

DNA/RNA as an information energy catalyst's of life system

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Abstract : - DNA as a catalyst don't change in the metabolic transformation, in fact DNA rebuilt a self copy in all living cells , in similar way, a generic catalysis can be present into a reaction in small quantities and it is unaffected in its quantity at the end of the reaction . See http://www.edscuola.it/archivio/lre/chemical_bases.htm. This analogy can be a starting point to tray to develop the frontiers of research in Bio-quantum Physics .At present we encounter fundamental problems in sharing theoretical physics with molecular biology, awaiting solution for a better understanding of what means life. (see : http://www.edscuola.it/archivio/lre/what_means_life.htm). First of all I am sceptic about the scientific character of a biological conceptions that considers the more advanced molecule in the evolution, like an inactive matter to take apart in order to copy directly by contact some pieces of genetic information, as well as in the “LEGO” toys.

Because Life system is based on the communication system , http://www.edscuola.it/archivio/lre/life_science_communication.htm, in this paper would like to prevail over the conceptual contradiction where a “ dead molecule” must be the principal actor of the life in nature. This paper will be presented at QUANTUM-BIONET meeting in Pavia (It) (see : <http://www.quantumbionet.org/eng/index.php?pagina=119>) in order to introduce a new way of thinking, where the DNA functioning, it is **not only** seen as a storage of genetic information. This is important in order to consider " DNA /RNA dynamic system, as an information energy catalyst, able to transmit and receive BIO-PHYSICAL quantum signals (e.g. Bio-Photons and associated Bio-Phonons) , to and from the proteins in the living cells .The interactive dynamic information exchange in Quantum-Bio-Physics , requires a more drastic revision of some fundamental concepts of Science than any that have gone before.

The Central Dogma of Molecular Biology says that the bio-synthesis process (DNA -> RNA Series -> Protein) is referred to the set of processes whereby DNA is self-copied (replication) , and some genetic codex are copied by t-RNAs (transcription) and finally transported through messengers (m-RNA) to ribosomes translation of genetics codex into linear proteins production . (see: <http://www.edscuola.it/archivio/lre/oba.htm>) .This approach of copy and glue, makes an mechanical linear picture of traditional biology, that seems to much similar to a typography operational model for transferring genetic information to wrote proteins, as they are books. As a matter of fact this dogmatic model now is criticized by contemporary biochemical science, because it is incomplete in terms of what's really going

on in the interactive communication between DNA Enzymes and Proteins. Since this model of proteins production, do not considers in physical terms the collective action of information exchange at the quantum level, as it is necessary to co-organize in a precise spatial and temporal orchestration, all biological events that permits to the metabolic cell's system to evolve and to transform itself , till the cellular Apoptosis.

<http://www.edscuola.it/archivio/lre/apoptosis.htm> . Certainly this criticism to not solve the problem of understanding the co-evolutive turning over of information between DNA and Proteins till the cell Apoptosis (e.g. the programmed cell's dead as is known through the leaves falling from trees or petals from a flower). In fact today it is not still evident in which manner all the necessary information flows between DNA/RNA activities and the complete metabolic operation of the living cell. In addition it is not clearly understandable how work the evolutionary rules, enclosed in the genome, determining so precise timing activities of enzymes during the molecular transformations. Today biologists believe that the great potentialities of the genome are due to the phenomenon of the "alternative splicing", utilised in order to generate many various proteins from the same gene. In any case it will be not possible to forecast a splicing method to acquire the precise time/space accurate ordering to a great protein variety that exists in the cells and in the more complex living organisms. Hence through the alternative splicing can be generated various proteins, however remain to understand the functionality of the proteins in connection with the genetic information. This because the effective dynamic functions of proteins is a consequence of the three- dimensional folding and of other functional factors. Therefore it is clear that the living system certainly do not only depends only from the number of diverse proteins generated into a cell. The fundamental challenge of the living science frontiers is at present focused on the need to comprehend the self catalysed control of the functionality of the complex circle of the living cells. Therefore we start to open this challenge getting an hypothesis about the DNA/RNA/Proteins co-evolution activities thinking to the DNA/RNA actions as an powerful catalyst able to communicate information .

Quantum Bio-physics in living organisms.

