MedMax Publishers

Journal of Clinical Neurology & Research Review Article

Mind-Body Interaction

Cengiz Mordeniz

Department of Anesthesiology and Intensive Care, Pain Medicine, Traditional and Complementary Medicine, Tekirdag Namik Kemal University, Turkey

***Corresponding author**
Assoc Prof. Dr. Cengiz Mordeniz, Tekirdag Namik Kemal University Dept of Anesthesiology, Namik Kemal mahallesi, Kampus caddesi, No:1 Suleymanpasa /Tekirdag /Turkey. Tel: 90-5055107675; E-mail : cengizmorster@gmail.com.

Received: 10 March 2022; **Published**: 06 April 2022

Abstract

The human mind–body possesses an innate ability, based upon the evolutionarily conserved brain and body systems to promote health and healing. Since there is a bidirectional influence of psychological and physiological variables on health, modern allopathic medicine, that addresses the disease in the body and disorder in the mind, should be reconceptualized for more holistic wellness. The mind-body dualism is re-evaluated in the light of different scientific findings such as energy and electromagnetic wave, information, quantum theories, and placebo effect.

Keywords: Mind–body medicine, Mind, Perception

Introduction

The "mind" refers to the human-like features, while the"brain""concretizes" the mind. Descartes splits the brain and the mind, by two different kinds of substance: aphysical, extended substance (res extensa) and a thinking, unextended substance (res cogitans). In the "substantive dualism", the mind, as a nonphysical entity is separate from the body. In "attributed dualism" the mind is not a separate entity, but shows two distinct properties, one psychological (thoughts, feelings, volitions); the other physical (electrical and chemical properties of the nervous system). Psychosocial factors ranging from hostility to psychosocial stress influence and affect the health outcomes. The mind-body duality, was shown in the form of art in Michelangelo's Creation of Adam, (Figure1) where the mind and thought are depicted by a sagittal section of the brain [1].

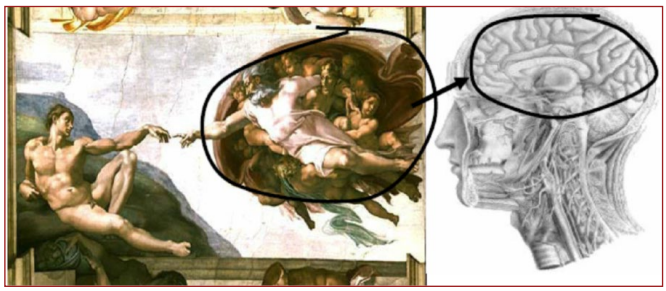

Figure 1: Comparison of a portion of Michelangelo's Creation of Adam with a modern anatomical drawing of the brain.(1)

The main cause of an illness, the most important factor, why a person becomes ill, lies in the brain. Stress, pain and pleasure play a critical role in wellness, contributing significantly to the risk of disease. If a stressed person feels good, he/she will have fewer ill effects. People seeming calm outside but turmoil inside, will have disorders like migraine, irritable bowel syndrome, rheumatoid arthritis, or multiple sclerosis. Psychoneuroimmunology, first coined by Robert Ader in 1980, refers to the connections between the psyche, the nervous system, and the immune system and search the role of the mind in disease cause. Psychoneuroendocrinology, covers the connections between the psyche(behavior and the nervous system) and the endocrine system. Laboratory animals whose brain-immune communications were disrupted through surgery or pharmaceuticals became highly vulnerable to lethal complications of inflammatory and infectious diseases. People exposed to chronic social stresses showed increased susceptibility to common cold, and the prevalence of depression is higher in patients with coronary artery disease (CAD). Depressed CAD patients have 84% greater risk of cardiac death compared to nondepressed CAD patients. Interstitial cystitis has been shown to be stress related disease with significantly elevated norepinephrine level in urine. Positive supportive environment of extensive social networks or group psychotherapy can improve immune response and resistance to disease—even to cancer and protect against premature mortality, prevent illness, and assist prompt recovery from illness. Medicine should adopt a biopsychosocial approach rather than an exclusively biologic model of health [2].

If the mind controls the body, the motion is qualified as graceful or awkward. If the motion is without volition, it is considered as spasms and reflexes. The perception from the body to the mind is called sensation . If the body control is obstructed, while the mind functions normally, it is defined as paralyzed and numbed. Descartes' dualism viewed a person as a physical body and a non-physical mind.

Huxley (1874) called epiphenomenalism instead of dualism, where the interaction is defined in the direction from the body to the mind. Later it is modified as interactionalism, to mean that the mind and body interact in both directions.

Ryle (1949) turned the dualism toward behavioralism, and did not separate the mind from the body, but just considered the mind as an aspect of the body's own activities.

Smart (1959) developed the Identity theory saying that mental states are identical to their associated brain states.

