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Review Article

Spin Wave and Soliton Wave Activity as Well as Biocomputer Imulation in Visual Perception

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Abstract: All the material presented in this thesis as well as the author's implications/conclusions prove that a living organism can be perceived as a complex electronic device similar to technical devices, whereas biological materials (proteins, DNA, RNA) - as components of electronic devices. These arguments allow us to state that a biological system can be considered to be a quantum computer that functions on the basis of entangled quantum states and optoelectronic phenomena. Melanin and neuromelanin are involved in the central control of all biological, physiological and psychological processes. Numerous modular communication systems and signalling pathways that transmit signals into cells are generated under the influence of light. Melanin and neuromelanin function as multireceptors of a full range of electromagnetic, acoustic, and soliton waves, torsion fields and bioplasma, which does not receive so much information as the senses do, but receive it constantly. The role of photoreceptors, receptors of hearing and touch is limited to a single reception of a stimulus, whereas melanin and neuromelanin play an integrative function, combining stimulus elements into a whole, namely combining movement with space and time, sound with light, space and time. From the psychological point of view, melanin and neuromelanin are responsible for the entire process of adaptation to the environment, mental development, the development of attention and perceptual experience, which, together with an increase in melanin and neuromelanin, acquire better sharpness and quality. Bioplasma controls these processes.

Keywords: Bioelectronic processes, bioplasma, biocomputer, consciousness, perception.

1. Bioelectronic model - its role in the perception and mental processes

L. Bertalanffy formulated the concept of a living organism as an open system that collects and gives material substance, and maintains a constant value of bulk relationships under the conditions of continuous variation of material components, energy and information which flow continuously flow between an organism and the surrounding environment (Bertalanffy 1976).

Therefore, the principal feature of the living world is the organization of structures filled with mass and energy into an information carrier. Information is in fact defined as the ability to organize a system or maintain it in an organized state, while energy is defined as the ability to perform the work (Kowalczyk 1981, p. 17), (Latawiec 1995,p. 38).

Human life is not just a matter of biology and biochemistry, but it also is a cybernetic-information and bioelectronic structure which determines the health or ill-health of an individual or human behaviour. This bioelectronic structure is what makes up a "*homoelectronicus*" together with its electronic personality. In this new bioelectronic paradigm, one can notice quantum psychology and human cognition in terms of quantum processes occurring in a biological system which is understood as a bioelectronic device that processes, stores and manages information. A quantum individual is the same individual as an anatomical and physiological one, but living in the world of quantum dimension. In addition to the traditional, well-known biochemical reactions occurring in living organisms, a new reality is being opened for science that functions on the basis of a bioelectronic model of life. This model shows that the same particles that constitute the molecular substrate of biochemical reactions are produce biological structures, such as proteins, melanins, nucleic acids, bones, etc., which are an electronic material having piezoelectric, pyroelectric,

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ferroelectric and semiconductor properties (Sedlak W. , 1977, p 156).

Apart from using biochemical channels, the human biological system, in order to transfer information, uses electromagnetic, acoustic, soliton waves, electric, electromagnetic and torsion fields as well as bioplasma. This communication is not only utilised in biological processes but also in all mental functions. Control of the human biological system is accomplished by a grid of information channels: electron, photon, phonons, soliton, spin, ionic and bioplasma ones. Each of these channels may in itself be a carrier of information to a biological system or it can function as part of a team in the bioplasma system (Sedlak 1980).

The biochemical model fails to explain the complex mechanisms of mental life, the nature of consciousness and the transition from inanimate to living matter. Where is the threshold and what is the role of biochemical processes in the consistency of soma with consciousness, what is their role in building mental structures. The author is in favour of the thesis that the nature of mental processes is inexplicable as far as interactions of biochemical processes are concerned and it is much easier to describe it in the light of quantum processes (Adamski 2006 p. 70).

High-speed information transfer in living organisms proves that coordination at various levels of biological complexity requires media characterised by minimum energy requirement but more of informational nature (Molski, 2005. p. 209).

