspects of such a treatment.

Introduction

Coercion is still common practice in psychiatry (1-3), in spite of a growing awareness of the inflicted harm (4). Of the many different forms of coercion, coercive persuasion seems to be the only form that is generally accepted and even recommended among psychiatrists, with the argument that “positive symbolic pressures, such as persuasion, do not induce perceptions of coercion and such positive pressures should be tried in order to encourage admission before force or negative pressures are used” (5).

If you think about it, this is extremely worrisome: Coercive persuasion – what was called “brainwashing,” “mind-control” and “thought reform” 50 years ago – is not felt like coercion at all. This means that if you are coercively persuaded, you are not even likely to be able to observe it. This makes coercive persuasion, which can change patient’s attitudes, preferences and loyalties – that is why it is used of course – an extremely strong measure, as the patient cannot really resist it. Therefore, coercive persuasion is likely to be much more harmful than open and visible use of coercion, which you can resist and distance yourself from. Coercive persuasion is, when it makes you change and degrades your personal philosophy of life, like an invisible poison that stays in your flesh and bones forever. You might have a feeling that you picked up something that was very bad for you, but you can’t know what it was or where you picked it up, so you can’t get rid of it.

As our consciousness is the primary source of everything we do and are, including our health, quality of life, and ability in general (6), we are extremely vulnerable to influences and manipulations that shift our consciousness away from what could be called our “natural philosophy,” our inner account of who we really are what we really want from life, into an alienated philosophy of life. Large shifts in people’s philosophy of life can happen in accidents where traumas give strong, emotionally charged, negative learning (7,8).

The question is how easy it is for other people to impose such a major shift in our consciousness, if they want to use us for their own purposes. We know that commercials are exactly about that. You cannot avoid looking, and then you are sold, but then again, not completely. This is on a small scale, and the coercion is subtle – you want to be fancy, so you buy fancy clothes.

But what if you are a parent, and you persuade your child? We all know that this is easy. What if you are a physician who wants to stop a mentally ill patient from creating problems for him and others, how easily could you “thought reform” this patient and change his behaviour by coercive persuasion?

We all know, as we have tried to persuade other people many times, that most people do not voluntarily let go of their autonomy and personal favourite philosophy of life, attitudes and values; the shift in consciousness takes a yield, and the external pressure causing it needs sometimes to be extreme. But at other times, the person’s consciousness is very mouldable, especially if the person is in serious trouble and has confidence in our good intentions and us. And if you are the doctor, and the patient’s life depends on you, the power-relation is similar to the parent-child relation, and modifying the patient’s consciousness is really easy.

The main characteristic of an intended shift, and the reason that it has been called “coercive persuasion,” “brainwashing,” “mind control,” “thought reform” is that it fundamentally violates the victim’s autonomy, and thereby destroys quality of life, as quality of life is the realization of self (9-12). Brainwashing is thus the complete opposite of

existential therapy that aims in freeing the person, rehabilitating autonomy, and improving quality of life and health (13,14). In clinical holistic medicine (14-16), this is done by rehabilitating the patient's character, life mission and natural philosophy of life (17-19).

Most interestingly, existential therapy will also deliberately implant philosophy of life in the patient, but this is done after consent – not that this means too much if the patient is severely ill and will consent to anything the physician suggests – but the philosophy is a positive, life-supporting philosophy, implanted as a part of the therapeutic contract and meant for later de-learning, when the patient reaches his final destination of autonomy and self-insight (14).

From a psychodynamic perspective, we know that coercive persuasion is an obligatory part of every harsh childrearing practice (20-25), as the child being relatively powerless constantly must yield to and obey its parents; in spite of this often being highly traumatic, this seems to be generally accepted in our culture. When the person is an autonomous adult, we find coercive persuasion in principle unethical, especially if the inflicted harm is obvious, unless the person is criminal or insane.

Most interesting, unethical, coercive persuasion has mostly been associated with religious leaders of sects and cults (26-28) and political totalitarianism, especially in Russia and China (28-30), while the traumas and harm from coercive persuasion inside the modern Western societies, especially towards the criminals and the insane, have been almost ignored in research.

The harm caused by coercive persuasion is alienation and loss of autonomy; the symptoms of this are a reduction of the person to a more primitive being, or if taken further, to an unconscious zombie-like being with little free will and initiative and severe problems related to meaning of life (31) and sense of coherence (32). The most severe cases of brainwashing have systematically been seen to lead to suicide in cults, although other courses might exist (33-35); coercive tools have been sedating drugs, physical, and mental restraints.

This chapter addresses the well-known theme of coercive persuasion in psychiatry (1-4,36); another chapter will address the unnecessary violation of suspected criminals that often harm these, in principle, still innocent people, just to make everything worse. Our intent with the present analysis is not to give suggestion on how to solve the problems of crime and insanity from the societal point of view, one possibility of course being the elimination of the burdening person by coercive persuasion, another more constructive than healing and development of him or her.

We just want to make everybody professionally involved in patients and criminals more aware of the serious ethical problems of coercive persuasion, which can be extremely harmful to the vulnerable existence and vital autonomy of a human being. We want to prevent professionals victimizing the already vulnerable, disturbed person. Mentally ill patients have in general few resources, a poor social network, and low self-esteem, making them especially vulnerable to coercive persuasion.

Drugs and coercion in psychiatry

In Denmark, the annual use of antipsychotic drugs corresponds to 6% of the population – about 300.000 patients – taking such drugs every day, with another 6% taking antidepressive

drugs. The prize of the antipsychotic and the antidepressive drugs in 2007, were 122 million EURO and 106 million EURO respectively, accounting for 14% of the national turnover on drugs (37).

The massive use of drugs in psychiatry happens in spite of recent scientific meta-analysis having documented that these two large groups of drugs in principle are of questionable therapeutic value. The antidepressive drugs are active placebos (38), giving the patients adverse effects that make them believe that they get help, while they are actually harmed by the adverse effects of the drugs. The antipsychotic drugs have in Cochrane meta-analysis and similar studies been shown to have no effect at all on the mental health; they seem only to pacify, and this effect is likely to be a consequence of chronic poisoning by the drugs (39).

Most interestingly the drugs pacify the patients and make it difficult not to “cooperate” (NNT=4 for “cooperativeness”); in an authoritarian, coercive system, “cooperation” is exactly the same as “obedience,” so the documented effect seems to be a documentation of the antipsychotic drugs efficiency in facilitating the coercive persuasion. Psychiatric treatment with the antipsychotic drugs has been criticized for reducing the patients to “zombies” (40) and to a very disturbing degree, it has been documented that suicide among mentally ill patients occurs very often, and this is statistically related to intensive psychiatric treatment and hospitalization (41).

Taken all together, this looks like psychiatry uses coercive persuasion as its primary tool, facilitated by the drugs and other techniques like electroshock (42, 43); the use of coercion might explain why biomedical psychiatry in general does not improve mental health (39).

Theories of coercive persuasion

Brainwashing has often been a legal issue both in the United States and Europe (26,27), but a surprisingly limited number of scientific theories of brainwashing and coercive persuasion could be found in a combined Pubmed/MedLine and PsycINFO search, in spite of 300 references, and most of the proposed theories have been seriously disputed. The most acknowledged research in brainwashing is probably done by Lifton (28,30), who studied brainwashing in China and found eight central conditions or “themes” for brainwashing (see 44):

- *Sacred science.* The group's doctrine or ideology is considered to be the ultimate truth, beyond all questioning or dispute. Truth is not to be found outside the group. The leader is above criticism.
- *Doctrine over person.* Member's personal experiences are subordinated to the sacred science, and any contrary experiences must be denied or reinterpreted to fit the ideology of the group.
- *Loading the language.* The group interprets or uses words and phrases in new ways so that often the outside world does not understand. This jargon consists of thought-terminating clichés, which serve to alter members' thought processes to conform to the group's way of thinking.

- *Milieu control.* This involves the control of information and communication both within the environment and, ultimately, within the individual, resulting in a significant degree of isolation from society at large.
- *Demand for purity.* The world is viewed as black and white, and the members are constantly exhorted to conform to the ideology of the group. The induction of guilt and/or shame is a powerful control device used here.
- *Confession.* Sins, as defined by the group, are to be confessed either to a personal monitor or publicly to the group. There is no confidentiality; members' "sins," "attitudes," and "faults" are discussed and exploited by the leaders.
- *Dispensing of existence.* The group has the prerogative to decide who has the right to exist and who does not. This is usually not literal but means that those in the outside world are not saved, unenlightened, unconscious, and they must be converted to the group's ideology. If they do not join the group or are critical of the group, then the members must reject them. Thus, the outside world loses all credibility.
- *Mystical manipulation.* There is manipulation of experiences that appear spontaneous but in fact were planned and orchestrated by the group or its leaders in order to demonstrate divine authority.