Putnam (1973) suggested the term "functionalism" where mental states are thought to be realizable by multiple brain states, which are considered more abstract than their biological or mechanical realization.

In the theory of the mind-body interaction of Gordon and Hobbs, a person has both a mind and a body, connected by two channels of sensation and control. The mind, body, sensation channel, and the control channel having a 3-valued state, either active, impaired, disabled, or in the case of body, intact, damaged, or destroyed. The control channel transforms the will into an action, while the normal sensation channel translates the stimulation into beliefs in the mind. The stimulated body changes the mind's perception through the channel of sensation. The body's actions are the consequences of the mind's will, by the channel of control. With an active mind, an intact body, and active control, the will is turned into an action. The first channel of interaction between the body and the mind is the sensation, which creates the perception through sense organs . Sensation, is the channel by which this sensory information is passed to the mind. The second channel of interaction between the body and the mind is the control channel that puts the person's will into a bodily action, by their level of control. The non-dualist alternative, is to treat the distinctions between inside and outside, subject and object, mind and world within experience as a continuous dynamic interplay of 'mental' and 'physical' factors [3].

Perceiving an emotional stimulus, and retrieving an emotional memory, all involve perceptual ,somatovisceral and motoric reexperiencing(referred as embodiment) of the relevant emotion in one'self. There is a reciprocal relationship between the bodily expression of emotion and the way in which how emotional information is interpreted. For example, the embodiment of anger is manifested as a muscle tension , the enervation of certain facial muscles with the rise in the blood pressure and peripheral resistance [4].

The sensation patterns of the subjective emotional feelings are triggered by the perception of bodily states that reflect changes in the skeletomuscular, neuroendocrine, and autonomic nervous systems. Somatosensation and embodiment play critical roles in emotional processing. The discernible sensation patterns associated with each emotion correspond with the major changes in physiological functions. All cultures have different body-related expressions for emotional states. For example voluntary reproduction of facial expressions induce subjective feelings of the corresponding emotion and produce differential changes in physiological parameters such as heart rate, skin conductance, finger temperature, and muscle tension [5].

The mental experiences are related to the emotions (psychological processes) and bodily responses (somatic system) . The lived body is considered as the "body in human experience" or the "perceived body" as the projection of the body in the real world. East Asian medicine already uses a holistic approach to interpret the body and its disorders, including emotional and psychosomatic disorders. The complex relationship between the mind and the body relationship would not be explained only by philosophy and anthropology. The particular spatial patterns of sensation throughout the body led by the emotional experiences triggered by the physical functions are the consequence of the interaction between the bodily response and emotions [6].

The pro-inflamatory cytokines produced by the innate immune cells in response to a peripheral infection provoke sickness behavior. When activation of the peripheral immune system continues unabated, during systemic infections, cancer or autoimmune diseases, the immune signalling to the brain can lead to an exacerbation of sickness and the development of symptoms of depression in vulnerable people and the prevalence of clinical depression is increased in physically ill people. Inflammation is therefore an important biological event that increases the risk of major depressive episodes, due to the traditional psychosocial factors. The behaviour of sick people changes so that they feel feverish and nauseated, ignore food and beverages, and lose interest in their physical and social environments. They tire easily and their sleep is fragmented. They feel depressed and irritable, and can experience mild cognitive disorders ranging from impaired attention to difficulties in remembering recent events.

The response to infection is characterized by endocrine, autonomic and behavioural changes. Pro-inflammatory cytokines produced at the site of infection by activated accessory immune cells not only induce symptoms of sickness, but also true major depressive disorders in physically ill patients without previous history of mental disorders. The brain–cytokine system is the conductor of the ensemble of neuronal circuits and neurotransmitters that organize physiological and pathological behaviour. High amounts of inflammatory cytokines impair mood, cognition, sleep and appetite, and contribute to the development of affective disorders. Cytokines can cross the blood brain barrier (BBB) through leaky area by active transport. Increased permeability of the BBB activates immune or neurotoxic cytokines to cause and trigger psychopathological changes. Prolonged proinflammatory cytokine production adversely affect mental health in vulnerable individuals with symptoms of fatigue, malaise, and diminished appetite. It was thought that these symptoms were directly caused by infectious pathogens, but it is now known that proinflammatory cytokines are both sufficient and necessary to generate sickness behavior even in absence of infection or fever. The reciprocal interaction of the immune system on the brain and behavior have taken center stage on immunologically-based diseases including infectious illnesses, autoimmune disorders, and cancer, because activated inflammatory processes affect multiple aspects of CNS (central nervous system).