2. Physical and electronic properties of melanin in the human biological system

Melanin, in terms of its electronic and physical dimension, is characterized by the following features:

A. donor-acceptor properties (Matuszak 2001);
B. ability of proton conductivity (Matuszak 2001, p. 80);
C. ability to absorb light of all wavelengths;
D. photoconductor and amorphous semiconductor properties (Strzelecka 1982, p. 227), (Crippa, Cristofoletti, Romeo., 1978, p. 167), (Chedekel 1995);
E. increased resistance to light and ultraviolet light;
F. generation of electrons and photons (Nicolas 1997);
G. large demand for oxygen (Prota, 1993, p. 79);
H. selective vulnerability to phonons - this means that cells with melanin are selectively vulnerable to acoustic waves. (Sarna, Swartz 1994, p.339);

I ability to transfer photons into phonons and the other way round s (Mc Ginnes J., Corry, Proctors 1974, p.854). Melanin and neuromelanin also have the ability to convert electromagnetic waves into spin fields in which solitons responsible for unconscious states are condensed.

Conversion of light into sound (of a photon into a phonon) provides information to organisms, not only for the purposes of biological processes, but especially for mental processes as in synesthesia, winter blues, in the process of adaptation to the environment in ADHD, etc.

J. exhibits paramagnetic properties of melanin (Schultz, Kurtz, Wolfram, Swartz, Sarna 1987)

K. demonstrates photoconductivity of melanin (Wilczok T., Drozdowska– Cader J. 1979);

L. melanin is a semiconductor, which allows for transforming light into electricity. Melanin is also considered as a transmitter of electromagnetic energy (Bruno. Nicolas, 2005, p. 794).

M. melanin is a piezoelectric - under the influence of an alternating electric field it produces acoustic waves. In addition, all melanins of the biological system exhibit bio-diversity based on physical properties such as absorption, the disappearance of light and sound, the binding of organic chemicals, storage of liquids and gases (Bruno, Nicolas, 2005, p. 793). Light and electric fields are the most important factors in controlling the biosynthesis of melanin, the absence of these factors results in the biosynthesis of melatonin. Melanin reduces the quantity of free radicals in the biological system of an individual. The most important feature of melanin is its ability to absorb light as well as to absorb, retain, store and regenerate energy (Nordlund *et al.*, 1998, p. 347).

Moreover, melanin protects against oxidative stress by eliminating reactive free radicals – peroxyl and hydroxyl ones, quenching singlet oxygen and excited states (King 2001, p. 68).

Melanin has intensified concentration of bioplasma and performs an integrative role. In the sphere of sensory perception, melanin combines stimulus elements into one whole, namely movement with space and time, sound with light, space and time. Moreover, melanin controls the perception of the size of objects, their arrangement in space; it determines the size, length, location, form, direction, depth and movement of an object. Thanks to melanin, one can experience the present and the future, whereas melatonin allows us to experience the past and the present. Melanin and neuromelanin are responsible for the entire process of adaptation to the environment, mental development, the development of attention and perceptual experience, which, together with an increase of melanin and neuromelanin acquire better sharpness and quality. Melanin is strongly correlated with melatonin. The disorder of this correlation leads to

different psychiatric dysfunctions. This fact is visible in such disorders as anorexia, winter depression, child hyperactivity and in various diseases such as phenylketonuria, Parkinson disease etc. Thanks to melanin and melatonin, sensory organs in addition to their ability to integrate sensory information, can form a coherent picture (Adamski 2005).

Melatonin provides to each tissue information about the time of a day and the time of a year. Melatonin functions as an internal clock. It measures time for seasonal phenomena as well as for the processes of adaptation and development, such as adolescence. Melatonin activates sexual desire and directs the process of pregnancy, etc. (Adamski, 2005). Melanin is a piezoelectric semiconductor and this property allows it to transform different kinds of energy into electric energy associated with electric fields. Impact of an electric field a piezoelectric causes electrostriction which triggers phonons that are an acoustic wave. The biological system has transducers such as a transducer converting electromagnetic energy into an electric signal (the sense of vision), a transducer converting thermal energy into electric energy (pyroelectric - the sense of temperature), a transducer converting mechanical energy into electric energy and vice versa (the sense of touch), a transducer converting acoustic energy into an electric signal (the sense of hearing). The biological system in different ways provides itself with the appropriate density of bioplasma state, thanks to which melanin combines a wide range of fields and elementary particles.

