The Mind Body Problem: Philosophical and Cognitive Theories and their Relevance for Medicine

I. Introduction:

Concepts of illness and body image as they relate to health are constantly shifting, incorporating older ideas from rediscovered ancient health traditions and newer ideas often introduced by medical and scientific discoveries about the body. The germ theory strongly influenced notions of hygiene in protecting oneself from external invaders in the 1940s. Later the changing biomedical understanding about the role of the immune system shifted the focus from the outside to what was happening on the inside with a marked interest in nutrition, vitamins, and trace minerals as immune modulating factors and agents (Martin 1994). The late 20th century is best regarded as the molecular age of clinical medicine. The ongoing scientific advances provided detailed and precise knowledge of the workings of the human body at the molecular level. Most recently much progress has been made in the field of neuroscience in regard to the structural aspects of the brain and its function. The developments in neurocognitive imagery (fMRI, PET, EEG and the like) have made some of the workings of the brain accessible to observation. With increasingly detailed knowledge of the brain's activities it looks like science will help us understand the biological pathways through which environmental and social factors have their effects on the body. Even if much of the boundaries between the physiological and the cognitive remain elusive, increasing understanding of the brain's functions help us answer some of the problems posed by the mind-body problem.

II. Definition of consciousness and the mind-body problem

The definition of the term consciousness is difficult and lay people and scientists currently use the term with several distinct meanings. A dictionary definition is that consciousness is the awareness of one's surroundings, of one's situation, and of one's thoughts and feelings (Onions, 1962). Similarly Solso (2001) defines consciousness as the awareness of environmental (e.g. sounds) and cognitive events (e.g. memories, thoughts, feelings, and bodily sensations). These definitions are no doubt adequate for daily purposes. Nevertheless, the definitions shed no light on the question of where this awareness is being registered. There exists no consciousness monitor. No technology is able to detect the physical signs of the presence of consciousness in a patient. Nobody knows what exactly is to be measured. Anesthesiologists struggle with surgical patients that experience some sort of consciousness under general anesthesia. The phenomenon of consciousness does not have clear cut boundaries and the medical field has no established consensus as to what should count as the criteria of consciousness. The problem of consciousness evolves on two separate levels. Consciousness stimulates ontological questions regarding the nature of consciousness. Is the mystery essentially a result of a commitment to a materialist/naturalist framework and requires the recognition of an immaterial realm? It further asks epistemological questions regarding our means to address the questions. Is the mystery residing in our lack of knowledge and cognitive abilities? Some scientists argue that we as humans will remain 'cognitively closed' to understanding the nature of the process of how the brain generates consciousness (Mc.Ginn 1989). Most researchers agree that there is some 'explanatory gap' (Levine 1983) comprised in the mind-body problem and the definition of consciousness. What is controversial is whether there is just a lack of epistemological understanding or also a deeper ontological lesson that needs to be drawn from it.

The problem that makes it difficult to explore consciousness is called the mind-body problem: How do mental experiences cause physical actions or how exactly do brain processes cause conscious states and how exactly are those states realized in brain structures (Solso 2001; Searle 2000). In our experience we seem to occupy two worlds. The world of the body and physical reality with its material and mechanistic (physicalistic) properties, and the world of the mind with its mental or cognitive properties. Many neuroscientists and philosophers have struggled with this issue at length. In general, their solutions fall into one of the following two ontological categories.

1. Dualism or dualistic interactionism

Dualism holds that mind is something altogether different from the natural world. The brain is completely different from mind and consciousness will remain a mystery in a materialist ontology. Mind is numerically and ontologically (in reality) different from brain. Consciousness and its physical basis seem essentially so different from one another that they must have distinct existences. There is a metaphysical independence of mind and body and the proper place to search for answers to the mind-body problem is in an immaterial realm of mental entities (res cogitans for Descartes or World 2 for Karl Popper). This view brings with it a problem perhaps larger than that it was presumed to solve: how to account for the link between consciousness in the immaterial realm and brains (and bodies) in the material realm? How can two totally different type of things causally influence each other and how do mind and body interact? This philosophical position further seems to violate the principle of continuity: how does a new type of actuality emerge in evolution?

2. Naturalism, also called materialism (physicalism) or materialistic monism:

Naturalism holds that consciousness is a real and perfectly natural phenomenon. There is only one kind of actual entities namely material or physical, and with improved scientific knowledge there will remain no mystery about consciousness. Mind is numerically identical with the brain and there is no need for an interaction between mind and brain because they are identical.

This ontological position has to solve following epistemological problems. It has to explain how the brain creates a unity of experience and of bodily behavior: How do the billions of neurons create the unified conscious experience and how do we explain that I can pat my head with my hand while beating time to music with my foot and smiling to my wife? It further has to come up with an answer to the problem of self-determination or free will: If consciousness is totally produced by the brain is there such a thing that once consciousness is generated grants it some partially autonomous power by which it could determine some of its own states? Finally, a naturalist position might have difficulties to explain extrasensory perceptions like telepathy, clairvoyance, psychokinesis, pre/peri-natal experiences, and near death/after death consciousness.

