

# Information-Matter Bipolarity of the Human Organism and Its Fundamental Circuits: From Philosophy to Physics/Neurosciences-Based Modeling

Florin Gaiseanu

Science and Technology of Information Bucharest (Romania) and Barcelona (Spain)

Starting from a philosophical perspective, which states that the living structures are actually a combination between matter and information, this article presents the results on an analysis of the bipolar information-matter structure of the human organism, distinguishing three fundamental circuits for its survival, which demonstrates and supports this statement, as a base for further development of the informational model of consciousness to a general informational model of the human organism. For this, it was examined the Informational System of the Human Body and its components from the perspective of the physics/information/neurosciences concepts, showing specific functions of each of them, highlighting the correspondence of these centers with brain support areas and with their projections in consciousness, which are: Center of Acquisition and Storing of Information (CASI) reflected in consciousness as memory, Center of Decision and Command (CDC) (decision), Info-Emotional Center (IES) (emotions), Maintenance Informational System (MIS) (personal status), Genetic Transmission System (GTS) (associativity/genetic transmission) and Info Genetic Generator (IGG) related by the body development and inherited behaviors. The Info Connection (IC), detected in consciousness as trust and confidence can explain the Near-Death Experiences (NDEs) and associated phenomena. This connection is antientropic and informational, because from the multitude of uncertain possibilities is selected a certain one, helping/supporting the survival and life. The human body appears therefore as a bipolar structure, connected to two poles: information and matter. It is argued that the survival, which is the main objective of the organism, is complied in three main ways, by means of: (i) the reactive operation for adaptation by attitude; (ii) the info-genetic integration of information by epigenetic processes and genetic transmission of information for species survival, both circuits (i) and (ii) being associated to the information pole; (iii) maintenance of the material body (defined as informed matter) and its functions, associated to the matter pole of the organism. It results therefore that the informational system of the human body is supported by seven informational circuits formed by the neuro-connections between the specific zones of the brain corresponding to the informational subsystems, the cognitive centers, the sensors, transducers and execution (motor/mobile) elements. The fundamental informational circuits assuring the survival are the reactive circuit, expressible by attitude, the epigenetic/genetic circuit, absorbing and codifying information to be transmitted to the next generations, and the metabolic circuit, connected to matter (matter pole). The presented analysis allows to extend the informational modeling of consciousness to an Informational Model of Consciousness and Organism, fully describing the composition/functions of the organism in terms of information/matter and neurosciences concepts.

*Keywords:* information/matter, matter-related information, bipolarity, entropy/antientropy, informational model of consciousness, adaptation/learning for survival, neuro-connections, sensors, transducers and actuators, informational reactive and genetic/epigenetic circuits, metabolic circuit

### **Introduction**

In a series of recent articles it was shown that the nature of consciousness and organism could be understood starting from Draganescu's philosophic vision on non-living and living matter structures (Draganescu, 1990), certified nowadays by physics arguments (Gaiseanu, 2018a) and described and defined by means of informational concepts of the Science and Technology of Information (Gaiseanu, 2019a). Starting from the observation that our decisions YES/NO in any moment design our future trajectory in our life (Gaiseanu, 2016; 2017b; 2018b; 2019b), it was deduced that the informational system of our body is composed by seven informational centers with well-defined functions, but working in a correlated way (Gaiseanu, 2017b; 2019c). In contrast to other informational models, referring to the information integration in the brain (Tononi, 2008) or to the brain activity as a processor (Baars & Gage, 2013), the Informational Model of Consciousness shows the specific architecture of the informational system of the human body and the way in which the functions of the informational subsystems are reflected in consciousness (Gaiseanu, 2017b), scientifically demonstrating the possibility to fully describe consciousness in terms of information, independently on the internal or external information source or its nature (Gaiseanu, 2019c), initiating and reinforcing the suitable concepts for a toward approach by an informational science of consciousness (Gaiseanu, 2019a). This was mainly possible by the introduction of the concepts of embodiment/disembodiment of information, allowing to describe the internal connection between mind and body and the concepts of informed matter, describing the essential feature of the living structure (Gaiseanu, 2016). Moreover, introducing also the concept of information field of matter and info-creational field of consciousness, where the new information is created by the mind, the thought acting as an informational operator on this field, it was also possible to complete the panorama of consciousness properties, allowing to explain the extra-power features of the mind, referred to mind-exploration of the living and non-living structures (Gaiseanu, 2016; 2017a; 2017b; 2020). The near-death experiences (NDEs) and associated phenomena, well-established by the medical clinic researches (Fracasso & Friedman, 2011), were also described by the introduction of the concept of informational field of universe, with its bipolar gravitational (entropic)/antigravitational (antientropic) behavior (Gaiseanu, 2016; 2017a). These remarkable advances in understanding of consciousness and life open large gates for further researches on this fascinating field (Gaiseanu, 2020).