Brain-immune interactions are the essential component in psychiatric and medical co-morbidities. Psychoactive drugs may be used to treat some inflammatory diseases, and drugs that affect immune system, may be useful in treating some psychiatric disorders. Diseases associated with chronic inflammation significantly affect one's mood or level of anxiety. Therefore any classification of illnesses in medical and psychiatric specialities, demarcating the mind and body, would be artificial [7].

Following the discovery of antibiotics, a new assumption arose that treatment of the infectious or inflammatory diseases can only be treated by the elimination of the foreign organism or agent which triggers the illness as the cause of the disease. 20th-century medicine has ignored and rejected the mind's influences and the body's responses on the physical illness and the body's own responses influencing the susceptibility to disease and its course, but new molecular and pharmacological tools have identified a network between the immune system and the brain, that allows the two systems signalling each other continuously and rapidly, along the same pathways, showing

how the state of mind influences health. Chemicals produced by immune cells signal the brain which in turn sends chemical signals to restrain the immune system affecting also behavior and response to stress. Disruption of this communication network, whether inherited or through drugs, toxic substances or surgery, provokes and exacerbates the infectious, inflammatory, and autoimmune diseases and related mood disorders. The state of the mind influences the resistance or recovery from infectious or inflammatory diseases. A physiological event highly stressful to one individual can infuence much less another, depending on each person's genetic tendency to hormonal reactivity and his/her previous experience. The degree to which stress can precipitate or exacerbate the disease not only depends on the intensity and duration of the stressful stimulus but also on the person's learned perception of the event as stressful and on the set point of the stress system. Psychological stress can influence and affect the individual's susceptibility to infectious diseases. The relationship between psychosocial stressors and disease is affected by the nature, number, and persistence of the psychosocial stressors as well as by the individual's biological vulnerability (i.e., genetics, constitutional factors), psychosocial resources, and learned patterns of coping. Psychosocial interventions have been proven useful for treating stress-related disorders. If a standard dose of common coldvirus (rhinovirus) is given to volunteer individuals, who are simultaneously exposed to stress, they show more viral particles and produce more mucus than non-stressed individuals. Vaccinated people during periods of stress, develop less antibody protection. Chronic stress also prolongs wound healing [8-12].

Psychosocial interventions, such as cognitive-behavioral stress management (CBSM)

1. Produced positive effect on the quality of life of chronic disease patients
2. Influence the disease prognose in a positive way
3. Reduce distress of chronic pain patients and increase their physical activity to return to work
4. Reduce perceived stress and negative mood and overuse of medications and utilization of health care system.
5. İncrease social support,
6. İmprove problem-focused coping,
7. Affect cognitive appraisals [13].

The internal physical components are also part of brain environment, as well as the external environment located outside physical body. The brain can be aware of the internal (interoception) and external (exteroception) environment. Eventhough interoception and exteroception produce physiological changes without awareness, humans can become aware of their internal states such as anxiety or stress. Interoception is an awareness to control over internal organs through biofeedback or mind–body practices. The popular component of many mind–body therapies such as mindfulness, is to bring the mind to the present moment in a non-judgmental way.

The state of being married and marital satisfaction are associated with adaptive immune responses, where poorer marital quality,disruption, conflict, stress and hostile marital interactions are related to maladaptive alterations in cardiovascular activity, increased catecholamine levels with depressive symptomatology and dysregulation of systemic immune function. Immune responses during marital discord also blunted the immune responses in the spouse who experiences great amount of stress and feelings of helplessnes. Compared with other social relationships, marital relationships tend to have greater effect on an individual's emotional and physical well-being. Although marriage is typically considered to be beneficial or protective, marital conflict can function both as an acute stressor (e.g., a solitary argument) and a chronic stressor (e.g., daily arguments for years).For some individuals, the marital relationship can be chronically stressful not because of conflict or hostility but because of the health state of the partner. Individuals who are the caring partner for spouses with Alzheimer's and other forms of dementia experience and live chronic stress, that causes depressive symptoms and mood disorders even after the death of their spouse.

A positive supportive environment of extensive social networks or group psychotherapy can enhance immune response and resistance to disease— even cancer. For example ,women with breast cancer, who receive strong, positive social support during their illness significantly gain longer life spans than women without such support. Socially isolated women have elevated risk and higher rate of mortality after the diagnosis of breast cancer, because of the lack of access to specifically beneficial caregiving from friends, relatives, and adult children. Social support has three dimensions: emotional, informational, and instrumental support . Emotional support includes the demonstration of empathy, reassurance, love, and caring. Informational support refers to assistance with both seeking and understanding medical information. Instrumental support has been operationalized as tangible aid, and assistance in problem solving tasks for medical decision-making [14-16].