Hassan (45) developed this further into his BITE model with some of the major criteria for brainwashing listed below:

- Behaviour control
- Need to ask permission for major decisions
- Need to report thoughts, feelings, and activities to superiors
- Rewards and punishments (behaviour modification techniques positive and negative)
- Individualism discouraged; "group think" prevails
- Rigid rules and regulations
- Need for obedience and dependency
- Information control
- Use of deception
- Access to non-cult sources of information minimized or discouraged
- Compartmentalization of information; Outsider vs. Insider doctrines
- Extensive use of cult generated information and propaganda
- Thought control
- Need to internalize the group's doctrine as "Truth"
- Use of "loaded" language (for example, "thought-terminating clichés")
- Only "good" and "proper" thoughts are encouraged
- Manipulation of memories and implantation of false memories
- Rejection of rational analysis, critical thinking, constructive criticism. No critical questions about leader, doctrine, or policy seen as legitimate
- No alternative belief systems viewed as legitimate, good, or useful
- Emotional control
- Manipulate and narrow the range of a person's feelings

- Make the person feel that if there are ever any problems, it is always his/her fault, never the leader’s or the group’s
- Phobia indoctrination: inculcating irrational fears about ever leaving the group or even questioning the leader’s authority. The person under mind control cannot visualize a positive, fulfilled future without being in the group.

A researcher who defined coercive persuasion as “psychotechnology, which can involuntarily transform beliefs and loyalties,” has stressed *deception* and *seductive pseudosolidarity* as standard elements in brainwashing (26).

The process of brainwashing “is fostered through the creation of a controlled environment that heightens the susceptibility of a subject to suggestion and manipulation through ... cognitive dissonance, peer pressure and a clear assertion of authority and dominion. The aftermath of brainwashing is a severe impairment of autonomy and of the ability to think independently, which induced a subject’s unyielding compliance and the rupture of past connections, affiliations and associations” (Peterson v. Sorlien, 1980, quoted in 26). A physical threat intensifies the coercion (26). Brainwashing leads to “feeling of guilt, dependency, low self-esteem, worthlessness, anxiety and hopelessness in vulnerable individuals” (43), severe reduction of autonomy, and in the most extreme cases, suicide (26,27,33,34). Other researchers have found a triad in brainwashing of “deception, dependency, dread” (46).

A simple way of understanding brainwashing is the three-step-process of: 1) gaining control of the victim’s time, activities, and mental life; 2) placing the victim in a position of powerlessness; and 3) suppressing the victim’s former identity (47).

If you think about it, this is to a large extent what every school child is exposed to every day and to a much smaller extent, what every employee to some extent must accept (25). So coercive persuasion is not something mystical and strange; it is our practical reality as human beings. Luckily, most of us are not very vulnerable and very receptive to brainwashing; as soon as the pressure goes and we get resources for healing, we return to our natural identity and philosophy (7). The fraction of people who are vulnerable are the people who did not get sufficient love and support during childhood from their parents or maybe even were physically or sexually abused. Most unfortunately, this is exactly the group of people that often becomes our mentally ill patients. Coercive persuasion therefore becomes extremely problematic with these people.

In conclusion, coercive persuasion can inflict serious harm and turn people into chronic patients; it must be mentioned that there are few regular scientific studies documenting this, and the negative effects of coercive persuasion have therefore been disputed in relation to a number of lawsuits (48-50).

Coercive persuasion in psychiatry

Schein (51) found in 1962, remarkable similarities between brainwashing in totalitarian regimes and treatment in mental institutions. Independent of the scientific scheme of coercive persuasion used, it was easy to find large similarities to the situation that a mentally ill patient

finds himself in, coming to the psychiatrist, and the brainwashed member of a authoritarian state of cult:

- *Sacred science.* Only psychiatrists understand the patient's mental illnesses and the diagnosis and treatments or the science behind it or rationally, and applicability of the treatments cannot be disputed. The patient must surrender fully to the psychiatric authority, accept the diagnoses as truth, and comply obediently with the prescribed treatment that most often is drugs.
- *Doctrine over person.* The patient's personal experiences are subordinated to the sacred science, and any contrary experiences must be denied or reinterpreted to fit the psychiatric science.
- *Loading the language.* The group interprets or uses words and phrases in new ways so that often the outside world does not understand. This jargon consists of thought-terminating clichés; the acceptance of "disturbed brain chemistry causing the mental disease" to be "compensated by the drugs" (the dopamine hypothesis) is such a cliché, often used but obviously falsified by the facts that antipsychotics do not improve mental health (39).
- *Milieu control.* The mental institution is often very restrictive when it comes to communication outside, and physical restrictions are normal; medication by force is a complete control of the patient's inner, biochemical milieu.
- *Demand for purity.* The patient is told to control unwanted "hallucinogenic" behaviour, like conflicts, aggression, critique, blame, justifications, theorizations, etc. Such expressions of the patient's autonomy are considered impure.
- *Confession.* The "group therapy" often used (comp. Jack Nicholson's famous appearance in the sharing-circle in the movie "One Flew Over the Cuckoo's Nest" (52)), in this way breaking down patient's integrity and autonomy; patients' mental diseases are discussed and exploited by the leaders.
- *Dispensing of existence.* The psychiatrists have the prerogative to decide who has the right to exist and who does not; other therapists are unenlightened, inefficient and harmful. Healing and help from the outside world loses all credibility.
- *Mystical manipulation.* The psychiatric environment is highly structured, and the patient has no possibility for understanding how his or her experience is manipulated.

Hassan's criteria (45) listed above are almost all met in contemporary biomedical psychiatric standard treatment with antipsychotic drugs. Thus, the critique raised more than 40 years ago seems still valid. When it comes to "psychotechnology, which can involuntarily transform beliefs and loyalties," *deception* and "*seductive pseudosolidarity*" seem also to be present in psychiatry; the psychiatrist pretends to be the patient's good doctor with the intention of healing the patient, but he knows very well that there is not a cure. The true nature, purpose and function of the psychiatric institution are hidden for the newcomer; the highly structured environment catches the patient and absorbs him or her.

Biomedical psychiatry is deceptive in that the institution, the drugs, etc., all are named after helping and curing the patient, i.e., "mental hospital," "antipsychotic drugs," but the drugs do not at all improve the patient's mental health, and the patient is not at all cured at the "hospital," but just drugged down into convenient passivity and obedience (39). Thus, the

patient is giving consent to the treatment in the expectation to get help, but this help will never come as it is not possible to cure any disease or improve mental health with the drugs; the essential purpose of the mental institution is thus not to cure the mentally ill – as is evident after all statistics – but to rid society of its burden of difficult, unfit, and troublesome people. An interesting question is if it really is legal “deceiving (people) into subjecting themselves, without their knowledge or consent, to coercive persuasion” (26).

Deep existential problems follow often from accepting the categorical, psychiatric diagnosis, which in itself leads to marginalized in all social and societal aspects. The patient is facing the “fact” that the incurable and chronic mental disease never will allow success at work or in education. The patient is there by effectively excluded from ever being of any substantial value to the surrounding world; he or she will never get a normal life. The meaning of life and the sense of coherence are sadly lost, and suicide in this situation can be a fairly rational decision (35) from the patient’s new perspective planted by coercive persuasion. The suicidal intent is often noticed, as this is a part of the standard procedure, and the coercive prevention of suicide, which philosophically is depriving the patient the last remains of autonomy, leads to a final repressed state of complete resignation and pacification, and this is the state of the “zombie” or robot, as Hunter already said (53,54): A person deprived of all will to live and even all will to die; with no hope, no joy, and no autonomy left.

The analysis of psychiatry as coercive persuasion looks surprisingly accurate, and this calls for a number of questions: What is really going on here? Why are the patients accepting the psychiatric diagnosis, and the drugs, in spite of the fact that drugs have been proven not to improve mental health at all and to be highly poisonous and sedating? Why are psychiatrists not behaving rationally and stopping the combined use of drugs and coercive persuasion when it is now clear that it is not at all based on scientific evidence? Why are the national health authorities accepting such a malpractice that seems to severely harm thousands of mentally ill patients, especially when there are so many successful alternative treatments (55-57)? Somehow the authorities, the psychiatrist and the patients all together have become fixed in the belief that the drugs help and it is the correct treatment and that the categorical diagnosis is the final truth about the patient, in spite of science telling us the complete opposite - but how come?

Coercive persuasion as weapon

Coercive persuasion has often been used in war (58-61). On a smaller scale, it has been used in the “war” between pharmaceutical industry – including on its side many biomedical psychiatrists - and the CAM therapists (62). Psychiatrists have, according to this book, often accused CAM therapists of harming the patients, an often-used testimonial from former CAM patients that later came into psychiatric treatment; vice versa have CAM therapists often quoted patients who had ETC or antipsychotic drugs for statements about these treatments as severely destructive and ruining the patient’s whole life. A vulnerable patient takes the role of a child in relation to his or her doctor, and this always opens up to the possibility of coercive persuasion; the patient can thus be made to think and say almost anything by her former therapist or physician. In such cases, the only rationale thing is to look at the facts (34) of

what happened, what was the outcome of the therapy? Did the therapy make the patient better with regards to quality of life, self-assessed physical or mental health, self-esteem, etc.? Were the patient's general abilities reduced during treatment? Was the patient hospitalized during the treatment? Was emotional withdrawal cured or intensified? Were libido and sexual relations opened up or closed down? Were there any suicide attempts or death wishes? Was the relation with the outer world improved during treatment or did the patient become more isolated?