The brain does not show us the length of an electromagnetic wave, but it gives the impression of a specific hue; a similar situation occurs in the auditory sense – a particular magnitude of an acoustic wave is transformed into a sound impression. These processes are possible thanks to bioplasma found in melanin and neuromelanin. It is bioplasma that is responsible for processing perceptive impressions. Melanin contains two types of free radical centres (Sarna Swartz, 1985, p.342).

The first type is permanent and, irrespective of the conditions of an experiment (with the exception of degradation) the level of free radicals cannot be reduced. Free radicals are probably created during the synthesis of melanin and they are captured within the polymer. The concentration of the other type of free radical centres depends on many factors such as light, temperature, pH, presence of paramagnetic and diamagnetic metal ions or some oxidants or reducers. Free radicals are of great importance for the biological system, yet they contribute to the ageing process. Free radicals are atoms, molecules or ions that have a single unpaired electron in their outer shell. They are chemically active so they oxidize each compound during the process of connecting or losing an electron. Therefore, free radicals have a huge chemical reactivity on other particles. They attack mainly those compounds that have double bonds in their particles such as proteins, DNA, or unsaturated fatty acids that are included in cell membranes, polysaccharides, lipids and cholesterol found in blood. As a result of this process, electrons generate free radicals that attack other substances. Free radicals play an important role in the process of imprinting information to the nucleus. Free radicals (created when melanin is irradiated by UV) or, to be more precise, radical reactions, are able to change the arrangement of nuclear spins as well as recording permanent information in the nucleus. This information is then included within the biological structure. So far, it has been claimed that this operation of recording can only be carried out by strong magnetic fields (Huping Hu., Maoxin Wu. 2004, p 7).

Free radicals are also responsible for creating quantum states of entangled particles, atoms or entire informative structures and images produced in the bioplasma of melanin and neuro-melanin. A change of nuclear spins is connected with a change of the density of torsion and soliton fields that are said to be responsible for the nature of mental processes. Entanglement is a phenomenon in which the properties (specifically: quantum states) of two or more objects are connected (entangled) in such a way that one object cannot be adequately described without considering the other. This leads to a correlation between the physical properties of objects even if these objects are spaced apart at different distances. This phenomenon is known in the scientific world as the EPR paradox. The phenomenon of quantum entanglement can occur in a variety of micro-world objects (for instance atoms, elementary particles entangled in momentums or spin-entangled electrons). This happens immediately, and, the distance between them is of no relevance. For example, when two electrons are entangled, a change of quantum state on one of them causes the same change on the other. The first electron is given An state deliberately, whereas the other is given a corresponding Bn state. Thus, a physicist knows that another physicist has sent them information regardless of the distance between them. Now let us imagine two quantum computers whose memory is composed of entangled electrons. In such a case, these computers can send any data and the connection between them is immediate. In my opinion, the galactic Internet will work in such a way. Why are entangled clouds of atoms needed for the human biological system? First of all, they create acts of consciousness; they also save and convert data in the bio-quantum computer as well as transferring data via the biological Internet (Bouwmeester *et al*., 1997).

Teleportation allows for sending quantum information recorded in the form of the state of a system, whereas dense coding can increase channel capacity thanks to an exchange of quantum information. Since the teleportation scheme can be extended to multiple qubits it is possible to transmit longer essages

using this method. During the process of photoreception light enters the iris filled with melanin. According to the author, entangled quantum states are used in sensory perception, especially in the sense of sight as well as in forming acts of consciousness. Through the annihilation process, free radicals can break entangled quantum states. This fact can influence changed states of consciousness – e.g. while taking drugs. During an electron-positron annihilation process a reduction of charges takes place and a light impulse is emitted. Soliton light that generates images on an electromagnetic wave and then transmits them to consciousness is produced while a quantum entangled state in bioplasma is reduced. Soliton images can carry human emotional states, thoughts or patterns of behaviour in the form of archetypes.

Free radicals are activated in melanin and they change the arrangement of nuclear spins. Information is recorded in the nucleus during the change of spins. At the same time entangled quantum states are generated and controlled by bioplasma. Then, melanin included in the brain receives these states. Any information received by neuromelanin is perceived by the brain as a conscious act which enables individuals to function properly. This information recording mechanism has a significant role in transmitting inborn knowledge through biological structures. When a new born child is no longer provided with oxygen from the placenta and starts to breathe on their own (the first breath) the level of oxygen in the arteries increases suddenly, causing oxygen shock and increasing the level of oxygen radicals.

