

## REMOTE CONTROL by DNA as a Bio-sensor -antenna.

*"Piezoelectric quantum transduction is a fundamental property of at- distance induction of genetic control "*

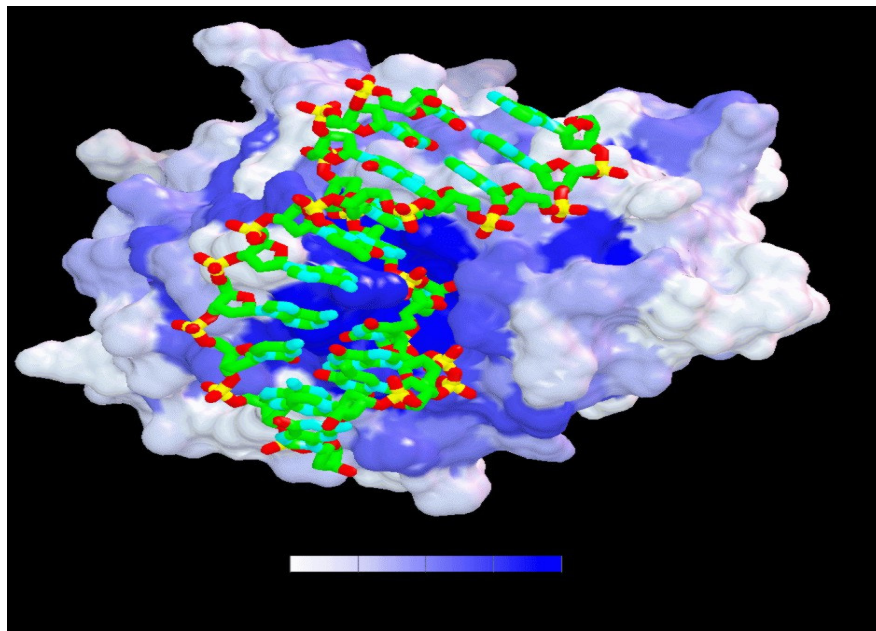
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Remote control of Nuclear-DNA (nDNA) is determined by the piezoelectric changes in response to structural modification in shape and lengths of the double helix during the formation of RNA –copies.

It is well known that the composition and assembly of the chains of protein's synthesis happens through the transfer of genetic information; in fact nDNA is transcribed into mRNA in order to obtain the requested coding sequences to build up proteins using 20 standard proteingenic amino acids.

In biology, there remains open the main problem of modern genetics that is related to the understanding of which circuits of information exchanges are working in the cooperative reproduction of the proteins, in order to activate a "**remote genetic control**"; so that certain genetic sequences can be assembled or replaced and destroyed in good synchronism to get an harmonic modification of the developmental dynamic of living organisms.

Today it is emerging that DNA can be seen as an *a-periodic quasi-crystal*, that during the opening of the double chain, becomes polarized and at the same time produces multiple conformational changes in the closed environment of the *nuclear envelope* hosting the eukaryotic nDNA.

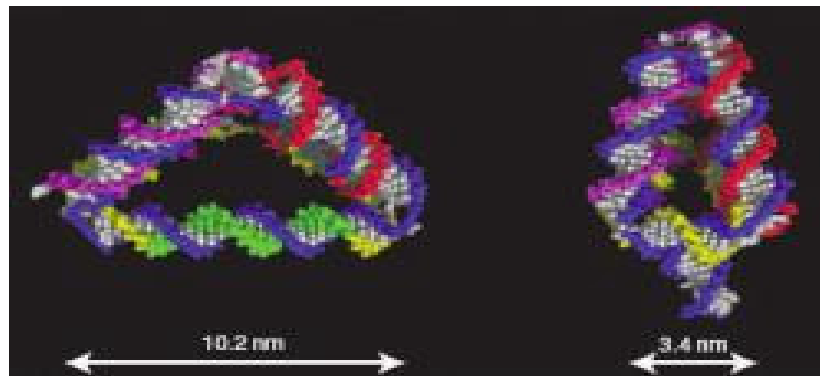


<http://www.scripps.edu/~cliff/jpgs/udgdnasurf.jpg>

In fact, it can be put in evidence that various geometrical structures of nDNA, inscribed in the closed envelope, that are structured through some dynamic contractions, as turning on or screwing up the different basic linear nDNA helixes, that can cover twenty different three-dimensional quasi-crystal point geometries.