All these subjective and objective factors related to autonomy, empowering, meaning of life, and sense of coherence, feeling of guilt, dependency, low self-esteem, worthlessness, anxiety and hopelessness, social isolation, and suicide must be analyzed to see the whole picture and answer the difficult question: Was this constructive therapy or destructive, coercive persuasion?

A most difficult issue is the issue of consent and free will. A mentally ill patient needs care and is dependent; free will is thus reduced, and consent must be seen in this light. If a patient gives consent to psychiatric treatment, in a mental state where he or she feels very bad, this is not really a valid consent. Such consent is important not to violate the patient's feeling of autonomy, but the consent has little meaning in its philosophical sense as the illness puts a strong force on the patient; we therefore need to monitor the process and the outcome of every treatment very carefully to be sure to help and not harm a vulnerable, ill patient. Luckily, this is easily done with a small questionnaire on quality of life (62). Every patient needs to fill in such a questionnaire before treatment is initiated; if the patient is not able to do so, the quality of life questionnaire should still be rated by an external observer (63) and corrected by the patient when he or she is able to do so.

An important ethical obligation we have as therapists in this turbulent time is not to use the patients as weapons in our internal combats; in the end, all coercive persuasion will harm our vulnerable patients.

Discussion

Coercive persuasion, or "brainwashing," is possible if somebody is in a weak and vulnerable relation to another more powerful person, similar to that of a small child with its parents. The powerless position is often the one mentally ill patients have in relation with their psychiatrist; it is so tempting to put all hope of salvation and cure into a relation with an authoritarian doctor who seems to know everything and promises to help. Most unfortunately, the biomedical psychiatrist believes in the dopamine hypothesis and therefore also in the antipsychotic drugs, but these drugs do not improve mental health according to the statistics (38); when a physician believes in the drugs, he does not have the intent of curing the patient himself, and thus he will not provide the resources needed for recovery and spontaneous healing (7). His biochemical understanding of life, brain and mental diseases and consciousness does not allow this either. The psychiatrist carries instead the intention of fitting the patient into society; he wants to help the patient to assume a role that is non-destructive and un-problematic, and the only role that is possible is as chronically mental patient, with the conflict-causing, hallucinatory behaviour pacified by antipsychotic drugs.

The coercive psychiatrist is empowered by society to use force to make the patient behave normally; in the patient’s experience, this is often a battle where the patient fights for his autonomy but loses; the psychiatrist ends up destroying the patient existentially, but he does this to serve society and finds himself in good intent, while the patient often sees him as an enemy.

A strong belief in tradition, and what seems to be obsolete, biochemical hypothesis of mental illnesses, makes it difficult for psychiatrists to disregard all the new scientific studies, including the many large Cochrane analysis that have shown that the patients’ mental state – the measured mental health – is not improved by the drugs. New studies have also documented very embarrassing data on the adverse effects, suicide and spontaneous death from the drugs (40,64). As long as the psychiatrist simply sticks to the belief that mental illness is a genetically inherited brain-defect that only can be compensated by antipsychotic drugs, he simply will be in denial when it comes to the urgent needs of reforms; and in this denial, he will not consider other therapeutic methods.

It is an interesting idea that the reason for the psychiatrists insisting on using the “antipsychotic,” sedative drugs is coercive persuasion during his medical training. Only if these ideas and theories were accepted could he become the physician he wanted to be; this “coercive learning” could be called “professional deformation.” Generations of physicians have thus been brainwashed to believe in biochemistry as the final answer to the mysteries of life, and the dopamine hypothesis as the final answer to the mystery of psychotic mental illnesses; so when new science shows that the dopamine hypothesis is not likely at all, he simply sticks to it anyway. The lack of openness to new ideas and the strong irrational conservatism that we see here could very well be another symptom of coercive persuasion.

About 5% of the Western population is on antipsychotic drugs, making this one of the largest pharmaceutical industries in the world. The industry uses billions of Euros and dollars on highly biased, randomized clinical studies (38), and all these studies are made by doctors getting payment, prestige, and important degrees from their involvement. The medico-industrial complex is highly integrated in society, and the industry is returning so much of the money it makes to the doctors that this can fairly be compared to a bribe. But it is done in smart ways so nobody can officially blame the doctors; and often the doctors do not even themselves realize that they are being manipulated.

The politicians need psychiatry to take care of the mentally ill, to get quiet and stable, productive societies; and a successful pharmaceutical industry also brings wealth to the nation. The fact seems to be that millions of patients who believe that psychiatry helps them are little by little reduced to zombies by mental and chemical repression. The patients are in reality losing their lives and whole existence due to drug-facilitated, coercive persuasion; but when it comes down to it, nobody really cares about the mentally ill.

Conclusion

Coercive persuasion, or brainwashing, as it is known from war and totalism (29) seems to be the normal practice of Western psychiatry of today; it is strongly facilitated by the sedative and highly poisonous, “antipsychotic” drugs that have been shown not to improve mental health in a number of recent Cochrane meta-analyses. After the patient is tricked into

believing that psychiatry is about healing the mentally ill, which most unfortunately is not the case in biomedical psychiatry, as patients are not healed, the tool of coercive persuasion is used to repress and pacify the patient into the convenient role of a chronic, mentally ill patient.

Most unfortunately, the psychiatrists of today have completely lost contact with scientific reality and have drifted away in obsolete ideas and illusions that are in no way substantiated or even the least supported by facts. But the money and the prestige connected with a high position at a mental hospital are still so attractive that the psychiatrist simply loses common sense and accepts a role as terminator for naïve patients, being horribly manipulated and existentially destroyed by the combined effects of coercive persuasion and strongly sedative and poisonous drugs taking the patients' ability of autonomy and resistance away.

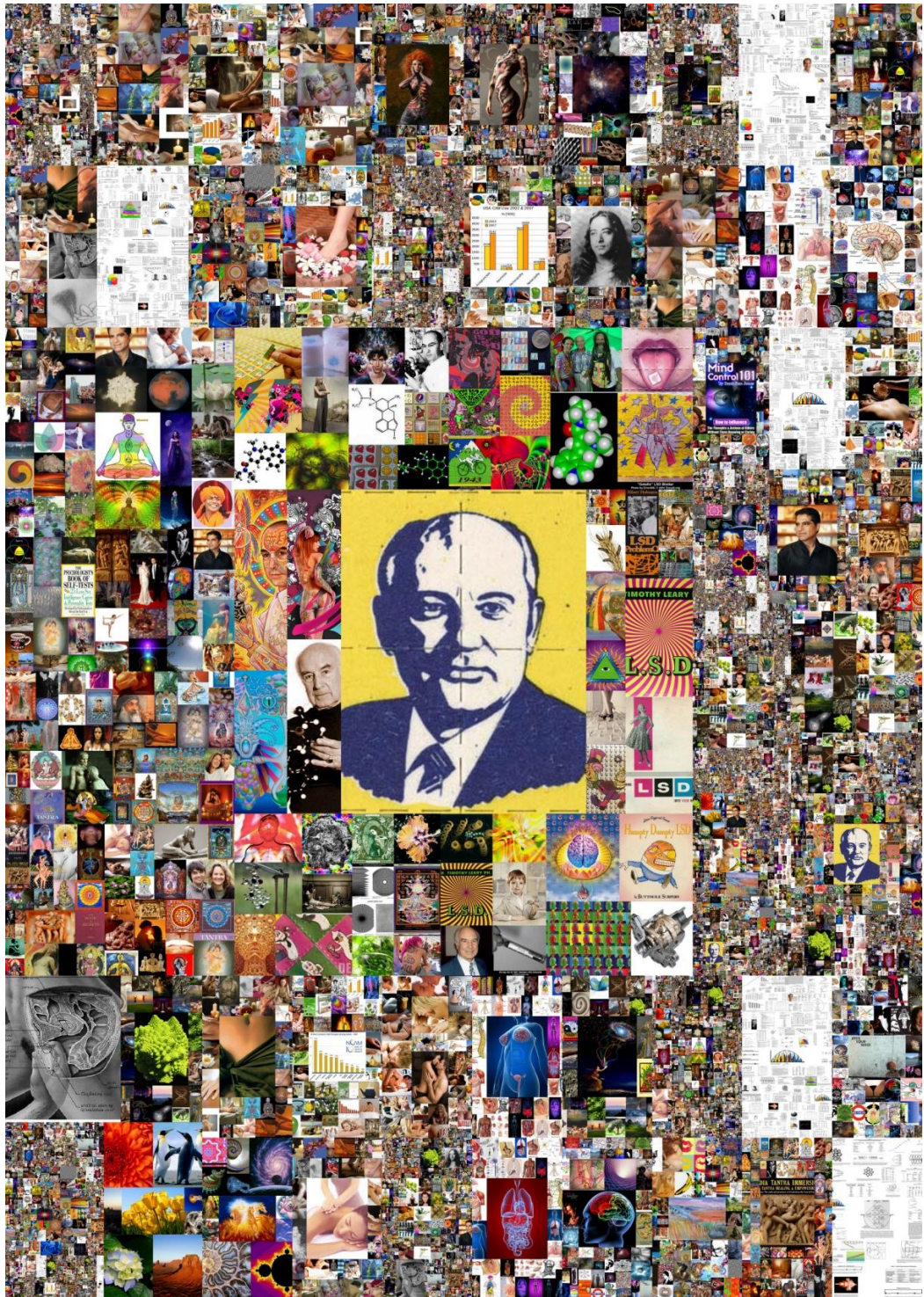
Every year, about a million, mostly young people, enter the psychiatric system and become patients (65), and every year, a million of so good people who could have had wonderful, blossoming lives are turned into existentially reduced "zombies" or even into dead by suicide. We have been so busy criticizing the other societies and cultures that we completely have missed that we in the Western world could be the most repressing, evil, violent and un-containing of all people that have inhabited the planet to this day.