On the basis of suitable developed physics/informational and modeling key concepts and on the neuro-analysis of the transmission/management of information in the human organism, in this paper are reported results concerning the informational circuits of the human body, allowing to distinguish three fundamental circuits which assure the survival of the body and of the species. Such results demonstrate again on this way the bipolar information-matter architecture and functions of the human organism, supporting Draganescu's philosophic view on living structures previously proposed (Draganescu, 1990). These results allow also to extend the Informational Model of Consciousness to a general info/matter model of the human organism.

### **Preliminary Philosophy on Living Structures and the Physics-Based Development of Informational and Modeling Concepts**

Based on a deep knowledge of the solid state structures and their properties exhibited especially in microelectronic systems (Draganescu, 1972), the concept of **information**, as a *fundamental component of nature*, both in *non-living and living structures*, was introduced/revealed in philosophy in modern terms by Draganescu's philosophic studies in 1979 (Draganescu, 1979) and developed later in 1990 (Draganescu, 1990). According to this concept, it was shown that information and matter are the fundamental components of universe, collaborating each other to form non-living and living structures. While elementary "profound/deep" matter would be a non-active substrate of the world, information plays the phenomenological role of the **tendency to a structuration**, allowing to obtain the material structures according to the relation:

Matter + Information => Structured Matter (1)

and the living entities by the relation:

Structured Matter + Information => Living Structures (2)

In rel. (1) by Matter should be understood a fundamental, primordial state of matter, incapable of itself structuration, without the participation of information, which acts as an active structuration agent.

According to these concepts, the *living structures are a result of an additional quantity of information*, allowing to *animate the non-living matter structures*. Such concepts confer to information a fundamental role, confirmed later by physics arguments both at elemental quantum level and astrophysic scale (Gaiseanu, 2016; 2018a). Indeed, as it was experimentally demonstrated in some quantum physics experiments, information can be separated by the particles themselves, so Gaiseanu has argued that an informational field of matter can be defined (Gaiseanu, 2016; 2017a). Moreover, Gaiseanu has argued also that the universe itself operates as an *informational matter/antimatter system* (Gaiseanu, 2016), the antimatter component acting by means of an antientropic (antigravitational) field (Gaiseanu, 2019e).

Coming also in this domain with a deep preparation and experience in the solid state physics and microelectronics processes (Gaiseanu, 2013; 2017c), Gaiseanu has introduced the informational concepts as a tool of investigation specific to Science and Technology of Information, showing that the informational system of the human organism could be described in terms of information (Gaiseanu, 2019a), within the Informational Model of Consciousness. Such a possibility was obtained by defining the *matter-related information concept*, as a key to understand the incorporation and transmission of information in the human body by *embodiment/disembodiment mechanisms* (Gaiseanu, 2019c), and to apply suitable mathematical/informational tools (Paun, 2000; Gaiseanu, 2019c). These important advances allow also to understand that the mind and its operability is supported and can be described defining the *though as an informational operator on the info-creational field* of mind (Gaiseanu, 2016; 2017a), formed by the accumulation of information, both that received from the internal and external sensors or created by the mind itself (Gaiseanu, 2017b). Therefore, the *though acts as a vector on this data field*, because it needs an address where should go to activate a stored information, or to "scan" the reality by means of the "mind eye", adequately trained (Gaiseanu, 2020). During the near-death experiences (NDEs) (Fracasso & Friedman, 2011), the *bipolarity of the time arrow* in the bipolar matter/antimatter system is manifested also by the regression to the childhood and the "absorption" of the informational entity by a "tube" (the "gap" between the life and afterlife stage) into the antientropic field, as Gaiseanu shown (Gaiseanu, 2017a). This field can maintain the coherence of this entity, explaining the *afterlife*

*cycle* (immaterial and immortal—at least for a certain period) of the human informational existence (Gaiseanu, 2018c).

