



(REVIEW ARTICLE)



## That fantastic and mysterious flow of electrons that we call LIFE

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### Abstract

The aim of this article is to present a personal conception on the structure and evolution of matter and to examine critically the one theorized by physics and quantum biology.

The fundamental questions I am going to try to answer are:

- What is a life?
- Why is it difficult, elusive to understand its inner molecular mechanism?
- Is it possible to formulate a comprehensive theory of the molecular mechanism that guides it, without resorting to abstract mathematical equations, true transcendental transpositions of the real world?
- What does mysterious and powerful feeling push us in the search for its essence, despite the limited cognitive tools we have? Is love for knowledge an end in itself?

The narrative I'm going to present is based on the assumption that all the elementary particles of matter and the forces with which they interact use a proper means of communication a universal molecular code, that informs them and guides them in the random evolution towards infinite possible solutions.

I have also theorized that the evolution of life on earth had been possible thanks to the formation of a barrier, called the cell membrane, capable of containing within it, a set of organized and coordinated molecules, separated from the chaotic external world.

To this hypothesis shared by many authors, I have associated the concept that the cell membrane has perfected the process of biological communication.

Finally, I have hypothesized as the basis of life processes an incessant flow of electrons, which regulates communication and provide the energy they need.

The substrate of this mechanism is formed by electromagnetic waves, the only ones capable to transport electrons and orchestrate the cosmic symphony.

I may consider myself sufficiently gratified of the concepts presented here if they find some adhesion and theoretical contribution from the readers.

**Keywords:** Quantum Mechanics; Electromagnetism; Communication; Quantum Biology; Electronic flow; Plasma membrane

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## 1. Introduction

Once upon a time..., it is the beginning of all fairy tales, and like all fairytales that respect each other, even the facts and theories that I 'm going to expound, in this article, often take the form and contents of a fairy tale narrative.

It often happens in the description of an experimental result or a natural event, of which we do not understand at all the origin and the intimate succession of the mechanisms that are at the base, to have to resort to a completely abstract interpretation always presents with the esoteric language of mathematical formulas.

Since, as we all know, reality surpasses and precedes fantasy, the narration of the real facts, of which science deals, very often fails to grasp the essence and however rigorous, rational and plausible this may appear in the transpositions of mathematical formulas, It is still the product of pure abstraction, in the unrealistic attempt to reproduce reality.

### 1.1. Limits of Epistemology

Is there the objective reality of the material universe, present and immanent, with characterizing and qualifying properties that is independent of our ability to conceive it and even before observing it?

Such an objective reality has surely existed for billions of years and will probably continue to exist indefinitely, it could be defined as the universal space/time or place of events in which the phenomena of the evolution of matter take place.

Space/time is the place where all phenomena take place, we can imagine it as a kind of immanent property eternal and devoid of intrinsic knowable dimensions where the transformations of universal matter occur. And it is only with the presence of material transformations, which mark its rhythm, that it acquires a knowable dimension.

According to Einstein's relativity, the space/time size assumes its own consistency if it is occupied by material bodies, which by their presence generate a specific "Field", different, according to their nature.

They assume consistency when they become the object of our speculation and we observe and measure them.

It is the evolution of matter and its transformations that we identify as a space/ temporal dimension, and we witness a before and after of continuous becoming, actually devoid of its own dimensions.

Despite the effort dedicated to research it is impossible to grasp and define the meaning of the space/ temporal size, because the moment we observe it we imagine and try to describe it, has already changed and is no longer the same as a few moments before.

In the absence of change we would not have the perception of this intangible dimension.

Even when we try to measure it we arbitrarily introduce a stranger observer with respect to events, and we use sizes and dimensions devoid of any affinity and consistency with the object under consideration.

In the presence of multiple observers, we introduce other variables independent of the observed object, with the different sensitivity, culture and way of thinking of individual witnesses.

It is clear from the foregoing that the properties of space/time introduced in scientific research contradict the same postulates on which it is based for the impossibility of giving meaning dimension to quantities that do not have dimension.

What, for example, does the expression one billion light years mean? Can we measure it or grasp it with imagination ?

The dialectic between objective ontological reality and epistemic knowledge proper to the method of investigation of which we are endowed, is based on the intrinsic and elusive cognitive uncertainty of matter is the matrix of our controversial relationship with the universe.

It is evident then the logical conflict and the aporia of such an approach and consequently of the method of scientific knowledge of man.

Since man is but one of the infinite evolved manifestations of the same material matrix that we want to know, we will not be able to overcome the insurmountable limits of the matter of which we are formed.

It is like saying that universal matter wants and can know itself.

## 1.2. The molecules and the communication

All the molecules and the matter they form have unique and distinctive properties that characterize them individually: they have a "molecular footprint", that is, the "mold" that they form in space and an "electromagnetic code" The electromagnetic wave associated with each of them.

So they can assume infinite combinations in their informational content that allows you to recognize and identify them unequivocally. So for example we distinguish "enantiomer" molecules that have the same composition but a different orientation in space

Over the course of billions of years, elementary particles, with their reciprocal interaction, have formed material bodies with distinct properties and physical states, endlessly amplifying the possibilities of morphogenetic combinations.

The fundamental questions that epistemological research raises are:

- What laws follow the evolution of the universe to produce the innumerable forms of matter?
- What is the aim of the development of the subject and why is it being achieved?

Two schools of thought are opposed the mechanistic conception and the finalistic conception:

- According to the materialistic conception matter follows a random mechanism without a predetermined imaginable end;
- According to the finalistic and deterministic vision, the evolution of matter follows a process necessary to achieve a final goal.

Quantum Mechanics and the Biology that is inspired by it, describe the electromagnetic field as an efficient cause of the existence of matter and the functioning of living beings.

Therefore the electromagnetic field and all the other quantities that come into play in the processes of morphogenetic interaction, must be able to verify with a feedback mechanism the consistency and effectiveness of the responses produced by the individual events. What is the value of interactions that have no effect?

In a complex system such as that theorized by the quantum revolution, it is not enough that there is the interaction between electromagnetic fields or of any other nature and the associated particles there must be a mutual conformational and energetic coherence such as to produce a significant effect.

Hence the concept of "communication" based on the reciprocal interaction between the constituent elements of matter, to produce effective information or new structures.

One of the limitations of the natural sciences is to consider phenomena with a monistic vision, focused on the observation of individual aspects and components of living matter.

In this way we lose sight of the whole of the living as "OLOS" ( The term "OLOS" comes from the Greek and means everything as whole) in its indivisible unitary essence.

Such a reductive assumption leads quantum biology to argue that DNA is the electromagnetic center of the operational control of all vital functions of cells and multicellular organisms, or that the migratory behaviour of the robin is directed by a protein center present in the optical system, the cryptochromes, capable of tuning in with the Earth's magnetic field, or still explains the extremely complex and still mysterious phenomenon of consciousness with the activity of particular frequencies produced by the microtubules of neurons, or alternatively calling into question the DNA.