This sudden increase of the radical's levels initiates the process of imprinting the present reality in which the new born child is situated. A similar situation can be noticed as far as the sense of sight is concerned. Melanin in the epithelium of the retina and iris is formed before birth. The first eye contact after delivery activates the development of free radicals, which register into the child's biological system information about the surrounding world. Moreover, this first eye contact closes further synthesis of melanin in this epithelium. This means that information once encoded in these structures serves as a model for many biological and psychological processes such as adaptation to the environment, reception of tonality, space, time, emotional states, one's behaviour and consciousness of one's own body (Barrett 2008).

If the biological system did not have those innate patterns of knowledge, a great many psychological functions (e.g. speech) would take years to learn. An increase of spin field intensity and various entangled quantum states impact the concentration of bioplasma and create continuous acts of consciousness. According to the author, melanin and neuromelanin in their electronic structure create/constitute a spintronic device that is essential to the functioning of sensory perception. This statement is supported by the following data. In electronics, it is assumed that a spintronic device must include some key elements. First of all, spin polarization must be generated, which is understood as a quantitative advantage of electrons possessing a certain spin orientation. This can be achieved by transporting electrons from a material in which polarization permanently exists (i.e. ferromagnetic material), or by a suitable optical stimulation that is possible using the selection rules in a semiconductor circuit. Secondly, one needs to be able to control the spin, this is best achieved in semiconductors due to their unique physical properties (including spin-orbit coupling). However, the problem of spin injection arises here. Spin polarization should be adequately stable in time – that is why the control of spin relaxation processes is of great importance (Barnas, 2002), (Fabian *et al.*, 2007).

3. Soliton and spin wave as an information carrier in visual perception

The biochemical model explains the intricate mechanisms of mental life. It still cannot explain what the transition from inanimate to animate matter is. Where the threshold and what is is its essence, the role played by the biochemical processes in the consistency of the soma of consciousness and its impact on the soma and vice versa? A similar problem is with the other mental processes, their nature does not within the biochemical model of life and it is inexplicable on the basis of biochemical interactions; again, it is much easier to describe it in the light of quantum processes - including the physics of wave (Adamski 2006, Vannini 2008, p. 165-184).

In bioelectronic terms an organism is understood as an integrated circuit composed of biological piezoelectrics, pyrooelectrics, ferromagnetics and semiconductors, and filled with bioplasma. Such an organism is controlled electronically by quantum processes. In this integrated circuit, referred to as the human body there is a central system in the brain that can control and coordinate the psychosomatic structure. Control is accomplished by a grid of informative channels such as electron, photon, phonon, soliton, spin, ionic and bioplasma channels. Each of these channels may be a carrier of information to a biological system, or may function as part of a team in bioplasma (Sedlak, 1994, p.183), (Adamski 2011).

This system is capable of transforming mechanical, thermal, electromagnetic and chemical energy into electrical energy. The electric field generated during such transformations is needed for the body to:

- record information provided by sensory perception in the brain,
- regenerate damaged tissues, enzyme functioning and melanin synthesis,

- create bioplasma which is responsible for the integration of the entire biological system (Athenstaedt 1987), (Adamski 2006).

According to J. Gibson, perception of the environment does not unambiguously depend on retinal images. The retina of the eye, which has developed in vertebrae through evolution, is yet another stage of the development of the perceptual system and is not a significant factor for the identification of the structure of a beam of light referred to as environmental information. This phenomenon can be seen in animals which cannot form retinal images but experience the same sensation (e.g. noticing a steep cliff or seeing objects that will collide with the animal) as animals with a fully developed sense of sight. Gibson assumes that perceptive information is received by perceptive and motor systems (Gibson J., 1979, p. 112).