If there is only one type of actual entities conscious experience has to be portrayed as somehow reducible to purely material stuff or as an emergent property of the brain. The following scientific theories of consciousness have attempted to explain the mind-body problem over the last thirty years (for a detailed description and references see Van Gulick 2001):

1. Reduction:

X (e.g. mind) is nothing more than Y (e.g. brain), or X reduces to Y, or X is just a special sort, combination of Y, and X is nothing over and above Y.

One easy way out of the theoretical impasse of the mind/body problem is to think that mind and consciousness are nothing more than brain processes. All of our conscious states are caused by lower level neuronal processes of the brain. Increasing biomedical understanding and sophisticated neuro-scientific knowledge will fill all gaps in the chain of causation and establish consciousness as neural correlates of the brain. Reduction involves relations between objects, properties, events, processes (ontological reduction between real world items), and concepts, theories, models, or representational frameworks (representational reduction).

How must things be related for one to ontologically/representationally reduce to the other? These are some of the concepts discussed in scientific discourse:

a) Identity: Two distinct entities converge to the same item (e.g. heat is just kinetic molecular energy; pain is just the firing of c-fibres).

b) Composition: Mental things (e.g. minds) are composed entirely of physical parts.

c) Supervenience: The beauty of a painting may not be identical with any of its strictly physical properties such as the distribution of pigments on the surface of the canvas, but any other painting that shared all the physical properties of the first would also have to share its aesthetic properties. Or in the mind/body domain: no mental difference without physical difference.

2. Emergence:

X is more than just Y; X is something over and above Y. Mind states emerge from brain states. They are not completely independent of the brain. X and Y are not completely independent but X's features go beyond those of Y.

Examples of emergence are: a piece of cloth might be purple even though none of the molecules that make up its surface could be said to be purple. Or, mind is greater as the sum of its brain parts.

A radical kind of emergence postulates that the whole has features of a kind whose nature and existence is not necessitated by the features of its parts (Van Gulick 2001). This threatens the view of the physical world as a closed causal system. The problem is to demonstrate how higher-order properties operate without violating the micro-physical laws.

Next, this author summarized current mind-body views that fall into either the reductive or the emergent category. Some seem to fall in neither category or try to bridge both approaches (e.g. non-reductive physicalism).

a) Identism/Identity theory: Mind = brain: types of mental states (e.g. experience of stabbing pain) are identical with types of states within the central nervous system (e.g. c-fibre firings).
b) Functionalism: Mind is a function of the brain: mental states and properties are higher-order features defined by their higher level roles but nonetheless realized solely by their neural substrates (like computer programs are realized/executed by the hardware of the computer).

c) Epiphenomenalism: Mind is produced by the brain but it does not act back on the brain (no downward causation).

d) Panexperientialism or Pan (Proto) Psychism: If it is impossible to build a mind or consciousness out of purely nonmental parts, then we must view the parts as themselves in some way having a mental or at least a proto-mental aspect. Mind is distinct from the brain but not composed of a different kind of stuff. Parts have at least a proto-mental aspect. Proto-consciousness in physical nature; consciousness-like features of particle fields. Uncollapsed quantum wave of physics. Quantum effects operating within biological subunits. There is a latent seed (essence) of consciousness dispersed through less complex physical systems.

e) Functionalistic non-reductive physicalism: Combines a pluralistic view about the diversity of what needs to be explained by science with a commitment to the physical as the ultimate basis of all that is real.

f) Dual-Aspect Monism: Reality is ultimately constituted by a single realm of things and properties which are neither mental nor physical. This ultimate ur-reality manifests itself to us in both physical and mental ways, but is itself more basic than either.

Naturalistic and dualistic ontologies consent in a view that most actual things are devoid of any experience. They both think that elementary units of nature must be devoid of both experience and spontaneity. Both approaches share problems too: If consciousness entered evolution at some still debated point in time how is the emergence of experience out of non-experiencing entities conceivable? The emergence of an inner world from things that have only an outer world quality remains a mystery. Then, time presupposes experience: without experience there is no now. Time

arose at some point in the evolutionary process and evolution itself presupposes the existence of time. Last, where do we have to draw the line between experiencing and non-experiencing things?

The organization of consciousness remains an exciting mystery. Since the era of cognitive psychology, whose fundamental ideas are largely inspired by computational models, consciousness became a kind of component or aspect of information-processing models. Consciousness turned into a module connected to various other modules of processing and transmitting information. The main question for cognitive psychologists was: who selects the relevant sensory information from the flood of sensory data, and how, and with what selection criteria? We all constantly chose some information over others and marginalize most of the sensed information. The spotlight metaphor represents that ongoing selection of our awareness and describes consciousness as a selector input in an information-processing model. Most information remains in the darkness of the room. What happens to that marginalized information? Schacter claims that information changes the quality and quantity of neural connections in the part of the brain which is processing the information. Information produces structural neural changes called engrams. These dormant engrams are distributed throughout the brain and can be reactivated by a new stimulus. The various distributed sources of knowledge are subjected to the control of an unknown executive or selector (Solso 2001).