In short, however, we have a hypothesis to explain any vital or other phenomenon, thanks to the adoption of quantum mechanics for use and consumption of the most imaginative and abstract theories based on random results.

Unfortunately, the numerous inconsistencies and the many obscure aspects of the theoretical postulates that fill scientific literature, bring us back from the phantasmagorical empyrean of abstract theories to the heavy earthly reality, by proposing to us the numerous doubts and questions that still have no answers.

**1.3. My personal vision**

My critical view does not deny the science is not scientific nihilism for its own sake, but based on proving what has been said to attempt in my turn a different narrative from the current one.

My method adopts a personal logical-deductive paradigm and totally devoid of the abstract language of mathematical formulas.

**1.4. The quantities of quantum physics that define matter**

To understand the description of the living, according to the current hypotheses of Quantum Biology, a brief introduction to Quantum Mechanics is necessary.

Quantum mechanics, better defined as "the" theories of quantum physics on which science is based, have changed over the years many times Figure1,[1] and are still being verified.

These theories describe the behavior of matter, at the atomic and subatomic level, with the introduction of new quantities and mathematical formulas able to interpret phenomena that classical physics has failed to explain.

Interpretation	Author(s)	Deterministic?	Wavefunction real?	Unique history?	Hidden variables?	Collapsing wavefunctions?	Observer role?	Local?	Counterfactual definiteness?
Ensemble interpretation	Max Born, 1926	Agnostic	No	Yes	Agnostic	No	None	No	No
Copenhagen interpretation	Niels Bohr, Werner Heisenberg, 1927	No	No <sup>1</sup>	Yes	No	Yes <sup>2</sup>	Causal	No	No
de Broglie-Bohm theory	Louis de Broglie, 1927, David Bohm, 1952	Yes	Yes <sup>3</sup>	Yes <sup>4</sup>	Yes	No	None	No	Yes
von Neumann interpretation	von Neumann, 1932, Wheeler, Wigner	No	Yes	Yes	No	Yes	Causal	No	No
Quantum logic	Garrett Birkhoff, 1936	Agnostic	Agnostic	Yes <sup>5</sup>	No	No	Interpretational <sup>6</sup>	Agnostic	No
Many-worlds interpretation	Hugh Everett, 1957	Yes	Yes	No	No	No	None	Yes	No
Popper's interpretation <sup>40</sup>	Karl Popper, 1957 <sup>41</sup>	No	Yes	Yes	Yes	No	None	Yes	Yes <sup>13</sup>
Stochastic interpretation	Edward Nelson, 1966	No	No	Yes	No	No	None	No	No
Many-minds interpretation	H. Dieter Zeh, 1970	Yes	Yes	No	No	No	Interpretational <sup>7</sup>	Yes	No
Consistent histories	Robert B. Griffiths, 1984	Agnostic <sup>8</sup>	Agnostic <sup>9</sup>	No	No	No	Interpretational <sup>8</sup>	Yes	No
Objective collapse theories	Ghirardi-Rimini-Weber, 1986, Penrose interpretation, 1989	No	Yes	Yes	No	Yes	None	No	No
Transactional interpretation	John G. Cramer, 1986	No	Yes	Yes	No	Yes <sup>9</sup>	None	No	Yes <sup>14</sup>
Relational interpretation	Carlo Rovelli, 1994	No	No	Agnostic <sup>10</sup>	No	Yes <sup>11</sup>	Intrinsic <sup>12</sup>	Yes	No

Basic Concepts of Quantum Mechanics [2] [3] [4]

**Figure 1** From Pinterest Quantum mechanics, Quantum physics, Physics

**1.5. Wave-Particle Dualism**

The nature of matter and radiation must not be thought only in exclusive terms of either a wave or a particle, but the two entities are both a corpuscle and a wave.

Wave and particles are two different expressions of the same phenomenon.

**1.6. Measurement concept**

According to quantum mechanics it is impossible to know, measure, the state of a particle without changing its conditions irreversibly.

Once a system size has been measured, it is no longer possible to determine its value before the measurement.

## 2. Quantization of energy

It theorizes the quantization of observable energy phenomena, from electromagnetic radiation to light radiation up to the atomic level, which can take only a discrete set of values and also indicates the procedure for determining them. Consequently, it abandons the concept of the "continuity" of physical phenomena, an essential presupposition in classical physics.

### 2.1. Field definition

The field is a space-time perturbation caused by the movement of particles carrying energy.

We can translate it with the expression environment, or the physical medium defined by the properties with which it manifests, as electric field magnetic, gravitational, and is the physical place where all natural events take place, but whose essence is very difficult to prove, let alone measure.

Someone defined the "Quantum Field" as the real warp, the plot within which the various forms of physical reality are expressed.

#### 2.1.1. Principle of complementarity

This principle states that the dual aspect of some representations of physical phenomena at the atomic and subatomic levels cannot be observed simultaneously during the same experiment.

The principle was thus described by Heisenberg (1927): Even if there is a body of "exact" mathematical laws, these do not express relations between objects existing in space-time; it is true that approximately we can speak of "waves" and "corpuscles", but the two descriptions have the same validity. Conversely, the kinematic description of a phenomenon requires direct observation; but since observing means interacting, this precludes the strict validity of the causality principle.» [5],[6]

#### 2.1.2. Heisenberg's principle of uncertainty

He states that in quantum mechanics the velocity and position of a particle cannot be measured both at the same time with arbitrary precision. The better is the accuracy of the measurement of one of the two quantities, the worse is the precision in the measurement of the other. In other words, measuring the position of a particle causes an impossible perturbation to be expected of its speed and vice versa. [6]

The quantities that quantum mechanics deals with form the elementary particles of matter, they are entities of varying physical and energetic consistency, which are able to interact with each other and produce the transformations that we observe in nature.

The properties of the fundamental quantities that define the elementary particles are the mass and their energy content, able to produce effects on other material elements.

So the physically detectable manifestations as events or modifications that take place in a given physical context, are the expression of the activity of the elementary particles that come into play in that specific space-and are able to produce a recognizable transformation.

#### 2.1.3. Conclusions of the Copenhagen School

The school was founded around 1927 by Niels Bohr and Werner Heisenberg, in which the two scientists defined the fundamental postulates of quantum mechanics with these principles: science does not describe Reality, but only serves to make predictions, and since it is not possible to attribute any property to the constituents of matter, if not on the basis of their observation, it does not even make sense to recognize its existence if they are not observed. It makes no sense to conceive, as the classical physicists did, an objective reality independent of the measurement process, because in a certain sense it is the measure that "creates" reality: in the absence of observation the object examined does not possess any property, and according to other members of the school it does not even exist.