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Bio- and alternative medicine in conflict. Human rights protection of the alternative therapist

If you believe in most of what we have written in this book, you will understand the conflicts of interest between you as non-drug therapists and the pharmaceutical industry and the physicians working for it. Basically, the pharmaceutical industry has grown so big because we – the small non-drug therapists – have not been able to influence governments, academic institutions etc.; we have not been able to pay billions of dollars to hundreds of thousands of medical doctors for participating in drug trials, and we have not been able to fill the TV programs and newspapers with advertisements that claim that we can help.

But as people are waking up in general, and that is what is happening now, interest in mind-body medicine and non-drug therapy has grown immensely, and today there is an enormous market for non-drug therapy. Many patients who chose to believe in biomedicine are shifting back from drug therapy to non-drug therapy. These people are now starting seriously to work on developing their own consciousness and philosophy of life and improving their quality of life. To take responsibility for one's own life and health has become a major trend in society. We now see the commercial industrial medicine react to this "threat from the alternative." This is what this chapter is about. If you involve yourself in holistic medicine, you are likely to meet these problems as a part of your daily living in the future. So you should be prepared for it.

In spite of strong commercial interests in biomedicine, we now observe that complementary, alternative and holistic medicine (CAM) is being used more frequently than biomedicine in the Western world. Many physicians have lost faith in pharmaceutical drugs and integrate existential psychotherapy, therapeutic touch, clinical holistic medicine and other CAM techniques into their clinical practices. In response, commercial forces impact the media and national health authorities to promote the use of biomedical drugs.

CAM researchers and therapists are frequently "quack busted" following a rigid pattern: 1) First a fabricated accusation is presented to the public and the health authorities via the media, 2) that will start a public investigation often conducted by biomedical doctors, who are strongly biased against CAM, 3) accusations of sexual or violent abuse make insecure patients re-interpret the treatment and complain in the media, 4) as this feedback loop takes

off, more and more “evidence” gathers against the CAM researcher or therapist, culminating in a public “witch burning” scandal, 5) even if investigations by the police and the court of law shows that the original accusations was unsubstantiated – which is normally the case – the researcher or therapist will still be found guilty in malpractice by his biomedical colleagues, 6) in the end the prosecution process generates by itself the evidence against the CAM researcher or CAM therapist that takes him out of business and 7) the national health authorities’ participation in the persecution of CAM researchers and therapists based on rumours violates the physician and therapist basic human rights and is a serious hindrance to research and development of CAM.

Introduction

Two industries have economies larger than even small countries: the weapons industry and the medical industry. In capitalistic society, money rules, and these industries have been known to employ thousands of lobbyists and use billions of money on direct and indirect bribes (1). The sharing of the turnover from the pharmaceutical industry has been so efficient it made Ross Scholes say: “The highly trained medical professionals is like an accessory to the vast pharmaceutical and health-care industry, as a stewardess is to a jet airliner and the aviations industry” (1, p 37). This is of course not completely true; many doctors know that biomedicine like penicillin is highly efficient for syphilis, but has its limitations when it comes to pain and chronic diseases. Recently, many physicians have realized that biomedicine is not the only kind of medical science, but when they were in medical school, they were trained to give “the magic bullet” or pill and therefore are not able to understand the process of healing and offer psychodynamic psychotherapy, bodywork or the two combined as in scientific holistic medicine (2-4).

Strong commercial interests promote drugs, but many physicians today believe that CAM (complementary and alternative medicine) would help the patient more than the drugs alone. This has become so obvious in countries with nationalized biomedicine, like in Denmark, where all ill people are treated with drugs at no cost for them, but for the chronic disease, the drugs do not cure the patients. Quite on the contrary, literally half the nation has been turned into chronic patients: 40-60% of the Danish population is chronically ill now, half with mental and half with somatic illnesses in spite of the free biomedical healthcare (5). For these patients, the alternative non-drug CAM therapies are the only alternative, but the regular physicians are not able to provide it. Because of this, some physicians now take complementary education in scientific CAM, like the European Master’s of Science degree (MSc) in complementary, psychosocial and integrative medicine, which has become increasingly popular (6).

Biomedicine or CAM?

It is even more depressing that some drugs are giving the patients a false hope of cure, while the adverse effects of the drugs often are so strong that they constitute a severe hindrance to spontaneous healing and recovery. We have seen that with chemotherapy for cancer and with

antipsychotic drugs for schizophrenia and other severe mental illnesses. Long-term survival was not improved at all for metastatic cancers in the latest general review made by Ulrich Abel (7), and antipsychotic drugs are definitely not improving mental health according to the latest Cochrane meta-analyses of the treatments of psychotic patients with antipsychotic drugs (8).

We also know that total Number Needed to Harm (NNH) of many biomedical treatments are one, two or three, i.e., the fraction of patients getting an adverse effect is often one in three or more. At the same time, we know that for many drugs Number Needed to Treat to Benefit (NNT) are often five or more, meaning that 20% or less of the patients are getting better on the drugs. Statistically, many patients are harmed, and few patients cured by the drugs. The conclusion to all this has been that “the drugs don’t work” (9), if we have to put it very dramatically.

CAM, on the other hand, is harming no patient and is often helping one in two or three, at least according to the patient’s subjective report of feeling being helped, making alternative and holistic medicine likely to be the rational choice with most diseases. Interestingly, more and more physicians are starting to doubt the pharmaceutical industries’ methods of documenting the effect of the drugs. When it comes to depression, we know that the most efficient antidepressive drugs according to a recent Cochrane meta-analysis are no better than active placebos (10). This means that the antidepressive drugs most likely only have adverse effects, no beneficial effect at all, and most of these drugs have serious adverse effects.

Attack on the alternative

In spite of non-drug CAM and holistic medicine being helpful and not harmful with sometimes biomedicine being the opposite, biomedicine has managed not only to survive but also to repress the majority of the CAM practitioners and CAM researchers on this planet. When you look only at the NNT (number needed to treat) and NNH (number needed to harm) figures, remembering that all modern physicians have sworn to rational and evidence-based medicine, this is a riddle. But when you look to the formation of public consciousness in different societies, you will soon realize that the media is running the show. The media is bringing one story after the other on “CAM quacks” harming and violating their patients and biomedical doctors saving them with new drugs and biochemical discoveries, so that biomedicine and the pharmaceutical industry will stay in power.

Interestingly, it seems that the pharmaceutical industry has found an ingenious solution to the threat from complementary and holistic medicine: *Directing whom the public health care system will investigate*. The process can be small and invisible for the public with some accusations of violations, medical errors, and harm done to a patient, making the health authorities look into the practice of the CAM researcher or therapist, finding all the things that can be criticized, especially all the things that deviate from “biomedical standard treatment.” The publicly employed medical experts that evaluate a controversial CAM research or treatment are normally biomedical doctors, often biomedical psychiatrists with a collective, close link to the pharmaceutical industry and no understanding of or sympathy for CAM. The CAM-practicing physician will therefore end up being blamed in public for not treating correctly according to standard. The political system, which is under severe pressure from the biomedical pharmaceutical lobby, often accepts “preponderance of evidence” against the

CAM therapist and finds him guilty. In the recent period, when these cases have been brought in front of the court system (not the medical system) with demands of “clear and convincing evidence,” then the CAM therapist is almost always found not guilty (11).

Witch hunting in the media

Often, the CAM opponents are using the media to obtain the intended public investigation. Most often, biomedical physicians, again often psychiatrists, go to the media with severe accusations of sexual and violent abuse, horrible errors and serious harm done by the CAM therapist.

If the media buy into the story, which they are likely to do as sex, violence and news connected to medicine attracts enormous attention and sells newspapers more than anything else, afterwards the public health authorities are politically motivated to engage and demonstrate strength and efficiency by attacking the CAM therapist, taking license, etc. Often, “leaks” to the media will bring a continuous flow of hot stories about the “bad” doctors/therapists. As soon as a CAM therapist is brought in this position, his patients lose faith and confidence and often they start re-interpreting what actually happened in the clinic and can even complain, in spite of feeling helped and completely satisfied with the treatment only yesterday. A strong wish to distance them and to get rid of an embarrassing association with the “CAM witch” often makes them terminate their treatments and change their opinions of the CAM therapist. This is a normal psychological mechanism; we know from the New Testament that even the disciples of Jesus repudiated him when he was caught by the Romans to be crucified. Even in the unlikely case that the CAM therapist is a true saint, a strong negative campaign in the media will still make him look like a criminal.