The bipolarity of this system could also explain the *retro-causality phenomena*, consisting in the possibility that the *future influence the present*, observed during some quantum experiments (Gaiseanu, 2020). Indeed, from the point of view of the Informational Model of Consciousness, the particles at a quantum level could manifest the specific characteristics of antimatter field, where the direction of the time arrow is oriented from the future to the past, reversely than in the matter gravitational field. This is a basic phenomenon explaining the *time regression* during NDEs and the *future event anticipation* (Gaiseanu, 2017a; 2017b). From the perspective of the Informational Model of Consciousness, the retro-causal phenomenon could be also an effect of interaction of the mind (expressed by *intention*), with the experimental microparticles at the quantum level (Gaiseanu, 2020).

The special characteristics of the mind, manifested by *intuition, revelation, clairvoyance, presentiments and anticipation*, are also part of such categories of phenomena, explained by the Cognitive Sentient Exploration of Reality (CSER) (Gaiseanu, 2019d), as a powerful tool of exploration allowed by *extra-cognitive properties of the mind* (Gaiseanu, 2020). The info-connection of the Informational System of the Human Body (ISHB) to the bipolar informational field supports also according to the Informational Model of Consciousness the Religious and Mystic Experiences (RMEs) and so called *paranormal phenomena* (Gaiseanu, 2017b; 2020), some of them specified above. The teleologic tendency of the living structures (collaboration of all the parts for the fulfilling of the common purpose of the entire unit) is also supported by the antientropic connection within the Informational Model of Consciousness (Gaiseanu, 2020).

Another key concept as a basis of the Informational Model of Consciousness is the entropy and antientropy. While matter is subjected to the thermodynamics law of the entropy increasing, the *living organisms shows a specific antientropic behavior*, the main purpose of the living structures being their **survival**. As entropy in matter systems is always positive, the antientropic behavior is often called negentropy, referring to the revers (negative) tendency with respect to that of the matter systems. According to the Informational Model of Consciousness, ISHB is connected by means of the Info-Connection pole to the antientropic field of the universe, as an external antientropic source, favorable to life and living (Gaiseanu, 2016; 2020), as will be shown also below.

The intimate interactions between the organism cells and information inside of the organism, their communication and the encoding/transfer of information by epigenetic and genetic processes are the *basic mechanisms responsible for mind-body relation* explained by the Informational Model of Consciousness (Gaiseanu, 2019c; 2020). Such an analysis contributes to understanding in *terms of information* the mechanisms of *relation between (material) body and (informational) mind*, a millenary philosophic problem which is still debated within various scientific branches.

### **Management of Information From the Perspective of the Informational System of the Human Body and Neurosciences-Based Modeling**

In order to define and discuss the *bipolarity of the human organism and its informational circuits*, it is necessary to present shortly the architecture of the Informational System of the Human Body (ISHB). According to the Informational Model of Consciousness, the ISHB components are the following (Fig. 1, upper left side): Center of the Acquisition and Storing of Information (CASI), which receives information from the

external and internal sensors and contains therefore the entire personal informational data (memory) as the life experience; Center of Decision and Command (CDC) managing the info-operations and commands mainly to the executory elements (muscles and associated mobile elements); Info-Emotional System (IES), operating with emotions and emo-states (defined as emotional stationary states); Maintenance Informational System (MIS) managing the conversion of the foods into necessary nourishment elements for the body; Genetic Transmission System (GTS), allowing the preparation and the transmission of the genetic material and Info-Genetic Generator (IGG), managing the development of the body according to the age and the inherited information from the parents (Gaiseanu, 2019f).

