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# What is a human being

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## Abstract

The paper investigates the whatness of a human being. Essential features are presented from point of view such sciences as neuroscience, philosophy, physiology, quantum mechanics, psychology, communication and computation. One chapter is dedicated to the brain topology and another one to the consciousness. Theories of aging are discussed. Psychological profile of a human-being is addressed in detail including the phenomenon of the self. An important subject of the article is the body internal communication. This is review, based on many sources, as an attempt to mark possible answers to some never-ending or only partially answered questions that need further research to name unnameable things. One innovative chapter pays attention to transcendentals named metasymbols of life. There are, at the end of the paper, remarks on the passing of life.

To provide concise form of definitions author has applied the notation taken from his formal language OSL (Object Specification Language).

## Keywords

*essence of human life, quantum space, theories of consciousness, brain structure, brain processes, body communication, biological networks, neural networks, biological quantum processes, peptides, morphic resonance, microtubules, human-being systems, nervous system, aging, self, mind, transcendentals-metasymbols of life, happiness, phenomenon of the "flow", biocomputation, natural computing, human bioenergetic system.*

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## Introduction

A human being seems to be commonly readable object because we humans should have known ourselves. The devil is hidden in the details which are presented in different ways by philosophy, physiology, psychology, neuroscience, medicine etc. The task is unbelievable complex because life machinery has been started from the cellular molecular-genetic level up to complicated variety of networks (neural, quantum, peptides) and becomes effective at mind and visible at external behavior levels. Some relations between mentioned above processes have not been known yet.

A phenomenology [26], holistic approach and medical engineering seem to be the way to make the essential progress in research. Strong attention is paid recently to quantum biological processes and their role in phenomenon of consciousness.

The bio-quantum research would include the solution similar to BCI (Brain Computer Interface) by using medical devices with sensors capable to register streams of quantum waves in the body. It is important because the quantum mechanics probably determines the shapes and properties of molecules like neurotransmitters and proteins that affect how the brain works.

Human-being behaviour may be seen sometimes (e.g. state of psychological "flow") as output of invisible "secret" forces. These forces act not only at the level of tissues and neural networks, but also in deep internal atomic and intra-atomic structure upon the quantum mechanics. Wolf A.F. [95] believes that such research will enable us to understand ourselves as quantum biopsychosocial beings.

Despite of progress in research many things remain unexplored and mysterious. A consciousness belongs to this category. McFadden J. [50] known for his theory of quantum evolution - CEMI (Conscious ElectroMagnetic Information), claimed that consciousness arises in an electromagnetic field generated by the brain when activated neurons not only transmit electrical signals to other cells through neurotransmitters but additionally emit electromagnetic energy that penetrates the surrounding tissue. This energy carries with it information in the form of quantum waves.

According to another theory consciousness arises as a result of decoherence in the quantum space of a person due to the action of phonons or is associated with the existence of higgs-fields. Some scientists claim, that consciousness does not exist as state of the brain but is a temporary flow of information collected on demand (decoherence?) from many parts.

The answer to question "what parts of brain are responsible for consciousness?" has not been clear yet. The hypothetical list includes posterior-cortex or prefrontal-cortex or thalamic-reticular-network. In this context should be paid attention to higher-order thought theory that claims that thinking is reflected in activity of the dorsal lateral prefrontal cortex.

The resonance theory of consciousness states that it acts using a specific mechanism of electrical synchrony and shared resonance of gamma, beta and theta waves that leads *micro*-conscious entities to combine into *macro*-conscious entities and allows different parts of the brain to achieve a phase transition in the speed and bandwidth of information flows between the constituent parts [34]. It is similar to neural network technology of "all or nothing way" when connections are made by activation of neural circuits (neurons<sup>1</sup> or fields<sup>2</sup>) having required action potential.

The quantum school explains consciousness by applying quantum theories and explains that consciousness has a quantum origin, is non local and creates our perceived reality from vibrating entities that can have multiple versions based on the observer's perception.[22]

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1 MUA and SU signal aquisition

2 LFP signal aquisition

The late (2023) research [73] suggested that the shape of the brain is more fundamental constraint on dynamics than complex intercortical connectivity. It opens the question of important role of quantum mechanism in raising of consciousness (as complementary to neural network wiring) particularly by quantum waves associated with thoughts and feelings.

A consciousness is a very complex phenomenon acting by several cognitive information flows: associative, reflexive, perceptual, emotional, verbal, analytic. It uses complex changeable neural networks and could be assumed that works also thru quantum space using mechanisms of superposition and entanglement. There are many theories and hypothesis in that topic- see section 8 (pp.22-27).

*Carr B. [72]:* "Even if quantum theory does involve consciousness in some way (..) it merely replaces one mystery by another. Thus, one probably needs some deeper paradigm."

*Blackmore,Troscianko[77]:*"It is the problem of how to cross the 'fathomless abyss' or 'chasm', or how to bridge the 'explanatory gap' between the objective material brain and the subjective world of experience. (..) Some argue that new physical principles are needed to solve the hard problem, mysticians believe it can never be solved."

It would be questionable if all "hard problems" might be explained only by understanding the computational or neural mechanisms involved.

## 1. WHAT IS A HUMAN LIFE

The word "being" signifies either the substance, nature, and essence of anything existent or a property common to all that which can rightly be said to be (*Gilson E.[68]*).

The subject of human-being is well represented by following multi-dimensional expression:

```
human-being{
  life(biological,mental),
  biological-life(biochemical-processes),
  mental-life(consciousness,self-consciousness,subconsciousness,intuition,..),
  space(living-space, perceptual-space(senses),environment),
  living-space(psychological,social,educational,professional,financial,..)
  time(inner<!body internal time>,mental<!conscious-time>),
  <!inner time & mental time work together in case of self-consciousness>
  inner-time-marker(cell-telomere-length),
  mental-time3[present-flow(events=>cognitive:conscious-states=>information-states),
    conscious-states(primal-impression,retention,protention)4
    backward-view(recollection),
    forward-view(expectation,planning,dreaming),
    no-time(coma,..)],
  event-type[(task(operation(process(action(act))))),(trigger,<duration>,closer)],
  event-time-state(standing<!not moving in time>,moving)
  event-streaming[(simultaneous,sequential),(single,multiple),(iterative,recursive),
    (distributed5,local)]
  event-connection(time-like<!cause-and-effect related>,space-like)6,
  life-history[aging-curve,events(<birth>,social,health-illness,education,job,critical,<death>)]}
```

3 We don't mention here the features of physical time.

4 Processes of time-consciousness - according to Husserl [60]

5 e.g. quantum entanglement & superposition

6 *Wolf F.A.[99]:* Events are "timelike" when anything material can connect one event with the other, so they are cause-and-effect related. Events are "spacelike" when nothing material can connect one event with the other.

A "mental-time" is a conscious experience expressed as the flow of cognitive-conscious-states. 'Orch OR' theory (Hameroff S., Penrose, R. [20]) suggested that consciousness is a sequence of quantum state reductions i.e. self-collapses of the quantum wavefunction 'orchestrated in microtubules inside brain neurons.

A part of mental-life is the internal experience of one's existence that could be described as the "sense of self" or self-consciousness and is used to refer to ourselves *as such*. In psychology self-consciousness is a tendency to introspect and examine one's inner self and feelings and can result in self-monitoring and social anxiety.

Life is the most important thing for a human because there is only one chance to get it. From a biological point of view, the life of mammals - which we are - is a common and typical phenomenon in the organic world. Chemically and molecularly, a human being is one of many many millions or billions objects of a similar type, so he has many smaller and bigger brothers. All - "they" and "we" humans - are links in the same chain that unites the organic world into one. Let us develop in harmony with nature and not destroy the environment, let us not fight with each other except what is a necessary struggle for existence. Let us not only tolerate each other but support also.

We had not known much about human species until last century. The discovery (in 1953-1954) of the double helix structure of DNA and the human genetic code was extremely important. We know that not everything depends on a single individual, but comes from family generations. We inherit talents, diseases, and upon some researchers even consciousness. We could say a long as we have successors we remain largely immortal.

What brings human to the top of mammals is a nervous system with built-in consciousness, subconsciousness, intuition and various secret mechanisms including quantum phenomena. A mental identity is formed through ontogenetic memory, genetic memory (derived from an individual DNA), stored connections with the external world (temporal, past events and experiences) and phylogenetic memory, containing hereditary connections between stimuli and responses.

Self-consciousness is "that" what is being read in our mind at a given moment. Particularly noteworthy are the states of superconsciousness, immersion, ecstasy, daze, fascination referred as "flow" and sometimes supra-psychic orgasm. For many people these states are moments when feeling of happiness is experienced.

Internal concentration in the state of "*FLOW*" is so intense that there is no room left for thinking about anything unrelated to the activity being performed, or about extraneous problems. Self-awareness disappears and the sense of time is disrupted. A pure example of this could be the state of a himalayan after climbing a hitherto unconquered peak. All that matters is that moment and nothing else! There is a loss of self-awareness and sense of time.

The "flow" phenomenon was studied by M.Csikszentmihaly [1] and described as a manifestation of optimal fulfillment or engagement characterized by following features:

- joy, deep concentration, emotional fluidity, a heightened sense of self-mastery, lack of self-consciousness and self-transcendence (the whole body and mind are engaged), the senses merge, the self opens up, and life reveals an inner richness and joy of being,
- concentration and focus on a limited field and personal control over a particular situation or action,
- loss of self-awareness and self-care,
- a distorted sense of time.

An important prerequisite for achieving a state of flow is the absence of distractions because they could cause a return to reflective mode and force the exit. The phenomenon of "flow" is a state of joy, creativity and total commitment, no problems and a joyful feeling of transcendence.

## 2. HUMAN BEING HAS MANY FACES



*Sculpture in Decius Park in Cracow<sup>7</sup>*

Living is like being in the war, we need to learn the art of behaviour, how to resolve conflicts, make compromises, establish cooperation, how to lose but not give up... . In critical situations, we need to take adaptive strategies to facilitate psychological or social survival ... Let's learn to banish the anxiety, because it takes us over due to disrupted communication, tense muscles and over-stimulation.

In extreme cases (e.g. life threatening) anxiety petrifies us, leads to complete immobility and confinement (dissociation, fainting, escape into "non-existence" - we can even stop breathing then). Our autonomic nervous system then shifts from the "fight" state to the "flight" state. In the face of extreme danger we behave like animals pretending to be dead, because the neuroception activates defense mechanisms without the participation of consciousness. So this case shows that multifaceted nature of humankind is *sine qua non* to be alive.

In normal - not extreme life - the situation is also not brilliant because *we have created a kind of prison for ourselves*. We are prisoners of habits, views, prejudices, cultural and social norms ... Coming out to oneself requires psychological opening up, throwing off the cover formed by surroundings and freeing oneself from the "hypnosis" of many social conditions.

Francis Bacon [1561-1626] called these environmental conditions as "idols:"

- tribal (*idola tribus*) - imposes on member an often irrational and alien attitude to his surroundings,
- civilizational (*idola specus*) - upbringing, technology, culture and tradition
- theatrical (*idola theatri*) - we take for reality what is contained in the vision of the world shown; sometimes we pretend even to be someone else!
- public forum (*idola fori*) - we take for reality what is contained in the words.

*Finding oneself* requires shedding everything extraneous and quieting one's inner self, and this can be achieved, for example, through natural wordless meditation and emotional impressions evoked by images, poetry and music.

Afterwards we can touch our roots, look deep inside ourselves and "feel" the functioning of our internal organs. We gain a sort of "third eye" capable of extrasensory cognition. We can then better absorb knowledge, evaluate it and assimilate what suits our personality, and above all, establish a relationship with ourselves.

<sup>7</sup> Sculpture made by B.Chromy, photo by author

Let's *verbalize less* (since words artificially encapsulate what is indefinable, what weaves and develops within us) and *feel more* ourselves.

Let's find solitude and "thinking about nothing"... Let's accept ourselves, because without this there is no rapprochement and we would not know our inner "essence".

'*Being ourselves*' means using what we have within us, i.e. our own qualities, and all this being can only be done at the present time, because we are 'now' and not 'yesterday' or 'tomorrow'. When we accept our qualities and respect what we possess, we give evidence of love for ourselves. Respect is the basis of love and any relationship, whether with another human being, an animal or a plant.