At the same time the members of the school accepted the random nature of natural phenomena and the completeness of Quantum theory: for them this theory makes only probabilistic assertions about the outcomes of the measurement

processes, but such observations only make sense if the measurements are actually carried out. Consistent with the neopositivist spirit, the statements which cannot be verified are meaningless to the exponents of the School. [5],[6]

Unfortunately, even today, 100 years after its birth, quantum physics has not yet been able to conceive in a unifying theory, all the elementary forces that make up matter within a coherent framework. [1]

Among the doubts present in this science we point out: the lack of quantization of gravity, dark matter, the problem of quantum measurement and more. These doubts have been known for 100 years, and they are as unresolved today as they were then.

Also for astrophysics we can affirm a similar theoretical uncertainty, for example as regards the origin and the structure of the universe, with respect to which we can say and formulate any hypothesis, as many astrophysicists do, in any case no one will be able to verify and demonstrate its reliability

My conviction is that it is impossible to realize the difficult task of understanding the mystery of universal matter, yet man does not give up in pursuing it, because by its nature, has the irrepressible need for knowledge that pushes it beyond the limits allowed by its own capacity for abstraction and thought.

#### *2.1.4. Communication, immanent necessity of the physical universe*

The study of matter present in the universe and its evolution, past and future, is one of the greatest challenges that the human mind can conceive.

The only certainty we have is its continuous change powered by the energy that matter possesses or that is transferred to it

The quantity and quality of interactions between different constituent elements (atoms and sub-atomic particles) define the molecular complexes of matter in its different states of aggregation (solid, liquid, aeriform, plasma).

Epistemology attributes to the natural sciences, chemistry and physics, the greatest contribution to its current knowledge, in addition to the speculative contributions offered by philosophy. These sciences also theorized about the possible origin and destiny of the universe.

But whatever the origin and ultimate purpose of the random evolution of the universe, for this to be aimed at achieving any recognizable epistemological result, it must possess its own method of continuous verification of the feedback of its own evolution consistent with the intrinsic forces that govern it.

Therefore all the elements that compose it must be able to interact and communicate as intrinsically carriers of transmissible information in their random evolution.

A fundamental concept can express all the content and meaning of quantum mechanics: investigate the nature of matter and the interaction and communication between the particles that compose it, and in what form they can coexist and evolve and reveal how such interaction takes place.

The interaction, the physical contact between the elementary particles produces a change of their conformation and the field in which they are immersed. Their communication is expressed through the code of electromagnetic nature, which can take variable form and energy content.

Meanwhile a premise is necessary, in the universe individuality does not exist and it would not make sense that it existed, an isolated particle always remains equal to itself, takes value only if it interacts with others, and shares with them the same morphogenetic destiny that transforms them.

Moreover, there is no static condition, all the constituent particles of matter are equipped with continuous movement (quantum momentum, angular, spin, etc.).

Despite its many successes, quantum mechanics cannot be considered a definitive theory capable of describing all physical phenomena. A first fundamental limit, already recognized by the same scientists who formulated it, is its incompatibility with the postulates of Einstein's special and general relativity. In addition, the original formulation is unsuitable for representing physical systems when the number of particles in them varies over time. [7]

This premise is preparatory to the quantum introduction of the communication process, a fundamental activity inherent in all matter, according to the main hypothesis supported in this work.

According to the assumption presented here, communication takes place in the quantum dimension of space/time, or supposed time, and presupposes the interaction between physically consistent and separate elements, capable of producing a measurable and recognizable transformation.

The code adopted must be recognizable between the interacting entities, must be able to 'travel' and be translated (transduction) from one code into another (sensory, chemical, electrical, etc.).

For example, the light stimulus that gives rise to vision is immediately translated into a molecular signal (a protein in the retina changes its shape), which in turn is translated into an electrical signal, etc.; similarly, communication in complex organisms is mediated by, hormone molecules, and implies interaction with specific receptors, which are in turn molecules.

The component of physical entities cannot be omitted in the construction of the theoretical design of the universe.

I have previously introduced the concept that atoms and molecules of matter have a unique and characteristic conformational and energetic content that distinguishes them, which I have defined as their "atomic or molecular footprint".

For communication to be effective it must be coherent and recognizable by the interacting elements and between these and the field of belonging so that they can together achieve harmony and overall balance. It's the quantum transposition of universal Karma from Eastern philosophies.

#### 2.1.5. The wave transmission system

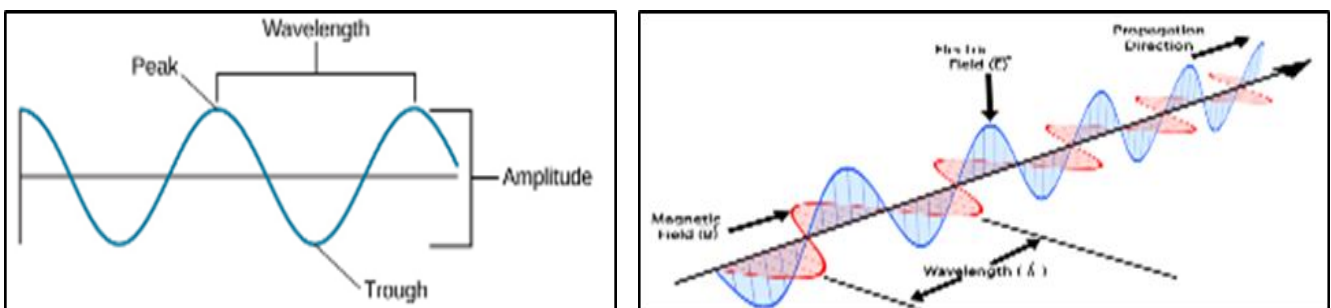
According to quantum mechanics and classical physics, the most widely used physical means of transmission in the material world is represented either by electromagnetic waves or sound waves, these must however produce a physical result or by means of corpuscular elements or by mechanically modifying the medium in which the transmission takes place, described as "field". [8-11]

To the question: why did this particular system of communication prevail in the universe and not others?

We could answer: because the wave function, as we know it from physics, is able to transfer in every point and moment, in space-time, the maximum content of information possible.

We know that waves are formed and defined by different physical quantities:

length, amplitude, frequency and space-time direction, spread to every point of their environment, so they are able to simultaneously and instantaneously transfer multiple physical variables. Figure 2



**Figure 2** Schematic representation of the waves, From Wikipedia

Electromagnetic waves have the additional ability to transport particles. They are perfect for communication, and even in the space-time theorized by Einstein does not change the informational content they enjoy. In addition, the quality of

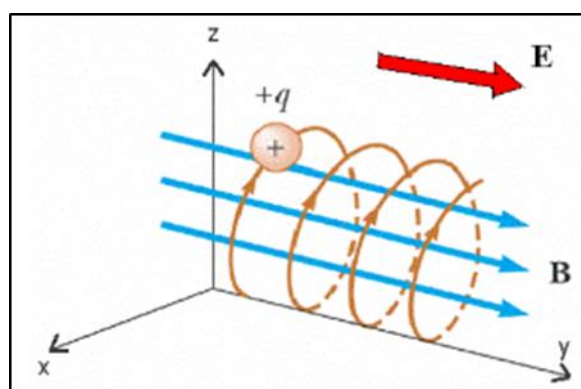
information depends on the intensity and duration of the stimulus molecular complexes and receptor systems respond differently depending on these modes of interaction.