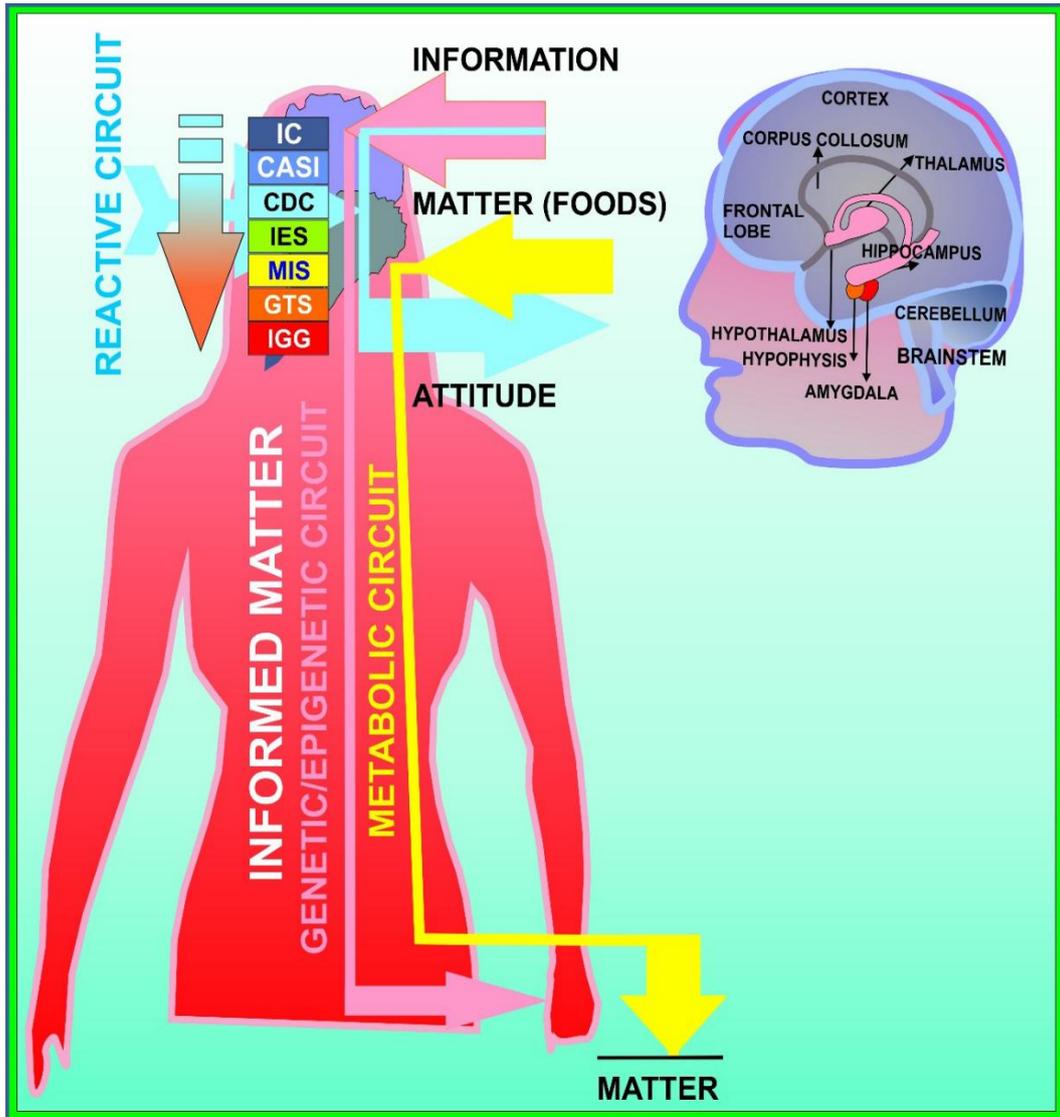


Figure 1. Schematic representation of the fundamental informational circuits for survival (central side), specific informational subsystems (left upper side) and brain neuro-connection zones (right upper side).

A special informational center is defined as Info-Connection (IC), dedicated to the connection under special conditions to the specific phenomena detected during the *near-death experiences* (NDEs) (regression to the childhood, external exploring of the reality by extracorporeal view, crossing of a tunnel to a luminous gate,

peace sensation, etc.), to the *religious and mystic experiences* (RMEs), *extra-sensorial and paranormal phenomena* (premonition, presentiments, clairvoyance, extra-corporal exploration, psychokinesis, mind communications, etc.), explained by the access of the mind to the bipolar informational field induced by gravitational (entropic)/antigravitational (antientropic) bipolar system of our universe and our solar region (Gaiseanu, 2016; 2020). This is a consequence of the matter/antimatter (dark matter) activity in the vacuum and the pair polarization in the gravitational field, as explained elsewhere (Hajdukovic, 2012; 2013).