'*Being ourselves*' should not be mixed with '*being oneself*' despite that the both expressions might be treated as synonyms. The first denotes the social attitude to the self, the second means that you are truehearted to yourself. *Being oneself* requires inner tranquility, which is good for the process of life extension. With quieting, we free ourselves from the domination of the outside world and merge into the inner subconscious self.

We recognize inner tranquility by such *signs of inner peace* as :

- spontaneous thinking and acting not caused by anxiety
- the ability to rejoice in every moment (a sense of joy is more important in prolonging the length of life than a fighting spirit)
- non-judgment of oneself and other people
- not causing conflicts
- not worrying and not suppressing (e.g., through anger) negative emotions which
- counteracts the formation of resentment and hatred
- frequent moments of gratitude
- contentment in dealing with nature and people
- frequent smiling
- love and respect for oneself (without loving oneself it is difficult to win the love of others)
- sensitivity to love shown by others
- a tendency to accept developments beyond one's control,
- the courage to change those things over which we have influence, t
- the ability to forgive oneself (among other things, as a release from self-blame) and others.

Let's make more room for intuition, sympathy and empathy, and so allow the natural constructive development of our personality. Let's open ourselves, without the help of a museum guide or musicologist, to painting and music - let's perceive them directly, just as we used to when we were children. Let's not cultivate a cult of technology - let's not devote all our free time to such technical gadgets as cell phones, computers and cars - let's treat them only as a service tools and not as a "hobby." Let's maintain feelings of trust, closeness, respect for our own bodies, love, friendship, attachment.

It seems to be ideally if humans have returned to pure human "nature", but we don't really know what the human nature is. S.Freud claimed controversial statement that human is driven by libido and is dominated by inclinations to evil (doing evil gives satisfaction), aggression and destruction. Others opposed and claimed that the essence of man is love for himself and others.

We should prefer a "straightforward" attitude based on fulfilling ethical human values such as goodness. A.Schweitzer called it *elementary thinking*, which means only respect for what strengthens the chances of human survival, which is in our instinct for self-preservation.

### 3. HUMAN BEING AS A SYSTEM

Human being is a product of long evolution lasted over several million years and resulted of with very complex physical and functional structure. The human body at average consists of about 30 trillion "own" cells (mostly red blood cells) and more than 39 trillion "foreign cells" such as bacteria, viruses, fungi and archaeons. The most complex part is a human brain, containing nearly 100 billion neurons, working in neural networks along with quantum *cellular microtubules ones*.

*The brain "feels" the changes and reacts thru* neurotransmitters, neuropeptides and quantum phenomena. Instructions for actions are the DNA database<sup>8</sup> and ontogenetic experience (relations between events and objects) stored in neural networks. So, we could assume that *state and behaviour of human-being mostly depends on built-in DNA and links created in neural networks*. According to Kandel E.[4] gene products (mRNA molecules and proteins) are delivered to the specific synapses whose activation originally triggered the gene expression.

Schrödinger E. [69] approached the gene as an almost perfectly stable physical substance that had immense variety and appreciated it saying "incredibly small groups of atoms, far too small to strictly subject to statistical laws, play a dominant role in the orderly processes and events taking place in a living organism".

In [70] he explains more: "How can we, from the point of view of statistical physics, reconcile the facts that the gene structure seems to involve only a comparatively small number of atoms (of the order of 1,000 and possibly much less), and that nevertheless it displays a most regular and lawful activity—with a durability or permanence that borders upon the miraculous"?

Viewing the human-being as a whole we can state that he is an independent self-contained object capable to perform simple and complex functions, albeit directed genetically and by the custom and culture. He operates under conditions of social communication but has to deal on its own.

*Cavanna A.[98]:* A human-being is the only system in the universe not directed by entropy because the free will which enables redirection of neural flows.

A human being as a biological system is selfcontained and equipped with advanced cognitive capabilities. It operates on-line (in real time) and is aimed to maintain stability (homeostasis) against the changes issued by the flow of matter and energy generated by internal and external factors.

This stability works thru body sensors and internal body communication channels.

There are following body sensors in perceptual space:

*perceptual-space[sight(eyes),sounds(ears),smell(nose),taste(tonque),touch(skin),pressure,itch, temperature(thermoceptor), body-position(muscle\_sensors),muscle-tension(muscle\_sensors), balance(innerear),blood-acidity,pain(nociception),body-awareness(proprioception), blood-hormones&drugs(chemoreceptors),magnetoreceptor,time-receptor]*

Sensors are widespread throughout the body including exteroceptors (contacting with the outside), interoceptors (detecting information from internal organs and processes) and proprioceptors (detecting sense of position and load). Receptors are the sensing elements that communicate a signal from the ligand to the cell to elicit a specific physiological response. A ligand is a molecule (*neurotransmitter, opioid peptide, hormone, etc*) that can bind to the receptor and produce a specific response.

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<sup>8</sup> Human genome contains 2.9 billion DNA base units. The full human genome sequence was defined in March 2022

Perceptual system builds information from relations between sensory signals and actions, forming a structured (circular, dynamic) internal model in the brain. (Brette R.[97])

“Engines” of human communication are rooted to personal consciousness, subconsciousness and ad hoc somatic response actions<sup>9</sup>, all anchored in central, enteric and peripheral nervous systems.

communication-engines[personal(consciousness(mind,..),subconsciousness(instinct,intuition,..)),  
social-consciousness,cosmic-consciousness(astral-body)<sup>10</sup>]  
communication-signal-type[(magnetic,electro-magnetic,electrical,chemical,enzymes,proteins,  
fluid/blood-flow,quantum-particle)  
messenger-molecule (transmitter,hormon,immunotransmitter, growth-factor,..)  
transmitter[(neuropeptide#100),neurotransmitter(#60)]

Most neurons use classical neurotransmitters (such as glutamate and monoamines) and peptide transmitters. They may co-exist in the same neurons.

*Peptides* play important cell-to-cell communication role as hormones and neurotransmitters, associated with such behaviours as maternal behaviour and pair bonding, heart rate regulation, food intake and growth, gut & muscles modulation and many others. Neuropeptides are chemical messengers made up of small chains of amino acids that are synthesized and released by neurons of the central and peripheral nervous system.

*Neuropeptide nanomolar signaling* is more sensitive than brain neurotransmitter in micromolar size. Peptide cell-to-cell communication is triggered by depolarization of the cell and then peptides are released thru dense core vesicles. Neurotransmitter also needs action potential and its job is to carry signals from one neuron to the another nerve cell (modulatory neurotransmitters can send messages to many neurons at the same time), a muscle cell or a gland.

Quantum processes in a human-being body are the part of biological computation capable to process many different types of “data” (analog with different substances) dispersed over the body and noisy [27].

A crucial role in this variety play information transducers encoded in the limbic-hypothalamic system. They transform information from one form into another one, particularly encode the phenomenological experience of “mind” and emotions into the hormonal “messenger molecules” of the endocrine system.

This limbic-hypothalamic system filter coordinates all the major channels of mind-body regulation via the autonomic, endocrine, immune, and neuropeptide systems. Messenger molecules (neurotransmitters, hormones, immunotransmitters, etc.) flowing through these channels are the structural informational mediators of mind-body communication and transformation [36].

**Behaviour of human** is easy to observe but internal "engines" of behaviour are complex and seen sometimes as unclear phenomena (mainly mind & consciousness) that need further research.

{behaviour-centre[consciousness(mind,..),subconsciousness(instinct,intuition(trust,love,hate) ..),  
social-consciousness,cosmic-consciousness(astral-body)]  
mind[wisdom(thinking,reasoning,learning,recognizing,ability to communicate),knowledge,...]]}  
{behaviour processes[thinking,emotions,info-retrieval,memorizing,intuition,communication,..]  
emotion(love,hate,satisfaction,frustration,agression,enjoyment,anger,fear,regression,inferiority,..)}

<sup>9</sup> In this paper we dont touch body defensive actions in case of inflammation, injury etc.

<sup>10</sup> Hypotetical assumption - *Might be the case of entanglement* -inspired by Hugh Everett concept of „Many-Worlds”[18]..



**System of human-being consists of many subsystems <sup>11</sup>**

*human-being-system*{[bio-physiological,communication,bioenergetic,computation, ..]  
 [bio-physiological(nervous,cerebrospinal,cardiovascular,digestive,respiratory,urogenital,limbic,  
 lymphatic,endocrine,osteoarticular,skeletal,motor-muscular, immune,  
 secretory,ureteric,visual, ..)]  
 [communication-systems(ANS,ENS,PNS,perceptual-system,..)]  
 [communication-type(internal,external(individual,social))]}  
 }

Subsystems are tightly interrelated. The base for communication are listed above bio-physiological subsystems. For example the endocrine one release hormones that travel via the bloodstream to different organs to regulate metabolism, growth, mood, and other key aspects of mental and physical health.

$\Sigma$ neural network, $Q$ quantum space, $\Omega$ peptide network,
$\Xi$ neural subnetwork, $\Theta$ gene-network, $\mu T$ cellular microtubules network
$\Sigma(\Xi)$ <! $\Xi$ branch of network $\Sigma$ /subnetwork> $\Xi(Ix,Mx,Ox)$ <!layers I,M,O -input,middle,out>
$Q[\omega(? ?)(<contents><object1>,<object2>)]$ <!entanglement relation>
$Q[\omega(? ?)(<contents><object1>,<object2>)]$ <!entanglement relation>

<b>NS</b> [CNS,ANS(ENS,.),PNS]	Nervous System
CNS	Central Nervous System
ANS	Autonomous Nervous System
ENS	Enteric Nervous System
PNS	Peripheral Nervous System

{[*nervous-system*(CNS,ANS,PNS]  
 CNS(brain,spinal-cord)  
 spinal-cord(cervical,thoracic,lumbar)  
 ANS(entericNS,sympatheticNS,parasympatheticNS)  
 parasympatheticNS(dorsal motor nucleus,vagus,...).  
 vagus-action(heart-rate rhythm, "face-heart connection", "fight or flight" behaviors,...)  
 ENS(neurons(sensory,motor,inter),,,)  
 PNS(ventral-horn neurons,dorsal-root ganglion neurons,...)}.

The PNS includes cranial (vagus), spinal, and autonomic nerves and also their ganglia, and associated sensory and motor endings.

Relation between central, autonomous (ENS and vagus play the main role<sup>12</sup>) and peripheral systems is bidirectional and includes probably quantum as well as standard neuron actions.

*CNS* <=>(≈, $\Sigma$ ) *PNS*

*ANS.vagus*<=>*PNS* <!Vagus transmits parasympathetic signals to and from the heart, lungs, and digestive tract>

PNS consists of nerves coming from CNS (brain & spinal cord ) to body parts.

ENS is capable of operating via the vagus independently of the brain and spinal cord. It controls the motorfunctions of the system and secretion of gastrointestinal enzymes.

<sup>11</sup> To describe subsystems we used OSL notation - see the appendix.

<sup>12</sup> Polyvagal theory [43] appreciates the role of the vagus nerve in emotion regulation, social connection and fear.

#### 4. BRAIN "Scientists know both a lot and very little about the brain"

A brain is the main part of the nervous system. Electrochemical signals flow through neural networks has usually complex mapping and functionality<sup>13</sup>. A good example of the scale of communication is the largest transmitting cable (corpus-callosum) made of some hundred million<sup>14</sup> axons, that links the two hemispheres [71].

A brain is the most important, interesting and mystic organ of human system. Researchers have been trying to explore this "territory" by means of brain-machine/computer-interfaces (BCI) and mathematical models of networks. There are many neural networks in our body, but at present detailed mapping is known only for some of them. This task has been expanded and complicated when including the quantum approach in research.

A complexity of brain and its networks is very high (almost hundred billions of neurons & trillions of connections) and activity of them is classified as a biological computation. Connections are made by activation of neural circuits (neurons<sup>15</sup> or fields<sup>16</sup>) having required action potential and triggered by many events (emotion, motor imagery signals, narrative speech, stress, psychotherapy, medications internally acting mostly thru biomolecules<sup>17</sup>). A response from the target cell are the generation of an action potential, the contraction of a muscle, the stimulation of enzyme activity and chemical, electrical and blood flow changes. Neurons are able to fire either in a burst (after a period of hyper-polarization) or a tonic manner. Active neuron is alive neuron - when making connection or being connected. The activity is for the neuron a question "to be or not to be".

Many things are here to discover. "We don't have a single unifying theory for how the brain works... We know the microscale of single neurons, and we know how large patches—the macroscale—of brain light up in fMRI [functional magnetic resonance imaging], but we are lacking how the brain works at the mesoscale level." (Miyoung Chun, the Kavli Foundation's executive vicepresident)<sup>18</sup>.