Remembering that “non-center-symmetric point's groups”, are 21 (on 32) there is now getting the possibility to induce twenty different cases generating a DNA's piezoelectric effect; in fact, the geometry groups in which the piezoelectric effect is effectively working are only 20, because one of them, while it is non-center-symmetric, has a super symmetry that does not allow piezoelectric applications.

Therefore there is a punctual relationship between “20” quasi-crystal conformations of nDNA, generating different polarization axes of piezoelectricity, and the different bonding composition of “20” amino acids in the protein's building. Now it is taken into consideration the modes of DNA communication, developed in nature to design the exact arrangement of the diverse amino acids in the proteins, in order to get a punctual relationship between the functional *self-assembly* of proteins through a “*remote regulating control*” of DNA by means of long distance information signaling. (2)



**Nanohelix DNA structure provides new building block for nano scale piezoelectric devices**

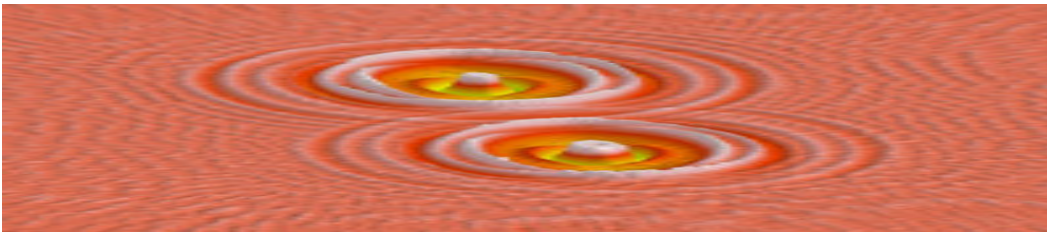
In fact the remote control of *Nuclear-DNA* can be determined by the piezoelectric changes in response to structural modification in shape and lengths of the double helix, during the formation of RNA –copies.

The term **PIEZOELECTRICITY** is derived from the Greek word “**PIEZEN**” meaning “to press”, so that the Piezoelectric effect is observed only if the geometry of a structure belongs to a *point's crystallographic group of symmetry* that is *not center-symmetrical*; in that cases the elastic compression generates a polar axis, whose reversal direction change the sign of electric charge on pairs of opposing surfaces. The piezoelectric field gradient, lasts only for the time of solicitation and is proportional to the surface and direction and intensity of applied stress. Hence the *a-periodic crystal structure of nDNA* can be a good generator, at nano-scale level, of **Bio-piezoelectricity** that can convert torsion energy and their relaxations into a multi step cascade of ultrasonic quantum wave/particles. In fact nDNA can be seen as a *quasi-periodic crystal* that can assume a structural dynamics of conformational changes generating about **20** different non-center-symmetric geometries, *in order to be able to work as a piezoelectric antenna* to receive and/or to disseminate in the living cell, twenty different informational signaling, that are in synchronic correspondence to the construction/destruction of **20** different amino acids, that are the basic structural building units of proteins. (3) Hence the DNA-piezoelectricity, generated from twenty non-centre symmetric polar geometries, can communicate various genetic information signalling in a synchronic manner with the protein's building or destruction, to ensure the efficient living cooperation through the entire cell.

As a matter of fact, a complex system-transformation of piezoelectric energy permits us to obtain a quantum transduction of sound-quanta (*Phonons, from the Greek word of Sound*), to develop an at distance induction of genetic control of protein's diversity sequences development. The above happens in two steps: **a)** firstly the piezoelectric effect of DNA causes the contraction or expansion water drops, containing salt- ions, in the cytoplasmic sea of the cell, processing a system of sound quanta; therefore, it highlights the existence of a relationship between the genetic section copied from mRNA and the entity of piezoelectric polarization that take form of a sound wave that is spreading in the cytoplasm. **b)** After this, the pores of the **DNA-envelope** (4) work as a *quasi-crystal lattice net*, based on quantum cavities, trapping and entangling multi acoustic phonon's swarms, in order to transmit a field of **no-local** "quantum- information energy". (5)

Indeed changes shape of conformational transition of DNA – piezoelectricity, under an entangles phonon's flow modulation, produces an efficient source of remote control of DNA; so that DNA can be described as an **bio-piezoelectric-antenna**, exchanging "information energy" (**Ei**) in the cell, in order to develop an selective and efficient cooperative protein's processing.