The quantum molecular level is still very little known in terms of quantized modes to exchange information in a living systems. In true biologists recognize the need to accept an operational orchestration of the dynamical metabolic phenomena of life, speaking about the communication of don' t well specified "signals" between DNA/RNA and proteins functional activities . In fact biologists, till now, do not accept the challenge to define a physical interpretation of such signals, so that the scientific investigation of the communication of biological signals remain very limited. Therefore persist open the question to interpret the signal communication in order to get a physical explanation of the space/time orchestration of metabolic and differentiation changes in order to get a more complete understanding of the study of living matters .

The fundamental idea that micro and macro physical structures need to be deeply nested by means the communication Quantum Physic "Wave/Particles", it is the basis for going beyond the reductive boundaries of the mechanical science. This paper will develop an hypothesis in order to imagine the biological information flow of signals , seen in terms of

formation and communication transfer of quantum-particles generically indicated by "...ons" . To explore this hypothesis of the frontiers of biological communication we need to revisit biological phenomena in terms of " Bio- quantum Physics ".

DNA as an "ANTENNA" transmitting "Gene Quantum Signals"

Some unanswered questions requires the new quantum-biological approach, because those questions are involving the biological conversion of energy into bio-photons (particles of sound) and bio-phonons (particles of light) generally indicated by ("...ons"), as quantum-phenomena usable for communication processes in nature. Now we would start to describe an model of quantum bio-communication, where it is necessary to introduce important new elements that radically change our understanding of the DNA working functions. First of all the DNA itself can be considered a "nano-bio-technology" able to work as an "quantum-antenna" to spread "gene-signal" towards some active receptors of proteins in the cell. Within this hypothesis DNA would be capable to communicate signals to the proteins and enzymes, to harmonise the regulatory relationship of the "anabolic" function, to produce proteins , switching to "catabolic" pathways, carrying out the transformation of meta-stable proteins, into waste simple products to eliminate them, within a precise timing control of biological reactivity. Certainly DNA do not works as an isolated molecule, therefore we need to conceive the catalytic activity of the DNA/RNA coupling, in order to suggest a model of biological "sound-chemical" reactivity based on bio-phonons communication in the living cells.

In fact we know that from the point of view bio-electrical behaviour the closed and stable DNA is considered an bio-polymer ; hence a closed DNA do not conducting as a wire any electromagnetic field. Differently when DNA is open via the enzyme (DNA-polymerase) in two anti-parallel half chains and after is closed again from side to side with the binding proteins activities. Thus we be acquainted with this operations where the DNA chains are becoming polarised and depolarised. During this time's duration of opening and closing, the DNA, can emits quantum particles ("**Gene-Ons**") corresponding to the double helix polarization in "bi-polarons", interacting with "bio-phonons" emission. The last are generated by the breaking of the Hydrogen Bonds of the sequence of coupled basis A-T and C-G. (see: http://www.edscuola.it/archivio/lre/dna_come_antenna_biologica.htm) .Therefore the such quantum particle generated by the opening the DNA helicoidal molecular chains , and by the breaking of the H-Bonds, can communicate an quantum-spectrum, based on a series of "**Gene-Ons**". This spectrum, has an exact correspondence in quantum –pulses, to the coding information of the gene, because it is emitted at the same time that the gene comes copied by the RNA. Therefore the "**Gene-Ons**" model, where the biological energy is quantised into 'bi-polarons' and coupled with 'bio-phonons', can be a source to generate a codified sound-wave flow, able to interfere by resonance effect, in order to activate molecular switch assets of functional protein activities. Polarization modes are depending from the spatial localization of the particular gene in the DNA chains, so that bio-photons can successfully represent a system of "semantic resonance" for anticipating a mutual recognition between DNA/RNA codification/de-codification processes and the successive metabolic transformations of

proteins, this because the “**Gene-Ons**” particles are able to communicate genetic codified information to harmonize the space/temporal orchestration of a living cell from its differentiation to the final apoptosis.

Terminological clarifications of Information conception as codified energy.