The dynamics and functions of these centers are *projected in consciousness* as cognitive centers (Gaiseanu, 2017b), suggestively defined respectively as: Iknow (Ik—memory), Iwant (Iw—info-operability/decision), Ilove (Il—emotions), Iam (Ia—body status), Icreate (Ic—sociability/genetic transmission), Icreated (Icd—genetic inheritance) and Ibelieve (Ib—trust/confidence). The *confidence* is actually a consequence of the choice of a reliable alternative from many others, which is in fact the definition of information (Gaiseanu, 2018a; 2019a). Within the Science and Technology of Information the concept of information has a precise meaning, mathematically defined as a probability expressed in Bits that an event in a binary system to occur. A binary behavior is typical also for the human decisional operability, choosing between the decision YES or NOT, which marks in any moment its life and future trajectory, similarly with the info-operation in the computing systems. The quantity of information acquired by a system is defined and measured as a *difference between the entropy* of the system in a final and in an initial state, information resulting actually from the *elimination of uncertainty* between these states. The reduction of the entropy is a result of an incorporation of information, while the increase of entropy is equivalent with the loss of information, these two parameters showing an opposite behavior. Therefore, the human organism is programmed and works in an antientropic manner, against the entropic tendency of material systems, allowing the survival.

The decisional information is communicated by attitude, which provides to the body and to the external environment a decisional information, as an information output. The motor decisions are addressed to the execution elements, mainly to the muscles and associated mobile elements.

The correlation between the areas of the brain and each informational subsystem from neurosciences point of view were reported in detail elsewhere (Gaiseanu, 2019g; 2019h), but in order to *distinguish and define the info-circuits of the human body* it is useful to highlight them succinctly as follows: (Fig. 1, upper right and left side):

(1) The prefrontal cortex, correlated with the short-term memory, hippocampus—with the long-term memory, cerebellum—with the behaviors and skills, thalamus—responsible for sensory impulses and the cerebral cortex, managing their interpretation, are the main areas supporting the activities of CASI, dedicated to the detection of external and internal signals by sensors and to their storing in memory;

(2) The cerebral hemispheres, frontal and prefrontal lobes of the cerebrum supports the dynamic abilities of the mind concerning the informational operations, the elaboration of the decisions (mainly expressed, but not reduced to the vocal expression) and the command transmission to the motor execution elements, informational activities characteristic of CDC;

(3) The limbic system, i.e. thalamus, hypothalamus, hippocampus, midbrain and amygdala are responsible for the emotional activities, managed by IES;

(4) The brainstem area of the brain, hypothalamus and medulla controls the autonomic functions of the organism, referring to digestion and cardio-respiratory processes, managed by MIS;

(5) Hypophysis and hypothalamus are responsible for the reproduction/sexual activity represented by GTS;

(6) Hypophysis and hypothalamus control also the body growth and its development, metabolism and the aging, while the basal ganglia seems to play a role in the inherited personality features, activities managed by IGG;

(7) The anterior cingulate cortex seems to be responsible for religious experiences, as it was recently shown (Inzlicht et al., 2011), and by extension for extra-sensorial experiences (Gaiseanu, 2019c; 2019e).

Analyzing such an architecture, it can be deduced that the informational system of the human body is a binary system, *articulated to matter by MIS* and to *information by the pole IC and CASI*. The information managed by the informational subsystems starting from IC and CASI to GTS and IGG shows various *degrees of info-integration in the body material structure*, as matter-related information, mainly characterized by a specific interaction between the virtual (non matter related) and matter-related information (codified information into the body cells). The *two poles* of the human organism are therefore *information* and *matter*. The body itself can be therefore defined as an *informed matter structure*, just to point out the constitutive fundamental elements of the living organism, formed by matter + information. In other words, we have to understand that the human body as a living system is composed by matter and information.