So the strong negative, evil-intended exposure of the CAM therapist, most often with fabricated evidences and untrue accusations, will destroy the CAM therapist’s practice. The national health authorities could save a good doctor by investigating the case that has brought to attention in the media, and telling everybody what they found out; but this is not how it works. It seems the reality around a government is too politically and financially motivated to be guided primarily by truth and honesty. Instead of investigating the actual case, the public organs normally start to investigate the CAM therapist himself.

They normally go through all his case records, many hundreds of them, to see if he has done some errors in the past. Often, this investigation goes back for many years. And the criteria for an error is seldom that a patient was harmed, or not helped; even if every single patient is helped and perfectly satisfied, the CAM physician will be blamed that he is not treating according to normal biomedical standard. The patients who start complaining will win their cases just because of this, in spite of knowing what treatment they originally accepted and in spite of this treatment actually helping them.

Most sadly, as soon as the CAM therapist is seen as a non-healing and a destructive, harmful therapist, much of the therapeutic gain is actively destroyed by the patients, to disengage and distance himself or herself from the therapist. So many hours and years of good therapeutic work with the patients can be wasted in a single evil campaign. Non-drug intervention is always using the placebo effect (12), and the placebo effect is as strong, just reversed. So the patients can easily destroy their therapeutic gains. The double fork-attack by

the media and the public health authorities are mutually reinforcing each other, making life a true hell for the CAM therapist, who can literally lose everything in a few days or weeks.

CAM therapists who experience this are often forced to flee their own countries, and in practice, almost all basic human rights are seriously violated (1,11, see also appendix). It is worth underlining that it is the national health authorities that have the faith of the citizens, as it is normally expected that these national organs are there for the sake of the citizens. Everybody knows of course that the boulevard press or media are living from lies about sex, violence and all evil. So the responsibility for the massive violation of the human rights of the CAM therapists is with the national health authorities.

Witch burning/hunting of the CAM therapists is a social phenomenon fuelled by a combination of several strong interests in society: The people want entertainment, and this must be about sex, violence, abuse, failure, etc. The “evil doctor” abusing his patients is one of the archetypical stories that never stops entertaining. The media makes lots of money on twisting reality and adding sex and violence to the stories, and the best stories are about people intending to do good but instead being sexually violent or abusive.

CAM therapy is strongly provocative as it is body and sex positive, believing strongly in the healing powers of nature. It has lots of enemies, like the pharmaceutical companies, the biomedical physicians, conservative people in power positions, etc. Witch burning of CAM therapists often involves politicians taking a free ride to exploit the situation and gain political position and power. This often leads to strong activation of public health organizations to investigate and even arrest the CAM therapist and a strong motivation to “safe the patients” by proving his guilt. Often, this process creates its own evidence against the CAM therapists, very much like the famous processes against the witches.

In the process of being torched as a witch, the CAM therapist often loses all human rights, all material and intellectual properties, and his family/friends are often also prosecuted, making it impossible for him to stay in his own country. He often ends up like a refugee who cannot even live and practice his CAM therapy in the neighbouring countries.

Even if the CAM therapist in the end of the process wins in the court of law and all accusations turn out to be false, he will often have lost everything, because of his bad public standing. It is most problematic that witch burning seems to be systematically used as a weapon against the CAM therapists in processes started all over the world by powerful organizations like the Quackwatch, with 130 employees seemingly being used by the pharmaceutical industry (11). It is therefore important that every person professionally involved in health and justice understands the mechanism of witch burning to avoid participating in it.

What should be done?

To prevent the national health authorities violating the basic human rights of the CAM therapist and destroying good therapists that the country desperately needs and hindering the development of medicine into a more efficient, more holistic, and less harmful medicine, it is absolutely necessary that:

1. The national authority only investigates the actual case or complaint and only when this is substantiated by facts – “clear and convincing evidence,” and not by

- “preponderance of evidence.” If it is substantiated, then there is a reason to investigate the general practice of the CAM therapists.
2. All investigations should be done in absolute confidentiality regarding the public and the media and in complete openness regarding the CAM therapist, who must be heard before any decision regarding the (mal)treatment is made.
 3. Educated experts in CAM, not biomedical experts and psychiatrists, must do the investigation. In Europe, for example, we have the Master’s of Science in complementary, psychosocial and integrative medicine at the Interuniversity College in Graz based on a dedicated and long CAM practice.
 4. As non-drug therapy always uses placebo, shift in consciousness and implanted philosophy of life (13), and so far we do not have a developed science of consciousness, the actual treatment must be judged only from its results, not from its scientific or unscientific basis. Holy madness, crazy wisdom, etc. might be highly efficient, but un-scientific (14). Obvious evil behaviour can be a tool, as traumas from evil acts, according the principle of similarity, can only be healed by the repetition (in a smaller scale) of the evil act (2,3,4,15,16). The CAM therapist acting “evil,” or saying “evil things” (example: Yalom) (17) can and will be a part of holistic existential therapy.
 5. When the results of a non-drug CAM treatment are investigated, it is worth remembering that side effects are almost nonpresent in CAM therapy without violent or sexual abuse (18), and if these two aspects are involved, this is clearly a police matter. As in psychiatry, coercive persuasion is often used in CAM; in CAM, this normally happens after consent and mutual agreement, in contrast to the coercive treatment in psychiatry. The signs of coercive persuasion, or “brainwashing” is “feeling of guilt, dependency, low self-esteem, worthlessness, anxiety and hopelessness in vulnerable individuals” (19), severe reduction of autonomy, and in the most extreme cases, suicide (20-23). Without these signs, coercive persuasion is not likely to have happened. Implanted memories of, for example incest, can be very harmful to the patient’s social and family life; this can be a product of coercive persuasion but is more likely to be a symptom of a sexually related personality disorder (13).
 6. When damage is obviously present, as in suicide, it must be considered that a substantial number of psychiatric patients commit suicide, with several percent doing it during admission to a mental institution, and several more percent doing it after admission (24). Only when the therapist obviously has failed the patient is it fair to blame him for this. If the patient becomes psychotic, it will often be a brief reactive psychosis with full recovery in a few days or weeks (18). This is a rare state that some patients spontaneously enter often without being provoked at all, so it is not fair to consider this an inflicted damage. We know that the use of the placebo effect often has some minor, temporary adverse effects in a few percent of the patients; this is not to be considered as harm.
 7. Sexual abuse can in therapy happen in spite of consent, as its per definition is abuse when a physician/therapist has sex with a patient (25,26). It is important to notice that sex means coitus, cunnilingus or felatio, or the patient for any reason touching the therapist’s naked genitals. If these kinds of sexual behaviour are not present, the patient has not been sexually abused (27). The reason for this strict definition is the

need for the physician to be able to talk freely about sexuality and to use all available, gynaecological procedures and all sexological tools, including bodywork to help his patient.

8. Information and consent: The patient can be deceived by false information and false promises, which is a serious violation of good CAM practice. A non-drug intervention is either talk or bodywork, and neither of these needs special information or consent. If an orifice is penetrated digitally or with an instrument, consent is always needed.
9. Research in non-drug therapy is always allowed and encouraged; data that can reveal the identity of the patient cannot be shared. Quality assurance is best done with a validated questionnaire on quality of life and self-assessed health (i.e., QOL5 (28)), before, after and a year after treatment (28)
10. The ethical code can also be violated in spite of no harm done. We strongly recommend the ethical code of the International Society for Holistic Health (26).

Conclusion

In conclusion, non-drug therapy without coercion or coercive persuasion and without sexual abuse is not dangerous or harmful (18). Therefore, it is wise for any national health authority to expect that this is an evil-intended campaign and not the truth when it comes to a CAM therapist being blamed of harming a patient, especially if this comes from his biomedical colleagues or an organization in any way related to the pharmaceutical industry. In the case of a CAM therapist being accused, as well as in all other cases, the CAM therapist is innocent until proven guilty. The media can often destroy a CAM therapist's clinical practice and the therapeutic gains of his patients and raise doubts about his methods, in a few days, and even make satisfied patients complain.

There should be laws against that but such are difficult to have in a country with free speech. But the national authorities that have the trust of the people should under no circumstances engage in such evil-intended campaign. The national authorities should do their very best not to share any suspicions with the public and only announce faults and harm when they are certain to have happened. It is extremely important that governments and their organizations and employees keep clear of every connection to the pharmaceutical industry, financially or otherwise. Only when experts in CAM are evaluating other CAM therapists can the evaluation be fair. This does not mean that acupuncturists must evaluate acupuncturists, but the evaluating person must be both a trained CAM therapist and scientifically trained in the healing principles of CAM.