The theoretical approach of DNA as an Antenna it is till now incomplete. In fact is based on an intuition of cognitive and bio-semiotic sciences , wherever the DNA as an "ANTENNA" is transmitting at distance "Gene Quantum Signals" codified as “genetics quantum-sound waves/particles, in order to be easily recognizable by proteins (e.g. “**Gene-Ons**”) .The resonance of some active protein's sites can be conceived as a speeder and efficient system of reception at distance of genetic information where the precision of communication substantially depends from the co-evolutive character existing between genes and proteins that permits the best organization of the receptors. The above approach correlates two kinds of genetic transmissions in a way that the double interaction will be both considered as complemented aspect ; e.g. a) by contact transfer and b) from quantum sound anticipation and feedback. The second gene-information exchange can increase the genetic information power in efficiency and security. In fact gene “codification” and transmission is not far from an analogy of societal life where an organic set of linguistic rules can be codified both in terms of the sounds as a vocal transmission of thought and also in graphic symbols, used in written organization of concepts. Certainly the model of DNA working as an “nanotechnology-Antenna” it is till now only an speculative hypothesis, argued on the basis of a true observable cooperation between proteins and DNA/RNA activity , as for instance is necessary to open the DNA ,copy a section of the genetic codex, and to close again the double helix, by the activity of binding proteins in order to permit the gene expression. (see Figure about the collaboration between proteins at the replication fork) .

Despite the effective level of ignorance about what is in similar cases the management of information communication, the idea of “**Gene-Ons**” transmission, conceived as not-localised quantum-phenomena of a coupling between the quantisation of electromagnetic field (bi-polarons) and quantum sound waves (bio-phonons) , it is marked by traditional scientists as a return to “**Vitalism**”. So that it is becoming very difficult to open up a new emerging branch of Quantum-Bio-Physics aiming to develop a more deeper understanding of the information flow generated through most fundamental molecular quantum-level of biological structure . For this reason it is not only necessary to augment an “ad hoc” model of DNA as an "Quantum-ANTENNA" , because mainly it becomes necessary to go beyond the reductionist limits of mechanical paradigm of traditional science, to open nowadays in a new way of thinking about the old challenge of understanding “**what means life**”, opening an advanced strategy of **Knowledge Based Bio-Economy**. Therefore to avoid similar too easy criticism to the “**Gene-Ons**” assumption, as a bio-system of codified information energy communication, it become useful to clarify the etymology of the terms connecting information in relation to the codification of forms. The verb “*to inform*” , used in the common daily language, it is originally related to the expression “*to model according to a form*”. In fact, “*to inform*” derives from Latinum “*in-formare*” that means , “*to give a form*”. There is, therefore, an original “operative” value in it: the “information”, because from its etymology we can appreciate the remarkable ability of the

ancient scientists to recognize the anticipation of the informing activity to produces a form. In fact, for the ancient Greek scientist Aristotle, wrote: "*Information* " is a truly more primitive fundamental activity than energy and matter, therefore information has not an immediate meaning as the world knowledge, this because Information is something that precede every physical form. Information is relate with the Greek world "*morphé* " that means the potential preliminary activity to obtaining an objective form i.e the effective form that we can perceive , pre-exist as a virtual conception , before the concrete material being of an object. Therefore the visual representation will be interpreted by someone antique Greck scientist by the "*Eidola*" e.g a pure qualitative image or symbolic simulacre turning to the spectator eyes, where from an invisible shadow it is becoming a graphic perceptual form. Therefore originally "information action" represent an interface with a double activity of codification of forms. As a matter of facts information is related to both aspects: a) the potential codification plan of producing an objective form, and in turn , b) we can perceive an object as form's of information transmission. Thus, the "information $\leftarrow \rightarrow$ form" relationship is a circular relation of codification and de-codification of signalling , where the first activity corresponds to an action to reproduce a codex-plan necessary to produce an object and the second activity is based to send back , over a distance, an intelligible message of the forms of object to the sense perception . In mechanical reductionism of science forms are directly correlated with matter or energy interactivity , all working in the same Euclidean Space Time. Therefore the existence of an potential virtual state of information, conceived as a system of codify /de-codify of signals, that the antique Greeks attribute to the intellect of the nature, in the reductionistic mechanical science disappear. As a consequence into a mechanical paradigm of science, information assumes directly an objective meaning , so that it is no more conceived in the antique scientific & humanistic integrated conceptualization , about the existence an intermediate hidden level of the qualitative matrix of codex transformation as the fundamental basis necessary to generate knowledge.