### **Dynamics of Information and the Informational Circuits of the Human Body**

The informational circuits can be described in terms of information and of neurosciences concepts, and can be defined by the composing components, which basically are: the *informational manager* (corresponding brain zones), the associated external and internal informational *sensors*, the *transducer elements* (body specialized info-executive organs, converting the information in various other physicochemical or mechanical forms and reversely), the *motor execution elements* (muscles and associated mobile elements) and the *neuro-connections between these components*. The transmission of information by means of the nervous system was earlier described in detail (Gaiseanu, 2019c) and is basically supported by *electrical* (like in microelectronic systems) and *chemical agents* (neurotransmitters). Therefore, the main informational circuits of the human body correspond to the main informational subsystems defined above, formed by the specific info-manager (the brain zone), the neuro-connections, which are the nervous fascicles of the spinal cord and their branches connecting the brain and each corresponding region of the body, with a conduction and distribution role of the information to the specific executive organs (*transducers and motor/mobile elements, which actually can be defined as actuators*), and by sensors. We have to note that the motor elements (muscles and associated mobile elements) are actually *mechanic actuators* (a particular form of transducers), acted voluntarily by CDC, while the transducers in general (organs), can work independently in an automatic regime managed by MIS.

We have to understand by sensors the *sensitive elements* able to transmit to CASI relevant signals related to the operating activity and status of the various parts of the body in any moment. These sensitive elements are actually part of the transducer category of info-sensitive/execution elements. Besides the common senses (sight, hearing, smell, taste, touch), the sensors could transmit to the brain signals like hungry, thirst, pain, coldness, heat, etc., coming from *external or internal sources*. Besides the specialized sensors like eyes and ears, the other body organs themselves act not only as executive, but also as sensitive elements (transducers).

The activity of the sensors allows the capture not only of the signals from the informational subsystems which are directly (consciously) detected (CASI, CDC, IES), but also from the subsystems which automatically works (MIS, GTS, IGG), as reflected by the activity of the cognitive centers of consciousness defined above.

Therefore, these centers are also *constitutive parts of the informational circuits* of the human body, each of them corresponding to the specific informational subsystem. The received information in CASI could be included as adaptation criterion (distinguishing between Good/Bad so allowing a YES/NO selection) into a new process of decision in CDC, within an *informational operational feedback process*. Therefore, a dynamic change of information takes place not only within the conscious system components (CASI + CDC + IES), but also with the so called Programmed Informational System—PIS (PIS = MIS + GTS + IGG). The conscious system will be referred therefore as to the Operative Informational System (OIS), because its main objective from the informational point of view and from the basic life requirements is the *connection and reactivity to the environmental conditions*, to assure the *immediate and medium-term* adaptation for survival.

In terms of information, the *human body* can be therefore described as an info-material system with the following informational connections: (1) input of the operating information, represented by the external and internal *sensorial* informational channels; (2) output of reactive information, represented by attitude, as a reactive response to the received information from external or internal sources; (3) info-genetic input, which is the genetic inherited information from the parents; (4) info-genetic output, which is the genetic transmitter to the next generation. On the other hand, we have to observe that MIS operates with information dedicated to manage the ordinary matter itself, from the ingested (foods, air, water) to eliminated processed matter, so it is useful to define also a matter input and output in order to fully describe the body as a bipolar info-material system. While the informational input/output connections are dedicated to manage the adaptation/survival processes, the material processes managed by MIS are strictly necessities for the body maintenance structure and its power in any moment, serving also to the survival objective, but from the material point of view. From the perspective of the Informational Model of Consciousness, MIS assures in this way the connection to the matter pole of the info-material structure, which is the body itself (informed matter) in contact with the ordinary matter. This pole connection is similar in terms of informational systems with the connection to a power source, assuring the necessary energy of the system to allow its operability.

Normally, the attitude is the product of the subsystem CDC and expressed by the cognitive center Iw. The decision depends however on *information and decision criteria* (Gaiseanu, 2018b; 2019b), which can be provided by each of the other cognitive centers as well: CASI (Ik) is the provider of information for CDC (Iw), while CDC deposits the decisional information in CASI, IES (Il) is also a powerful partner within the decision making process, because besides the controlled emotions, the spontaneous ones could have a high influence on the decisional process, MIS (Ia) determines the momentary info-status with specific influence on the decisional process, as well as the GTS (Ic), IGG (Icd) and IC (Ib) by means of their specific characteristic signals. Therefore, the attitude A can be defined as a function of the informational signals of all other centers, under the form:  $A = A(Ik, Il, Ia, Ic, Icd, Ib)$ . Particularly, if the strategy of decision is to adopt a decision different of that which is really wanted, the signals of the center Iw could be introduced also as a variable into the general form of the function A, among all the others.