Baar's 'Global Workspace' theory postulates an entire network of neural expert subsystems with specific tasks. The second construct of his theory, is a structure that integrates the various expert system for information to be globally disseminated or raised to awareness. Context, his third theoretical construction, refers to the unconscious influences of all the processes that remain in the

darkness. Contextual processes may be momentary or long lasting. Expert systems and contexts collaborate in co-creating the global workspace of consciousness (Solso 2001).

Both theories speak of an active agent which is selecting from the many informations which ones are to come to awareness. Both theories are in need of an integrating process that creates meaning out of the chaos of information. But this executive or expert agent remains enigmatic. The brain correlates for this function are also unknown.

Chalmers (1995) postulates an easy problem of consciousness concerning the explanation of various cognitive functions (e.g. the control of behavior, the focus of attention, selective or discriminatory abilities). On the other hand, the really hard problem is, for Chalmers, the explanation of the subjective aspect of every experience. He describes the hard problem as the problem of bridging the explanatory gap between accounts of the causal-functional (physical) kind and the occurrence of subjective experience: why is the performance of cognitive functions accompanied by experience? Before we get back to that important question let us discuss some examples of mind/body interactions.

III. Description of mind/body interactions.

1. The four levels of causal relationship

There are many metaphorical concepts we use and live by that describe the relationship between mind and body. In our culture mind is metaphorically perceived as an entity. We talk about the mind as a machine and as a fragile object. Examples are: ‘my mind just isn’t operating today’, ‘I’m a little rusty today’, ‘his mind snapped’ ‘you have to handle him with care since his accident’ etc. Other

metaphors describe bodily effects of mental states: ‘she/he gives me a headache’ ‘this event broke my back’ ‘this experience shattered him/her’ etc... We assume that the conscious mind controls our voluntary functions and actions and take it for granted in everyday life. Furthermore, recent knowledge from psychosomatic medicine grants the mind some effect on the body (Kihlstrom, 2002). But how the conscious mind exercises its influence is not clear. There are four distinct ways in which body/brain and mind/consciousness might enter into causal relationships. 1)Within conventional medicine and other body therapies, physical causes of physical states are taken for granted. Consequently the proper treatment is assumed to be some sort of physical intervention. 2)Biological psychiatry relies on the assumption of physical causes of mental states and propagates psychoactive drugs for psychological disorders. 3)Many forms of psychotherapy are based on mental causes of mental states and assume that psychological disorders can be alleviated by means of psychotherapeutic interventions. 4)Psychosomatic medicine is conceptualized on the relationship between mental causes and physical states. Consequently, under certain circumstances a physical disorder may require or benefit from a mental intervention. The biopsychosocial medical model believes that psychological and social phenomena have an effect on a wide range of bodily processes. It describes how mental and emotional states caused by social, cultural and individual psychological processes are translated into neural, endocrine, and immune responses of the body and in this way contribute or even cause disease.

2. Clinical evidence of mind/body interactions

Biosociomedical accounts of mind-body interactions include studies of imagery and biofeedback, studies of the placebo effect, studies of the effect of stress and trauma, and studies of meditation’s efficacy in mitigating distress and increasing well-being.

One area of interest in the field of neuroscience and mind-body medicine is stress and the ways in which humans respond to stress. The body's reaction to stress is determined by the interplay of several physiological systems (immune, neural, and endocrine). Recent advances in these different fields have led to a clearer understanding of the connections among these systems, revealing possible mechanisms by which the host response to environmental and social stresses is mediated. Several modulators of stress and important variables in the link between the environment and individual body have been described (e.g. the hypothalamic-pituitary-adrenocortical axis HPA and the neurotransmitter serotonin). It's effects have been linked to depression, schizophrenia, suicidality, aggressive behavior, chronic pain, and many other stress related diseases.

Two new terms have been used to describe these physiological stress responses: "allostasis" for the adaptive maintenance of stability through change and "allostatic load" for the wear and tear that the body experiences due to over stimulation of allostatic cycles (McEwen & Seeman 1999). Allostatic load represents the biological signature of cumulative psychosocial adversity. Various physiologic parameters (e.g. systolic and diastolic blood pressure, waist-hip-ratio, serum HDL and total cholesterol, overnight urinary cortisol excretion) have been investigated as measures of allostatic load.

Then, recent animal and human findings shed new light into the neurobiology of stress through the HPA axis and the serotonin system. Adrenal glucocorticoids and serotonin receptors have been shown to interact during conditions of chronic stress, or severe "allostatic load" (McEwen, 1987; Chalmers et al., 1993; López et al., 1999). Further, serotonin is important for adequate coping with stress. As mentioned above, aberrant serotonin function is implicated in the aetiology of, for

example, major depression and anxiety disorders. Dysregulation of the hypothalamic-pituitary-adrenocortical axis, involving elevated corticotropin-releasing hormone (CRH) activity, also plays a role in these stress-related illnesses (Linthorst, Penalva, Flachskamm, Holsboer & Reul 2002).