Maxwell (1831-1879) expressed mathematically (Maxwell's equations) the corpuscular-wave theory of electromagnetic waves, while Niels Bohr introduced the quantum dimension.

According to these theories, matter has quantized corpuscular-wave properties, attributes that allow it to interact between different physical entities, even if they are separated by enormous distance, but only if they are coordinated by resonance. With this type of interaction, the modification of the quantum state of one particle is transmitted immediately to the other, by means of the phenomenon defined "entanglement", that is, a coherent correlation and interaction between separated and distant particles in space.

With a different representation the electromagnetic wave could conceive it as a wave with a helical spatial conformation capable of generating an electric and magnetic field oriented with radial symmetry at  $360^\circ$  and not only on the horizontal and vertical planes as the quantum mechanics describes them Figure2.

Electromagnetic waves can be circularly polarized, when the oscillation plane of the electric field rotates during propagation in that case, the relative vector shape of the propellers around the direction of propagation. Figure3 (clicking on Figure 3b you can see the animation of the spiral motion)



**Figure 3** From ResearchGate "Modeling and Characterization of Charged Particle Trajectories in an Oscillating Magnetic Field"

Returning to the assumption presented in this article of the immanent necessity of communicating, the hypothesis I support is because it is inherent in the mode of interaction, necessary between the elements that make up the universe.

Communication/interaction must have other features, must be specific, effective (produce an effect), unambiguous and reciprocal.

Two different atoms or molecules that interact can exchange information, only if the interaction is specific, selective and effective, that is to produce a new result compared to the original elements and consistent with their environment. This in synthesis is the mechanism of molecular evolution, which has shaped new atoms through endless random clashes, mutually effective, morphologically and energetically complementary

It follows from this that what does not exist does not communicate, and what does not communicate does not exist.

According to quantum physics and the Heisenberg uncertainty principle, the states of a particle (such as position and velocity) are "observable" properties only in experiments, and it is impossible in principle to give a complete description without also considering the role of the observer.

So according to Heisenberg, and all quantum physicists, we can only see the elements that make up matter when we measure and then interact with them. And even if we admit its existence independently of their observation, nevertheless we know them only when we observe them. Otherwise their existence can only be deduced through complex probability calculations.



Communicating also means being able to interact, through various physical systems and exchange something material, detectable and knowable, that is unique and distinctive for each entity, what I have defined as "the molecular footprint".

Parmenides of Elea the founder of the eleatic school (550 B.C.) stated that "Being is and cannot not be", meaning that only material things "are entities" able to reveal their being, their existence, because if they do not exist they do not communicate and are not. This concept is an obvious assumption and forms the basis of positivistic/materialistic thinking.

Thus, according to Parmenides' philosophy, all material things, as well as existing, must be able to interact, "transmit" their existence to other entities and to the surrounding universe.

A few centuries later George Berkeley (1685-1753) stated "Esse est percipi", meaning "being is being-perceived", that is: the whole being of an object consists in its being perceived and nothing else.

According to the two philosophers, it is only through interactions that physical matter can be in synchrony and equilibrium or "in phase coherence", as quantum mechanics wants, to communicate.

The scientific revolution of the early 1900s was produced by the transition from classical physics to quantum physics. It has introduced new theories and formulas, to include some experimental results, not otherwise interpretable with the laws of traditional physics.

At the same time, Biology, which has borrowed fundamental laws and formulas from physics and chemistry, has undergone a similar revolution, passing from the initial description and morphological interpretation of the living, to cell theory, finally to Molecular Biology.

Molecular Biology itself, the most advanced frontier of the science of life, however, fails to explain satisfactorily the synchronic and balanced functioning of all the functions that occur simultaneously in the cells and in the various tissues and organs of life.

#### *2.1.6. Molecular Biology, Birth and evolution of the plasma membrane*

In this article I will try to present, with an original theoretical approach, the evolution of the living and the forces that underlie and govern their change.

I suppose that in the early universe the interactions and exchanges between material particles were frequent and completely random, and continued over billions of years. Until the process of organizing and uniting the particles themselves into articulate and complex systems able to evolve independently, and diversify from the remaining universal chaos. [12-17]

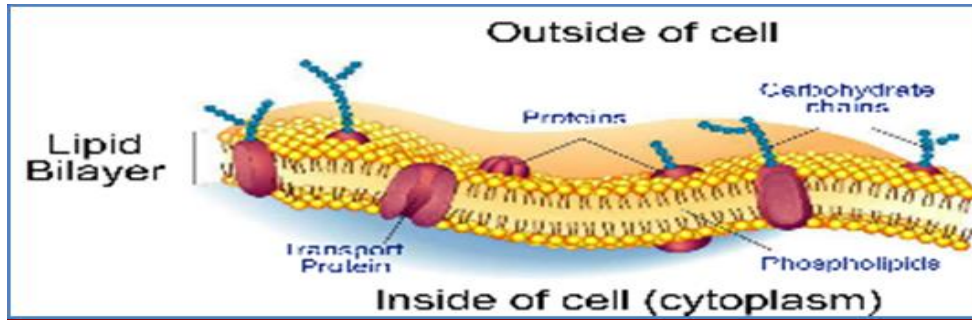
On our planet it is believed that an analogous extraordinary process of interaction between particles has taken place, initially chaotic and then more and more organized, from which simple molecules originated first, then evolved into increasingly complex forms. [18]

What we call life began when these molecular complexes formed special structures that separated them from the external environment, and reached an internal organization in equilibrium. In order to ensure their replication and the possibility of evolving independently, while maintaining contact with the external environment with which to exchange substances and information.

The structure that separates the two internal /external systems is what we now call the cell membrane, Figure4

Thus the cell membrane divides and protects its internal contents from the surrounding environment and allows it to multiply autonomously in increasingly complex and diversified forms.