A particular attention in understanding this system of genetic remote control, need to be focus on the "entanglement state of multi acoustic phonons" generating a field of quantum bits of information energy, that can be related to the emergent experimental evidence that the "nuclear DNA envelope" is responsible for signalling genetic activities, associated with the *nano-pore gateways*, in order to play a role in modulation of chromatin structure and gene expression. In fact in previous papers it is explored the *quantum* relationships between information energy units and the principal forms of energy. (5)



Entanglement between nanoscale-oscillators : <http://www.physorg.com/news6484.html>

How it is visible from the upper simulation when two quantum particles overlapping, synchronize the individual times of vibration in the common interval ( $t_2-t_1$ .) while their space coupling maintains an identity of **no-local** information within the space sequence between the coordinates ( $x-y$ ).

So the action of *quantum confinement* , induces a differentiation of the geometrical property of space and time, characterizing the new dimension of *super-dense entanglement*, in which the area of the overlapping of *Quantum particles*, becomes described into a new set of organization of space-time arrows, as it is caused from the splitting of the property of complementarity of individual wave/particle (6). Thus the *network of nano-holes* of the "DNA-envelop" of eukaryotic cells, can be imagined as a fishing net, that captures the kinetic-mass of the particles, separating them from pure waves that spread" *information energy*" (**Ei**) in the cell to activate an at distance a good cooperation activities in living system's dynamics,



**In conclusion, Biological-Piezoelectricity**, as a property of nDNA (but also of Mitochondrial - MtDNA or some catalytic centers of enzymes and protein's folding), can be produced through some steps of "Quantum Energy Conversions". So that "Bio-Piezoelectricity" works as an initial method for improving a co-operative at distance *Information Energy* exchanges, based on "*No-local quantum information*", obtained from the "*entanglement effect*". In fact the *super-position of Phonons* permits transformation at the nano-scale level, the elastic energy of quasi-crystal lattices, in a pure wave field of Information Energy (Ei).

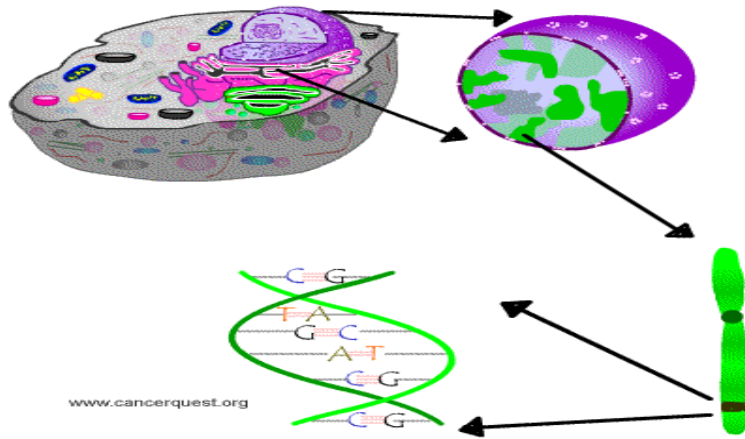
Finally, the described sequences of Quantum Energy transformations, help us to understand the double working function of DNA, both: in transferring the genetic messages for building proteins, but also in regulating the *self organization* of living cells, through exchanging in a *not-dispersive* simultaneity, the *information energy*.

In that way, DNA is working as a ***Biosensor –Antenna***, in order to control the "*self organization*" of metabolic cycles of living cells.

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*“DNA- REMOTE CONTROL”*



[http://www.cancerquest.emory.edu/images/cell\\_to\\_dna.gif](http://www.cancerquest.emory.edu/images/cell_to_dna.gif)