For example, child abuse researchers believe the activation of the HPA axis and a concomitant peripheral release of hormones including ACTH, epinephrine (adrenaline), and cortisol are key components in the sensitization of the stress response in traumatized children (Perry & Pate 1994). Further, evidence is now emerging that the HPA changes induced by traumatic events in childhood can persist into adulthood. Women (ages 18-45) who have suffered abuse exhibit increased pituitary-adrenal and autonomic responses to stress compared to nonabused women: "Our findings suggest that hypothalamic-pituitary-adrenal axis and autonomic nervous system hyperreactivity, presumably due to cortical releasing factor hypersecretion, is a persistent consequence of childhood abuse that may contribute to the diathesis for adulthood psychopathological conditions" (Heim et al. 2000, p. 592).

In addition, exposure to "adverse rearing conditions" (including both neglect, in the form of low levels of praise and encouragement, and abuse, as measured by frequent parental anger and physical punishment) is related to lower density serotonin receptors and to dysfunctional serotonin response (Pine et al. 1997).

Higher allostatic load scores in humans were also found to predict increased risks of cardiovascular disease as well as increased risks for decline in physical and cognitive functioning and for mortality (Seeman, Singer, Rowe, Horwitz, &. McEwen 1997). Finally, a study of more than a thousand male

Vietnam veterans 20 years after combat exposure suggests a strong link between severe stress exposures and a broad spectrum of human diseases (circulatory, digestive, musculoskeletal, endocrine-nutritional-metabolic, nervous system, respiratory, and nonsexually transmitted infectious diseases) (Boscarino, 1997).

Social ordering in human societies is associated with gradients of disease. Although the causes of these gradients of health are very complex, they reflect the cumulative burden of coping with limited resources and negative life events. They also mirror the allostatic load that these burdens place on the physiologic functions of the human body involved in coping and adaptation. Egalitarian communities, states, and countries with income differences that are small tend to be healthier (Wilkinson 1999). Characteristics of social cohesiveness, social trust, active community participation, or in general the quality of social relations correlate with income distribution and influence the overall health status of the community (Kawachi 1999).

Another accepted evidence for the effect of states of mind on medical outcome is the ‘placebo effect’. Simply receiving treatment, and having confidence in the therapy or therapist has itself been found to be therapeutic in many clinical situations (Wall 1996). As with other instances of apparent mind/body interaction, ther are conflicting interpretations of the causal processes involved. A recent article by Hrobjartsson and Gotzche (2001) claim that placebo can affect how people feel but has no significant on objective outcomes (organic disorders). That is, they accept the possibility of mental causes of mental states but no mental causes of physical states. However, Wall (1996) cites evidence that placebo treatments may produce organic changes. Recent studies have begun to elucidate tangible physiological pathways that mediate the placebo effect. A number of elegant studies by

Amanzio et al. (2001) demonstrate that endogenous opioids play a central role in placebo analgesia. More specifically findings from another study (Benedetti et al. 1999) show that expectation of anatomically localized analgesia may result in selective release of opioids with inducing a specific effect only on the part of the body which is the target of the expectation. This suggests that a highly organized and somatotopic network of endogenous opioids links expectation, attention, and body schema. Lastly, another study found that placebo analgesia is accompanied by a complex cascade of events which affect the cardiovascular system (Pollo et al. 2003). In summary many researchers anchor placebo effects in biological reality.

The theoretical problems posed by mental causation are illustrated by studies of imagery. Sheikh et al. (1996) found that imagery can be an effective tool in exercising mental control over ones own bodily states (e.g. heart rate, blood pressure, etc...). The evidence that imagery can sometimes have bodily effects suggests that the conventional, clear distinction between psychological reality and physical reality may not be so clear. As Kenneth Pelletier (1993) puts it:

“Asthmatics sneeze at plastic flowers. People with a terminal illness stay alive until after a significant event, apparently willing themselves to live until a graduation ceremony, a birthday milestone, or a religious holiday. A bout of rage precipitates a sudden, fatal heart attack. Specially trained people can voluntarily control such ‘involuntary’ bodily functions as the electrical activity of the brain, heart rate, bleeding, and even the body’s response to infection. Mind and body are inextricably linked, and their second-by-second interaction exerts a profound influence upon health and illness, life and death. Attitudes, beliefs, and emotional states ranging from love and compassion to fear and anger can trigger chain reactions that effect blood chemistry, heart rate, and the activity of

every cell and organ system in the body.....All of that is now indisputable fact. However, there is still great debate over the extent to which the mind can influence the body and the precise nature of that linkage." (19).