Informatıon

A new concept enters deeper and deeper in the sciences today: information. The structuring of the matter is related to the information as a consequence of structuration process. From the informational point of view, the characteristic information carried by genes, is a matter-related information contained/integrated into the cell and this form of expression shows the relation between information and its matter support. Within the matter-related informational systems, the information is contained into the intimate structure of the material system, formed by multi-particles, unified with specific forces and characterized by both entropy and information. When the degree of atomic order is high, the entropy is low and such structures contain a high quantity of incorporated information. If one atom abandons its particular site, the entropy of the system increases by emission of information. An integrated atom in a specific site incorporates (embodies) information, by valence bonds with the neighbourhood atoms in the structural lattice. When these inter-related bindings are broken, the system turns into a new state, with higher entropy, because incorporated information is lost by this info-disembodiment process, which generates the genetic information, incorporated (embodied) in the cells, as matter-related information, if certain specific conditions are fulfilled. The epigenetic processes, allowing to transfer the info-acquired traits during the life, follow the same type of informational mechanisms. Information in the mind is virtual. The informational operator of the mind , the thought, activates the "stand-by" information which is still not active, like in a computer memory by bringing on the virtual screen, either from external, internal or memory domain. Emotions are also informational signals, generated as a reaction to the virtual information detected in the conscious mind by two main emotional categories: impulsive/spontaneous emo-reactions and emotional states (emo-states). Distinguishing between the virtual and matter-related information promoted by the Informational Model of Consciousness,the informational architecture of consciousness consists of seven groups of specific activities:

1.centre of acquisition and storing information (memory),
2.centre of decision and command (decision),
3.centre of emotional states (emotions),
4.centre of body maintenance (power and health),
5.centre of genetic elaboration/transmission (reproduction)
6.infogenetic generator, inherited from the parents (predispositions, talents and skills).
7.centre dedicated to the connectivity with some extra-power properties of the mind

The sensitive elements of the body, the sensors, that transmit information from the internal and external sources,to transducers and motor-type execution elements, are responsible to convert the info-signals emitted by the brain into the chemical or physical action. The informational system is managed by the brain, as an informational distribution support. The received information, incorporated into the cell by epigenetic overlapping processes, is transmitted through the genetic matter-related support, as an expression of maximum level of info-integration in matter of the distinct functions of the brain from the informational perspective on the basis of distinction between the virtual information, operated by mental processes, and the matter-related information, particularly genetic information, incorporated into the matter, as an info-material support ,to the brain informational activities such as info-perception and memory, info-operability and decisional activity, info-emotional activity, automatic maintainability of the body, info-genetic transmission and info-genetic reception. The atoms are not the last link of matter. Eliminating layer by layer, the matter, at the end remains actually an informational system . The human body is a bipolar structure, composed of information and matter, where the information has a primary role in modelling the body material components to form a mind-body complex acting as a reactive/ adaptive info-material system against external dynamic conditions [17].

MIND-BODY THERAPIES

Biofeedback is a mind–body technique and a self-management tool in which participants get aware about their unhealthy mental patterns and habits, and learn to improve their health by controlling bodily functions (e.g., breathing rate, heart rate, blood pressure). Autogenic training, a relaxation technique developed in 1932 by Johannes Heinrich Schultz, with training sessions for simple relaxation and body awareness exercises to reduce the body's stress response, and to teach participants bodies to respond to verbal commands and to "tell" their body to relax and control certain physiological responses (e.g., body temperature, heart beat, blood pressure) on their own.

Implementation of safe and effective mind–body therapies, (relaxation, stress management,biofeedback) as an essential part of a practical, holistic, integrative approach for an array of health-related problems, such as chronic low back pain,headache, insomnia, cardiac rehabilitation(prevention of postinfarction morbidity/mortality), management of disease-related symptoms in cancer,osteoarthritis, rheumatoid arthritis, and postsurgical outcomes, and treatment of hypertension give the following potential benefits:

- Promotion of self-efficacy and self-directed empowering
- Patient-centered care for significant cost savings
- and reduced utilization of health care services
- Improvement in function and quality of life
- Patient satisfaction
- Early return to work,
- Better health outcomes [18].
-

Medicine must shift from an exclusively "biomedical" model to "biopsychosocial" understanding of health and illness. Searching among physicians, medical students, and residents, following factors emerged as possible barriers to the integration of mind-body principles and practices in medicine:

1. Lack of scientific evidence about efficacy of mind-body/ psychosocial approaches;
2. Inadequate attention to psychosocial factors and dehumanizing aspects of medical education;
3. Tendency to reduce psychosocial factors against biological/ biochemical processes;
4. Creating a division between conditions perceived purely biological in etiology and psychological in nature;
5. Feelings of inadequacy to utilize mind-body interventions and lack of awareness of resources to refer ;
6. Lack of time to address psychosocial/mind-body issues;
7. Lack of third-party reimbursement for mind-body issues in medical encounter;
8. Belief that spending large amounts of time with patients addressing the psychosocial domain is not economically practical
9. Perception that psychosocial issues are beyond the immediate control;
10. Concern that more serious, life-threatening, biological aspects of patients might be underemphasized if too much weight or attention is given to psychosocial domain.
11. Lack of interest or motivation of patients to address psychosocial/lifestyle issues (eg, preference for "quick-fix" and symptom relief offered by more conventional, pharmacological approaches);
12. Belief(or larger culture's perception) that physicians are not trained to address interior lives of patients
13. Fear that patients might feel stigmatized if physicians suggest that psychosocial/mind-body factors play causal role in their symptoms [2].