Appendix

Frequent violations of the human rights of CAM physicians and CAM therapists following from prosecution by a national health authority when provoked by biomedical opposition. *Universal Declaration of Human Rights Adopted and proclaimed by General Assembly resolution 217 A (III) of 10 December 1948* On December 10, 1948, the General Assembly of

the United Nations adopted and proclaimed the Universal Declaration of Human Rights. The National Health Authorities' participation in the biomedical physicians and pharmaceutical industries "witch burning" of CAM physicians are causing the government to violate almost all the physician's human rights. We will give examples of this in the following.

Article 1. All human beings are born free and equal in dignity and rights. They are endowed with reason and conscience and should act towards one another in a spirit of brotherhood. *Comment:* Starting an investigation of a CAM physician who is being accused of harming a patient, without first establishing certain knowledge of the nature and extent of the possible harm, is violating the CAM physician's fundamental rights of being treated equally to other doctors and with dignity. This is not done in a spirit of brotherhood but in a spirit of going for a criminal, even before it is known if the accusations are in any way true.

Article 2. Everyone is entitled to all the rights and freedoms set forth in this Declaration, without distinction of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status. Furthermore, no distinction shall be made on the basis of the political, jurisdictional or international status of the country or territory to which a person belongs, whether it be independent, trust, nonself-governing or under any other limitation of sovereignty. *Comment:* The low status of a CAM physician just being accused of quackery and harm of patients is being used against him.

Article 3. Everyone has the right to life, liberty and security of person. *Comment:* That the Health Authorities acts before it is established, if the patient has been harmed or violated in any way, seriously deprives the CAM physician of his liberty and security; the process of witch hunting puts the CAM physician in a position where his fundamental liberty and security is completely gone, and the government engaging in that is putting the CAM doctor though an experience very similar to torture, and many CAM therapists end up broken and unable to work, very much like victims of torture.

Article 4. No one shall be held in slavery or servitude; slavery and the slave trade shall be prohibited in all their forms. *Comment:* The persecuted CAM therapist is often reduced to a position where he would be better off as slave, and he often ends up abandoning his own country.

Article 5. No one shall be subjected to torture or to cruel, inhuman or degrading treatment or punishment. *Comment:* The treatment by a national health authority engaging in and by this act justifying the "witch burning" is extremely cruel, inhuman and degrading indeed. When quality of life is very low, suicide can be a rational act, and if the CAM physician commits suicide during a campaign partly run by a national authority, this authority is partly responsible for the suicide.

Article 6. Everyone has the right to recognition everywhere as a person before the law. *Comment:* "Witch burning" of a CAM physician is in effect similar to severe physical, invalidating harm and even murder in some cases and should be considered similar to that by law.

Article 7. All are equal before the law and are entitled without any discrimination to equal protection of the law. All are entitled to equal protection against any discrimination in violation of this Declaration and against any incitement to such discrimination. *Comment:* The treatment of the CAM physician by the health authorities, as if he were bad or evil because of his preference for CAM instead of biomedicine, is discrimination per se.

Article 8. Everyone has the right to an effective remedy by the competent national tribunals for acts violating the fundamental rights granted him by the constitution or by law.

Comment: The national health authorities should protect CAM physicians from encroachment not participate in them.

Article 9. No one shall be subjected to arbitrary arrest, detention or exile. *Comment:* The social status of a “witch-burned” CAM physician is similar to an arrested or exiled citizen.

Article 10. Everyone is entitled in full equality to a fair and public hearing by an independent and impartial tribunal, in the determination of his rights and obligations and of any criminal charge against him. *Comment:* When the national health authorities are making up the evidence against the CAM physician, the tribunal becomes anything but impartial.

Article 11. (1) Everyone charged with a penal offence has the right to be presumed innocent until proved guilty according to law in a public trial at which he has had all the guarantees necessary for his defence. (2) No one shall be held guilty of any penal offence on account of any act or omission, which did not constitute a penal offence, under national or international law, at the time when it was committed. Nor shall a heavier penalty be imposed than the one that was applicable at the time the penal offence was committed. *Comment:* By participating in the public witch burning of the CAM physician, the national health authorities do NOT presume the CAM therapist innocent; this violates Article 11(1). As the evidence created by the health authorities are often used in the court against the CAM physician, the trial is not fair at all.

Article 12. No one shall be subjected to arbitrary interference with his privacy, family, home or correspondence or to attacks upon his honour and reputation. Everyone has the right to the protection of the law against such interference or attacks. *Comment:* The national health authority should work actively against the attacks on CAM physician’s honour and reputation not participate in it.

Article 13. (1) Everyone has the right to freedom of movement and residence within the borders of each state. (2) Everyone has the right to leave any country, including his own, and to return to his country. *Comment:* Returning to one’s country is often impossible for the torched CAM physician.

Article 14. (1) Everyone has the right to seek and to enjoy in other countries asylum from persecution. (2) This right may not be invoked in the case of prosecutions genuinely arising from non-political crimes or from acts contrary to the purposes and principles of the United Nations. 197 *Comment:* When the CAM physician seeks asylum in another country, the witch burning often starts all over again.

Article 15. (1) Everyone has the right to a nationality. (2) No one shall be arbitrarily deprived of his nationality nor denied the right to change his nationality. *Comment:* The witch burning can deprive the CAM physician his nationality.

Article 16. (1) Men and women of full age, without any limitation due to race, nationality or religion, have the right to marry and to found a family. They are entitled to equal rights as to marriage, during marriage and at its dissolution. (2) Marriage shall be entered into only with the free and full consent of the intending spouses. (3) The family is the natural and fundamental group unit of society and is entitled to protection by society and the State. *Comment:* By false accusation of harmful behaviour and sexual abuse in the witch burning process, the CAM physician’s family life is often violated; when the national health authorities participate in the witch burning, they become guilty of violating article 16.

Article 17. (1) Everyone has the right to own property alone as well as in association with others. (2) No one shall be arbitrarily deprived of his property. *Comment:* The process of

witch burning often deprives the CAM therapist all his property, as he cannot make a living anymore and thus loses everything if he chooses to stay in his own country.

Article 18. Everyone has the right to freedom of thought, conscience and religion; this right includes freedom to change his religion or belief, and freedom, either alone or in community with others and in public or private, to manifest his religion or belief in teaching, practice, worship and observance. *Comment:* When the CAM therapist is forced to abandon his CAM practice because of not conforming to or believing in biomedicine, this is a violation of article 18.

Article 19. Everyone has the right to freedom of opinion and expression; this right includes freedom to hold opinions without interference and to seek, receive and impart information and ideas through any media and regardless of frontiers. *Comment:* When the hearing of the CAM physician is not correct and sufficient, and when the answers are not taken into consideration, this is a violation of article 19.

Article 20. (1) Everyone has the right to freedom of peaceful assembly and association. (2) No one may be compelled to belong to an association. *Comment:* It is when the physician chooses to become CAM therapist instead of belonging to the biomedical society that he is torched.

Article 21. (1) Everyone has the right to take part in the government of his country, directly or through freely chosen representatives. (2) Everyone has the right of equal access to public service in his country. (3) The will of the people shall be the basis of the authority of government; this will shall be expressed in periodic and genuine elections, which shall be by universal and equal suffrage and shall be held by secret vote or by equivalent free voting procedures. *Comment:* When the CAM physician is given a bad reputation in society, his political career is ruined.

Article 22. Everyone, as a member of society, has the right to social security and is entitled to realization, through national effort and international cooperation and in accordance with the organization and resources of each State, of the economic, social and cultural rights indispensable for his dignity and the free development of his personality. *Comment:* The witch burning deprives the CAM therapist of his dignity and often also his possibilities for personal development (the money necessary for therapy, etc.).

Article 23. (1) Everyone has the right to work, to free choice of employment, to just and favourable conditions of work and to protection against unemployment. (2) Everyone, without any discrimination, has the right to equal pay for equal work. (3) Everyone who works has the right to just and favourable remuneration ensuring for himself and his family an existence worthy of human dignity, and supplemented, if necessary, by other means of social protection. (4)

Everyone has the right to form and to join trade unions for the protection of his interests. *Comment:* The process of witch burning most often deprives the CAM therapist of his work and income; after the process, he will often only earn a fraction per hour of what he earned before. If he did research, he will often be deprived of his funding. The process will almost always burden his family and often lead to family break-up. His children will often have severe disadvantages from his poor social standing, like the other kids will not be allowed to come in the home, etc. His company and trade unions will almost often be compromised.

Article 24. Everyone has the right to rest and leisure, including reasonable limitation of working hours and periodic holidays with pay. *Comment:* The process of witch burning most

often deprives the CAM therapist all rest and reduces leisure significantly; money for holidays, etc., are often short.

Article 25. (1) Everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, clothing, housing and medical care and necessary social services, and the right to security in the event of unemployment, sickness, disability, widowhood, old age or other lack of livelihood in circumstances beyond his control. (2) Motherhood and childhood are entitled to special care and assistance. All children, whether born in or out of wedlock, shall enjoy the same social protection. *Comment:* The witch burning often completely deprives the CAM therapist of his standard of living, and very often he will become sick from the pressure, prosecution and lack of sense of coherence with his society. Friends and colleagues will often turn their backs on him.