The new structure contains numerous molecules that have specialized functions such as receptor systems, exchange/transport channels, information transduction systems etc. Therefore it can be conceived as a complex communication system able to receive and transfer information, to recognize effective stimuli of different nature. [19]



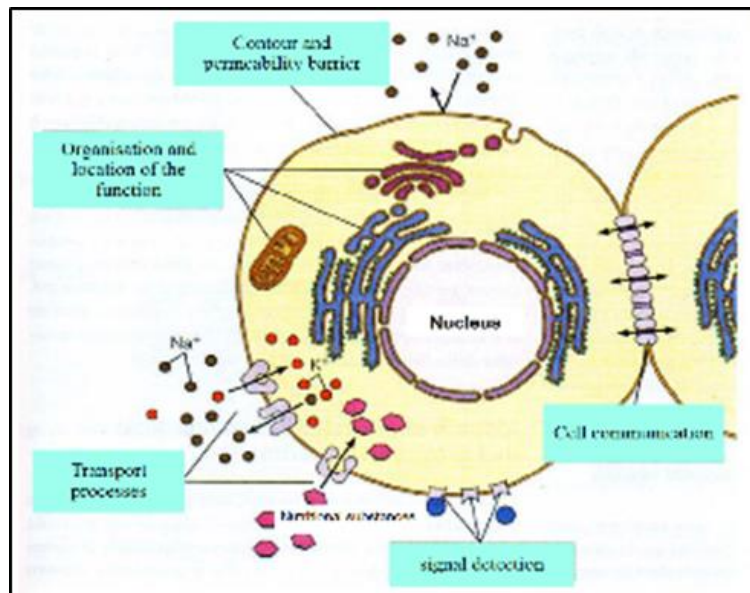
**Figure 4** Schematic representation of the cell membrane, from my data on files

The lipid double layer that forms the membrane, has the property of closing spontaneously on itself, and to accommodate inside it molecules, of composition, shape and diversified activity as mentioned, to duplicate and communicate with chemical messages or direct contact with other similar structures Figure 5.

In general, the fundamental structure of cell membranes is the same in all living, from prokaryotes to eukaryotes, consisting of a lipid double layer, containing protein structures, and has maintained the same composition, with a few exceptions over millions of years.

What differentiates the different cells is the type the quantity and the distribution of the molecular structures immersed in the lipid layer and constitutes the true cellular functional apparatus.

In addition, the specific topographic distribution, and their aggregation may vary within the same cell type. [20-21]



**Figure 5** Personal drawing of a cell

But what is the ultimate goal of this incessant activity of transformation that distinguishes all the matter of the physical universe, including living?

Two philosophical-epistemological conceptions are opposed, finalistic and mechanistic.

According to the deterministic/finalistic conception, the evolution of the material universe pursues laws and purposes teleologically and arbitrarily assigned (according to the Christian religion by GOD) and it is up to the human mind to discover their meaning. It is evidently impossible to know a priori the ultimate goal of cosmic evolution, for it is cognizable only when the end has been reached, if it ever reaches it.

This conception is not so dissimilar from quantum mechanics that it would like to force all known matter into its own laws and formulas that define its essence and destiny in a priori.

According to the mechanistic conception, all the matter of the universe follows its own internal rules derived from nature itself and from the properties of the elementary substances that compose it. In so doing it has the ability to adapt as the product of an intrinsic mechanistic causality, thus denying the presence of a higher or immanent purpose, reducing the complexity and evolution of the real world to linear cause-effect relations.

Therefore both conceptual postulates deterministic/ finalistic and quantum mechanics express abstractions that transcend and are alien to the very essence of matter.

The two opposing concepts, finalistic and mechanistic, still confront each other in the debate, and have not found a universally shared synthesis.

At the basis of this difficult intellectual synthesis there is the substantial indeterminism inherent in the possibility of knowing the universal matter, of which even today after numerous theories we have no certainty. Figure1

A possible reconciliation between finalism and mechanism can be derived from the unitary description of the two instances provisionally assuming a logical-deductive mediation adhering to the assumptions of both.

Personally, I find it difficult to agree with the final deterministic conception, because of the difficulty inherent in knowledge and in the very definition of the ultimate goal of material evolution.

The infinite manifestation of the forms and properties that inorganic and organic matter presents and above all the countless transformations still in progress, do not allow us to grasp the overall design and the teleological destiny of the evolution of the universe, if not in probabilistic terms.

Jacque Monod expresses this concept very clearly:

*"Science starts from the postulate of objectivity that is to say the systematic refusal to consider the possibility of reaching a "true" knowledge through any interpretation of phenomena in terms of final causes, that is, of "project" and therefore excludes any final cause because it cannot be studied experimentally."*

*Le hasard et la nécessité. Essai sur la philosophie naturelle de la biologie moderne, Ed. du Seuil, Paris 1970*

But let us leave, momentarily, the impervious terrain of quantum mechanics and resume the discussion on the properties and characteristics of biological membranes.

We have seen that what characterizes them is the presence and the topological distribution of the complex molecular structures present in it.

To each of these corresponds usually a specialized function, we mentioned receptors, ion channels, cellular junctions, etc. But a particular characteristic shared by all these elements, is the property of changing their conformation and activity in response to molecular stimuli.

None of these elements escape this iron rule, and it is the essential reason why, in the course of evolution, and thanks to evolution, they have assumed, each in its specific role, these properties.

There are countless examples of this rule and I think it is pointless to mention them.

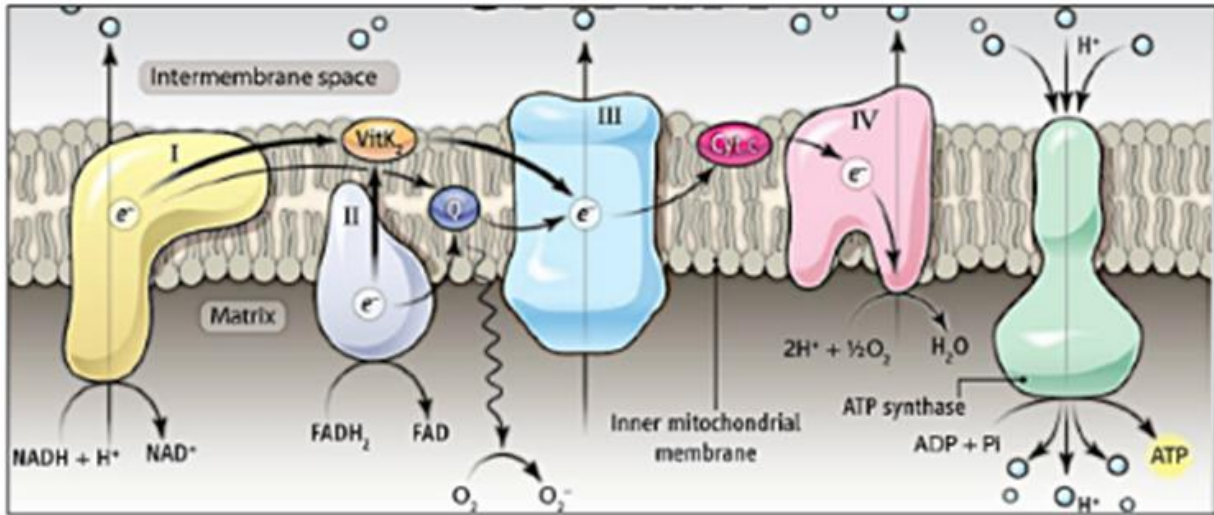
Instead, I think it is interesting to note that the effective stimulus to obtain a functionally valid response between interacting structures is direct contact or interaction by means of the molecular footprint released by chemicals, which results in a temporary or permanent conformational modification in one or both of them.

This type of relationship between molecular structure and function is so important and generalized as to be codified in the genetic patrimony. We know that a point modification in the genetic code (a nucleotide) is enough to obtain a functionally ineffective protein.