Change of mechanical paradigm in knowledge based bio-economy

"Alienation in Science" can be defined by the degree of separation between Scientific contents and the possibility to obtain creative result of research work. Quantum Mechanical criteria of the Wave /Particle duality is an example of scientific alienation. For the scientific knowledge of the XX century , Waves / Particles belong to a dual nature e.g in some cases the same quantum of energy behaves as a wave, and in other cases it collapse in some quantized particles. Thus wave-particle simultaneous duality is a conceptualization responsible of the inadequacy of conventional concepts like "particle" and "wave" complementarity that is necessary to fully describe the behaviour of quantum objects. Therefore this duality belong to a serious limit of Quantum Mechanical knowledge giving rise to various paradoxes of the Quantum Physics. As a matter of facts the permanence of the Wave/ Particle duality leads to a logical inconsistency in the interpretation of the fundamental experiment where only a single Wave/Particle passing through two distant holes (double-slit experiment), can give the interference phenomena. A different idea about Wave/Particle is born in the context of "**Bio-active information**" , where the coexistence of the duality of Wave/Particles is broken because the admission of a "**Pure Information Wave**", having a behaviour similar to the

“**Vacuum energy in an empty space**” experienced even when the space is devoid of matter. Pure Information Wave can be seen as a new entity as an underlying background of potential energy that lives in a different composition of Space/Time. The “**Pure Information Wave**” can be transformed in by quantum tunnelling in “**.ons**” particles, e.g. the effective energy forms (able to do work), collapsed by the virtual dual state of Information Energy, because of tunnelling effect into effective “**.ons**”. The heuristic value of the “Bio-active Information” theory, <http://xoomer.alice.it/a.i.s/BIOACTIVEINFO.htm>, is driven by the assumption that every configuration of “virtual wave/particle” is based on a variable architecture of the space/time of “Information Energy”, that differ from the Euclidean perception of the Universe commonly organized within three dimensions of space, and one dimension of time ($s_1, s_2, s_3 + t$). In Euclidean space/time travelling of “**...ons**” is ordinarily associated with an extreme dependence on linear watch-time measurements in a not relativistic i.e. an absolute independent continuum of three-dimensional geometry of the space. Differently we can distinguish, a non interactive “*simultaneity*” of the transmitting over a long distance “Pure Information Energy” generated by means the DNA sequences. This simultaneity of transmission-and-reception of genetic information in a cell can be justified only going beyond the classical Euclidean conception of observation, where the observer is arbitrarily split from observation. In fact if we accept to think in order to maintain the traditional Euclidean perception, the simultaneity of signal transmission become forbidden in space/time Euclidean diagrams where the time is a linear dimension of successive arbitrary timing instants. Viceversa “simultaneity” for spreading over the entire cell the Gene-signals, is no more in contrast to a crucial innovation of a Virtual representationist paradigm of the “Information Energy”.

The alternative Space/Time Fourth Dimension of the Non-Euclidean Information Energy

Going beyond the essence of quantum mechanics, where every single particle have characteristics of both waves and particle, it means to clarify how the wave can have physical meaning, i.e. not only a probabilistic value.

Unfortunately easy to see how normally our understanding of space /time is shaped by our everyday perceptual conception of Euclidean material geometry. In spite of this a fixed model of space/time cannot work within a not visible quantum-reality where a not Euclidean geometry works better in a an immaterial space. For that reason, in quantum world, the traditional Euclidean perception of Space/time can be restructured as belonging as a virtual pre-image digitalized in two bits of Space/ Time Coordinates ($s_1, t_1 +, s_2, t_2$), that described the virtual reality of a pure qualitative “**information energy**”. The transformation of space - time coordinates, by a cognitive intuition, can be obtained simply changing the extension of one local vibration of atoms into a long distance resonant vibration. This extension provides the changeover from one space coordinate into a second time coordinate in the pure information field, where oscillate the imaginary Wave/Particle in order that they can be contemporarily exists in this virtual context described by the four vector of bi-dimensional Space and bi-dimensional Time. As a matter of facts in relativistic context, where the Gene-Signals are created and destroyed, time and space are not more belonging to a different

incommensurable entities as in classical mechanics. Thus in a more theoretical formalization the transformation from one space dimension to one time dimension, can be obtained via a quantum tunnelling based on an reversible jump, where one component of Time coordinate \leftarrow in relation to \rightarrow INFORMATION ENERGY \leftarrow it is Folded // Unfolded \rightarrow within a Space coordinate \leftarrow as a consequence of tunnelling effect during the \rightarrow ENERGY /MATTER INTERACTION.