According to the above discussion, the *attitude, as a final product of the decisional process is the informational output, as a reactive response* to the environmental factors for *momentary, optimal short-term or longer-term adaptation*, operated by the Reactive Circuit (Fig. 1, where it was taken into account that the vocal form is the main expression of the attitude). The body posture, face/glance expressivity, gestures and the mobility dynamics in general could be also participatory contributors to the outside attitude expression.

Besides the electrical/chemical form of info-transmission by means of the nervous cells, a deeper form of

the *mater-related transmission of information* was recently referred as epigenetic processes (Gaiseanu, 2019i). The received information from the environment, perceived as a long-term stressing information, repetitively operated/processed by ISHB, can be integrated and transmitted to the next generation, without affecting the genetic system of the cells, allowing in this way the *long-term adaptation and species survival* by the incorporation of the new acquired information as a *form of the adaptation* to the environmental changing conditions. Such a process is marked by the interrupted arrow symbol in the upper left side of Fig. 1, along the informational subsystems of the organism, starting from IC and CASI, where the virtual information is received, up to GTS, where the codified information is ready to be transmitted to the offspring.

The mechanism of *incorporation under a stable form* (epigenetically codified information) of the received/acquired information follows some distinctive steps: (i) info-reception step in CASI, as a short-term memorized information, unstably related to brain cells; (ii) info-memorizing of information in CASI long-term memory by repetition (*learning process*), implying CDC system; (iii) intensive (traumatically) lived event and/or affective repetition, implying the emotional system (IES); (iv) info-incorporating as an info-ability/skills into the automatic informational system (implying MIS); (v) epigenetic codification of information and its genetic transmission to the offspring (GTS).

The adaptation process is actually supported under a stable form by a learning process, which is a repetitive multi-sequential mechanism expressed by *epigenetic incorporation of information* into the *material cells*. Not only the human body, but the living structures in general show this capacity, explaining on the long run the evolution of the species. If a repetitive info-stress/cue received from the external environment can be converted into an automatic skill by the organism (step (iv)), that means that a new feature is added to the organism functions, which can be transmitted to the offspring (step (v)), within a large chain of repetitive cycles, if the external conditions are maintained. Such a *process of adaptability* could explain not only the *integrative acquisition of some new functions*, but also the *body modification/plasticity*, according to the survival necessities. *Learning is therefore an acquirement fundamental process of species evolution*, sustained mainly by epigenetic mechanisms. This fact is demonstrated actually during the educational process of the new generation, with effect not only on the acquisition of new information, starting from the first days of the life till maturity, but also on some physical characteristics of the body, revealed sometimes by extraordinary performances.

In the human body, such a mechanism implies therefore the activity and contribution of various informational subsystems, and finally processed by the genetic circuit of GTS. This specific circuit will be defined as Genetic/Epigenetic Circuit and is *fundamental for the species survival*, marked in Fig. 1. Therefore, while the Reactive Circuit assures the rapid or medium-term adaptation for survival, the Genetic/Epigenetic Circuit assures the long-term adaptation for survival and the continuity of species, by the specific genetic/epigenetic output. In terms of time, the Reactive Circuit operates during the present period of time, while the Genetic/Epigenetic Circuit operates for the future time. The two defined circuits, i.e. the Reactive and the Genetic/Epigenetic Circuit are referred to the *informational axis* of the informational system of the organism for survival, showing flexibility in operating the input information during the dynamic interaction with the environment, by short and long adaptation mechanisms. While the Reactive Circuits operates especially with virtual information, the Genetic/Epigenetic Circuit is responsible for the info-incorporation (codification) of information into the cells under a stable form, exhibiting and supporting in a concrete form the relation between information and matter.

The informational axis refers therefore especially to the *dynamic informational process* of interaction of information with the informed matter (body), emphasizing the reactive output response and the genetic/epigenetic output response respectively. These circuits could be therefore associated with the informational pole of the organism. The activity of these circuits is mainly informational and dedicated to codify information on informed matter, transducing the input virtual information in matter-related information.

On contrary, the MIS subsystem operates directly with *matter elements*, automatic informational processes acting as an info-managing support necessary to process the matter-input elements for the body maintenance. The specific circuit dedicated to the management of digestive/breathing/distribution processes, absolutely necessary to maintain the *power and the functional material and energetic support* of the organism can be defined as Metabolic Circuit, as it is marked in Fig. 1. This circuit could be therefore associated with the matter pole of the organism.