Conventional science and quantum physics represent two different perceptions and explanations of reality. The conventional biomolecular framework assumes that the biocommunication is operated in living systems primarily from chemically mediated interactions.

The emergence of quantum physics led to new models for subatomic interactions. Besides significant implications for understanding the relationship between consciousness and human health, quantum theory may be implemented in a healing context by ıts underlying principles.

Quantum Physics–inspired models are proposed to describe a wide variety of the psychological and physiological processes that could not be explained or have been difficult to explain through traditional assumptions. Clinician's awareness of the application of quantum theory to human health, has the potential to enhance relationships, trust, and open communication to facilitate an integrative approach to patient through bi-directional flow of energy. [19,20].

Bıophysıcal Lıght

Antenna proteins, crucial components of photosynthetic process, transmit the excitation energy over a distance up to tens of angstroms to another molecule by the process of resonance energy transfer (RET) or electronic energy transfer (EET). Biophysical light interacts with the human self-organization of information by means of biomolecular, metabolic, or neural communication. The organization of any biological system, established in a complex electrodynamic field, is determined by its atomic physicochemical components, and their behavior and orientation.

The holographic model of reality, provides a scientific explanation of psychoenergetic phenomena. The human body vibrates between 4 and 10 Hz with amplitudes of 10 mm. The physiologic functions of the lungs ,joints and bones are directly influenced by certain combinations of sound vibratory levels through which the human body becomes a musical instrument. A new perspective in the development of electromedicine will reveal new pathways using the latent energies of human body [21].

Nonlocality

The principle of nonlocality is the potential remote relationship between separate particles regardless of how large or small is the system. Nonlocal influences don't diminish with distance, by known form of exchanged energy. The principle of nonlocality can be applied to explore distant healing and prayer between individuals across space and time. Nonlocality explains how the mind–body connection is impacted by intuition and intention.The visual agnosic patient is not able to tell what he is looking at, although it can be demonstrated that the patient can see the object. Prosopagnosic patients, that are neither blind nor intellectually impaired, can interpret facial expressions and recognize their friends and relations by name or voice, yet they do not recognize specific faces, not even their own in a mirror. Electrodermal recordings show that the prosopagnosic patients respond and react to familiar faces without awareness, but subconsciously register their significance. Quantum theory has reached the point where the source of all matter and energy is nothingness containing all the possibilities of everything that have ever existed or could exist [22].

Entanglement

The principle of entanglement tells that separate objects are actually interconnected eventhough their spacial distance excludes this possibility. Entangled microscopic particles in contact with one another can be observed at a distance as mirroring and providing information about the other's movement or spin. The well-documented psycho-physiological impact of neurophysiological effect is associated with the principle of entanglement. Belief and positive expectation can modify the stress response and lead to placebo responsiveness of many psychophysiological disorders such as hypertension, angina, inflammatory bowel disease, and asthma. The acute affective benefits of exercise (and other passive treatments) depend of the mental interpretation of the activity in which the participant is engaged, since the engagement in a pleasant activity yields positive effects.

All life experiences perceived as pleasant or beneficial trigger global positive changes. The information how to maximize the effect of training , shapes the exercise behavior and performance benefits related to both altered training routine (action) and the placebo effect stemming from thought-shaping information (expectancy). The placebo effect is a mind-set based on classical conditioning and trusted information from social resources. The invigorating feeling after exercise and the abundant media information about the benefits of exercise shape the individual's expectancy, which mediates the psychological effect of exercise. The placebo effects are psychobiological events attributable to over all therapeutic context. These psychosocially induced biochemical changes in a patient's brain and body affect the course of a disease and the response to the therapy [23].

Phase locking/coupling

Phase locking establishes coherent oscillation among atoms in order to facilitate long-range interactions and energy storage as the key principle of energy resonance and information transfer in humans. In quantum field theory, phase locking facilitates order, coherence and collective modes of communication as an internal antenna that enables a person to exhibit self-awareness and coordination. The electrical activity of neurons oscillating simultaneously at the same frequency in separate parts of the brain is an example of phase locking. The principle of phase locking has demonstrated the role of neural synchronicities as a mechanism for neural integration of cognitive tasks. Synchronisation has become a major scientific tool to explain biological order at many levels of organisation.