So far scientists have held that electromagnetic waves are the only valid factor in visual perception. The author is of the opinion that it is also spin waves and soliton waves, apart from electromagnetic waves, that play a significant role in producing images of the world. It can be inferred that there is a second centre that produces a structure of the picture of the world and is responsible for the development of human personality. It is melanin and neuromelanin that control the function of this centre. According to Nicolaus' classification of 1968, which takes into account pigment colour and chemical composition, melanin biopolymers fall into three main groups:

- Eumelanins – these melanins are of brown to black colour, they contain carbon, hydrogen, oxygen and nitrogen (Mårs, Larsson 199). They are primarily found in the skin, hair, retina, choroid, iris, ciliary body, retinal epithelium and in the inner ear. During tyrosine and catecholamine oxidation the following substances are generated: dopamins, adrenalins or noradrenalins (Sarna 1981), (Sealy, *et al.* 1982).

The retinal epithelium is situated behind the photoreceptor layer. In addition to protection of the photoreceptors, melanin in this epithelium is responsible for sharp vision. In people with albinism, who suffer from a shortage of melanin, light, having passed through the photoreceptors and the retina epithelium, is reflected and travels back to the photoreceptors. This results in damage to blood vessels in the eye and photoreceptor cells. Consequently people who have albinism cannot see objects clearly. Based on health complaints reported by albinos one can infer that melanin found in the retina epithelium is involved in visual perception (Pawluczak W., 2000, s. 107). (Bilińska, *et al*. 2000).

- Pheomelanins – pigments ranging in colour from yellow to red. In addition to carbon, hydrogen, oxygen and nitrogen they contain sulphur whose presence is the result of the inclusion of cysteine in the biosynthesis pathway for these colorants. They are found in human skin, blond and red hair (Mårs, *et at.* 1999).

- Allomelanins – a group of natural black colorants, commonly found in plants and micro-organisms. What is special about them is absence of nitrogen in allomelanin particles (Sarna 1981).

Neuromelanins constitute another group of natural pigments located in the central nervous system, among other things, in the brain stem, leptomeninges, black substance neurons, locus coeruleus and the reticular formation (Liu, Simon 2003). These biopolymers contain sulphur, which may suggest that they are a mixture of eumelanin and pheomelanin (Tran, *et al.* 2006).

Melanin is marked by a large number of unpaired electrons: that is why energy bands can occur in its particles. Melanin can be considered as a semi-conductor in which protons are bound by electron traps. So it does a good job of catching electrons (Sarna, Swartz 1998).

Melanins exhibit capability to react with reactive oxygen species that are free radicals, such as: hydroperoxyl radical $HO_2^{\bullet}$, superoxide radical O_2^{-}, hydroxyl radical $HO^{\bullet}$ and with reactive oxygen species that are not free radicals (that do not have an unpaired electron) such as singlet oxygen $^1O_2$, ozone O_3, and hydrogen peroxide H_2O_2 (Sealy, *et al*. 1982), (Okazaki, *et al*. 1985).

Melanin can oxidize and reduce superoxide radical anions. The amount of oxidized and reduced superoxide radical anion depends on the type of melanin polymer. Therefore, if exposed to UV radiation, pheomelanin can generate hydrogen peroxide, which in turn will lead to oxidative damage to nucleic acids, proteins and lipids, and contribute to carcinogenesis of melanocytes and other cells (Brenneri Hearing 2008). On the other hand, eumelanin is responsible for removing free radicals, among other things, as a result of reduction of superoxide radical anion to hydrogen peroxide, which resembles the properties of superoxide dismutase. Therefore it can be viewed as a kind of pseudo-dismutase (Łopusiewicz, Lisiecki 2016). When exposed to light, auto-oxidised DOPA melanin (soluble) generates hydrogen peroxide five times faster that enzymatic DOPA melanin (insoluble) (Rok, *et al*. 2012). (Różanowska, *et al*. 1999).

Exposing melanin to light results in increased EPR signal. This is due to an increase in stationary concentration of radicals which are becoming spin generators, thus also emitting spin waves which take on the role of an information relay. Radical generation

effectiveness increases significantly as wavelength decreases in the 230 to 600 nm range.

EPR spectroscopy is one of the most promising methods for detecting and characterising melanin in biological material. It is a non-destructive method that features high sensitivity of free radical detection in a sample. The EPR method allows for determining the type, properties and concentration of paramagnetic centres in melanins, spin-spin interaction between free radicals and spin-network interaction of unpaired electrons with diamagnetic polymer molecules (Chodurek, *et al*. 2013), (Abbas, *et al*. 2009).