2.1.7. The cell membrane and the oxide-reductions

But in addition to acting as a support of the molecular structures that contain, and communication, biological membranes perform another very important task: maintain a different concentration of ions (ion concentration gradient). The internal and external flow of cells produces a membrane potential of about -70 mV (Millivolt) capable of generating and transferring an electronic flow, which is a property shared by all living beings. At the same time they must retain both the hydrogenionic concentration ( pH ) and the osmotic pressure within them.

An analogous biochemical mechanism occurs in a more specific and organized way in the respiratory chain present in the mitochondria in them a gradient of concentration of hydrogen ions H<sup>+</sup> generates molecules with high energy content ATP, NADH, FADH, etc. energy that can be transferred and exchanged to perform the multiple cellular activities.



**The Pathway of Electron Transport**

- The electron transport chain is in the inner membrane (cristae) of the mitochondrion
- Most of the chain's components are proteins, which exist in multi-protein complexes
- The carriers alternate reduced and oxidized states as they accept and donate electrons
- Electrons drop in free energy as they go down the chain and are finally passed to O<sub>2</sub>, forming H<sub>2</sub>O
- Electrons are transferred from NADH or FADH<sub>2</sub> to the electron transport chain
- Electrons are passed through a number of proteins including **cytochromes** (each with an iron atom) to O<sub>2</sub>
- The electron transport chain generates no ATP directly
- It breaks the large free-energy drop from food to O<sub>2</sub> into smaller steps that release energy in manageable amounts
- Electron transfer in the electron transport chain causes proteins to pump H<sup>+</sup> from the mitochondrial matrix to the intermembrane space
- H<sup>+</sup> then moves back across the membrane, passing through the proton, **ATP synthase**
- ATP synthase uses the exergonic flow of H<sup>+</sup> to drive phosphorylation of ATP
- This is an example of **chemiosmosis**, the use of energy in a H<sup>+</sup> gradient to drive cellular work

**Figure 6** Electron Transport Chain (Oxidative Phosphorylation)From Dirty medicine

Oxidative phosphorylation, which occurs in the respiratory chain is the final essential process to feed and maintain the flow of electrons and keep the cell alive. The electrons are then transferred to a final acceptor that is different for aerobic and anaerobic organisms.

This is not the place or purpose of this manuscript, to describe the many structures involved in this complex process.

I just want to emphasize the particular organization of the systems involved in the respiratory chain Figure6

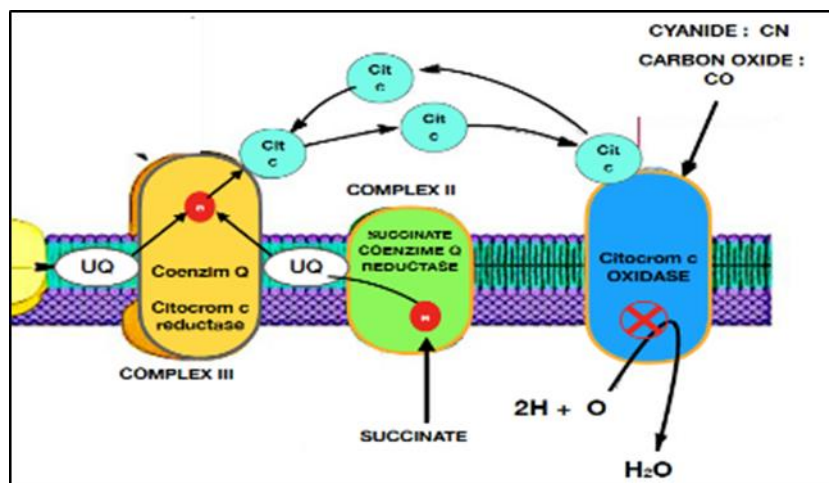
From what premise we can conceive all the matter we know, from the inorganic to the living, as characterized by a communicative process mediated by an incessant flow of electromagnetic waves, electrons or elementary particles.

According to classical chemistry, the result of this unique system of interaction between particles and charge transfer, called redox or redox-oxide, is the production of a new conformational and energy structure between the interacting entities.

During oxidative phosphorylation, electrons are transferred from the electron donors to a series of electron acceptor to a series of redox reactions ending in oxygen, whose reaction releases half of the total energy. [22]

This electronic flow is essential for life, if it stops, death comes.

For example, potassium cyanide causes a rapid, strong and irreversible inhibition of the mitochondrial respiratory chain, which occurs at the level of Cytochrome C Oxidase. Cyanide binds to the  $\alpha_3$  cytochrome  $Fe^{2+}$  ion which is part of the cytochrome C oxidase complex, preventing its binding to oxygen. The same applies to the binding of cyanide or carbon monoxide CO to hemoglobin. [24],[25] Figure7.



Schematic drawing by the Author

**Figure 7** Stopping of the electronic flow in the respiratory chain produced by cyanide and carbon monoxide,

#### 2.1.8. Central role of oxide-reductions in living systems

In living beings, the control of the flow of electrons is of fundamental importance to avoid that their excessive production escapes transport systems and can produce free radicals ROS (Reactive Oxygen Species) extremely harmful to cellular structures.

In this regard there are special molecular mechanisms for the control of free radicals (rescue systems) able to restore the electrochemical balance, or through the intervention of vitamins: Vitamin C, Vitamin E or with some enzymes: SOD (Superoxide Dismutase), Catalase, Glutathione peroxidase, etc.

The phenomenon of electron flow, through the process of oxide-reduction, driven by electromagnetic waves, is not limited only to cells, but is a mechanism widely spread in nature from bacteria to plants, animals, man included.

There are numerous testimonies that attest to the occurrence of electrical phenomena in the animal world, just mention the controversy Galvani - Volta on the origin of the electric activity of frogs.

It is a common acquisition that some fish (Fish Ball) produce very intense electric discharges, as is known and has been demonstrated an adjustable electrical activity in plants.

Not to mention the electrical activity of the brain and heart in the absence of which the death status of people is certified.

#### 2.1.9. Quantum Biology, the boundary between theory and reality

For all this supposed coordinated complex of electronic flows to work it is necessary that it is regulated in a coordinated and harmonious way by a network that wraps and connects all living systems.

The modern version of the intracellular and intercellular network is constituted, according to quantum biology, by the electromagnetic field of background, in which take place in a controlled, sequential and balanced way all electronic flows.

Following this theoretical setting if the electromagnetic field is the physical substrate in which all cellular processes take place, which is the control center that coordinates everything?

And assuming that this exists what property must possess?