{**brain**[forebrain,midbrain,hindbrain]

forebrain[thalamus,hypothalamus],basal-ganglia(caudate-nucleus,putamen,globus-pallidum),  
cerebral-cortex]

midbrain[tectum,colliculus(superior,inferior),tegmentum,substantia-nigra]

hindbrain(brainstem:reptilian-brain,cerebellum,medulla,pons)

brain-area[cortical-region,subcortical-region,nucleus(clump/layer)]

cortical-region[primary-visual,entorhinal,inferior-temporal,orbitofrontal,  
lateral-prefrontal,inferior-parietal,..]

subcortical-region[thalamus,globus-patlidus,putamen,substantia-nigra,corpus-striatum,..]

cerebral-cortex:neocortex[lobe(frontal,parietal,occipital,temporal)]

functional-cortex-area(visual,sensory,tactile,auditory, ..)

somatosensory-system[subsystem1(touch,pressure,pain,tickle,itch,vibration,temperature,  
proprioception,kinesthesia),subsystem2(sight,hearing,taste,smell)]

multifunctional-cortex-area

[limbic-system(amygdala,hippocampus,hypothalamus,septum,cingulate-gyrus)]

*A limbic system is involved in the regulation of emotion, but affective processes spread out also on ventromedial regions in the prefrontal cortex.*

13 Important function of controlling many organs is performed by peptide and quantum networks.

14 200-250 million nerve fibers (axonal projections)

15 MUA and SU signal aquisition

16 LFP signal aquisition

17 enzymes, proteins

18 <https://physicstoday.scitation.org/doi/10.1063/PT.3.2207>

neuron{

[neuronal-cytoskeleton(neurofibrils,microtubules,filaments),  
soma-nucleous(perycarion(Golgi-apparatus,tigroid,mithochondria)),membrane,cytoplasm,vesicle),  
myelin-sheath,schwann-cell,axon(hillock,initial-segment,body,myelin-layer,telodendron),dendrite],  
<!glia cells (schwann cells,oligodendrocytes,..) nourish neurons and wrap them in insulating myelin>  
neurotransmitter <!chemical messenger:discharge of chemical substance from a neuron in response to a given stimulus>  
input(signals =>dendrite),output(axon =>)  
<!dendrites receive the electrochemical signals, axon transmits electrochemical signals>  
activity-level(input,trigger,conduction,fire-output) <!actual function of neuron>  
action-potential(excitatory,inhibitory)  
input(electrosignal,chemical-pharmacological,natural-signal(light,sound,pressure,..)]  
form(multipolar,bipolar,unipolar),creation-type(primary,new-born,»mirror<sup>19</sup>)]  
function-type(motor,sensory,interneuronal,.. )  
»« synapse(presynaptic-cell,synaptic-cleft,postsynaptic-cell)  
#synapse (<!about a billion synapses per cubic millimeter of cortex >)  
cell-internal-network(Øgene<sup>20</sup>)

brain-basic-function[mental,sensory(vision,hearing,smell,touch,...),  
motor(eye-movement,voluntary-movement, ..)]

brain-mental-function{

mental-basic-function(association,speech,emotion,language-comprehension,coordination,...),  
mental-complex-function[consciousness(self,..),cognitive-activity,wisdom,intuition,.].  
cognitive-activity(attention-coordinating,decision-making,movement-selection)  
mental-hidden-function(intuition,premonition,..)}  
engine[thinking,emotions,info-retrieval,memorizing,communication,...]  
communication-signal[(electrical,magnetic,electromagnetic(photon,..),chemical,natural)]  
communication-layer(single,multichannel)

BN- biological-network

{internal-communication[( $\Sigma$ , $\Theta$ , $\mu$ T, $\Omega$ ),biochemical,species-interactions,..]  
<!( $\Sigma$  neural network, $\Theta$  gene-network, $\mu$ T cellular microtubules network, $\Omega$  peptide network)>  
biochemical(quantum(metabolic,..)),protein,gene,..),  
species-interactions(food-web(preypredator)),host-parasite networks),  
space-interactions(intracell,intercell,regional,multiregional,dispersed,...)  
regulatory-biomolecules(enzymes,proteins,...)...  
micro-part[neuron,synapse,receptor,photons,unpaired-electron,neurotransmitter, glia-cell]  
quantum-stream[<•cellular-microtubules<sup>21</sup>>(photons,unpaired-electrons,...)  
quantum-actions{[cell-actions(motility,mitosis,transport(intracellular,intercelluar),...)]}

Selected neural networks

<!• located in ,  $\Sigma$  neural network, Q quantum network,  $\Xi$  layer,  $\Upsilon$  output ,  $\Phi$  function>

neural-networks(corpus-callosum,visual,memory,basic-functions,retina,language,social,..)<sup>22</sup>  
[nerve-tracts(commisural•corpus-callosum,association•hemisphere),  
projection(cortex <=> subcortical structures)]

19 "copy" from outside (during communication with another person)

20 neuron contains the whole genome in the form of gene-network (the activation of each gene is a complex function of the activation of other genes in the cell) [85].

21 microtubules are hollow cylinders (approximately 25nm in diameter and vary in length from 200 nm to 25  $\mu$ m)

22 some of widely known brain neural networks.

$\Sigma/Q$ corpus-callosum[ $\Xi/\approx$ left-cerebral-hemisphere  $\Leftrightarrow$   $\Xi/\approx$ right-cerebral-hemisphere]  
 <!essential for integration of cognitive and emotional functioning>  
 corpus-callosum(rostrum,genu,body/trunk,splenium)  
 <!rostrum & genu connect the frontal lobes of the left and the right hemisphere,  
 body & splenium connect the temporal lobes & occipital lobes of the hemispheres>,

$\Sigma$ visual[ $\Xi$ retina( $\Xi$ photoreceptors, $\Xi$  interneurons, $\Xi$ ganglion-cells)  
 $\Rightarrow$   $\Xi$ thalamus(messages)  $\Rightarrow$   $\Xi$ visual area •occipital lobe]  
 <! puts together the color, motion, orientation, depth to "see" the image>

$\Sigma$ memory<sup>23</sup>[(prefrontal-cortex $\Leftrightarrow$  $\Xi$ hippocampus $\Leftrightarrow$  $\Xi$ parahippocampal),amygdala,cerebellum]  
 memory[type(sensory,short-term,long-term),format(engram<!memory-trace,neural circuit>)]

$\Sigma$ basic-functions( $\Xi$ medulla $\Leftrightarrow$  $\Xi$ spinal-cord) <!swallowing,heart rate,breathing>

$\Sigma$ social( $\Xi$ medial-prefrontal-cortex $\Leftrightarrow$  $\Xi$ posterior-superior-temporal-sulcus)

$\Sigma$ language{left-hemisphere[lobe(temporal,occipital,parietal)  $\approx$ convergence(auditory,visual,sensory)]  
 $\forall \Rightarrow$ (wernicke's-area,broke's-area,..) [right-hemisphere  $\approx$ feature-of-speech(emotional,prosodic)]}

$\Sigma$ motor/muscles{primary-motor-cortex[tract(dorsolateral:pyramidal,ventromedial)]  $\Rightarrow$  spinal-cord}[14]

$\Sigma$ spatial-attention(posterior-parietal-cortex,frontal-eye-fields) [15]

$\Sigma$ face-recognition(middle-cortex, temporal-cortex)

$\Sigma$ self(posterior-cingulate-cortex,medial-prefrontal-cortex,inferior-posterior-lobe) [16]

$\Sigma$ consciousness(?•posterior-cortex/?•prefrontal-cortex/?•thalamic-reticular-network)  
 <! first 2 hypotheses IIT/GNWT<sup>24</sup> [82], third [57]>

consciousness( $\Sigma$ higher-order thinking):=(?•medial-prefrontal-region/?•anterior-cingulate-cortex/  
 ?•NMDA-sensitive synapses)[101]

$\Sigma$ RAS[ $\Xi$ spinal-cord(reticulospinal tracts)  $\Leftrightarrow$   $\Xi$ (hypothalamus.brainstem)]  
 <!RAS:Reticular Activating System- functions(autonomic,motor,sensory,behavioral,cognitive,mood-related)>

Regions of brain are functionally specialized and the proof of is the index of the coupling strength between structure and function. [75]

The “forces” are dispersed but “commander” could be found. Each part of the body has its own ‘control center’ [21] that is responsible for its functions:

[movements(*motor-cortex*),voluntary-movement(*frontal-lobe*),  
 involuntary-function(*brainstem*),pain&sensations(*sensory-cortex*),  
 judgment&foresight&smell(*frontal-lobe*),  
 language-comprehension(*parietal-lobe*),speech(*Wernicke's-area,Broca's-area*),  
 hearing&intellectual&emotional-functions(*temporal-lobe*),  
 visual-functions(occipital-lobe(*primary-visual-area*))  
 swallowing&breathing&heartbeat&wakefulness-center(*brainstem*)]

## Are brains of men and women different ?

*This is very good question to answer and we do this task on the base of several sources [86,87,88,89].*

There are genuine differences in the biology, chemistry and mentality. Ones may believe that some behavioural differences between men and women are due to cultural influences.

It could be supposed that the source of most differences is the brain. The women's brains are said to be wired for empathy and intuition, whereas male brains are supposed to be optimized for reason and action (role of testosterone). Brain regions, that tend to contain especially high concentrations of receptors for sex hormones, differ in size between men and women (such as the amygdala and the hippocampus). In general, female brains are busier, because emotional centers, visual and coordination

23 The interaction of fast gamma and theta oscillations in the hippocampus could play a key role in coordinating interactions between encoding and retrieval of information. [84]

24 IIT-integrated information theory,GNWT -global neuronal workspace theory

centers are more active.

Women have greater *inter-hemispheric* connectivity - it means more connections going left and right across the two halves of the brain. Men's brains have greater *intra-hemispheric* connections, more connections from front to back and stronger connections between brain areas for motor and spatial skills.

Male brains tend to have a slightly higher proportion of white matter while women have the larger amount of gray matter of their hippocampus, a structure that plays a role in memory, and the left caudate lobe which is thought to control communication skills. In female brains there's more wiring in regions linked to memory and social cognition, so women are better feeling and knowing the right way to respond in social situations.

One hypothesis is arguing for why autism is four times more prevalent in males than in females. It is an extreme form of the normal male cognitive profile as a result of high testosterone levels in the womb. Someone claims that it could be related to the fact that females have two X chromosomes in the stem of the 23 pairs while males have one X and one Y chromosome and this second may be involved in brain physiology and cognition.

## 5. HUMAN BEING - BIOLOGICAL AND BIOENERGETIC SYSTEM

*A life is a set of biochemical processes aimed to provide metabolism and maintain cells, tissues and communication systems in a stable internal state called homeostasis.* In other words it is self-maintained and capable to be reproduced.

The processes run upon rules like of a complex chemical factory. The production sites are cells, reacting largely on their own and equipped with their own energy sources in the mitochondria. The human body of an adult contains about 30 trillion cells. There are more than 200 cell types, and each type is designed to perform dedicated specific function. These types are like specialized production branches.

Human cells are very busy: they do intensive signaling (intracellular, purinergic, synaptic), DNA and RNA synthesis, absorption, digestion, respiration, biosynthesis, excretion, egestion, secretion, movement, homeostasis, and reproduction. Biochemical processes are automated and self-started as a result of internal and external stimuli.

This complex activity is well organized by coordinated work of such organs as brain and heart supported by efficient energetic internal system.

The central control room in a human factory is the brain and the main engine is the heart. The destruction of these organs means the end of "manufacturing" activity. The equivalent of technological lines are here biological networks (neural, peptide, quantum) and physiological processes.

*All processes of life need energy. Energy is a dynamic force that circulates in the body in a continuous streams and provides the driving force for the transfer of information.*

In traditional chinese medicine channels for energy streams are named meridians through which chi energy flows. Meridians are also known as acupuncture meridians and energy vessels that function as a network, much like a highway system, that can be mapped out throughout the entire body.

But meridians are probably not real anatomical structures - scientists have found no evidence that supports their physical existence. There have been attempts to identify meridians using thermal or radioactive tracer imaging techniques. However, again these techniques have not proven to be reliable in

their ability to identify meridians. Some observations claim that acupoints and meridians locate over mixed nerve bundles.