According to the above discussion, the informational subsystems defined within the Informational Model of Consciousness (info-managers within the brain), associated to the circuits defined above, which include the sensors (sensitive elements), transducers (organs), actuators (muscles and associated mobile elements) and neuro-connections, can fully describe actually the entire human organism, within a general model which we can call the Informational Model of Consciousness and Organism (IMCO), able to distinguish between the various forms of organization and functions of the human body, and all them based on the fundamental constitutive elements: matter and information, as stipulated and demonstrated above.

### Conclusions

The previous philosophic studies on the fundamental constitution of the world, viewed as a result of the interaction between a primary (inactive) “deep matter” and information (as an active structuration agent) preciously proposed, concluding that the living structures result from an addition of information to the structured matter, were developed by introduction of suitable physics and informational concepts on the basis of new quantum and astrophysics findings, demonstrating the bipolar informational character of universe and the bipolar information-matter architecture of the human organism. The key concepts concerning the analysis of the human organism are information and entropy/antientropy, allowing to define an information field of matter and an info-creation field of the mind, where the thought acts as an informational operator, which furthermore permitted the informational modeling of consciousness and of the human organism.

The analysis of ISHD in order to detect and model the informational circuits of the organism allowed to reveal a specific architecture consisting in seven informational subsystems defined as CASI, CDC, IES, MIS, GTS, IGG and the special one defined as Info-Connection (IC), an antientropic and informational pole of the organism. The corresponding cognitive centers in consciousness are a result of informational activity of these informational subsystems and were suggestively defined as Ik (memory), Iw (decision), Il (emotions), Ia (body/health status), Ic (sociability/genetic transmission), Icd (genetically inherited predisposition/mentality) and Ib (trust/confidence) respectively. The analysis in terms of information and neurosciences of these components and their neuro-connections to the brain shown that the informational activity of each of them can be described defining the corresponding circuits, composed by the info-managing subsystem (specific regions of the brain), the corresponding organs as transducers of information, the motor execution elements (all of them acting also as sensitive elements), and the cognitive centers, as a projection of their functional activities in consciousness.

The human body appears in this way as a bipolar info-material structure, composed by information and matter, with (i) an info-input absorbing information from internal and external sources and connected to CASI, (ii) delivering by CDC a reactive information as an informational output (attitude) to assure the adaptation for survival, with (iii) an info-genetic input inherited from parents (IGG) and with an (iv) info-genetic output transmitted to the offspring (GTS), to assure the species survival. An input and output of the material processes was also defined to fully describe the material processes managed by MIS, this operating as a power source by the connection to the matter pole of the organism.

The attitude as a reactive informational output is a result of the info-operation of the received information, depending actually on the activity of all other centers. The genetic codified information could include the acquired information by epigenetic processes, as a result of various transitory steps assisted by the contribution of various subsystems, and finally transmitted as an info-genetic output. This process can explain the evolution of the species by a large term adaptation/learning process, reflected both in the acquired specific stabilized traits and the physical attributes, including the body plasticity.

On this basis, it was defined a Reactive Circuit, allowing the short and medium-term adaptation for survival and a Genetic/Epigenetic Circuit for long-term species survival. These circuits are associated with the informational axis/pole of the organism, while the defined Metabolic Circuit, dedicated to manage the matter for body energetic/material necessities can be associated to the matter pole of the organism, assuring its power source. While the Reactive Circuit manages especially the virtual information, the Metabolic Circuit is dedicated to manage the necessary matter for energetic and material needs of the organism. The Epigenetic/Genetic Circuit is dedicated to the codification of information on matter, as a matter-related information, to be transmitted to the next generation.

The presented analysis allows to extend the Informational Model of Consciousness to an Informational Model of Consciousness and Organism (IMCO), able to fully describe in terms of information/matter and neurosciences concepts the composition/functions of the human organism.

### Acknowledgment

To my son Adrian Gaiseanu and his family.

In memoriam of Acad. Mihai Draganescu, the founder of Science and Technology of Information.

To Science and Technology of Information and to Romanian Academy.

With grateful thanks to Acad. Florin Filip, Acad. Gheorghe Paun, Dr. Constantin Bulucea—Honorary Member, and to the Members of the Section of Science and Technology of Information of the Romanian Academy, for the attention paid to my works and activity.

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