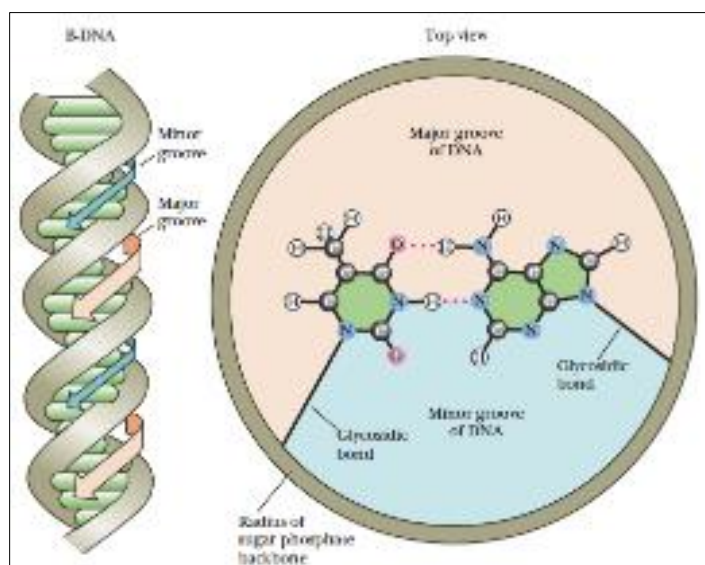
It should have at least the following characteristics:

- Must contain the information necessary for the production and control of all elements and events present within the cells;
- It must use the same molecular code as its dependent cellular elements;
- It must be present in all cells and have the same identical structural matrix.

Some authors have proposed that such a role could be fulfilled perfectly by DNA. [26]

Indeed, DNA is present and is identical in all cells of the same organism, even if it is expressed differently in the various tissues and organs that contain it, from the somatic to the germinal line. [23]

Therefore it could guide and control effectively, simultaneously and orderly all the mechanisms and elements that come into play in cellular activity. Figure 8



**Figure 8** DNA image from Wikipedia

Molecular biology has definitively clarified what the double helix does: it is able to reproduce itself identical to itself and to guide the synthesis of the fundamental elements of cells, proteins.

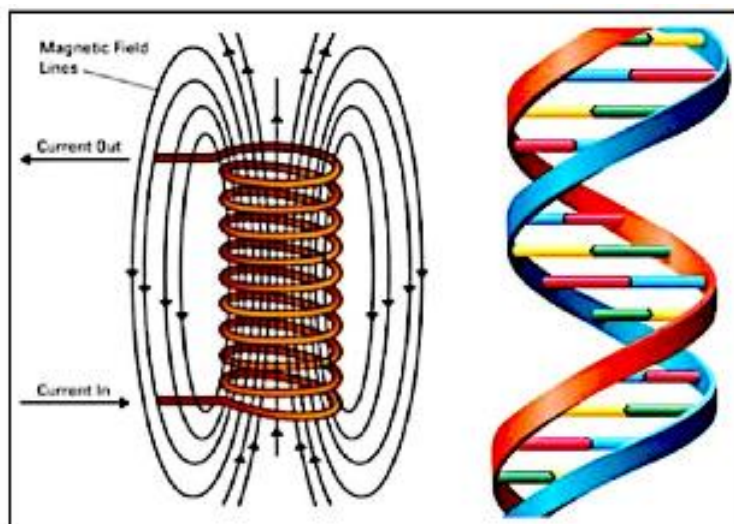
Interestingly, DNA is transmitted in a mirror-like, semi-conservative way, across all generations of billions of cells and organisms on planet Earth.

The small variations that may occur in it, the mutations, accumulating from generation to generation, have allowed the evolution of all living species.

The procedure is analogous to that which occurs during the embryonic development and the differentiation of tissues and organs in the individual living beings, derived from the zygote to the whole organism, through the epigenetic mechanism.

But as postulated by Quantum Biology, DNA cannot be seen only as a center of genetic information. But we can consider it as an Information Energy Complex (EI) capable of transmitting and receiving quantum signals from this to proteins and other molecules present in living cells. Figure 9 [27]





<egocreanet2016@gmail.com> Analogy between DNA as antenna that generates electromagnetic field

**Figure 9-**From *BIOLOGIA QUANTICA: BIOFOTONI E BIOFONONI* Paolo Manzelli

So that DNA was conceived as an "antenna" that transmits information and exerts homeostatic control of metabolism by means of the emitted quantum mechanical waves and the feedback it receives.

The same theory would also explain how it is possible to control the complex and orderly cellular activity, which molecular biology is not yet able to explain. [28-31]

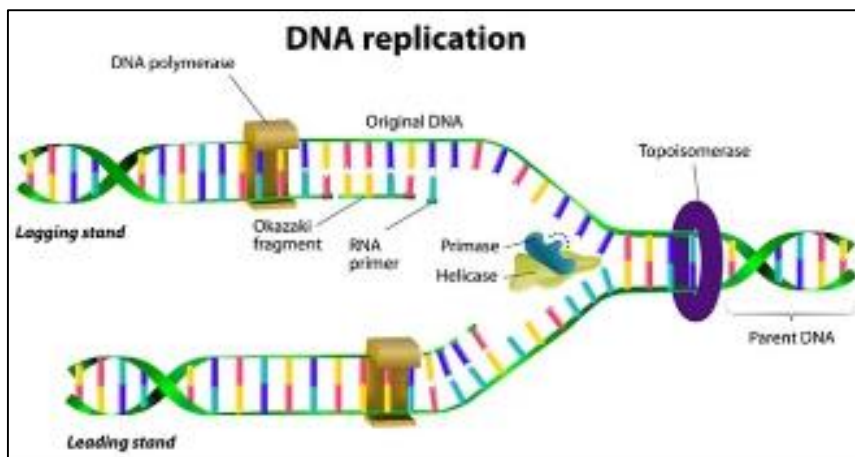
Similar conceptions can be examined in the fundamental article by Richard H.W. Funk et al [42]

In reality, the only interpretations of the phenomena that Quantum Biology has postulated, without however providing a complete and exhaustive explanation, are:

Chlorophyll synthesis, The orientation of the robin, Vision at the retinal level, The mechanism of smell.

But there are some facts that cannot be fully explained even by adopting the quantum theory applied to biology, I list them below:

- How is control exercised in organisms that do not contain DNA, for example in RNA viruses, in prions, where RNA or prion dictate the rules?
- And what role does DNA play if post-transcriptional epigenetics determine the phenotype?
- If we look at the fundamental process of DNA duplication we see that it is under the coordinated control of a complex enzymatic system and a dense network of feedback reactions in which it is difficult to identify where it begins and where it ends, many are the elements that come into play and determine which of these has a leading role of controller Figure10.
- DNA itself is subject to the effects of the fields in which it is immersed, gravitational electromagnetic fields, high frequency 5G waves increasingly present in the environment, so much so that there is a heated debate and widespread concern about the possible consequences that these energies could have on our health.



**Figure 10** Synthetic representation of DNA duplication, from Wikipedia

But then who is the sole controller, the Deus ex machina of all natural phenomena?

Over the last three decades, molecular biology has shown that the phenotype transmitted through DNA is far from being fixed at birth: environmental influences, which include nutrition, stress, emotions, exercise, the intake of natural substances or chemical mutagens, can modify it without changing the basic code. These changes, as evidenced by epigenetics, cannot be passed on to future generations, but have a decisive impact on the living during their development which escapes the direct control of DNA.