The neural approach seems to be the most logical and consistent explanation for the action of acupuncture thru nervous system: for example the acupuncture in lowering elevated blood pressure also can be reversed by blocking neuronal activity or neurotransmitter action in a number of regions of the brain, including the ventral hypothalamus, mid-brain and medulla.[62]

The human being's energy could be viewed from several point of view: physical, emotional, mental and spiritual

- physical energy concerned mainly the health
- emotional energy (intensity of emotions like the happiness, the flow ...)
- mental energy (how much to be focused on something)
- spiritual energy (why doing something).

## Cellular aging

This is the greatest threat to life processes and the most acute feature of the biological system.

*Generally, the main reason of aging is loss of homeostasis (at the body level) and proteostasis (at the cell level).*

*There are many hypotheses and theories of the aging:*

- \* *The excess of calories from food has the effect of shortening life.*

From this point of view, noteworthy are the vegetarians and gnostics, who believe that biophotons taken from the light of the sun give enough energy to survive without the need to take food and even to live longer. A similar feature have plants taken biophotons as a result of photosynthesis. There are scientifically confirmed cases of living for quite long time (even years) without food and water by people properly prepared (e.g. through meditation and taichi-like exercises) and living in a pollution-free environment.

- \* *The aging process is genetically regulated by sirtuin enzymes or the IGF1 (insulin-like growth factor) receptor.* Sirtuin (silent mating type information regulation two) proteins responsible for regulating metabolism are thought to affect longevity.

\* *The aging begins when disturbances occur in the so called field of consciousness of our internal organs.* (in Ayurveda) The flow of information in the body encounters obstacles in the form of stress, memory blocks, trauma and accidental errors. Our organs (heart, liver, kidneys ...) "know" when their normal functioning is disrupted. Old age means that some vital places have run out of energy and information. This usually refers to the brain, immune system and endocrine glands. With the help of self-healing methods of meditation or self-hypnosis, that probably unblock a signal exchange between the brain and the body, ayurveda followers claim that is able to remove even serious disturbances.

\* *Aging is the result of the cumulative effects of the destructive activity of free radicals,* formed in the mitochondria during cellular respiration processes [unfortunately, ingesting antioxidants in the form of pills has no effect on this - as these compounds must be produced in our cells]. It has been reported that the fight against free radicals is aided by components contained in natural fruits and vegetables such as blackberries and blueberries.

- \* The aging process and the average lifespan of individuals of each species have been programmed by evolution and *depend on the action of certain genes.* The maximum human lifespan is estimated at 125 years. Life cannot last forever because cells divide a limited number of times causing shortening

of telomere length. Cells die when the ends of telomeres have been shortened to a limiting threshold as a result of division.

- \* Late-life changes result from *protein glycation* i.e. attachment of sugar to protein molecules which causes them to function improperly.
- \* Aging is related to *changes in the mitochondria* due to accumulation of damage to mitochondrial DNA that causes a cascade of biochemical reactions, leading to cell death.
- \* Aging changes are related to *changes in the mitochondria due to hyper-metabolism*
- \* The body ages due to a *shortage of hydrogen: protons* (H<sup>+</sup>)
- \* Unbalanced levels of 32 proteins in blood plasma (even in middle age)
- \* The loss of the Y chromosome at process of aging could partially account for men's shorter life. This is therefore a biomarker of biological aging and has a direct effect on the health of men.

There are running not only aging processes in the human body but also restoration ones:

- every day 1% of blood cells are destroyed and reconstructed
- the average life of leukocytes is 8-10 days
- half of liver protein and blood plasma is renewed in 10-20 days
- human skin protein is renewed about 160 days
- taste buds on the tongue live the longest 10 days, but could be rebuilt even every 3 hours
- hair grows 12 cm in a year .

*The greatest gift is we do not live forever.* This makes us face the value of our existence and make efforts to ensure that our life is not lost thanks to achievements and a lasting trace. As time has been passing it arises the question "can we do something important valuable before we die?". Answering this help us to live a fruitful meaningful life.

*The bioenergetic model* of the personality may be presented in the form of a pyramid, where at the top is the ego and the mind, lower are thoughts, feelings and movements. Energy processes manifest in movements, lead to feelings and end with thoughts.

Sullivan [42] believed that *physical* transfer of energy in the body is a must because human exists between the states of absolute euphoria and absolute tension and all arises from needs and anxiety. Physical channel is related to *psychological* transfer of energy in interaction between people because the tension is a feeling of physical and psychological strain accompanied by discomfort, uneasiness, and pressure to seek relief through talk or action.

*Another energical view was presented by Lowen* [44] who defined character as a fixed pattern of behavior that has its bodily expression in the form of chronic, mostly unconscious muscular tension that blocks or restricts nascent impulses. The power of impulses depends on the intensity of bioenergetic processes in the body. Chronic muscular tensions block the flow of impulses or feelings not only undermine the individual's effective functioning as a person, but also limit his contact and interaction with the environment. These blockages also limit a sense of belonging, of being part of the world, and reduce the individual's ability to feel fully.

*Lowen claimed that human functions are ongoing at four layers.* In a healthy person these layers function in a coordinated, expressive rather than defensive manner.

- 1.The ego - which uses defense mechanisms (denial, projection, rationalization, etc.) to create the individual's self-image.
- 2.The muscular layer - its manifestation is chronic muscle tension in disturbed individuals or graceful and coordinated effective performance of healthy individuals.
- 3.The emotional layer-feelings of anger, pain, fear despair, as well as pleasure and joy are located.

4. The fourth layer is referred to as the "heart" - this is where love, the desire to be loved, is located. Impulses flow through the heart, because pulsation of the heart is the source of energy.

A mature and harmonious person should have access to his emotions, should have a clear insight into himself. Upon Lowen's interpretation in emotions is hidden the essence of our humanity. When the flow of energy is harmonious, a person should be able to experience the basic emotions of despair, anger, laughter and orgasm. When even one of these emotions the patient is unable to show, it indicates blocks in his body. Energy blocks are nothing more than chronic emotional tension, which leads to a change in the functioning of the body.

Energetically, the balance in the body is maintained by two opposing forces, one of which, acting upward, pulls the body upward, and the other pulls the body downward. The basic principle of energetics is the rule that charged energy cannot exceed discharged energy. Energy unblocking involves using a series of exercises to energize, ground and release the patient's emotions.

*Breathing* is also very important. The way you breathe contains information about your emotional state and any blocks. Calm deep breathing can lead to a state in which the patient gets rid of his fears and anxieties. In addition to breathing, the pulsation and vibration of the body are also very important. The brain's oxygen consumption is 20% of the oxygen in your body i.e. three times as much as muscles use.

## 6. HUMAN BEING - COMMUNICATION & COMPUTATION SYSTEM

A good working body communication is the condition sine qua non for consciousness, subconsciousness and ad hoc somatic response actions, all anchored in central, enteric and peripheral nervous system and endocrine system. That communication has been performed by means of such signaling molecules as neurotransmitters, neuropeptides, hormones and signals transported along cellular microtubules.<sup>25</sup>

Information streams represented by flow of signals are the result of dynamic communication between the cells (not only neurons) which are store centers for fixed (e.g. DNA) and variable information. In quantum processes a quantum particle and its surrounding inerton cloud function as the carrier of mass and fractal properties of matter[3].

Signals have many forms (chemical, magnetic, electromagnetic, photons and other quantum particles/waves associated with micro-nano-tubules, enzymes, proteins, electrical signals), so biocomputation, or say natural computing, is far more expanded and advanced than digital computing mainly because featured with various channels and multistreams in each channel.

Comparison of bio-computation and classic computing could look like below:

- bodyware <!human body:hardware>  
   {brain[cell(neuron,..)],body-cell(gene,..),channel(neural,peptide,quantum,control-circuits,..)]  
   <!brain (central unit:content-addressable<sup>26</sup>)storage&control>  
   <!cell: equivalent to integrated circuit with its own processor and firmware (DNA,RNA)>}
- mindware (mind,consciousness,..)<!autonomous operating system>

Internal communication may be triggered autonomously or by external events (emotion, touch, speech,..) within space of nervous system and immune system. Touch and speech events are served by brain networks of spoken language and motor control. Emotions lead to quantum processes on

<sup>25</sup> see also page 7, section 3. Human-being as a system

<sup>26</sup> Instead of an address or memory location



microtubules e.g. love involves changes in photons, fear in electrons [15]. One may argue plausibly that mirror neurons created for example in members of fighting groups (known as the effect of crowd psychology) could be the result of quantum processes.

The brain processes information at the speed about 268 mph on its superhighway made up of 400 miles of capillaries (among other ingredients), so a human thinking is fast or even very fast if we add that "operations" could be made in multiprocessing parallel mode in many neural networks.

The autonomic nervous system (ANS) communicates at a non-conscious level with glands and organs to manage such functions as digestion, heart rate, and breathing.

Emotions work on neural networks, for example meditation dedicated to balance left & right brain hemispheres uses network:

$$\Sigma/Q \text{ corpus-callosum} [\Xi/\approx \text{left-cerebral-hemisphere} \leftrightarrow \Xi/\approx \text{right-cerebral-hemisphere}]$$

Important position in communication takes vagus because it transmits parasympathetic signals to and from the heart, lungs and digestive tract. Brain parts take participation in integration of human system; for example hypothalamus is a connector between the endocrine and nervous subsystems.

### body-internal-communication

```
{communication-space[waving-space(quantum-space,..),wiring(neural-networks,..),
  physiological-channel(peptide-flow,..),genetic-channel(genes-network)] }
signaling_molecule[#60-100(acetylcholine,glutamate,y-aminobutyric-acid,glycine,oxytocin,endorphins,
  adrenaline,cortisol,dopamine,estrogen,gherin,growth-hormone,insulin,melatonin,
  ytocin,progesterone, testosterone,vasopressin,serotonin,..) ]
signal[electrical,magnetic,electromagnetic(photon,..),chemical,natural,..]
mode[network-layer(single,multi),signal-stream(single,multi),neuro-thread(single,multi)]
<!The neuron's cells are arrayed in layers. The topmost layer provides feedback from other cortical regions,
  the lower two layers (filled with pyramidal cells) handles the long-distance communication> }
```

According to Rossi E.L.[48] the mind is closely connected to genes. It sends neural-messages from the limbic-hypothalamic system to endocrine system to take such actions as metabolism, growth, activity, sexuality, immune response .

[limbic-hypothalamic-system(neurohormonal-messenger-molecules)  $\Rightarrow$  endocrine system(steroids hormones)  
 $\Rightarrow$  genes-system(modulation of the genes expression)]

ENS is the area of communication between the brain and the gut via both the neuronal communication and hormone release. Sensory cells in the gut influence hunger and satiety. [83 ]

*Neural and peptide transmitters* play an important role in internal information (signal) flows. Neuropeptides consist of short chains of amino acids, with some functioning as neurotransmitters and some functioning as hormones. Neuropeptides are used by neurons to communicate with each other and to regulate a variety of biological processes, including metabolism, learning, food intake, reproduction. They are much larger molecules than classical neurotransmitters in neural networks in the brain.

Hormones facilitate communication between various parts of the body—including tissues, muscles, nerve cells, and organs. Neurotransmitters are signaling molecules that transmit messages specifically from nerve cells to their targets, including other nerve cells, muscle cells, or glands.

Pert C. B. [47] pointed out that neurochemicals (neuropeptides as well as neurotransmitters) constitute, along with their receptors, a system that integrates emotions, body, mind, and the nervous

system . Rossi [48] classified neurochemicals as messenger molecules playing important role of the main communicators between body and mind. <sup>27</sup>

Internal communication is the basis for *self-consciousness* and is the way to strengthen our immune system thru peptide transmitters that act in the endocrine system and are complementary to the nervous system transmitters. Particularly powerful effects are gained in states of internal quiescence, when transmitter and receptor mechanisms work more efficiently, as neural and peptide networks are free from interference and tasks imposed by external events.

Then the subconscious gains its power of influence at all levels of our body (also in relation to such organs as the heart, lungs or pancreas...). The driving force in the "informational" linking of the central nervous system and the immune system is the nerve growth factor NGF and RAS (Reticular Activating System).

## 7. PSYCHOLOGICAL PROFILE OF HUMAN BEING

Scientific relations between classical psychology and neuroscience are not compatible in many cases with some exceptions in the case of clinical psychology. Psychologists stated [101] that wide range of psychological reactions exercised when we perceive, think and reason, feel emotions and make decisions are attributes of human being as a whole not of their parts (in particular, not of their brains) and therefore *psychological explanations of human activities cannot be replaced by neurological explanations*.