Hence starting from a Virtual Information Signal ,living in a “virtual life” of not Euclidean space/time , effectively the signal will be transformed in a objective pulsing “..ons” , e.g. effective Particles oscillating in an Euclidean geometry of the Energy /Matter interaction.

One aspect of the travelling of “..ons” , in Euclidean rigid geometry is that the loss of information associated to the signal is very high, because the attenuation of signal strength is reduced by the inverse of the square of the distance. So that in the contact of fixed Euclidean geometry of space /time , we can admit practically the transfer of genetic information only by contact. In spite of this, the Virtual dimension of the Information Energy living in the bi-dimensional Space/Times ($s_1, t_1 + s_2, t_2$), permits that the loss of information from a signal is very little , because signal strength remain quite constant at distance as in a simultaneous activity, , till that the virtual existence, bi-dimensional in time and space of gene-signals, is no transformed through the interactivity with the matter in an effective “...ons”, working in an Euclidean space/time.

In this way it will be possible to re-interpret to day the Aristotle concept of Information as a coherent physical intermediate virtual state, associated with the transformation of different codified forms of energy and matter in microscopic states. For this model of understanding it might well be a need to develop a new approach of thinking about theoretical bio-quantum physics . In fact the very act of immaterial-perception means that the information energy packets are modulated in a virtual interpretation of the mind and thus turn out to the space-time perceived by senses or by instrumental devices. So that within an holistic point of view of the unity of science can be conjectured that it is the product of the ability to transform the Space/Time frames as take place in the entire Universe. This because we cannot think beyond what already become in the brain. As a consequence Information Energy permits to go beyond the Quantum-mechanical traditional approach this because “Pure Information-Energy” is living in a not Euclidean Space/Time, as something that exists before to get an real impact to physical reality, codified as energy and matter incoming in an Euclidean space.

How mind comes into existence and how it functions at the quantum level was the general assumption of Max Plank ,Nobel Prize in Quantum Theory . He wrote : *<There is no matter as such! All matter originates and exists only by virtue of a force. We must assume behind this force the existence of a conscious and intelligent Mind. This Mind is the matrix of all matter.>* Thus to empathize with the holistic approach of Quantum-Energy where Mind-Brain are a not separable Unit, it is necessary to remember the limit of the possible transformation in a mechanical science where do not be accepted any time/space changes. In the mechanical paradigm , on the basis of a fixed Euclidean dimension of the spaces time, all the transformation of Energy and Matter are seen only in two ways i.e. a) through the operations that transform the space of results (e.g. translations, rotations, similarities, etc...) and b) by means those operation which transform the changes of spatial coordinates in terms of dynamics

of the movement (e.g. the variations in based on the measure of the speed e.g. the quotient between space over time.

Driven by this way of mechanical thought all other chemical and biochemical transformation of reagents in products remain without any possibility to forecast the results, and so that can be only obtained through some experimental data, the knowledge about contribution of the catalysis to the transformation path .

Viceversa an application of such not Euclidean Space/Time transformation from Virtual wave/particles to effective vibrating “...ons”, can be useful in order to understand better how is working the communication expressed by information signals at quantum level by an approach that considers the " **DNA/RNA as an information energy catalyst's of life system**” .

DNA/RNA catalyst's multiple activity as driver of metabolic clock-reactions .

In the case of the stable DNA double helix the pre-existence information energy is really enclosed in two reverse electromagnetic not linear oscillating with a zero total conductivity. The information energy in this case corresponds to a virtual double state of quantum wave/particles where the space time four-vector is splitted in two dimension for space and two dimension of time. Only when the DNA double helix is open the Information energy collapse and this Virtual information field produces "**Gene-Ons**"; so that they can interact with every object shaped in Euclidean dimensions of space/time. In fact this change of space time coordinates transforms the virtual status in an effective quantum particles transforming its potential information energy in an effective electromagnetic force.

(See : http://www.edscuola.it/archivio/lre/science_of_information_energy.htm) Therefore "**Gene-Ons**" can be the catalytic driving force to make an specific and accurate at distance information, that can be received through a resonance effect by enzymes and other active sites of proteins in order to take place a variety of metabolic reactions and in a way to reduce the amount of energy required and establishing the correct clock-cycle for the cell's life.