- Moreover, inside the single eukaryotic cells coexist two types of DNA, the nuclear one and the mitochondrial one of maternal origin, in equilibrium with each other. The red blood cells are free of nucleus and therefore of DNA and perfectly fulfill their physiological role for 120 days and then renew.
- And again, during bacterial infection or parasitic invasion that introduces into the host a different type of DNA creating a conflict between two different DNA in the same subject, real "genetic chimeras". If we admit with quantum biology that DNA is the morphogenetic force to determine biological processes, which of these predominates and produces the final result ?
- Another exception is the homozygous twins: it is clear that these have the same genetic makeup, they are genetically identical, however it is impossible that they are epigenetically, as many investigations carried out precisely on identical twins separated at birth and raised in different environmental situations, have highlighted.
- Another example is blood transfusions and organ or bone marrow transplants or in the case of implantation of zygotes in the uterus of women undergoing medically assisted reproduction. Even in these cases we are faced with subjects carrying two different types of DNA. They are true genetic hybrids in which two different genomes coexist and in which genetic tests give dubious results that are difficult to interpret [32-37].

In all these cases, which DNA has the function of controlling the metabolic processes of the host organism?

At the present state of our knowledge, we know that DNA in its various conformations, is simply a succession of molecular components (nucleotides), organized into more complex structures (polynucleotides), able to produce a result, if and only if, other molecules, such as proteins, various types of RNA, metal ions, etc., interact with specific polynucleotide regions (genes).

Then the presumed central role of DNA loses all its consistency. It's the play of numerous molecular structures, which can turn on or inhibit its specific regions, with a complex feedback system, which depends on the real control center, the Deus ex machina of life.

In a recent article, it has been hypothesized that even consciousness would be the expression of the activity exerted on neuronal microtubules by electromagnetic waves.

This assumption is based on the fact that Microtubules, like the other components of the cytoskeleton of all eukaryotic cells, are subject to variations depending on the functional needs of individual neurons [38], or of individual cells,.



In addition, microtubules and mitotic spindle are destabilized by colchicine and other similar substances, widely used in oncology to block cell reproduction. What unforeseeable consequences can come from the use of these substances on consciousness on our awareness and on the higher cognitive functions being this under the control of microtubules ? [39]

There is no satisfactory evidence for the existence of a specific marker or place of awareness, nor has any new neural principle or mechanism for consciousness been suggested.

To summarize the concepts expressed so far, parallel to the electrical activity of which we have spoken, we must include a phenomenon closely related to it, that is electromagnetism, to which quantum physics has sensitized us.

Numerous experiments show us that electromagnetic manifestations have a direct and indirect effect on the control of the electrical phenomena, that we record in the living and represent the fundamental physical substrate. [40-41]

Recently, as we mentioned earlier, in biology we talk more and more frequently about Quantum Biology which is the cultural up-grade compared to molecular biology and the last frontier of scientific knowledge.

Although many manifestations testify to the numerous effects and influence exerted by electromagnetic waves on living beings, at the moment the theories proposed by quantum biology we must consider them provisional waiting for more substantial confirmation, supported by solid research.

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### 3. Conclusion

At the present state of our knowledge, we must take advantage of the new hypotheses and interpretations and the cognitive approach proposed by quantum physics and even if they are all to be verified, could integrate and expand the fragmentary and mechanistic vision that cell and molecular biology has offered us so far.

Within this conceptual scheme, we can thus solve the wave-particle dualism of quantum physics assigning to the electromagnetic field component the role of energy substrate, on which travels the unique message bearer, specific and effective, which is instead a primary attribute of its corpuscular or molecular component.

Because it is the atoms and molecules, or whatever we want to define them, that transmit with their molecular footprint, the message of which they are carriers, in that wonderful show that we call life.

Just to mention a few examples, in the immune phenomenon there must be the contact between antigen-antibody, or that between enzyme - substrate, hormone-receptor, neurotransmitter-receptor, etc.

In all these cases, direct physical contact between molecules must take place to obtain the effective result.

Given the principle of quantum coherence and field as a guiding force that conveys contacts between molecules in metabolic processes, by what other forces is mediated the next phase of transformation in the final products?

Therefore to solve the complex search for a coherent global vision of the physical world it is necessary to unite together quantum mechanics, Biology and philosophy in a unifying synthesis of knowledge, between disciplines for many complementary and interdependent aspects.

#### *Concluding remarks*

I started this narrative by trying to describe the composition and behavior of elementary matter and the hypothetical morphogenetic mechanism that is at the root of the evolution of life.

Then I would like to conclude this story as in fairy tales, with a final reassuring statement...." and everyone lived happily ever after".

Statement that contains a positive and proactive message, of a story in which I presented my interpretation of reality with the aim of "putting all things back in place" and recomposing the tormented theoretical conflict about nature, structure and destiny of universal matter, proposing a temporary solution satisfactory for all.

Because after all, as I said at the beginning and it is known to all, reality always exceeds and precedes fantasy and therefore the reality of the infinite material universe is not compressible within the abstract formalism of mathematical equations, whatever the theoretical physicists think, and we will probably never grasp its true essence.

Even if we are intimately aware of this, however, we do not want to admit it, because nothing can stop the irrepressible thirst for knowledge for the search for answers that we would like to be definitive.

However our research proceeds, the constant rule that we should always have in mind at every transient theoretical achievement, is the fundamental indeterminacy described by Heisenberg which is that immanent property that modulates and transforms the real world and prevents us from its understanding.

Consequently we must resign ourselves to the solutions that can be reached with the contingent capacity of abstraction that the human mind allows us which is the insurmountable limit to our understanding of natural processes.

Faced with the spectacular phenomena that we observe in the universe, all that remains is the deep wonder and wonder of our senses that it is impossible to describe, how indescribable are the phenomena observed, even with the most complex mathematical formulas.

I close with a quote taken from the poem *Joufré Rudel* by the Italian Nobel Prize winner for literature Giosuè Carducci (10 October 1906 ) which is the perfect metaphor of this document:

"Countess, what is life?

It is the shadow of a fleeting dream,

The short fairy tale is over,

The true immortal is love"

In this poetic verse the expression: "What is never life" is the fundamental question to which I have tried to give an answer;

- The verse "It is the shadow of a fleeting dream" expresses the changeable, provisional goal of the search;
- The phrase "the short fairy tale is over", announces that narration has just ended;

Finally, with the expression "the true immortal is love", I want to represent the irrepressible and perennial love for knowledge.

The whole article wants to show that reality surpasses fantasy and the ability to abstraction, but poetry can go far beyond reality and reach a dimension where everything is possible and infinitely rewarding.

To the many other questions that have emerged in the meantime, we will have to give an answer by continuing the incessant search.

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## **Compliance with ethical standards**

### *Disclosure of conflict of interest*

The author reports no conflicts of interest in this work.

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