Personal characteristics of human are related to his brain and depend on genetic code (particularly sex code), health's state, breeding, education etc. Each brain is unique like fingerprints.

*Person-profile:*

[genetic-id[fingerprints,DNA,sex-chromosomes (XX<!females>, XY<!males>),  
genotype(AA,AO,BB,BO,AB,OO),phenotype(height,eye-color,skin-color,blood-type,...)]  
[consciousness,mind,emotions(elementary,complex),behaviour(relations,actions,...),state,life-space,...]  
mind[wisdom(thinking,reasoning,learning,recognizing,communicative-competence),knowledge,...]  
complexEmotion[love,hate,satisfaction,frustration,agression,enjoyment/pleasure,anger,meditation,  
complexFeeling(fear-of-insupport,regression,inferiority,persecution)..]  
elementaryEmotion[hunger,thirst,chills,pain,...]  
relations to/with (self,family-members,environment,..)  
state[active,inactive,grounded<sup>28</sup>,dormant,suspended,aborted,idle,lost,dead,  
homeless,retired,married/divorced/single,ignored,misused,abused, ]  
life-space[psychological,social,educational,professional,financial,..]  
living-space(2D<!physically handicapped people>,4D,nD<lin case of schizophrenia>),....)  
behaviour[marriage,friendship,career,illness,aging,...]  
life-history[birth,aging-curve,social-events,health-illness-events,  
educ-events,job-events,critical-events,death]  
  
psychological-cluster[self,character,attitude,leadership,ability,  
extraversion,anxiety,independence,healthState,  
lifeStyle,creativePotential,satisfaction-level,BipolarPersonality]

<sup>27</sup> Both information in [49]

<sup>28</sup> Lowen[44] introduced the concept of grounding that describes contact with reality and level of security. A grounded person is a person who is able to respond to external situations in a mature and situationally appropriate manner. So groundedness is the ability to stand on one's own feet and experience foot contact with the ground. It turns out that the intensity with which we touch the ground reflects our contact with reality. There are two types of grounding: grounding in the body and in space. Grounding in the body means that we are in contact with every part of our body, grounding in space is precisely the confidence with which we stand, walk and touch the ground.

**Self**

*“Be yourself; everyone else is already taken.” (Oscar Wilde)*

The self is a very complex concept. First and foremost it is closely related to self-consciousness as a set of cognitive processes and structures concerned with thought and perception: shortly, what is being read in our mind at a given moment. Secondly it comprises many human psychological features and relations with environment.

Cavanna [98] pointed out that the attention mechanism of the brain and the sense of self combine to create human consciousness.

As far as we know the phenomenon of self is managed by many regions of the brain, particularly by this neural network:

*Σself*(posterior-cingulate-cortex,medial-prefrontal-cortex,inferior-posterior-lobe) [16]

*New researches added some interesting views.*

For example, Stanford Medicine scientist Parvizi J. team investigated [81] aPCu (anterior precuneus) which is subregion of PMC (human posteromedial cortex) located between hemispheres, and discovered that's a crucial component in establishing human-being physical self or "I". The mental map of physical self was created -by using implanted electrodes- saying that aPCu is part of a multiregions neural network that integrates information regarding our location, motion, muscle and joint positions, bodily sensations to form our self-awareness. *This network consists of 2 parts: physical "self-I" (representing alone self first-person perspective) and narrative "self-Me" (memory, habits, personality, emotions, feelings) that's active when dreaming or recalling past events.*

self-type[self-identity,self-assesment,self-sentiment,self-esteem,  
self-regard,self-reliance,self-control,self-security,self-image,self-extension,self-structure]  
self-inside[thought,perception(reality/illusion,like/dislike,efficasy,aim,..),evaluation]  
<!A self-fficacy refers to feelings of adequacy, efficiency, and competence in coping with life.>  
self-aim[rational(selfrealization,need,satisfaction,selfsecurity),regressive]  
self-state(self-assured,self-confident,self-conscious,self-contained,self-important,self-centred,..)  
leadership[assertive,creative,facilitative,independent,  
stable,permissive,leadership(Style,Potential]  
ability[toughMinded/openMinded,creative,fast/slow,  
toleratesDisorder/perfectionistic,grounded/abstracted,  
improving own learning,problem solving, IQ, .....]  
need[biological(food,medical,emergency,rescue, coping),  
cultural,psychological(love,esteem,selfrealization),social(freedom,..)  
financial,security]

Personality{

[Warmth,Reasoning,EmotionalStability,Concillation,Dominance,Liveliness,Openness,  
Tension,Rule-Consciousness,SocialBoldness,Sensitivity,Vigilance,Abstractedness,  
Privateness,Apprehension,OpennessToChange,Self-Reliance,Perfectionism,  
Affectionate,Ambitious,Assertive,Boastful, Cheerful, Cynical,Demanding,Dominant,  
Fearful,Forceful,Generous,Submissive,Tolerant,Trusting,Sarcastic,Optimistic..]

BipolarPersonality

[Warmth(reserved/warm)  
Reasoning(concrete/abstract)  
EmotionalStability(emotional/stable)  
Concillation(concillatory/aggressive)  
Dominance(deferential/dominant)  
Liveliness(serious/lively)  
Openness(extraversive/introversive)

Tension(relaxed/tense)  
 Rule-Consciousness(expedient/rule-Conscious)  
 SocialBoldness(shy/socially-bold)  
 Sensitivity(utilitarian/sensitive)  
 Vigilance(trusting/vigilant)  
 Abstractedness(grounded/abstracted)  
 Privatness(forthright/private)  
 Apprehension(self-assured/apprehensive)  
 OpennessToChange(traditional/open-to-change)  
 Self-Reliance(group-oriented/self-reliant)  
 Perfectionism(tolerates disorder/perfectionistic)  
 Bipolar-disorder(manic-state,stable-mood,depressive-state)  
 Borderline-disorder(extreme&intense mood swings disproportionate to the trigger-event) ] }

### **Mind**

*"The interrelationship of brain and mind are perhaps something we shall never be quite sure of" (Wilder Penfield)*

There are many "mind" term definitions. One of them is the holistic approach of Jeremy Hayward [100]: "Mind is not a 'something' separate from nature. It is identical at various levels of order with all of nature, not solely with individual brains. (..) It is therefore futile to look for evidence of mental processes as located purely in the brain of an individual organism. We must look for such evidence in the entire network of patterns of interaction which that organism has with its environment ."

Another definition [98] says:"The remainder of the evolved structure of the psyche, including knowledge, emotions, and attitudes, is defined as mind. The attention mechanism of the brain and the sense of self, embedded in the "I," combine to create human consciousness."

A mind is closely related to consciousness and even would be treated as a part of it. This relation is of tricky type: *"mind is part of consciousness but consciousness transcends mind"* [11]. Both (if hypothetically separate them) are working in conjunction in several cortical and subcortical regions.

consciousness{[mind(thinking,awareness,perception,judgment,..),wisdom,knowledge,.. ],  
 [location[brain(frontal-lobe,hypothalamus,limbic-system,..),quantum-space]  
 <!/locations of emotions and "self" are spread over the brain> }

A limbic system placements concern several areas in the cerebrum (cingulate gyrus, orbito-frontal cortex, parahippocampus) as well as a number of sub-cerebral structures such as portions of the thalamus & hypothalamus, the nucleus accumbens (in the basal ganglia), the septal nuclei and the amygdala.

A limbic system is involved in the regulation of emotion, but affective processes spread out also on ventromedial regions in the prefrontal cortex.[38]

A remembering has also extensive environment. The hippocampus receives input from virtually all cortical areas including the hypothalamus, amygdala and ventral medial prefrontal cortex.

Mind capabilities are clearly expressed by such *personal features* as:

- wisdom: right assessment, choice of solution,
- ability: tough minded/open minded, creative, fast/slow, tolerates disorder/perfectionistic, grounded/abstracted, improving own learning, problem solving, IQ, .....
- assertiveness, creativeness, independence, stability, leadership.....

Mind functions in close active relation with neural networks. Soloviov O. [3] claimed that psychic phenomena and mental processes provide the plasticity of them and integrates information concerned the

ontogenetic experience even in the absence of synaptic connections in the latter-type networks of the hippocampus and temporal cortex. The action is provided by control network [3]. So this approach assumes hierarchical (in control terms) structure of neural networks.

The mind should not be confused with the brain as this might happen in popular dispute: the second one is a physical organ while the first is a mystical non-physical product of the brain processes.

**brain**  $\Rightarrow$  **mind-functions** *<!brain to mind mapping>*

somatosensory-cortex,..) $\Leftrightarrow$ [process sensory information(smell,taste,sight,sound)]  
 hippocampus&parahippocampal $\Leftrightarrow$ [memories(form,organize,consolidate,retrieve)]  
 hypothalamus  $\Leftrightarrow$ [emotions(hunger,thirst,chills,pleasure,pain,..),..]  
 (prefrontal-dorsolateral-cortex,corpus callosum,orbitofrontal)/posterior-cortex $\Leftrightarrow$  consciousness  
 corpus-callosum  $\Leftrightarrow$  <unity/sphere of consciousness>  
 orbitofrontal cortex & limbic system $\Leftrightarrow$  "self"-identity  
 limbic system  $\Leftrightarrow$  emotions

**mind-functions**  $\Rightarrow$  **brain** *<!reverse mapping>*

process sensory information(smell,taste,sight,sound) $\Leftrightarrow$ lobes of the cerebral cortex  
 memories(form,organize,consolidate, retrieve) $\Leftrightarrow$ hippocampus&parahippocampal  
 endocrine&nervous systems connection $\Leftrightarrow$ hypothalamus  
 consciousness $\Leftrightarrow$ [(prefrontal dorsolateral cortex,  
 corpus callosum(<unity/sphere of consciousness>),orbitofrontal("self" identity))/  
 posterior-cortex]

## 8. CONSCIOUSNESS *"For all of this, we have no names" (Husserl)*

Consciousness is a fundamental feature of the human-being, that unfortunately has not been yet scientifically inspected and recognized in terms of internal mechanism and processes. It belongs to qualia category and has been discussed in [77] as well as easy and as hard. The easy type includes standard methods of cognitive science by understanding the neural mechanisms involved. The hard problem is to explain how physical processes in the brain give rise to subjective experience and how to bridge the 'explanatory gap' between the objective material brain and the subjective world of experience.

The simple way to avoid trouble was to mix consciousness with a mind and take these things as "such" (i.e. with no explanations) or classify to another branch of science. Thompson E.[60] : "Consciousness was supposed to be the subject matter of psychology, yet cognitive science has had virtually nothing to say about it until recent years."

Mocombe P.C. [103] in his consciousness field theory of phenomenological structuralism pointed out that "consciousness is an emergent fifth force of nature, a field of consciousness composed of a quantum material substance/energy, psychion, the phenomenal property, qualia or informational content, of which is recycled/replicated/entangled/superimposed throughout the multiverse and becomes embodied via the microtubules of neurons of brains and aggregate matter of multiple worlds to constitute mind".

Sejnowski T.J. [ 53] claimed that scientific definition of consciousness includes the state of being awake and aware of one's surroundings, the awareness or perception of something, and the mind's awareness of itself and the world. .

Cosmologist Carter B. [107] formulated strong anthropic principle (SAP), which considers the universe in some sense compelled to eventually have conscious and sapient life emerge within it.

Loewenstein W. [71] stated that prominent feature of consciousness is *awareness of time* (sensing of time itself, passing of time) being "a constant streaming, as if there was an arrow inside us pointing from the past to the future". He added that neurophysiology, and all the neurosciences combined, can tell us nothing in regard of consciousness and new changes came with quantum molecular intercellular-communication demons.

In NCC (Neural Correlates of Consciousness) formalism consciousness is viewed as a state-property (*dependent on set of neuronal events associated with conscious visual perception*) of some undefined complex, adaptive, and highly interconnected biological system.

A view that consciousness is rather the state than the process is formulated by Cavanna A.[98]: consciousness is a function of the content of the brain, not the mechanism of the brain.

Another one definition is of Szyszko-Bohusz A. [52] that consciousness is a perception of existence and this perception is reflexive (because of the work of the brain) and not reflexive (because of the reaction of senses). Another point view of this author is that the DNA, RNA and albumen of parents are transmitted to their children together with coexisting with them consciousness and excitability.