Free radical concentration in melanin changes depending on environment pH, biopolymer exposure to light, degree of hydration, temperature, metal ion content, therapeutic substances and presence of oxygen in the environment of a sample (Pilawa, *et al*. 2003), (Bilińska , *et al*. 2002). So free radical intensity increases as light intensifies, whereas decreases in temperature extends the life span of free radicals (Sarna 81), (Ortonne 2002).

Spin movement generated in melanin during its synthesis, as well as from various reactive oxygen species, contributes to the generation of spin waves which are carriers for solitons. On the other hand, electromagnetic waves are carriers for phonons i.e. an acoustic wave. This phenomenon is used in television broadcasting which provides images and sounds. A soliton is not an independent entity, it needs a physical environment which is provided, among other things, by spin waves whose quantum is magnons.

According to Popp, in DNA there is a biological laser which plays an important role in the functioning of bioplasma and the formation of the structure of consciousness. DNA uses different frequencies of electromagnetic waves and is a source of information for cells. In a healthy body the state of photon emission is more consistent than in a sick person. In respect of cancer cells the intensity of biophoton emission is increased, and is not controlled by the biological system (Popp 2003).

The author of this paper thinks that the laser in DNA generates solitons and coherent light, and determines ways to manage solitons which are involved in the formation of conscious states and all mental processes. The high consistency of coherent light is well correlated with spin pumping to bioplasma and high capacity solitons management. Spin pumping creates a problem since the spin polarization is suitably unstable in time, so it is important to control the role of spin relaxation processes and creating act consciousness (Fabian, *et al*., 2007). Laser-based soliton generation is extensively discussed in (Chong *et al*. 2008).

In modern science existing biosystems are considered at corpuscular structure level, with energy and information structures being ignored. The focus will move in the direction of the cognitive structures of energy - information, the body can be considered as a quantum generator of information: electromagnetic, solitonic, sound, spin and bioplasma. The term “information” has many meanings; it is generally understood as something that carries a message. Information is also referred to as the ability to organize system or maintain an organized state (Kite 1995, p. 33).

Solitons are generated in nonlinear optical centres and in Bose – Einstein concentrates. Strong laser waves, the degree of non-linearity and high concentration of atoms in a Bose-Einstein condensate have an impact on the formation of multi-dimensional solitons. Currently, the greatest degree of non-linearity is achieved by organic substances in which electrons appear likely to travel long distances. Dimensional solitons owe their existence and permanence to a balance of two forces. Dispersion tends to expand, while non-linearity seeks to compress solitons. Such a soliton can be obtained, directing a laser beam at appropriately selected half of the condensate. (Trippenbach, Infeld 2007. p.63)

Solitons are independent entities (Shipov 1993). A soliton is defined as a moving solitary high-power impulse which is not deformed during contact with another particle, wave, or field. There are solitons of light, water and sound which can strongly interact with other solitons, but after such interaction the form and structure remain unaltered, e.g. when two soliton waves approach each other they "notice" each other and penetrate each other, but they do not overlap; then they continue spreading in the same order in which they had been connected. This means that they penetrate each other, without losing their identity. Soliton waves carry signals without the necessity of moving the environment as a carrier wave. Only spatial relations are transmitted that is the geometry of the constellation of particles of water and air without their physical part - the environment contributes to this process only as a structural pattern (Brizhik 2003).

Soliton signals are transmitted not only to biological structures, but also to the psychological and spiritual realm - these are our mental, emotional and conscious states. Solitons can spread into the entire universe, and they do not disappear. They have existed from the beginning of life up, to the present. The cosmos was densely filled with a soliton network, carrying content and meaning. Information fields (solitons) can affect energy systems almost without an energy loss and cause large changes in the biological system. These fields and thoughts can influence each other and are associated not only with the biosphere, but also with the noosphere. Their variety of densities is

infinite. The brain has the ability to generate and receive information fields, and therefore, these fields may be a carrier of information from one brain to another (Adamski 2005, p.33).

The brain and every replication system of a genetic code have transmitting and receiving antennas that transmit space "Directives" (Edmundson, Enns, 1995, p 2491).

A soliton image of the universe has a strong effect on the development of human mental processes and social life. Solitons as independent entities form the structure of the unconscious which includes patterns of human actions, life programs. Unconsciousness is irrational, guided by instinct and does not exhibit any logic rules. Consciousness is responsible for intelligent recognition of reality and for the control of thoughts and emotions. Awareness affects soliton states (subconscious) when they cooperate and when they are controlled by bioplasma (Adamski 2016).