Synchronised and suprathreshold oscillatory neuronal activity within and between distributed neuronal assemblies is acknowledged as a fundamental mode of neuronal information processing. Coherent neuronal oscillations correlate with all basic cognitive functions, mediate local and long-range neuronal communication and affect synaptic plasticity. Two different kinds of physical substances significantly interact with each other. Purposeful coupling of matter and waves occurs in sub-cellular fields, resulting in self-organization.The quantum processes in protein dynamics and coherent ordering in cell cytoplasm suggest that microtubules function as quantum computational devices, and that mesoscopic and macroscopic quantum states are characteristic for living systems. Coupling is the key mechanism in information transfer between the energetic mind and brain. The exceptional electrical polarity of biological objects and long range interactions play a basic role in the endogenous electromagnetic field generated by the excited longitudinal polar oscillations of microtubules in eukaryotic cells. The electrodynamic field plays an important role in establishing coherence, directional transport , organization of morphological structures, interactions, information transfer, and brain activity. Cancer transformation is in a way a pathological reduction of the coherent energy state. Malignancy, local invasion or metastasis are a direct consequence of mitochondrial dysfunction and disturbed microtubule polar oscillations in the generated electromagnetic field [24].

Electromagnetic coupling is a mechanism of information transfer between individuals. Psychophysiological coherence refers to a synchronisation between positive emotions, and cardiovascular, respiratory, immune and nervous systems. From cardiovascular perspective, it is characterised by a heart rhythm pattern of elevated amplitude in low frequency heart rate variability of around 0.1 Hz, indicating harmony between sympathetic and parasympathetic divisions of the autonomic nervous system (ANS). From immune and hormonal system perspective, it is associated with dehydroepiandrosterone (DHEA), an energy renewing growth hormone that balances the stress hormones.

From neurophysiological perspective, it synchronises with the alpha band width on the electroencephalograph. Psychophysiological coherence has emotional, social, mental, spiritual, ecological and performance benefits. The heart, generates the most powerful, comprehensive, rhythmic electromagnetic field and like the orchestra conductor, synchronises neurological, biochemical, biophysical and energetic information of nerve impulses, neurotransmitters, hormones, pressure waves and electromagnetic field interactions.

Derived from Latin term movere [to move], the word "emotion" literally means "energy in motion". In phenomenological terms, emotion is the experience of moving energy through the bodies generating ANS related physiological and mental reactions, such as strong feelings of love, joy, sorrow or anger.

Feelings refer to a vast array of subtle conscious experiences and sensations. In itself, emotional energy is neutral. It is the physiological reactions, feelings and thoughts that give the meaning to the emotion. Reactive emotional energy manifests in brain activity before thought. Humans tend to evaluate everything emotionally, perceive first and think later.From physiological perspective, the brain, heart and intestines contain biological oscillators as pacemaker cells, whose rhythms can be modified through conscious intentionality.

For the brain and nervous system to function, the neural activity, which encodes information, must be stable and coordinated and the various centers within the brain must dynamically synchronize their activity for information to be smoothly processed and perceived.Coherence is also used to describe the coupling and the degree of synchronization between different oscillating systems. When two or more oscillatory systems operate at the same basic frequency, they can become either phase or frequency-locked which is called cross-coherence. In physiology, cross coherence occurs when two or more of the body's oscillatory systems, such as respiration and heart rhythms, become entrained and operate at the same frequency.

Global coherence does not mean that everyone or all the parts are doing the same things simultaneously. In complex global coherent systems, such as human beings, there is an incredible amount of activity at every level of magnification or scale that spans more than two thirds of the 73 known octaves of the electromagnetic spectrum. In living systems, there are micro-level systems, molecular machines, protons and electrons, organs and glands each functioning autonomously, doing very different things at different rates, yet all working together in a complex harmonious coordinated and synchronized manner. The brain rhythms operate over a wide range of frequencies,exhibiting various degrees of synchronized activity with the heart, which has much slower rhythms than the brain. When heart rate increases, the activity and amplitude of the brain waves also increase. Coherent heart rhythm increases heart-brain synchronization [25].

Auto-coherence describes coherent activity within a single system that exhibits sine wave like oscillations. More stable the frequency, amplitude and shape, higher is the degree of coherence. Increased coherence in a system coupled to other systems, push other systems into increased synchronization for more efficient function. Frequency pulling and entrainment are seen between heart and brain frequencies, respiratory and blood pressure and craniosacral rhytms and SKIN electrical potentials. So the coherent state is correlated with well-being, and cognitive, social and physical performance improvements. Physiological coherence describes the degree of order, harmony and stability in various rhythmic activities within living systems over any given time period. This harmonious order signifies a coherent system, whose efficient or optimal function is directly related to the ease and flow in life processes. By contrast, an erratic, discordant pattern of activity denotes an incoherent system whose function reflects stress and inefficient utilization of energy in life processes. Positive emotions such as appreciation and compassion, as opposed to negative emotions such as anxiety, anger, and fear, are reflected in heart rhythm pattern. Emotions modify the activity of the body's physiological systems, and beyond their pleasant subjective feeling, heart-felt positive emotions and attitudes provide a number of benefits that enhance physiological, psychological, and social functioning [26].