The last research<sup>29</sup> confirmed that the transmission called 'transgenerational inheritance' in case of environmental effects, such as starvation and trauma, in one generation can have biological effects on many generations of offspring.

Interesting thypothesis related to this conception is the formative causation of Sheldrake R. [67] saying that behaviour and even memory is influenced through morphogenetic fields coming into action through morphic resonance with fields that have existed previously. This allows for the repetition previous characteristics and could be treated as a complementary supplement to Darwin's theory of evolution. Someones pointed out that explanation of it could be found in a quantum physics.

### 8.1. Consciousness - psychological view

First definition of consciousness: "the perception of what passes in a man's own mind" is attributed to Locke's "Essay Concerning Human Understanding" published in 1690.

*Consciousness in psychology* could be defined simply as an individual awareness of existence. It could be widely interpreted in terms of scale: personal, social and even cosmic.

Social consciousness is a result of sharing the resonant mood of a situation and the mood of a time. "There is no escaping it. Our moods are either uplifting or downcasting or neutral, indifferent, flat. No matter how they are, we are cast into them one way or the other." [51]

Cosmic (sometimes called collective) consciousness is collection of consciousnesses of human-beings and remains intact after the dissolution of the individuals. According to this hypothesis the personal consciousness seems to be, at least partially, an extract from it. Pioneers of this concept were James (1902), Chardin & Teilhard (1923-noosphere<sup>30</sup>). It corresponds with the mentioned above Szyszko-Bohusz A. hypothesis [52].

Personal consciousness is an individual awareness of mental identity, unique thoughts, memories, feelings, sensations, and environments. The awareness of memories, attuned to the present moment in the here and now, means the control of behaviours and tells how responsive is a person. Shortly, consciousness is an awareness of self and the world around, is subjective and unique to each person.

<sup>29</sup> Nature vol.625 4 January 2024 p.24

<sup>30</sup> a sphere of reflection, of conscious invention, of conscious souls.

Study on consciousness helps to understand where our feelings come from and how we can work with them to create more abundant and joyful lives (Wolf F.[2]).

S.Freud divided human consciousness into three levels of awareness: the conscious, preconscious, and unconscious. Each of these levels corresponds to and overlaps with ideas of the id, ego, and superego.

- *Conscious* was defined as a part of the mind that contains all the thoughts, sensations, emotions, and experiences you're aware of in the present moment. When you're conscious of something, you can think about it logically and talk about what you're experiencing.
- *Preconscious* was indicated as all the memories you have that you can access easily. You aren't aware of them in the present moment, but you can call up those memories whenever you choose to do so.
- *Unconscious* was place where emotions, ideas created conflicts, anxiety, pain, fears, immoral and sexual urges, violent motives, irrational wishes, selfish needs, and shameful experiences.

*Consciousness includes* sense of self, time perception, mental functions, volition ( control of actions), perception of reality, body image, emotions and other sensations.

Consciousness can be fixed at following *states*: ordinary wakeful consciousness, hypervigilance, lethargy, sleep, dreaming, hypnotic state, drug-induced states, meditative state, dissociative states, hidden state (during coma) or lack of consciousness (brain death), partial epileptic seizures, death.

Dreams are altered states of consciousness. One of them is the lower-level consciousness (called primary) in which the brain constructs a virtual world but the dreamer is deprived of the ability to control and influence the ongoing experience. Lucid dreaming as a hybrid state of consciousness (primary and secondary) and the dreamer is aware of the fact that he is dreaming while the dream continues.

## 8.2. Consciousness - philosophical view

Some scientists [76,77] define consciousness as an introspective cognitive illusion that may not exist. Another view [78] does not see consciousness as the state of a brain and claims that brain only transmits the contents "picked up" from the around space.

Philosophers sometimes view conscious mental states as having qualitative properties called "qualia" as the felt properties or qualities of conscious. Generally they have used the term 'consciousness' for such topics as knowledge in general, intentionality, introspection and phenomenal experience.

- In the scholastic-Aristotelian theory a consciousness may be related to a soul as an immaterial substantial form of soul-body union.  
Kant argued that conscious experience must be the product of the (presupposed) synthesizing work of the mind  
Descartes concluded that mind and body are distinct (mind-body dualism), could be separated and the union of mind and body results in one complete substance or being through itself.
- Dennett's *Multiple Drafts* model specifies memory criterial for consciousness: that is *what it is* for the "given" to be "taken" . The consciousness is not to be found in a specific part of the system, but in the actions of the whole.
- Metaphysics is the branch of philosophy concerned with the ultimate nature of reality. There are two broad traditional and competing metaphysical views concerning the nature of the mind and conscious mental states: dualism and materialism. The dualism generally holds that the conscious mind or a conscious mental state is non-physical in some sense, whereas the latter holds that the mind is the brain, or is caused by neural

activity. Mind and body are the metaphysical parts (incomplete substances in this respect) that constitute one, whole human being, which is a complete substance in its own right.

- *Mysterianism* - McGinn claims that we are cognitively closed as to how the brain produces conscious awareness. He concedes that some brain property produces conscious experience, but we cannot understand how this is so or even know what that brain property is.
- *Analytic philosophy of mind* says that consciousness as a cooperative phenomenon of the whole brain or mind is a degree of coherence of the mind.
- Teilhard de Chardin's *concept of the noosphere* is the concept of a planetary global brain and planetary consciousness. A self-awareness can be effectively explained as a result of the interaction of three processes: *feeling of qualia*, *activity of neural circuits realizing the self-image* (recall from memory in the form of imagery), *the formation of the brain's electromagnetic field*. This allows to consider whether it is possible to find analogical elements and processes on a planetary scale.
- “*Mysterians*” (McGinn 1989, 1991, 1995) believe that hard problem of consciousness can never be solved because of human cognitive limitations and the explanatory gap that can never be filled.
- *Self-representational theory of consciousness* (called “*Neo-Brentanian theory*”) claims that conscious mental states are reflexive or self-directed and that conscious mental states represent themselves, just not a distinct or separate state. For example, when one has a conscious desire for a cold glass of water, this conscious desire represents both the glass of water and itself. Kriegel has used different names for his “neo-Brentanian theory” such as the SOMT (Same-Order Monitoring Theory).
- A *one version of representational theory* holds that the meta-psychological state in question should be understood as intrinsic to (or part of) an overall complex conscious state. This stands in contrast to the standard view that the HO (Higher Order) state is extrinsic to its target mental state. These various hybrid representational theories can be found in the literature.
- A *relativistic theory of consciousness* [96] says that we get different consciousness measurements depending on whether the observer occupies or is external to the cognitive system - "from its own first-person cognitive frame of reference, the observer will observe phenomenal consciousness, but any other observer in a third-person cognitive frame of reference will observe only the physical substrates that underlie qualia and eidetic structures.
- Gennaro (2002) stated that conscious mental states should be understood as *global brain states* which are combinations of passively received perceptual input and presupposed higher-order conceptual activity directed at that input. Higher-order concepts in the meta-psychological thoughts are presupposed in having first-order conscious states. Most contemporary theories of consciousness are aimed at explaining what makes a conscious mental state. State becomes conscious partly due to the implicit self-awareness.

Gennaro and Van Gulick have suggested that conscious states can be understood materialistically as the first-order state of the larger complex brain state. Van Gulick explored the alternative that the HO state is part of an overall global conscious state and calls such states “HOGS” (Higher-Order Global States).



- Cavanna A. [98] claimed that consciousness is a function of the *content* of the brain, not the *mechanism* of the brain.

### 8.3. Consciousness - physiological & neuroscientific view

There are many hypothesis and methods trying to capture the essence of consciousness.

\* *Integrated Information Theory (IIT)* states that consciousness arises from the neural architecture and interconnectedness of brain networks. The physical and data processing properties of neural networks—particularly, the rear regions of the brain<sup>31</sup>—by themselves can generate consciousness and the global brain broadcasting is not necessary. This hypothesis is against the global neuronal workspace theory (GNWT), which likens networks of neurons in the front of the brain to a clipboard where sensory signals, thoughts, and memories combine before being broadcast across the brain. [82]

\* An interesting question is the *relation between consciousness and subconsciousness*. The important role here plays probably RAS (Reticular Activating System) that connects subconscious part with the conscious part of the brain.

\* According to the *resonance theory of consciousness* it acts using a specific mechanism of electrical synchrony and shared resonance of gamma, beta and theta waves that leads *micro-conscious* entities to combine into *macro-conscious* entities and allows different parts of the brain to achieve a phase transition in the speed and bandwidth of information flows between the constituent parts [34].

*Very interesting view on the role of waves and their locations* - related to the resonance theory - has been worked out by researchers screening the brain in disorders of consciousness [93,94]. Results show the important role of subcortical areas in driving cortical activity associated with consciousness, particularly alpha waves role associated with consciousness and cognition and delta waves, mostly associated with unconsciousness, spreading across the brain. The distribution of theta waves power in the central areas of the brain is tied with reaching consciousness and could be associated to activity generated by consciousness supporting networks or to neurons functioning in isolation. Some brain injuries may underlie hidden consciousness, in which brain-injured patients are unable to respond to simple commands, making them appear unconscious despite having some level of awareness, because deficits in brain regions responsible for integrating motor commands with motor output preventing patients from acting on verbal mode.

\* *NCC (Neural Correlates of Consciousness)* theory considers consciousness as a mental state created when large numbers of neurons fire in synchrony with one another [Crick F., Koch Ch. 54].

\* *NCC another approach* [Flohr 1995] said that conscious mental activity interferes with the functioning of NMDA (*N-methyl-D-aspartate*) synapses between neurons and (Damasio 1999) includes emotive somatosensory haemostatic processes in the frontal lobe.

\* Edelman (1989), Tononi (2000) claimed that mental processes are *reentrant cortical feedback loops* in the neural circuitry throughout the brain.

\* Dehaene and Changeux (1986) developed a neuronal model for access to consciousness based on a brain-wide recruitment of networks of neurons *with long-range axons*, referred to as the global neuronal workspace. [6]

\* *Electromagnetic theories of consciousness* propose that consciousness can be understood as an electromagnetic phenomenon that occurs when a brain produces an electromagnetic field with specific characteristics [7][8]. Some electromagnetic theories are also quantum mind theories of consciousness.[9]

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31 the posterior cortex, called "sensory" cortex, includes all the cerebral cortex (includes the occipital, parietal, and temporal cortices) without the frontal.

\* *The eight-circuit model of consciousness* (Leary, Wilson, Alli [36,37,55]):

- 1&2 states (trusting&submissive,suspicious&dominant)
  - friendly weakness, phlegmatic humor
  - unfriendly strength, sanguine humor
  - unfriendly weakness, melancholic humor
- 2 - language, handling the environment, invention, calculation, prediction, building a mental "map" of the universe and physical dexterity
- 3 - human symbol systems (*Laryngeal-Manual Symbolic Circuit,Semantic Time-Binding Circuit*)
- 4 - socio-sexual circuit
- 5 - neurosomatic- rapture circuit (*neurological-somatic feedbacks, feeling high and blissful,..*)
- 6 - neuro-electric, metaprogramming circuit
- 7 - neurogenetic,morphogenetic circuit
- 8 - quantum consciousness, non-local awareness.

\* *An ergodic theory of consciousness* [92]

The collection of neurons are partitioned into clusters linked by the forward and backward circuitry in a probabilistic manner. The map is nonlinear and chaotic, to possess numerous invariant sets of clusters, which are referred to as agglomerations representing conscious states.

\* *Supramodular Interaction Theory (SIT)* [58] specifies which kinds of information is required by conscious processing to integrate high-level systems in the brain that are vying for skeletomotor control.

#### Summary of physiological & neuroscientific view

consciousness-space {

cortex-regions[(prefrontal-dorsolateral-cortex,corpus callosum,orbitofrontal/posterior-cortex ,..)]

possible-channels[(quantum,interconnected-neural-networks<sup>32</sup>, neural-correlations<sup>33</sup>,  
reentrant-cortical -feedback-loops-in-the-brain, neuronal-networks-with-long-range-axons,  
electromagnetic-fields, clusters-of-neurons-linked-in--probabilistic-manner,..)]

quantum(<•microtubules>(microparticles), resonance(gamma,beta,theta waves) }

### **8.4. Consciousness - quantum & other approaches**

Roots of a quantum philosophy could be find in the ancient world ("Soul of the World" Plato) and more recently in Carl Gustav Jung's theory of "collective unconscious".