Some colleagues criticize this space time transformation based on the assumption of pure energy information field , shaped in two bits (s1,t1) + (s2,t2) of Space Time coordinates , telling to me that I simply reinvent the " Ether" as an hypothetical medium for transmitting catalytic radiations in Bio - Quantum Physics. Other said that I think as an esoteric alchemist speaking about a new way of “Transmutation” , or other irrational kabala.

In true mechanical science it does not seem a conceptual instrument adapted in order to interpret various experimental observation of catalysis.

See: http://www.edscuola.it/archivio/lre/chemical_bases.htm. Differently from my colleagues I think that to building on the notion of bio-chemical information, we need to better understand the basic concept of "catalysis". Catalysis is the phenomena by which a given reaction, contains more information than chaos in order to reduce the amount of energy required to control the reaction and the effect of the catalyst activity it is the observable changes of the race of the reaction. In fact the catalyst actions generate a specific cooperative information coordination, in order to drive a chemical or bio-chemical massive transformation, from the reagents to the products , in a system open to an exchange of energy and matter. In

conclusion, any catalyst's action permits to chemical reactions or bio-molecular processes to take place more effectively in the context of a controlled timing development, by means a better co-organized conditions of information. As a matter of facts out of this control of information exchange all the reactions cannot get an auto-catalytic coherence in producing particular products e.g. all the reactions would not otherwise be possible to find any new equilibrium. Thinking in this way the system DNA/RNA can be seen as an evolution of chemical catalytic' s systems to spread genetic codified information , into a dynamic self generating process of protein's expression and contemporarily getting information through “**Gene-Ons**” to control the timing flux of metabolic reactivity in living species. Hence in a bio-quantum-physics "**Gene-Ons**" assumption can be of a key importance in the regulatory functioning of DNA/RNA catalyst's activities in relation to many important biological processes taking place in the living cells .

WAVE / PARTICLE – EVOLUTIVE – GENETICS

In true “Bio-quantum physic”, as indicated before, introduces important new theoretical elements of Genetic information . In fact "**Gene-Ons**" communication radically change our understanding of the workings of DNA/RNA catalytic system by means a transformation of Information Energy. This because "**Gene-Ons**" carried out at distance by means codified quantum energy , are containing a series of specific frequencies exactly complemented with the gene "clipped" and "glued" from DNA through by the RNA system. The effective presence of "**Gene-Ons**" can be identified exploring through fast spectroscopy methods able to detect the very low frequencies produced by the breaking of H-Bonds of the base pairs e. g. A-T (- bridging by a double H-Bonds) and C-G (containing a triple H-bonds)

This can be experimentally difficult but not impossible.

Certainly more fundamental is now to find a correspondence between theory and facts. Today advancement on cognitive neuro-sciences consider the man (male and woman) as an integral part of the communication on the Universe. Such will bring about a radical change in our understanding of what information is working in nature and it must also have wide repercussions in ourselves knowledge throughout our relationship to the rest of the universe.(see : <http://www.edscuola.it/archivio/lre/onnsup.htm>). The fundamental bases of the unity of science are familiar in Aristotle (340 BC) in truth he said : “ ***Metaphysics is universal and is exclusively concerned with primary substance***”. Definitely we need to remember that the ancient Greek scientist “Aristotle” identify with information something that is belongs to somewhat that is more primitive than energy and matter. To re-interpret to day the Aristotle concept of Information as a coherent physical intermediate state associated with the transformation of different forms of energy and matter in microscopic states, it might well be a need to develop a new approach of thinking about theoretical quantum - bio-physics where “information energy” (I) need to exist before to get an impact to physical reality . Thinking about quantum bio-information the re-composition of subject and object in an holistic domain of science permits to think that every mind-brain transformation , would be considered as an activity coming from a virtual reality. Therefore (I) can be conceived as a potential matrix of information-energy; so that the collapse of the Wave/Particle duality can be seen as the transformation of the potential information energy in “...ons” quantum

particles, able to interact as effective vector-forces in the Euclidean space . In addition in Quantum Bio-physics we can recognize that the Information Energy is the fundamental driving force to provide progressive changes till to enhance some mutation in natural systems. In fact the mutations in macroscopic world can be conceptualized as caused by the basic quantum interactions of communication among quantum- particles. So that this sharing of information energy gradually determines at the macroscopic level a not casual information to the system evolution. As a result the gene-information, that control the living dynamics, cannot be interpreted as a product of chaos but we believe that the highly structured information activities directed by the evolution catalytic adaptive exchanges among the triadic interaction of information, energy and matter that gradually produces macroscopic mutations that will be considered as quantum jumps in the evolutionary path.