Among other positive outcomes, meditation has been credited with reducing blood pressure, anxiety, addiction, and stress, while the Relaxation Response (Benson & Goodale 1981) has been shown to decrease sympathetic nervous system activity, metabolism, pain, anxiety, depression, hostility and stress (Andresen 2000). The biomedical model understands the linkage between psychological states and body functions as interconnections and reciprocal control between cortical, neuroendocrine, autonomic and immune systems. These have been extensively investigated within the field of psychoneuroimmunology (Watkins 1997) and psychoneuroendocrinoimmunology (Scapagnini 1992). But, biomedical accounts usually convert mind-body interactions into brain-body interactions. This reduction of mental states to brain states or functions, the view that mind and consciousness are nothing more than brain processes still faces many difficulties. How imagery affects autonomic or immune system functioning remains mysterious. In the next chapter I will focus on why mental causation remains mysterious if one is not willing to accept a reductionist approach.

3. The problem of mental causation for non-reductionist accounts

The limited biosociomedical view of disease hasn't found an answer to the mind-body problem. There is no understanding how traumatic or stressful experiences or meditation and imagery get translated into physiology and biochemistry. The easy way out of the problem is to take a reductionist stance, make matter fundamental, and reduce mental states to brain states. Meanings, stories, and emotions are derivative: epiphenomena that ultimately reduce to matter. This still

doesn't explain how a fantasy of a lemon stimulates one's saliva; just reading these lines the reader will notice the change. How a conscious intent to lift a finger for typewriting makes that finger move remains a mystery.

From an external third-person perspective the physical world appears causally closed. If one inspects the operation of the brains from the outside one can trace the whole causal chain from sensory input to motor output without observing or needing any subjective experience. The brain machine works perfectly well without the need for any subjective experience to account for the neural activity that one can observe. The physical world is causally closed from a third-person perspective. To acknowledge mental causation one need to give an account of how the mental cause and the physical cause of one and the same event are related to each other. Kim (1998) called this problem the problem of causal exclusion. Further one is not conscious of most of one's own planning processes that precede a conscious action. One might have some awareness that relaxing music or imagery lowers one's heart rate but one has no awareness how it does it, so how could there be conscious control of such processing? Some voluntary acts are preceded by for example a readiness potential by around 550 milliseconds (Libet 1985). The same is likely to apply to more complex voluntary acts (Velmans 2002). Thus conscious experiences appear to come too late to have a causal effect. These problems point at an impasse that current attempts to solve the mind-body problem face. How can experiences have a causal influence on a physical world that is causally closed or how can experiences affect processes that precede them? Both ontological approaches (naturalist and dualist) have until now failed to answer the 'how' questions.

IV. Symmetry and consciousness

"To us...the only acceptable point of view appears to be the one that recognizes both sides of reality – the quantitative and the qualitative, the physical and the psychic – as compatible with each other, and which can embrace them simultaneously...It would be most satisfactory of all if physics and psyche (i.e., matter and mind) could be seen as complementary aspects of the same reality." (Pauli & Jung 1955, p. 208).

The physicist Wolfgang Pauli worked closely together with the psychologist C.G Jung. Before his untimely death from throat cancer in 1958, Pauli was passionately interested in how psychology and physics (mind and matter) fit together. His quantum mechanistic approach in reconciling the two worlds of mind and matter and in explaining how conscious experiences can be causally effective in a closed physical world is one of various more integrative views that have emerged since then. These views claim that there is one 'mental life' but two ways of knowing it: first-person knowledge and third-person knowledge (Velmans 2002). Or, objective and subjective manifestations of our experiences are different complementary aspects of the same experience. Mind and matter are two expressions of a more primal quality or implicate order, as physicist David Bohm (1980) portrayed it. Once consciousness or observation occurs the 'quantum wave function' collapses into subjective and objective reality. The physicist's wave equation describes the probability of a particle to have wavelike and particle-like characteristics. Which aspect of matter appears, wave or particle, depends on the decision of the observer. But as Arnold Mindell (2000) states: "We must remember that both wave and particle are consensus reality descriptions of an invisible world. Both descriptions together are considered complementary; both consensus reality terms are needed to approximate the measurable qualities and quantities of matter" (p. 182). For physicists the wave function is

considered to be the most fundamental description of matter. The wave function results to be a complex number which has both real and imaginary aspects and cannot be measured directly. This more fundamental imaginal realm is the ultimate ur-reality that manifests itself to us in both physical and mental ways, but is itself more basic than either. Wilber (2000) claims that the non-dual aspect of reality can only be experienced from a non-dual heightened state of awareness (e.g. through contemplative practices and meditation). For Mindell (2000) we marginalize the imaginary realm and orient all our experiences to consensus reality[1]. "We look only for the most probable meaning of something..... Metaphorically speaking, looking only at the real value of an experience gives us answers in reality, but ignores the sentient dreamlike experience and process of reflection behind reality....Consensus reality is like a tree with roots in the non-consensus or sentient realm" (p. 111). This sentient or imaginal realm is at the core of mythology and spirituality. It can also be experienced in subtle tendencies and dreamlike processes that one subliminally senses. According to Mindell (2000) consciousness is based on sentient non-consensual tendencies reflecting upon one another. For him, in analogy to the wave function and Bohm's implicate order, the sentient realm underlies and structures all of manifest reality.