Article 26. (1) Everyone has the right to education. Education shall be free, at least in the elementary and fundamental stages. Elementary education shall be compulsory. Technical and professional education shall be made generally available, and higher education shall be equally accessible to all on the basis of merit. (2) Education shall be directed to the full development of the human personality and to the strengthening of respect for human rights and fundamental freedoms.

It shall promote understanding, tolerance and friendship among all nations, racial or religious groups and shall further the activities of the United Nations for the maintenance of peace.

(3) Parents have a prior right to choose the kind of education that shall be given to their children. *Comment:* The CAM therapist will normally lose the value of his education or therapeutic training, as he often will lose his license and/or ability to practice.

Article 27. (1) Everyone has the right freely to participate in the cultural life of the community, to enjoy the arts and to share in scientific advancement and its benefits. (2) Everyone has the right to the protection of the moral and material interests resulting from any scientific, literary or artistic production of which he is the author. *Comment:* The witch burning process normally deprives the CAM therapist of his free participation in society and his scientific, etc., production is often losing its value as his name is ruined.

Article 28. Everyone is entitled to a social and international order in which the rights and freedoms set forth in this Declaration can be fully realized. *Comment:* The witch burning destroys the social order around the CAM therapist.

Article 29. (1) Everyone has duties to the community in which alone the free and full development of his personality is possible. (2) In the exercise of his rights and freedoms, everyone shall be subject only to such limitations as are determined by law solely for the purpose of securing due recognition and respect for the rights and freedoms of others and of meeting the just requirements of morality, public order and the general welfare in a democratic society.

(3) These rights and freedoms may in no case be exercised contrary to the purposes and principles of the United Nations. *Comment:* The witch burning process deprives the CAM therapist of his possibilities to exercise most of his formal rights and freedoms.

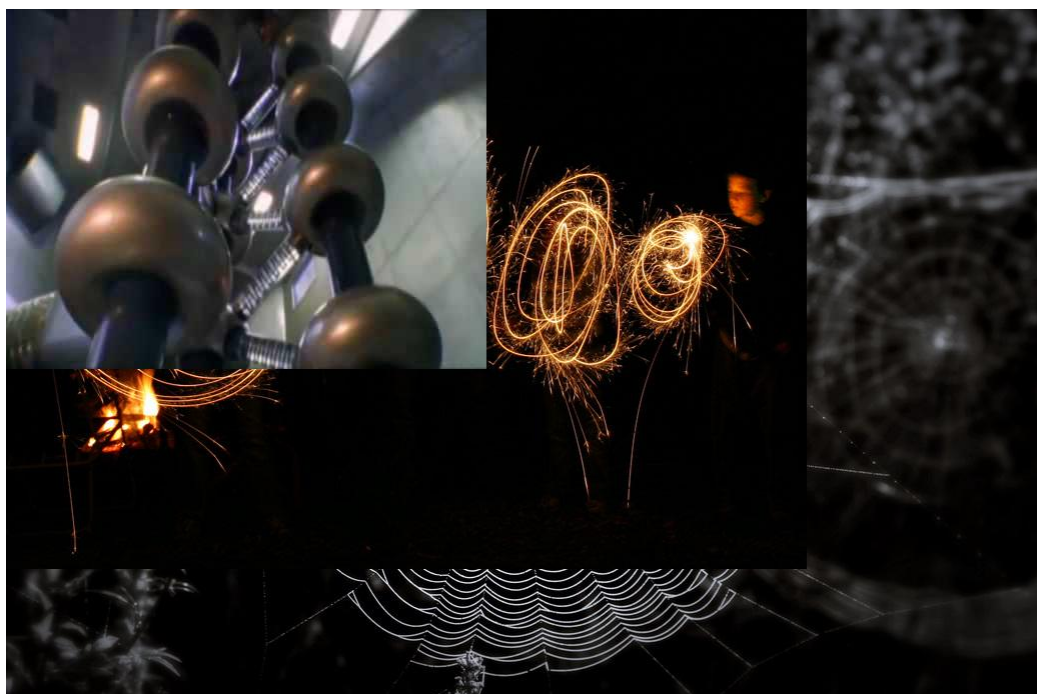
Article 30. Nothing in this Declaration may be interpreted as implying for any State, group or person any right to engage in any activity or to perform any act aimed at the destruction of any of the rights and freedoms set forth herein. *Comment:* Unfortunately, the State often plays the most central role in the witch burning of the CAM therapists.

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Section 4: Acknowledgments



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International review board

This book is written by Søren Ventegodt and Joav Merrick and is the result of more than ten years of work together, but it also is an international collaboration with a group of very special people with whom we have published many papers. This book project (a total of six books on mind-body medicine) has been a tremendous effort, and we have been guided, helped and supported by a group of international collaborators and colleagues. These busy academics and clinicians have given of their time and expertise to advise us, so we wish to acknowledge their incredible support and friendship in this endeavor.

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About the Quality of Life Research Center in Copenhagen, Denmark

The Quality of Life Research Center in Copenhagen was established in 1989, when the physician Søren Ventegodt succeeded in getting a collaboration started with the Department of Social Medicine at the University of Copenhagen in response to the project “Quality of life and causes of disease.” An interdisciplinary “Working group for the quality of life in Copenhagen” was established, and when funds were raised in 1991, the University Hospital of Copenhagen (Rigshospitalet) opened its doors for the project.

The main task was a comprehensive follow-up of 9,006 pregnancies and the children delivered during 1959-61. This Copenhagen Perinatal Birth Cohort was established by the a gynecologist and a pediatrician, the late Aage Villumsen, MD, PhD and the late Bengt Zachau-Christiansen, MD, PhD, who had made intensive studies during pregnancy, early childhood and young adulthood. The cohort was during 1980-1989, directed by the pediatrician Joav Merrick, MD, DMSc, who established the Prospective Pediatric Research Unit at the University Hospital of Copenhagen and managed to update the cohort for further follow-up register research, until he moved to Israel. The focus was to study quality of life related to socio-economic status and health in order to compare with the data collected during pregnancy, delivery and early childhood.

The project continued to grow, and later in 1993, the work was organized into a statistics group, a software group that developed the computer programs for use in the data entry and a group responsible for analysis of the data.

Quality of Life Research Center at the University Medical Center

The Quality of Life Center at the University Hospital generated grants, publicity with research and discussions among the professionals leading to the claim that quality of life was significant for health and disease. It is obvious that a single person cannot do much about his/her own disease, if it is caused by chemical defects in the body or outside chemical-physical influences. However, if a substantial part of diseases are caused by a low quality of

life, we can all prevent a lot of disease and operate as our own physicians, if we make a personal effort and work to improve our quality of life. A series of investigations showed that this was indeed possible. This view of the role of personal responsibility for illness and health would naturally lead to a radical re-consideration of the role of the physician and also influence our society.

Independent Quality of Life Research Center

In 1994, The Quality of Life Research Center became an independent institution located in the center of the old Copenhagen. Today, the number of full-time employees has grown. The Research Center is still expanding, and several companies and numerous institutions make use of the resources, such as lectures, courses, consulting or contract research. The companies, which have used the competence of the research center and its tools on quality of life and quality of working life, include IBM, Lego, several banks, a number of counties, municipalities, several ministries, The National Defense Center for Leadership and many other management-training institutions, along with more than 300 public and private companies. It started in Denmark but has expanded to involve the whole Scandinavian area.

The center's research on the quality of life has been through several phases on measurement of quality of life, from theory to practice over several projects on the quality of life in Denmark, which have been published and received extended public coverage and public impact in Denmark and Scandinavia. The data is now also an important part of Veenhoven's Database on Happiness at Rotterdam University in the Netherlands.

New research

Since The Quality of Life Research Center became independent, a number of new research projects were launched. One was a project that aimed to prevent illness and social problems among the elderly in one of the municipalities by inspiring the elderly to improve their quality of life themselves. Another was a project about quality of life after apoplectic attacks at one of the major hospitals in Copenhagen, and the Danish Agency for Industry granted funds for a project about the quality of work life.

Quality of life of 10,000 Danes

There is a general consensus that many of the diseases that plague the Western world (which are not the result of external factors such as starvation, microorganisms, infection or genetic defects) are lifestyle related and as such, preventable through lifestyle changes. Thus, increasing time and effort is spent on developing public health strategies to promote "healthy" lifestyles. However, it is not a simple task to identify and dispel the negative and unhealthy parts of our modern lifestyle even with numerous behavioural factors that can be readily highlighted harmful, like the use of alcohol, use of tobacco, the lack of regular exercise and a

high-fat, low-fibre diet. However, there is more to Western culture and lifestyle than these factors, and if we only focus on them we can risk overlooking others. We refer to other large parts of our life, for instance the way we think about and perceive life (our life attitudes, our perception of reality and our quality of life) and the degree of happiness we experience through the different dimensions of our existence. These factors or dimensions can now, to some degree, be isolated and examined. The medical sociologist Aaron Antonovsky (1923-1994) from the Faculty of Health Sciences at Ben Gurion University in Beer-Sheva, who developed the salutogenic model of health and illness, discussed the dimension, “sense of coherence,” which is closely related to the dimension of “life meaning,” as perhaps the deepest and most important dimension of quality of life. Typically, the clinician or researcher, when attempting to reveal a connection between health and a certain factor, sides with only one of the possible dimensions stated above. A simple, one-dimensional hypothesis is then postulated, like, for instance, that cholesterol is harmful to circulation. Cholesterol levels are then measured, manipulated and ensuing changes to circulatory function monitored. The subsequent result may show a significant, though small connection, which supports the initial hypothesis and in turn becomes the basis for implementing preventive measures, like a change of diet. The multifactorial dimension is therefore often overlooked.