Lens cells and melanin cells can be considered as waveguides. Light in a waveguide would be transformed into other light and could replace electrons that are used in transistors. In the sense of sight, there are two kinds of biocomputers: optoelectronic biocomputers that function with the help of solitons and quantum biocomputers that are governed by the rules of quantum informatics. Soliton biocomputers are responsible for processing soliton material taken from space and transmitted to bioplasma, giving it a high information density. Quantum biocomputers are powered by quantum braided states; they process and order perceptive images and then they transmit them to bioplasma. In bioplasma, this perceptive image is whitewashed by soliton content, giving it a pattern of behaviour or a way of thinking and of emotional responsiveness. Sedlak 1979 believes that bioplasma was once created and it cannot be created once again; it is unique in nature. Bioplasma is transmitted from parental organisms to the organisms of their offspring. It is a "master model" and so far unique. It cannot be produced in laboratory conditions. A soliton image acquired from space by bioplasma is evaluated and compared to the model. Then, bioplasma corrects the image and creates a uniqueness of the organism, with its energy-informative characteristics of personality, age, health state, illness or a way of thinking.

5. Management of receptor cells by a biocomputer

Quantum information science seeks to use spin properties not only to record information but also to transform and transmit it. Spintronics is believed to have revolutionized the construction of computer devices, and information processing. Traditional computers make calculations using a controlled flow of electrical charges, and changes in current flow are considered as a carrier of information. Presently, when we use a telephone, information is transmitted by electrons, and when we use optical fibres or mobile phones, it is transmitted by photons. Spintronics shows that information can also be transmitted by the direction of a spin (left or right). Synchronization of spins cause memory to appear. The difference as compared with the traditional computer lies in the fact that particles can remain in a state of superposition, i.e., their spin can be both positive and negative. This means that a molecule has both a state of "0" and "1" and the whole infinite sequence of values between these states. A traditional computer adds numbers in a sequential manner (one after the other), while a quantum computer can make a huge number of mathematical operations simultaneously. A calculating machine that consists of several hundred of atoms would be able to make billions of calculations at the same time (Jacak 2001), (Marecki 2002).

Quantum Information Science is a field of science bordering on theoretical computer science and quantum mechanics; it uses unique properties of miniature systems governed by the laws of quantum physics. Information technology shows that such phenomena as interference of wave functions, quantum parallelism, superposition of states, quantum entanglement and coherence can be used for calculating information in quantum computers (Nielsen, Chuang 2000), (Liberman, *et al*. 1995).

This relatively new science – spintronics - considers, besides electron charges, also its spin and deals with the design of electronic components of the planned structure of a spin. Elementary particles are endowed with electric charge, mass and spin. Electric charge is expressed by electric field in the space surrounding the particle; magnetic moment (spin) is expressed in a magnetic field of a rotating particle. The spin quantum number “s” in quantum mechanics is a counterpart of a spin. It takes half the value of elementary particles that are called fermions (electrons, neutrinos, quarks) and integer values for bosons (photon, graviton, gluons). For example, electron and quarks have the spin of 1 / 2, whereas the spin of a photon equals 1 (Chudy 2011).

Collective behaviour of particles is different depending on how they spin. When particle spin is complete, the particles are subjected to Bose-Einstein statistics. When the particles have the half-spin they are subjected to Fermi-Dirac statistics. (Wegrzyn *et al*. 2004).

When the spin of the molecule is positive, its status can be read as "1"; when it is negative – as "0". The principle of the operation of the supercalculator operation of the future is based on the direction of electron rotation ("spin") on the shells of the atom, or to be more precise, on the specific properties of elementary particles. They can "spin" in different

directions simultaneously and this phenomenon proves that they have different spin (Liber 2002).

The number of qubits determines the efficiency of quantum computers. The process of adding any subsequent qubit causes the acceleration of calculations to double. As a result, a quantum computer consisting of 500 qubits could operate simultaneously on 2500 states! In one act of reading we would obtaininformation from 2500 states whereas a classical computer would need for this process many centuries (Greenberg, 2011).

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