V. Consequences for a theory of medicine

The medical world is in transition and at a crossroad. The 19th and 20th century saw the establishment of scientific medicine based on the view that human health is fundamentally biological. The deep biochemical familiarity with the human body along with nanotechnological engineering advances will in the 21st century set the base for an increasingly sophisticated molecular

[1] The term consensual stresses the notion that reality is a cultural concept, not an absolute truth. Arnold Mindell (2000) adds a concept of non-consensus reality that encompasses all spheres of experience that get marginalized (e.g. altered

and technologic medicine. Superspecialized and automated procedures that are recognized to produce better results in medical treatment – like the surgical fix of hernias[2] or colonoscopies – wont require anymore the extensive training of today's medical doctors. Thus, many facets of medicine originally assigned to doctors can and might soon be replaced by machines, medical engineers, or expert systems and computer algorithms.

On the other hand non-compliance, the lack of adherence to medical treatment, difficulties encountered in chronic symptom management, the case of health disparities based on social strata, the problem of medical malpractice and litigation, as well as the raising health care costs point at unsolved problems that defy the technological advancement in medicine.

The materialist biomedical model of medicine looks at the body as a machine that can be understood in terms of its parts. This model studies the body's elementary particles, so to speak, its atoms, molecules, and organs, the bits and pieces that make up the cells and the body. In today's medicine you are either sick or well. You have a body or a psychological problem which may be hereditary, caused by stress and carcinogens, too much fat or not enough vitamins. Social science expands the biological view of health to incorporate interpersonal, social and cultural dimensions. Physiologic states become a metaphor for social and cultural processes. They are intrinsically entangled with relational and community aspects that call for a different sort of therapeutic model. Diversity awareness, conflict facilitation, process and system psychology, cognitive and behavioral approaches are required to address this part of medicine that cant be replaced by machines or technical

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states of consciousness and foggy dreamlike states) in the process of shaping consensus reality by the more dominant parts of society.

engineers. Nevertheless, the biopsychosocial model requires mental or psychosocial events to cross back over the mind/brain barrier and then influence the body via neural, immune, and endocrine pathways. It remains stuck in the problem of mental exclusion mentioned above (Kim 1998).

A non-dualistic model of medicine and illness sees body experiences not only as a local, physical difficulty, but also as a process that relates to the sentient or imaginal realm. The physical aspects and the subjective meanings of our experiences are complementary and just different aspects of a sentient process. This sentient realm encompasses the mechanical organization of the body and the subjectivity of the whole person. The philosopher of consciousness David Chalmers (1995) says: "...experience may arise from the physical, but is not entailed by the physical" (p. 205). Experience or subjectivity is as fundamental as physicality, they both have their roots in the wave function of reality. Clinicians in a non-dual model see the multidimensional nature of disease and approach clinical work from multiple complementary observer positions. Lakoff and Johnson (1999) see the mind as embodied in the body's flesh. For them the concept of a mind separate from the body is a metaphorical concept. Our phenomenologial experiences posit the content of our experience outside of our bodies. In virtually all our acts of perceptions we are not conscious of our organs of perception. This reinforces the illusion of a disembodied mind or subject. "The embodied mind is part of our living body and is dependent on the body for its existence. The properties of mind are not purely mental: They are shaped in crucial ways by the body and brain and how the body can function in everyday life. The embodied mind is very much of this world" (p.565). Furthermore embodied mind and spirituality governs our relationship with the environment and world. Embodied mind

[2] Routine and perfection increases the survival rate of many surgical procedures. Shouldice Hospital outside of Toronto, Canada has specialized on the surgical repair of hernias. None of their surgeons have completed general surgical training yet with one year superspecialized training they are the best hernia surgeons in the world (Gawande, 2002).

leads to an ethical understanding that nature is not inanimate and less than human, but animated and more than human. The Goddess, mind, the Subject is immanent in flesh and nature and all existence is pervaded by sentience.

Some physicists and astrophysicists have a view of life which gives meaning and direction to evolution, and its self-regulating creativity (e.g. consciousness). The metaphysical and teleological conceptualization of life that opposes entropy and gives meaning and direction to evolution survives despite materialism and scientism. In physics Newton determined the forces controlling the fate of objects and saw them as lifeless. Leibniz disagreed and insisted upon an inner force the "vis viva" as the mover of matter, for only matter can move matter, and the spirit or energy which is able to move it is necessarily part of it. History has for a certain time decided in favor of Newton. Einstein's relativity theory ($E = mc^2$), on the other hand, asserts that every material object has an energy which is inherent within it. But as Mindell (2000) observes: "Newton's idea of lifeless matter still prevails in science, since energy is defined mechanically. Yet Leibniz's "vis viva" hovers in the background, behind the new tendency of scientists on the cutting edge of physics who are exploring where consciousness enters matter"(134).