On this conceptual basis we can be able to renew the Science of Information , strengthening the correspondence between Bio-Quantum phenomena of Communication between Wave/Particles and Biochemical evolution of Information, as an integrated fundamental basis of DNA/RNA catalytic- evolutionary Activities.

It becomes important to underline that the term reality, in its widest sense, includes everything that is becoming , whether it is observable, or only comprehensible, or apparently self-contradictory as the Wave Particle in Quantum Mechanics. Reality in this sense may include both being and becoming , whereas concept of “existence” is often restricted to objective being related to an Euclidean conception. Therefore virtual reality in the Holistic view , represent a mind-image resolution that become in an effective existence like in the actualization of “...ons” , need to be included in the scientific domain.

With an electronic image the two not Euclidean ($s_1t_1+s_2t_2$) and Euclidean ($s_1s_2s_3,t$) structured worlds can be seen as two asymmetrical Space-Time circuits , connected by a oscillating quantum tunnelling gate ; in the first circuit oscillates a work-free not observable information Energy (I) as gene signals , till that the Information energy can be potentialised in free Energy quanta (E) in order to transfer by quantum tunnelling the wave/particles to the Euclidean circuit where can be originated the observable “... ons”. To accept this model we need to choose :

EITHER: A) THE REQUIRED *NONOBSERVABLE* SIGNALLING OF “INFORMATION ENERGY “ INPUT MUST BE MODELED INTO THE EUCLIDEAN SPACE IN “...ONS” , OR B) THE TRADITIONAL ENERGY CONSERVATION LAW IS FALSIFIED .

Therefore for this challenging goal we decide to complete the traditional Energy Conservation Law starting to consider the “Information as a kind of virtual energy” as a pure qualitative entity, that because can be transformed in other forms of quantum-energy need to be included in the principal scientific postulate that see : **“all events in nature belong to a particular form of different codified energy transformations, so that the total energy cannot be created or destroyed”** .

Starting from the above generalised postulate of Science and taking into consideration information energy as a part of the total energy-matter transformation, we obtain that the global variation (**www.**) of the sum of all the transformation of energy components must be equal zero. So that if we add all the different codification of energy in relation to the all

possible combinations of the space time coordinates in syntheses, we sum up :1) the Vibration-Energy, **(E)**, and 2) the codified-energy like Matter **(M)**, plus 3) the Information energy **(I)**.

At this point because the global variation (**www.**) of any constant (K) is equal to zero we obtain:

$$\langle E \text{ total} = (E) + (M) + (I) = K \rangle ; \text{ i.e. at any time } \langle \text{www.} [(E) + (M) + (I)] = 0 \rangle$$

$$\text{Hence } \langle +w.(I) = -w.(E) - w.(M) \rangle .$$

- *The growing up of Information Energy correspond to enrich the minimum of the other components of energy. This result is nominated the "PRINCIPLE of FERTILE EVOLUTION" (PFE).*

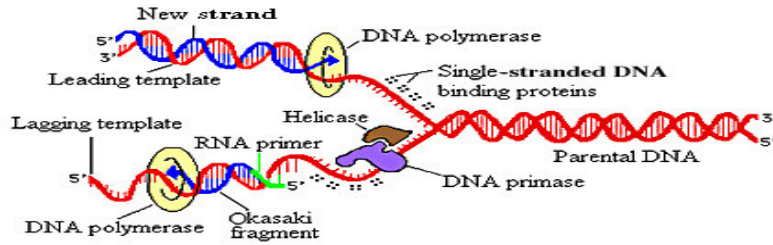
Hence on the basis of the “**PFE-Formula**” we obtain one solution of the energy codification/ de-codification cycle in the evolution of nature . Information Energy **(I)** can be seen in terms of a result of an holistic, co-evolutional development, where different forms of diverse codification of Energy can interact to produce more and more quality of “ Information Energy Quanta”. Therefore the **<PFE- formula>** effectively gives a possible “**direction of evolution**” in order to select, through a catalytic auto-organization, each developmental interaction in which nature progressively transforms Energy and Matter interactions to grow up an increase of the energy linked to the processing of information, **+ w. (I)**

Following this mode of signification the **< PFE –formula >** represents an evolutionary model of growing the “**energy quality**” based on the useful sharing of information codex interchanges during a quantum triadic interactivity among **(E), (M), (I)** , where the DNA/ RNA represent the major tool of the catalytic process of evolution.