Naturally emerging coherence increases harmony in the energetic system (referring to the functions that cannot be directly measured, touched or seen) with the activation of heart-felt positive emotions such as appreciation, compassion, care and love. This increased coherence and alignment facilitate the body's natural regenerative processes. Physiological coherence, referred as heart or cardiac coherence or resonance is a functional mode, measured by heart rate variability (HRV) analysis where a person's heart rhythm pattern becomes more sine-wave like ordered at a frequency of around 0.1 Hz (10 seconds). Another aspect of coherence mode is the phenomenon of resonance, that occurs in an oscillatory system when there is a large sudden increase in amplitude at a specific frequency. The frequency of amplitude increase is defined as the resonance frequency of the system. The resonance frequency of the human cardiovascular system is determined by the feedback loops between the heart and the brain . In humans and in many animals, the resonance frequency of the system is approximately 0.1 Hz. Coherence and resonance are characteristic of natural physiological state associated with heart-felt positive emotions. Physiological coherence embraces several related phenomena –auto-coherence, cross-coherence, synchronization, and resonance – all of which are associated with increased order, efficiency, and harmony in functioning of the body's systems. When one is in a coherent state, it reflects increased synchronization and resonance in higher-level brain systems. Psychologically, coherence reflects increased emotional and perceptual stability and alignment among the physical, cognitive, and emotional systems. Coherence and resilience are closely related to physiological and psychological processes, that are states rather than traits varying over time as demands, circumstances, and level of maturity change.

Physical resilience is reflected in physical flexibility, endurance and strenght while emotional resilience is one's ability to self-regulate the degree of emotional flexibility, positive emotions and relationships. Mental resilience is reflected in attention span, mental flexibility, and ability to integrate multiple points of optimistic world view. Spiritual resilience is typically associated with commitment to core values, intuition, and tolerance of others' values and beliefs. In a coherent state, increased physiological efficiency and alignment of mental and emotional systems accumulate resilience across all four energetic domains. Having high level of resilience is important not only for recoupling from challenging situations, but preventing unnecessary stress reactions (frustration, impatience, anxiety).Coherence pertains homeostatic balance in healthy individual, representing harmonious interactions of the body′s subsystems, with external relationships, and implies global order, structure, harmony, and alignment within and amongst systems. Coherent electromagnetic fields form stable patterns of biological rhythms in coupled states, resulting in synchronized oscillations. Biocommunicative processes in biology rely on coherent oscillations to induce biochemical reactions [27].

Conclusion

A mind getting aware of the reality, can command over his body. This does not mean to cope with or to ignore it by distracting but by truly knowing. Actually, there is no duality of mind and body or spirit. The human being explains the psychology and somatic diseases by separating the somatic body and psyche. In ancient traditions, the individual was taken as a psychological being. The modern medicine divided the body and the mind, but recently a trend toward personalized and holistic approach especially in traditional and complementary medicine integration considering the human being a bio-psychological-social and spiritual being, has been emphasized.

Quantum theory which has replaced mechanistic theory, forces to revise the current medical approach in favor of human

being and reconceptualize the patient-doctor communication, diseases and therapeutic modalities, reconsidering the patient a wholebeing, visualising his environment with relatives, parents, families, friends, neighbors etc. and the mind's power.

If the body does not exist, the brain would not have existed. Without the existence of the brain,the mind would not have existed. Finally, there are no two different identities. The brain-a part of the body , but is also the control center at the same time. It is not just a somatic anatomical body but also an electromagnetic field which surrounds in a colorful aura.

Getting through informational channels , it will be possible to detect and treat the disturbances at energy level in vibrational medicine. The disturbances can be found at early stage and cured without pharmacological or invasive interventions;complications, nor side effects, unlike by the current methods.

Instead of cure, the patients are presently labelled with a disease and become life time dependent on medicines, and need more medicines to suppress the side effects.Just a confidential and trustful communication can be the main method to help and heal the patient ,instead of replacing the patient as a virtual identity with a set of symptoms and signs supported by biochemical or microbiological analyses to get with radiologic images or electrical measurments.