With the rise of genetics and evolution, vitalist ideas disappeared almost completely except inside some departments of theoretical physics. Modern molecular biology ascribes life to an emergent property of biochemical processes and any vitalistic life force or energy field is deemed unnecessary and unacceptable. Nonetheless functional descriptions still fail to capture the organizing principle present in living systems and consciousness, the kind of inherent wisdom which fuses together amino and ribonucleic acids into proteins, molecules, and organisms. New concepts of quantum

theory (quantum coherence, quantum entanglement, quantum state reduction) are drawn to explain basic intercellular and intermolecular dynamics and to revise macroscopic physical systems. They form the new fields of quantum holism and quantum vitalism (Esfeld 1999, Hammeroff 1997). The question is still open as to which quantum holism can be regarded to be universal in the physical realm or limited to the microphysical level. For Hammeroff (1998) life is a macroscopic quantum state: "Life is an emergent phenomenon involving macroscopic quantum superpositions which are, in reality, self-organizing blisters in fundamental spacetime geometry" (1).

Mind and meaning are embodied in flesh. Body and mind are two complementary expressions of a basic embodied reality. In a non-dual medicine the physical expression of disease is only one dimension. The somatic language of the body conveys meaning for the individual, his or her environment, and the world at large. The meanings that emerge from the physicality of our bodies are complementary to psychological meanings. A clinician of non-dual medicine and/or psychology[3] will attend to the many levels in which meanings or stories are communicated through illness and other life disturbances. Embodied meaning is passed through specific personal experience, arises in the context of community and cultures, and is passed through generations. What is needed is a willingness to observe the unitary reality from multiple observer positions and to recognize that mind and body are fundamentally psychophysical. This allows us to make sense of mind-body interactions observed in clinical practice and everyday life.

[3] From a non-dual perspective the differentiation between medicine and psychology makes less sense.

References:

Amanzio M. Pollo, A., Maggi, G., & Benedeeti, F. (2001). Response Variability to Analgesics: A Role for Non-specific Activation of Endogenous Opioids," Pain, Vol. 90 (2001) 205-215.

Andresen, J. (2000). Meditation Meets Behavioral Medicine. The Story of Experimental Research on Meditation. Journal of Consciousness Studies 7 (11-12). 17-73.

Benedetti, F., Arduino, C. & Amanzio, M. (1999). Somatotopic activation of opioid systems by target-directed expectations of analgesia. J Neurosci 19(9): 3639-48.

Benson, H. & Goodale, I. (1981). The Relaxation Response: Your Inborn Capacity to Counteract the Harmful Effects of Stress. Journal of the Florida Medical Association, 68, 265-267.

Bohm, D. (1980). Wholeness and the Implicate Order. London, Boston: Routledge.

Boscarino, J.A. (1997). Diseases Among Men 20 Years After Exposure to Severe Stress: Implications for Clinical Research and Medical Care. Psychosomatic Medicine 59, 605-14.

Chalmers, D. T., López, J. F., Akil, H.,Watson, S. J., (1993). Molecular Aspects of the Stress Axis and Serotonergic Function in Depression. Clinical Neuroscience 1: 122-128.

Chalmers, D. (1995). Facing Up to the Problem of Consciousness. Journal of Consciousness Studies, 2:3, 200-219.

Esfeld, M. (1999). Quantum Holism and the Philosophy of Mind. Journal of Consciousness Studies, 6, No. 1, 23-38.

Gwande, A. (2002). Complications: A Young Surgeon's Notes on an Imperfect Science. New York. Henry Holt Books.

Heim, Ch., Jeffrey D.,. Heit, St., Graha, Y.D., Wilcox, M., Bonsall R.,. Miller, A.H., &. Nemeroff, Ch.B. (2000). Pituitary-Adrenal and Autonomic Responses to Stress in Women After Sexual and Physical Abuse in Childhood. JAMA 284:592-597.

Hammeroff, St. (1997). Quantum Vitalism. Advances: The Journal of Mind-Body Health 13(4): 13-22.

Hammeroff, St. (1998).What is Life? Quantum Vitalism. Quantum Approaches to Consciousness. QUANTUM-MIND@LISTSERV.ARIZONA.EDU. Fri, 6 Nov.

Hrobjartsson, A. & Gotzsche P.C. (2001). Is the placebo powerless? An analysis of clinical trials comparing placebo with no treatment. New England Journal of Medicine 344, 1595-1602.

Kawachi, I. (1999). Social Capital and Community Effects on Population and Individual Health. Ann. N.Y. Acad. Sci. 896: 120-130.

Kihlstrom, J.F. (2002). The Seduction of Materialism and the Pleasures of Dualism. Journal of Consciousness Studies, 9(11), 30-34.