In order to investigate this multifactorial dimension a cross-sectional survey examining close to 10,000 Danes was undertaken in order to investigate the connection between lifestyle, quality of life and health status by way of a questionnaire-based survey. The questionnaire was mailed in February 1993, to 2,460 persons aged between 18-88, randomly selected from the CPR (Danish Central Register) and 7,222 persons from the Copenhagen Perinatal Birth Cohort 1959-61.

A total of 1,501 persons between the ages 18-88 years and 4,626 persons between the ages 31-33 years returned the questionnaire (response rates 61.0% and 64.1%, respectively). The results showed that health had a stronger correlation to quality of life ($r=0.5$, $p<0.0001$), than it had to lifestyle ($r=0.2$, $p<0.0001$).

It was concluded that preventable diseases could be more effectively handled through a concentrated effort to improve quality of life rather than through an approach that focus solely on the factors that are traditionally seen to reflect an unhealthy life style.

Collaborations across borders

The project has been developed during several phases. The first phase, 1980-1990, was about mapping the medical systems of the pre-modern cultures of the world, understanding their philosophies and practices and merging this knowledge with Western biomedicine. A huge task seemingly successfully accomplished in the Quality of Life (QOL) theories, and the QOL philosophy, and the most recent theories of existence, explaining the human nature, and especially the hidden resources of man, their nature, their location in human existence and the way to approach them through human consciousness.

Søren Ventegodt visited several countries around the globe in the late 1980s, and analysed about ten pre-modern medical systems and a dozen shamans, shangomas and spiritual leaders, noticing most surprisingly similarities, allowing him together with about 20 colleagues at the QOL Study Group at the University of Copenhagen, to model the

connection between QOL and health. This model was later further developed and represented in the integrative QOL theories and a number of publications. Based on this philosophical breakthrough, the Quality of Life Research Center was established at the University Hospital. Here, a broad cooperation took place with many interested physicians and nurses from the hospital.

A QOL conference in 1993, with more than 100 scientific participants, discussed the connection between QOL and the development of disease and its prevention. Four physicians collaborated on the QOL population survey 1993. For the next ten years, the difficult task of integrating biomedicine and the traditional medicine went on, and Søren Ventegodt again visited several centers and scientists at the Universities of New York, Berkeley, Stanford and other institutions. He also met people like David Spiegel, Dean Ornish, Louise Hay, Dalai Lama and many other leading persons in the field of holistic medicine and spirituality.

Around the year 2000, an international scientific network started to take form with an intense collaboration with the National Institute of Child Health and Human Development (NICHD) in Israel, which has now developed the concept of “Holistic Medicine.” We believe that the trained physician today has three medical toolboxes: the manual medicine (traditional), the biomedicine (with drugs and pharmacology) and the consciousness-based medicine (scientific, holistic medicine). What is extremely interesting is that most diseases can be alleviated with all three sets of medical tools, but only the biomedical toolset is highly expensive. The physician, using his hands and his consciousness to improve the health of the patient by mobilising hidden resources in the patient, can use his skills in any cultural setting, rich or poor.

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About the National Institute of Child Health and Human Development in Israel

The National Institute of Child Health and Human Development (NICHD) in Israel was established in 1998, as a virtual institute under the auspices of the Medical Director, Ministry of Social Affairs and Social Services in order to function as the research arm for the Office of the Medical Director. In 1998, the National Council for Child Health and Pediatrics, Ministry of Health and in 1999, the Director General and Deputy Director General of the Ministry of Health endorsed the establishment of the NICHD. In 2011, the NICHD became affiliated with the Division of Pediatrics, Hadassah Hebrew University Medical Center, Mt. Scopus Campus in Jerusalem.

Mission

The mission of a National Institute for Child Health and Human Development in Israel is to provide an academic focal point for the scholarly interdisciplinary study of child life, health, public health, welfare, disability, rehabilitation, intellectual disability and related aspects of human development. This mission includes research, teaching, clinical work, information and public service activities in the field of child health and human development.

Service and academic activities

Over the years, many activities became focused in the south of Israel due to collaboration with various professionals at the Faculty of Health Sciences (FOHS) at the Ben Gurion University of the Negev (BGU). Since 2000, an affiliation with the Zusman Child Development Center at the Pediatric Division of Soroka University Medical Center has resulted in collaboration around the establishment of the Down Syndrome Clinic at that center. In 2002, a full course on “Disability” was established at the Recanati School for Allied Professions in the Community, FOHS, BGU, and in 2005, collaboration was started with the

Primary Care Unit of the faculty and disability became part of the master of public health course on “Children and society.” In the academic year 2005-2006, a one-semester course on “Aging with disability” was started as part of the Master of Science program in gerontology in our collaboration with the Center for Multidisciplinary Research in Aging. In 2010, collaborations began with the Division of Pediatrics, Hadassah Medical Center, Hebrew University, Jerusalem, Israel.

Research activities

The affiliated staff have over the years published work from projects and research activities in this national and international collaboration. In the year 2000, the *International Journal of Adolescent Medicine and Health* and in 2005, the *International Journal on Disability and Human Development* of De Gruyter Publishing House (Berlin and New York), in the year 2003, the *TSW-Child Health and Human Development* and in 2006, the *TSW-Holistic Health and Medicine of the Scientific World Journal* (New York and Kirkkonummi, Finland), all peer-reviewed international journals, were affiliated with the National Institute of Child Health and Human Development. From 2008, also the *International Journal of Child Health and Human Development* (Nova Science, New York), the *International Journal of Child and Adolescent Health* (Nova Science) and the *Journal of Pain Management* (Nova Science) affiliated and from 2009, the *International Public Health Journal* (Nova Science) and *Journal of Alternative Medicine Research* (Nova Science).

National collaborations

Nationally, the NICHD works in collaboration with the Faculty of Health Sciences, Ben Gurion University of the Negev; Department of Physical Therapy, Sackler School of Medicine, Tel Aviv University; Autism Center, Assaf HaRofeh Medical Center; National Rett and PKU Centers at Chaim Sheba Medical Center, Tel HaShomer; Department of Physiotherapy, Haifa University; Department of Education, Bar Ilan University, Ramat Gan, Faculty of Social Sciences and Health Sciences; College of Judea and Samaria in Ariel, and in 2011, affiliation with Center for Pediatric Chronic Diseases and Center for Down Syndrome, Department of Pediatrics, Hadassah-Hebrew University Medical Center, Mount Scopus Campus, Jerusalem.

International collaborations

Internationally, with the Department of Disability and Human Development, College of Applied Health Sciences, University of Illinois at Chicago; Strong Center for Developmental Disabilities, Golisano Children's Hospital at Strong, University of Rochester School of Medicine and Dentistry, New York; Centre on Intellectual Disabilities, University of Albany, New York; Centre for Chronic Disease Prevention and Control, Health Canada, Ottawa;

Chandler Medical Center and Children's Hospital, Kentucky Children's Hospital, Section of Adolescent Medicine, University of Kentucky, Lexington; Chronic Disease Prevention and Control Research Center, Baylor College of Medicine, Houston, Texas; Division of Neuroscience, Department of Psychiatry, Columbia University, New York; Institute for the Study of Disadvantage and Disability, Atlanta; Center for Autism and Related Disorders, Department Psychiatry, Children's Hospital Boston, Boston; Department of Paediatrics, Child Health and Adolescent Medicine, Children's Hospital at Westmead, Westmead, Australia; International Centre for the Study of Occupational and Mental Health, Düsseldorf, Germany; Centre for Advanced Studies in Nursing, Department of General Practice and Primary Care, University of Aberdeen, Aberdeen, United Kingdom; Quality of Life Research Center, Copenhagen, Denmark; Nordic School of Public Health, Gottenburg, Sweden, Scandinavian Institute of Quality of Working Life, Oslo, Norway; Centre for Quality of Life of the Hong Kong Institute of Asia-Pacific Studies and School of Social Work, Chinese University, Hong Kong.

Targets

Our focus is on research, international collaborations, clinical work, teaching and policy in health, disability and human development and to establish the NICHD as a permanent institute at one of the residential care centers for persons with intellectual disabilities in Israel in order to conduct model research and together with the four university schools of public health/medicine in Israel to establish a national Master's and Doctoral program in disability and human development at the institute to secure the next generation of professionals working in this often non-prestigious/low-status field of work.

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