References

1. Vıtetta L,Anton B.,CortızoF.,et al. (2005) Mind–Body Medicine Stress and Its Impact on Overall Health and Longevity. Ann. N.Y. Acad. Sci 1057: 492–505.
2. Astin JA., Shapiro SL, Eisenberg DM, et al. (2003) Mind-Body Medicine: State of theScience, Implications for practice. J Am Board FamPract 16: 131-147.
3. Mackenzıe M (2018) TheYogācāraTheory of Three Natures: Internalist and Non Dualist Interpretation.Comparative Philosophy 9: 18-31.
4. NiedenthalPM (2007) Embodying Emotion. Science 316: 1002-1005.
5. Nummenmaa L , Glerean E, Hari R, et al. (2014) Bodily maps of emotions. PNAS 111: 646-651.
6. Lee YS, Jung WM, Jang H, et al. (2017) Y. The dynamic relationship between emotional and physical states: an observational study of personal health records. Neuropsychiatr Dis Treat 13: 411-419.
7. Irwin MR,Miller AH (2007) Depressive disorders and immunity: 20 years of progress and discovery. Brain, Behavior and Immunity 21: 374-383.
8. Carlet J, Rambaud C, Pulcini C (2014) Save Antibiotics: a call for action of the World Alliance Against Antibiotic Resistance (WAAAR). BMC Infect Dis 14: 436.
9. Patryn R, Jarosz M J, Włoszczak-Szubzda A, et al. (2011) Considerations on Directive 98/8 of the European Commission – the biocide directive. Ann Agric Environ Med 18: 452-458.
10. Bhugra D, Ventriglio A (2017) Mind and body: physical health needs of individuals with mental illness in the 21st century. World Psychiatry 16: 47-48.
11. Dantzer R. (2018) Neuroimmune Interactions: From the Brain to the Immune System and Vice Versa. Physiol Rev 98: 477–504.
12. Cohen BE, Edmondson D, Kronish IM (2015) State of the Art Review: Depression, Stress, Anxiety, and Cardiovascular Disease. Am J Hypertens 28: 1295-1302.
13. Lopez C, Antoni M, Penedo F, et al. (2011) A pilot study of cognitive behavioral stress management effects on stress, quality of life, and symptoms in persons with chronic fatigue syndrome. J Psychosom Res 70: 328–334.
14. Murphy J, Brewer R, Catmur C, et al. (2017) Interoception and psychopathology: A developmental neuroscience perspective. Dev CognNeurosci 23: 45-56.
15. Kiecolt-Glaser JK (2018) Marriage, divorce, and the immune system. Am Psychol 73: 1098-1108.
16. Gray JM, Rasanayagam S, Engel C, et al. (2017) State of the evidence 2017: an update on the connection between breast cancer and the environment. Environ Health 16: 94.
17. Gaiseanu F (2018) Information: from Philosophic to Physics .Concepts for Informational Modeling of Consciousness. Philosophy Study 8: 368-382.
18. Courtney L, Crawford C, Hickey A (2014) Active Self-CareTherapiesforPain (PACT) WorkingGroup. Mind–Body Therapiesforthe Self-Management of ChronicPainSymptoms. PainMedicine 15: S21–S39. WileyPeriodicals, Inc.
19. Bonilla E (2013) Distant mental influence on living organisms. Invest Clin 54 : 427-54.
20. TurnerP, Nottale L., Zhao J. et al. (2020) New insights into the physical processes that underpin cell division and the emergence of different cellular and multicellular structures. Prog. Biophys. Mol. Biol 150: 13-42 .
21. Atmanspacher H,Filk T (2013) TheNecker–ZenoModel for Bistable Perception .Topics in Cognitive Sciences 5: 800-817.
22. Stewart-Williams S, Podd, J (2004) The placebo effect: Dissolving the expectancy versus conditioning debate. Psychological Bulletin 130: 324-340.
23. Pokorný J (2013) Postulates on electromagnetic activity in biological systems and cancer. IntegrativeBiology 5: 1439–1446.
24. PlankarM ,Brežan S, Jerman I (2013) Theprinciple of coherence in multi-level brain information processing. Progress in Biophysics and Molecular Biology. 111: 8-29.
25. McCratyR, Deyhle A, ChildreDL (2012) The global coherence initiative: Creating a coherent planetary standing wave. Global Advances in Health and Medicine: Improving Healthcare Outcomes Worldwide 1: 64-77.
26. Schiepers O JG,Wichers MC, Maes M (2005) Cytokines and major depression.Progress in Neuro-Psychopharmacology and Biological Psychiatry 29: 637-638.
27. Luthar S (2015) Resilience in development: A synthesis of research across five decades. In Cicchetti, D., Cohen, D. J. (Eds.), Developmental Psychopathology: Risk, disorder, and adaptation.2015: 739-795).

Citation: Cengiz Mordeniz. Mınd-Body Interactıon. J Clin Neuro Res, 2022 2: 1-7.