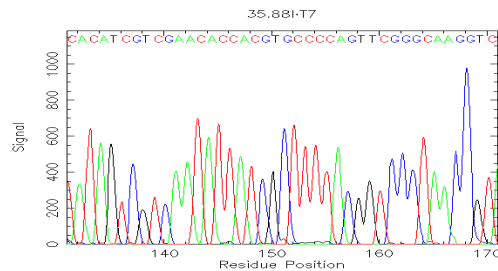
In conclusion I would like on the basis of those and similar hypothesis to promote an “EUROPEAN PROJECT “IDEE”, about the frontiers of BIO-Quantum PHYSICS. This preliminary exercise in cognitive science , can be useful to get an better opportunity to go beyond the mechanical conceptualization where the evolutionary transformation don’t remain conceptually blocked as a consequence of a not predicable mutations among different phases of evolution.

- Finally I am interested to find an “HOSTING INSTITUTION” involving an agreement with a team research members, to propose an IDEE European Project on the Title: <“BIO-Quantum Physics: “DNA/RNA as an information energy catalyst’s of life system ”> , aiming to ask for a Grant to the EU call - section 2.1.2 - ERC-“Advanced Investigarors”- 2007. see: <http://erc.europa.eu/index.cfm?fuseaction=page.display&topicID=66>

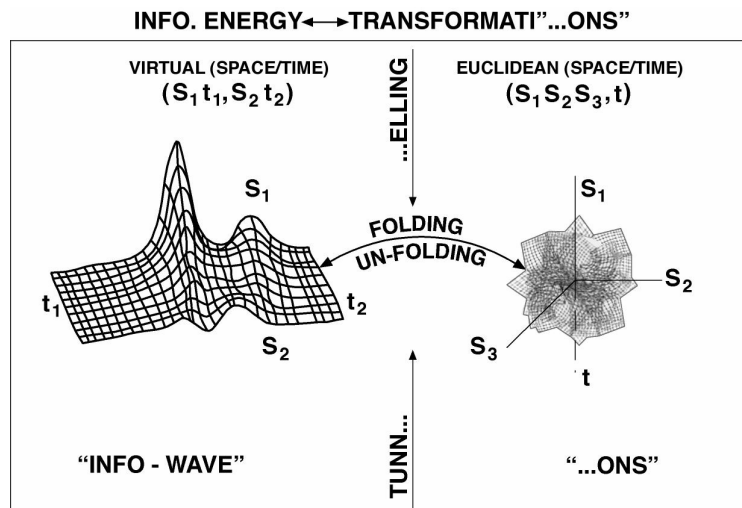
Firenze May 18 /2007 .



Collaboration of Proteins at the Replication Fork



From : A brief Introduction of DNA and Proteins. Greg Gloor, Ph.D., Professor of Biochemistry, ggloor@uwo.ca, 661-3526



Note: Virtual Info-Wave lives in an “hyper-flat space time” where the variation of Space ($\mathbf{w.s}$) = constant at infinitum as the variation of time ($\mathbf{w.t}$) = constant . Therefore the velocity ($\mathbf{w.s} / \mathbf{w.t}$) is ZERO at any time. So that the “simultaneity” is a property of the “virtual hyper-flat” structure bi-dimensional in space and in time.

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- **For transdisciplinary Conceptual references** see - Bi-dimensional Time in Art and Science .
- This is not a new idea, artists such Cubists were inspired by intuition of non-Euclidean space and created pictures of modern art anticipating alternative perceptions of space-time.
 - http://www.edscuola.it/archivio/lre/tempo_bidimensionale.htm



“Marcel Duchamp in Thought” : French Cubist and Surrealist Painter He was born July 28, 1887 in a Normandy, France He pioneered innovative kinetic art. His pervasive influence was crucial to the development of Surrealism, Dada, and Pop Art. He died in Paris on October 1, 1968.