Advanced development<sup>34</sup> of quantum mechanics in the mid-1920s opened many ways for new research, mainly thanks to *discovery the nature subatomic quantum molecular particles having characteristics of both particles and waves.*

Quantum field theory as the basis for an explanation of consciousness was applied in the 1960's by theoretical physicist Hiroomi Umezawa and results of it was called later QBD (Quantum Brain Dynamics).

Quantum processes seem to be the part of biocomputation that processes various types of "data" (analog dispersed over the body and noisy) and is not based on strictly defined algorithms. [27]

Research [29] stated, that quantum mechanical phenomena such as quantum entanglement and superposition, may play an important role in brain's functions.

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32 *Integrated Information Theory (IIT) hypothesis*

33 *Neural Correlates of Consciousness (NCC) theory*

34 Niels Bohr, Erwin Schrödinger, Werner Heisenberg, Max Born, Paul Dirac and others

Freeman W. [30] proposed the *neurobiological and quantum model* with self-organizing pathways accompanied by quantum transitions in brain.

In Wolf A.F. [95] consciousness “collapses” the quantum wave function by restricting the knowledge of the location of molecules acting within a neuron’s membrane and is the process of wave transformation through setting tolerances for observing either energies or locations of protein gate molecules embedded in the neural membranes. The differences between long- and short-term memory can be explained by different sets of tolerances.

Penrose & Hameroff claimed [20,21,22] that the consciousness should obey the rules of quantum mechanics and they proposed quantum model of consciousness called "*Orchestrated Objective Reduction*" (Orch OR) that recognizes gravitational collapse of the wave function as an occasion of awareness. The quantum approach explains that consciousness has a quantum origin, is non local and creates our perceived reality from vibrating entities that can have multiple versions based on the observer's perception.

The explanation of quantum feature is such that the neuron (as a cell of brain) contains microtubules, which transport substances to different parts of the cell. Microtubules are structured in a fractal pattern which would enable quantum processes to occur. [17]

The Relational Block World (RBW) model of Stuckey [24,25] defines fundamental ‘consciousness symmetries’ as relational with quantum nonlocality feature. A nonlocality is a specific feature that cannot be associated with neural network although the topology of them is changeable but would be known at a given moment (this is an embedded plasticity when many changes of synaptic wiring between neurons in response to inputs and new experience).

\* *Orchestrated objective reduction (Orch-OR) model* of Roger Penrose and Stuart Hameroff [21,22,23]

This hypothesis associates consciousness with molecular structures called microtubules rather than with neurons and postulates that consciousness originates at the quantum level inside neurons. Consciousness is represented by biologically ‘orchestrated’ coherent quantum processes in collections of microtubules within brain neurons, that these quantum processes correlate with, and regulate, neuronal synaptic and membrane activity.

Gravitational collapse of the wave function as an occasion of awareness. Microtubules are structured in a fractal pattern which would enable quantum processes to occur. This, they argue, could explain the mysterious complexity of human consciousness. Hameroff [56] claims that a new paradigm is needed to view the brain as a scale-invariant hierarchy extending both upward from the level of neurons to larger and larger neuronal networks, but also downward, inward, to deeper, faster quantum and classical processes in cytoskeletal microtubules inside neurons.

\* TRN a *thalamic reticular networking model of consciousness* (Min 2010 [57])

The consciousness as a "mental state embodied through thalamic reticulum nucleus by modulated synchronization of thalamocortical networks. Min suggested TRN as ideally suited for controlling the entire cerebral network.

\* *Hierarchically Mechanistic Mind (HMM) model* (Badcock [59])

The brain is composed of distinct components that perform different functions and exchange information in a hierarchical integrated fashion. Smaller ones- more specialized and working at short distance in a dense neural region, larger - encapsulated into long distance elements for combined functionality (such as thoughts, feelings) acting in a kind of hierarchy that creates dependencies between structures.

\* *Transactional approach in symbiotic cosmology* (King Ch. [90])

"Because the “holistic” nature of conscious awareness is an extension of the global unstable excitatory dynamics of individual eucaryote cells to brain dynamics, a key aspect of subjective consciousness may be that it becomes sensitive to the wave-particle properties of quantum transactions with the natural environment in the process of cellular quantum sentience, involving sensitivity to quantum modes, including photons, phonons and molecular orbital effects constituting cellular vision,

audition and olfaction. Expanded into brain processes, this cellular quantum dynamics then becomes integral to the binding of consciousness into a coherent whole."

*\*The spin-mediated consciousness theory [91]*

Quantum spin called "mind-pixel" is a linchpin between mind and the brain. The unity of mind is achieved by quantum entanglement of these mind-pixels that as nuclear spins have relatively long quantum coherence time. The subjectivity is sourced from "qubits" through the internal motion associated with the quantum spin.

## 9. METASYMBOLS OF LIFE

*"I know what it is until somebody asked me."*

In this section a special attention is given to transcendentals named "metasymbols of life" that are the product of subjective perception of life. They are abstract, mostly undefined and intuitively understood as something natural or obvious. They are almost undefinable but commonly useful.

*The metasymbol of life is a commonly known term directed at "something" particularly important to a person. It is represented not by a specific event or object, but by a broad conceptual notion into which anyone can insert own content. Examples of metasymbols are very well-known terms: love, happiness, beauty, good, evil, etc. For catholic believers such symbols could be "hell","heaven" "salvation" and "resurrection".*

*Two statements of famous scientists, cited below, would be helpful in understanding of metasymbols that really represent the essence of life.*

- *Aldous Huxley's*: "From pure sensation to the intuition of beauty, from pleasure and pain to love and the mystical ecstasy and death — all the things that are fundamental, all the things that, to the human spirit, are most profoundly significant, can only be experienced, not expressed. The rest is always and everywhere silence."
- *Emanuel Swedenborg*: "Nothing is farther removed from human understanding than that which is both closest to man and contained in his essence."

Metasymbol has nothing to do with any convention and arises from the essence of human existence. It is filled with the specific content of the individual's existence, his genes, his environment and perhaps the zodiacal cosmic powers.

Being a process it is born and dies in every man, and then perhaps astrally and genetically reborn in his successor with the power similar and yet different in expression and effect because another processes and events would take place in new incarnation. Metasymbols originate from consciousness and subconsciousness. Presumably they have the quantum character, so - if believing some hypothesis - they don't die and remains in the astral body.

Metasymbols of life are peculiar "machines" or "spiritual drivers" necessary for a human. They are capsules, in which the "power" is hiding, exceeding rational human consciousness and deciding about the quality of life. If we don't manage to liberate this power, we will lack the energy necessary for selfdevelopment and will be involuntarily set on the direction towards atrophy or self-destruction.

Metasymbols are abstractions and if we free ourselves - at least for a moment - from a multitude matters of our existence, we will see life as a relatively simple composition of a few most essential components in the form of metasymbols, which should be especially taken care of.

There are analogies between metasymbols and astrological archetypes and symbols. According to Jung the nature of the archetype is that the very act of submitting to their power creates a kind of "psychic field", which awakens in us "praemotions" of both individual and universal nature.

This occurs through the projection outside of the hidden unconscious internal psychic energy corresponding to our potential.

Thanks to projections we deepen and expand our space. According to P. Tillich [108] a symbol is characterized by the following features:

- it is perceivable by the senses, but it points to something beyond itself, something we cannot grasp directly or fully,
- it has no meaning for itself but participates in the reality of that to which it points,
- symbols cannot be arbitrarily invented because they have nothing to do with any convention,
- the power of a symbol reveals dimensions of reality that are usually obscured; a symbol is an archetypal image that moves the appropriate structures and mechanisms in man - his "geometrical instinct",
- a symbol has both a constructive (ordering, stabilizing) and destructive (chaotizing) power.

Man is driven mainly by a fear, hunger, thirst, sex, dominated by inclinations towards evil (because it gives satisfaction<sup>35</sup>), aggression and destruction. It occurs with such intensity that it acts interchangeably with needs. A need is a state of deficiency that motivates one to fill it. It resembles a hole that needs filling. Instead of filling existence with aggression and destruction, there should be actions fulfilling ethical values which strengthen survival, thus originating from the instinct of self-preservation. Accepting such meta-symbols as love, happiness, beauty and goodness is a counterbalance to negatively acting.

Metasymbol has nothing to do with any convention and results from the essence of existence. Metasymbols are extremely rarely "woven" and barely visible abstractions, and if you free yourself at least for a moment from the multitude of concretes of your existence, you will see life as a relatively simple composition of a few essential ingredients, which should be especially taken care of.

Parallels are drawn between metasymbols and astrological archetypes. It is in the nature of archetypes that surrendering to their power creates a kind of "psychic field" that awakens "praemotions" in us. This occurs through the outward projection of unconscious hidden inner psychic energy corresponding to our potential. Thanks to these projections we deepen and expand our awareness.

### **"Happiness" metasymbol**

*"Happiness is our natural state. Happiness is the natural state of little children, to whom the kingdom belongs until they have been polluted and contaminated by the stupidity of society and culture. To acquire happiness you don't have to do anything, because happiness cannot be acquired." (Anthony de Mello)*

*Does it make sense to ask what is happiness?*

What does it mean "to be happy" ? Such a simple question is difficult to answer ..."According to the people of Okinawa (Japan) an island inhabited by the world's most long-lived people, each person has their own ikigai, which is the driving force and one of the secrets of a long, youthful and happy life. Ikigai gives their lives meaning and provides the motivation to live to a hundred in full form. Having a clear and defined ikigai, or great passion, provides satisfaction, happiness, and gives life meaning. Residents belong to a local community where they are trained from a young age in yuimaaru, teamwork that forces them to help each other. Nurturing friendships, a light diet, adequate rest and some physical activity are ingredients in their recipe for health, and at the heart of the joie de vivre that provides the impetus to enjoy each birthday and celebrate each morning is personal ikigai." [105]

*Happiness is not a reward -- it is a consequence.*

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<sup>35</sup> According to S.Freud.

One is happy or one is not. This state cannot be learned on a course. It resides in the hidden subjective interior rather than in the conscious brain. To be happy it is not enough to want to be happy. If it were, everyone could consider themselves to be so. Happiness is primarily a consequence of an individual's existence and actions, and not just a matter of so-called positive thinking. In particular, it requires self-acceptance and is about constructing a meaning for one's life. Meaning - which you can see everywhere: in love, work, nature and art. Happiness is thus more a process than an effect.

Happiness may be defined as :

- a long lasting enduring enjoyment of life
- being in love with living
- state of well-being characterized by emotions ranging from contentment to intense joy
- emotions experienced when in a state of well-being
- the emotion one gets from leading meaningful life. *(I suppose there are some people who could feel happy without leading meaningful lives, if they are mentally detached from reality.)*
- an outcome of everything going your way, and you having everything you want.
- art of living, the aim and object of our existence.

Without happiness, life is dry and meaningless. With happiness, life immediately becomes fulfilled and wonderful. Happy people keep themselves happy because they know how they tick, they know the little ways to appreciate themselves and to see the humour and magic in each moment. Those people who are a bit heavy, who take life too seriously, may lose their happiness also.

*The formula for happiness*<sup>36</sup>:  $P + (5xE) + (3xH)$

P stands for Personal characteristics, including outlook on life, adaptability and resilience.

E stands for Existence and relates to health, financial stability and friendships.

H represents Higher order needs, and covers self-esteem, expectations, ambitions and sense of humour.

*Strategies to consciously raise our happiness set point*<sup>37</sup>:

- Count your blessings.
- Practice acts of kindness.
- Savour life's joys.
- Express gratitude and appreciation frequently to key individuals in your life.
- Learn to forgive and let go.
- Invest time and energy in friends and family. Feeling connected to other people is essential.
- Take care of your body.
- Develop strategies for finding meaning and coping with stress and hard times.

*Sonja Lyubomirsky [61] describes happiness as "the experience of joy, contentment, or positive well-being, combined with a sense that one's life is good, meaningful, and worthwhile."*

Humans have the unique capability of being the creative cause of their own happiness. Or they may choose to be victims of others or the world around them. People frequently have difficulty in being willing to admit their own realities and therefore blame others for their plight. This blaming of others and the outside world keeps the person from facing the issues.

Take the responsibility for your own thoughts and therefore your own feelings. Create a sincere desire to want to know the self and others accurately. The process is rather simple; however, it is very important that you believe in it and follow it completely.