Kim, J. (1998). Mind in a Physical World: An Essay on the Mind-Body Problem and Mental Causation. Cambridge, MA: MIT Press.

Lakoff, G. & Johnson, M. (1999). Philosophy in the Flesh: The Embodied Mind and it's Challenge to Western Thought. New York: Basic Books.

Levine, J. (1983). Materialism and Qualia: The Explanatory Gap. Pacific Philosophical Quarterly, 64, 354-361.

Libet, B. (1985). Unconscious cerebral initiative and the role of of conscious will in voluntary action. Behavioral and Brain Sciences, 8, 529-566.

Linthorst AC, Penalva RG, Flachskamm C, Holsboer F, & Reul JM. (2002). Forced swim stress activates rat hippocampal serotonergic neurotransmission involving a corticotropin-releasing hormone receptor-dependent mechanism. Eur J Neurosci 2002 Dec;16(12):2441-52.

López, J. F., Liberzon, I., Vázquez, D. M., Young, E. A.,Watson, S. J., (1999). Serotonin 1a receptor mRNA regulation in the hippocampus after acute stress. Biological Psychiatry 45: 943-947.

Martin, E. (1994). Flexible Bodies: Tracking Immunity in American Culture from the Days of Polio to the Age of AIDS. Boston, MA: Beacon Press.

McGinn, C. (1989). Can we solve the mind-body problem? Mind, XCVIII:891, 349-366.

McEwen BS, (1987). Glucocorticoid-biogenic amine interactions in relation to mood and behavior. Biochemical Pharmacology 36:1755-1763.

McEwen, B.S. & Seeman, T. (1999). Protective and Damaging Effects of Mediators of Stress. Elaborating and Testing the Concepts of Allostasis and Allostatic Load. Annals of the New York Academy of Sciences, 896: 30-47.

Mindell, A. (2000). Quantum Mind: The Edge Between Physics and Psychology. Portland, OR: LaoTse Press.

Onions, C.T. (Ed.) (1962). The Shorter Oxford English Dictionary. Oxford: Clarendon Press.

Pauli, W., & Jung, C.G. (1955). The Interpretation of Nature and the Psyche. Princeton, NJ: Pantheon.

Pelletier, K.R. (1993). Between Mind and Body: Stress, Emotions, and Health. In: D. Goleman & J. Gurin (Eds.) Mind Body Medicine. New York: Consumer Reports Books.

Perry, B.D. & Pate, J.E. (1994). Neurodevelopment and the psychobiological roots of PTSD. In: L.F. Koizol & C.S. Stout (Eds.). The Neurobiology of Mental Disorders: A Practical Guide. Springfield: Charles C. Thomas.

Pine DS, Coplan JD, Wasserman GA et al. (1997), Neuroendocrine response to fenfluramine challenge in boys: associations with aggressive behavior and adverse rearing. Arch Gen Psychiatry 54:839-846

Pollo, A., Vighetti, S., Rainero, I., & Benedetti, F. (2003). Placebo analgesia and the heart. Source: Pain 102(1-2): 125-33.

Scapagnini U. (1992). Psychoneuroendocrinoimmunology: the basis for a novel therapeutic approach in aging. Psychoneuroendocrinology 17(4):411-20.

Searle, J.R. (2000). Consciousness. Annual Review of Neuroscience, 23, 557-578.

Seeman, T.E., Singer, B.H., Rowe, J.W., Horwitz, R.I., & McEwen, B.S. (1997). Price of Adaptation – Allostatic Load and its Health Consequences: MacArthur Studies of Successsful Aging. Arch Intern Med. 157: 2259-2268.

Sheikh, A.A., Kunzendorf, R.G., & Sheikh, K.S. (1996). Somatic consequences of consciousness. In. M. Velmans (Ed.). The Science of Consciousness: sychological; Neuropsychological and Clinical Reviews. London: Routledge.

Solso, R.L. (2001). Cognitive Psychology. Boston, MA: Allyn & Bacon.

Van Gulick, R. (2001). Reduction, Emergence and Other Recent Options in the Mind/Body Problem. Journal of Consciousness Studies, 8(9-10), 1-34.

Velmans, M. (2002). How Could Conscious Experience Affect Brains? Journal of Consciousness Studies, 9(11), 3-29.

Wall, P.D. (1996). 'The Placebo Effect.' In: M. Velmans (Ed.). The Science of Consciousness: Psychological, Neuropsychological and Clinical Reviews. London: Routledge.

Watkins, A. (1997). Mind-Body Pathways. In: A. Watkins (Ed.) Mind-Body Medicine: A Clinician's Guide to Psychoneuroimmunology. New York: Churchill Livingstone.

Wilber, K. (2000). Waves, Streams, States and Self. Further Considerations for an Integral Theory of Consciousness. Journal of Consciousness Studies, 7 (11-12), 145-176.

Wilkinson, R.G. (1999). Health, Hierarchy, and Social Anxiety. Annals of the New York Academy of Sciences. 896, 48-63.