<sup>36</sup> <http://news.bbc.co.uk/2/hi/health/2630869.stm>

<sup>37</sup> *Some items suggested by Sonia Lyubomirsky psychologist of University of California at Riverside*

*Why we should dream of happiness?* "In dreaming, we dreamers create a story or a play. Storytelling or playacting appear to be a very important part of human evolution; we dream because we need to dream in order to evolve. And, in fact, most creatures dream. Dreaming is the result of each creature's evolving awareness of how to adapt to its environment...It seems that the dream is the place where we learn how to become aware and to separate an 'out there' from an 'in here.' The dream is a laboratory of the self-creation." (Wolf F.A.[2])

## **10. Passing - life flies continuously from being past to ...?**

*" death shapes the horizon of life "*

Human-being is the only animal that is aware of death. However, his instinct to live is so strong, that he practically does not bother about it. Death is the forbidden subject for many of us.

From physiological point of view a dying human-being is unable to maintain a biological stability and cognitive capabilities. The flow of matter and energy generated by internal and external factors has been stopped in the body, so the effect is the cessation of life.

Philosophical metapsychology shows death in context of dualistic, spiritual and physical, nature of human.

Plato proposed to define death as the separation of soul from body. In classical forms of dualism, the soul is a non-physical object intimately associated during life with body. At death the soul separates from the body continuing experiences after the body has died.

A dual nature of human-being was pointed out by Paracelsius who specified the body as physical part with animal instincts and the "archeus" as astral part responsible for creativity and mind.

Epicurus formulated the statement that death should not be a problem for man who has a clear understanding of the limit of life but the fear of death would be the obstacle to be happy.

Is death the end of "everything", a blank wall or an empty space or a door to another life ?

*Human beings are, in some sense immortal,* because the DNA, passed from generation to generation, is a link in the chain of genetic immortality. If consciousness and DNA have a quantum nature, then we would presume that the human can exist forever thanks to quantum entanglement to an *astral body (called astrogens)* even after the chain of generations had been broken due to death of the last member.

The genetic immortality in full aspect is suggested by Szyszko-Bohusz A. [52] saying that the DNA, RNA and albumen of parents are transmitted to their children together with coexisting with them consciousness and excitability.

The astral body capsule is filled with the specific content of the individual's existence, their aura, genes, environment and perhaps zodiacal cosmic powers. According to yogic philosophy the astral body contains prana (life force), energy channels (astral tubes) that carry prana, the senses and the mind.

*The aura* as a process is born in each individual life and then reborn in its successors with a power similar and yet different in expression and effect. It does not die but exists as an astral body and is an immaterial - probably quantum - form of consciousness that exists beyond the limitations imposed on us by time and space.

It is not locally assigned to the body and as a quantum object, in principle, it cannot be assigned to a single place thanks to the phenomenon of superposition and decoherence, which is a force that determines the direction in which a given quantum object will go. Raw material for it is probably a bioplasm and an energetic duplicate of the individual, appearing as a luminous shape or aura.

The hypothesis about astral bodies correlates with the belief of the Japanese of the island of Okinawa, that each person has their own "ikigai", which is the driving force of life and one of the secrets of a long, youthful and happy life.

Passing in immortal or soul sense may be in states "IN" or "AFTER".

A speed of mental (not physical) time may vary considerably. The time "IN" (being in action) depends on many things e.g. under stress the time seems to flow slowly or very fast. The time "AFTER" being a childhood, youth, maturity, old age could be felt as "short internal clips" or sometimes a flurry of events condensed to a complex moment. The time "FINAL AFTER" is beyond the human.

Usually we don't give attention to the fact that we will be gone and what debris would be left behind - maybe just a bit of ashes and photos. A few of us will follow hypothesis that "FINAL after" would be represented by a personal astral body derived from our genetic memory or by object called "eternal soul". This object is claimed to be created by the "morphic resonance" at a distance from morphogenetic fields as structures independent of time and space.

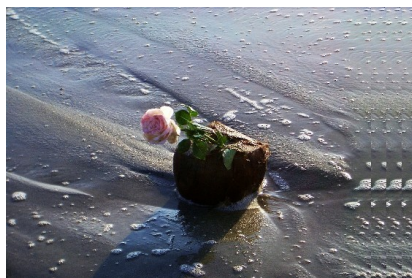
This action may involve quantum method and has relevance to such parapsychological phenomena as telepathy and is strongly related to hypothesis of formative causation of Sheldrake R.[67] saying that behaviour and even memory is influenced through morphogenetic fields coming into action through morphic resonance with fields that have existed previously. This allows for the repetition previous characteristics and could be treated as a complementary supplement to Darwin's theory of evolution. Someone pointed out that explanation of it could be found in a quantum physics.

Death is at least as important as life.

"Life is made *more* meaningful by the recognition that it will end with death. According to this view, we gain a deeper appreciation for the common satisfactions of our everyday experience when we fully realize that someday we will die, and will then have nothing at all." (Feldman F.[106])

*Concluding remark:* The way to overcome the fear of death is to endure pain and suffering in the face of an inevitable processes.

*"Although the physicality of death destroys us, the idea of death saves us."*  
(Irvin D. Yalom "Staring at the Sun")



*memories of us are left like alone abandoned blooming flowers*<sup>38</sup>



## Closing remarks

"It is humbling and more, than a little frightening to realize that we rely on what may be the most complex structure in the universe with little knowledge of how it works." (Louis Cozolino about the brain)

Answering the question "what is a human-being?" seems to be a simple task because we are not aliens but beings very familiar to ourselves. The work become harder when we do not describe visual and emotional impressions but are trying to specify internal mechanisms and processes and here many things might be only hypothetically defined.

This paper overviews fundamental questions of the human being, particularly presents in short some theories and hypotheses concerned qualia like consciousness. Many of them, particularly listed here in section of quantum approach, are provisional.

Future research on this topic probably should be supported by more fine-grained psychometric quantum tools and quantum medical devices to validate and measure various dimensions of self-consciousness and respective disruptions in altered states of consciousness.

Human-being is very much complicated object and there are many things (one of them is a brain) to investigate using advanced theory and technology (neuroengineering, cognitive computing, quantum mechanics). An approximative approach, based on rough or fuzzy sets, could probably help in the case of vaguely defined neural networks.

The mind is the matter of the thoughts that govern the actions of the body. Consciousness, particularly selfconsciousness, covers portion of around five to ten percent of all thoughts.

Body internal communication flows are based mainly on the nervous system and quantum activities. Each part of the body has its own local 'control center' responsible for its functions (movements, judgement, emotions, hearing, seeing, breathing...). Majority of them are under control of consciousness, subconsciousness and mind.

A great research attention in communication channels has been paid to neural networks, but more to discover is in a quantum flows. Research showing that *shape of brain* is more important than wiring in neral networks indicates some limitations of neural network approach, because in most of cases has been observed wavelike activity propagating throughout the brain. [79,80].

Mapping some supposedly separated or functionally specialized brain neural networks into has been done successfully while "screening" the whole brain (or dispersed area like limbic system) as the assembly of interconnected networks is a very complex task. This is due to complexity and embedded plasticity of brain that takes place when passing many changes of wiring (a synaptic coupling) between neurons in response to new coming experience. Examples of interdependent neural networks are networks of spoken language and motor control.

An investigation of neural networks helps to understand the brain functionality and behaviour but there is need of wider approach. Good question is how deeply wave quantum processes interact with all communication channels (neural, peptide, genes,..). The quantum activity plays very important role as the real lowest level of execution of "everything", because all biological processes have quantum nature .

## Appendix

OSL Notation used in this paper<sup>39</sup>

<b>CS(<math>\Sigma\Theta Q\Omega</math>)</b> -Communication Space( <i>neural, gene, quantum, peptide</i> )	
<b>NSS(<math>\Sigma</math>&amp;<math>Q</math>)</b> Nervous-System Space	
$\Sigma$ <i>neural network</i> , $Q$ <i>quantum space</i> , $\Omega$ <i>peptide network</i>	
$\Sigma(\Xi)$ <! $\Xi$ branch of network $\Sigma$ /subnetwork>	
$\Xi$ <! <i>neural</i> > , $\Theta$ <! <i>gene</i> >, $\mu T$ <! <i>cellular microtubules network</i> >	
$(\Xi(Ix, Mx, Ox))$ <! I, M, O -input, middle, out> ,	
<b>Q</b> [ $\omega(?)?)$ (<contents><object1>, <object2>)] <!entanglement relation>	
<b>NS</b> [CNS, ANS(ENS, .), PNS] <!Nervous System >	
CNS<!Central>, ANS<!Autonomous>, ENS<!Enteric>	
PNS<!Peripheral Nervous System>	
$\approx$ (name)	<i>quantum action</i>
$\approx$	quantum wave
$\omega$	<i>quantum entanglement</i>
$\omega(i?)$	partial entanglement
$\omega(?)?)$	total entanglement
$\Phi$	quantum wave function - qwiff
<...>	container
<! >	comment
<def > </def>	start-end of definition
<spec> </spec>	start-end of object specification
<beg> <end>	start-end of section
:	equivalent
=	value assignment
:=	definition with assignment
[..] {..}	list of assigned words
(..)	list of items
name	executive/operational object
<i>Relations</i>	
::	belongs to
$\Rightarrow$	mapping or multitrack relation
$\leftrightarrow$	bidirectional passive unary relation 1:1
$\rightarrow$	forward unary passive relation - no change
$\Leftrightarrow$	complex many to many active relations
$\Leftarrow, \Rightarrow$	backward, forward active relations>
$\vdash$	external link (like url)
$\mathcal{M}$	moving object
/ &	or and
a/b/c/./x/	only one element can be used
a&b&c&/.	any combination can be used
... , ...	more , much more
UUUU.xxxx	xxxx belongs to UUUU
<!xxxxxxxxxx>	comment
<i>Topology:</i>	
(●name)	located in named object

39 based on OSL language DOI: 10.13140/RG.2.2.14376.47365, [63]

⊖ (name)	located in cloud
»«	located outside
{.[.(..).].}	nested list of items
¥	output>
	<i>Attributes:</i>
@	mark of special attribute,feature,property
@dark	unknown, to obtain, to discover
@ai	generated by artificial intelligence
@rq	requested
@ans	answered on request
@dsq	disqualified
	optional
±	replaceable
	blocked
	isolated
?	questionable
#	number of
/?(name)	alternative & questionable

### OSL Phrases

```

<def> <NAME>/<name><!main/ordinary object/item name>
  object.id<!object identifier>
  object.type[eObject<!elementary atomic object >,dObject<!dynamic object >,iObject<!informational object >,
    virtObject<!virtual object >,smartObject,opObject<!open object>,incObject<!incarnation>,
    qntObject<!quantum object>,bindObject<!integrated objects>,copyObject<!copy of object>,
    taskObject,intsObject<!intersection objects>,capsObject:CAPSULE<!info of a given object>,
    objectSelf(noiceReduction,selfTeach,selfRepair,selfKill,selfRestore,selfRestart)<!self features>
  olh<!object life history>[timeline,events,dynamics-curve]
  state(active,inactive,dark,dormant,suspended,accepted,rejected,aborted,
    variable,invariable,idle/waiting,lost,expected,deleted,..)
  status[generic,real,virtual,undefined]
  rank[critical,necessary,most wanted,optional,worst,best]
</def>
<def> activity
  task(operation(process(action(act))))<!sequence of operations>,
  operation(process(action(act)))<!sequence of processes dedicated to part of task>,
  process[trigger,actions(acts),closer]<!sequence of actions >,
  scenario[taskSc,operSc,actionSc]<! scenario - predicted sequence>,
  reverseMode<!back to the previous state>,
  i-event <!independent event>, i-act <!independent act>
</def>
<def> relations>
  role[interface,integrator,component,monitor,commander,
    driver,trigger,reactor,agent,executor,generator
    locator,executor/performer,initiator,terminator,destructor,
    participator,owner,stockholder,customer,supplier;partner,employee]
  relation[activated by,activates,assisted by,built from ,
    appearance depends on ,belongs to/is owned by ,
    exists as satellite of <object>,calls <object> (<interface>),
    consists of <parts>,contained in/contains,
    controlled by/controls,derived from,
    existence depends on,exists when/in/for,
    included in,linked to ...by/links,
    refers to,relates to,related by affinity,
    represented by/represents,involved in,
    shared by/shares,used by/uses]
  rule[decision-table,when-if,formula,ai-method]
</def>

```

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