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## Climate and Health: risks and advantages

Europe is also starting to worry about this crazy weather, which, at the end of June, gave rise to difficult and different situations, such as high temperatures of the Mediterranean and floods in Great Britain.

The last Swiss winter has been considered the warmest since long time and can be compared to the one of 1278. The only certain thing is that in the Middle Ages human activity didn't affect the climate as it is suspected to happen now due to the "Global Warming" and the constant increase in pollution, that seems to be caused by the big social and industrial development.

What to do?

There are different answers to this question, ranging from real alarms requiring extreme measures in environmental and industrial policies to answers denying the important role of industrial development in climatic and environmental changes we now see.

This kind of disagreement in the International Scientific Community clearly shows different levels of knowledge. A scientific interdisciplinary and international effort is therefore necessary in order to achieve a better knowledge on this matter that can be put into practice at legislative and R&D levels, aimed at reaching a compatible development and shared by our societies. This is the case of the atmospheric ozone alarm because there's not much of it in the stratosphere (the famous ozone hole) and because there's too much of it in the troposphere and where we live the limits are being reviewed by the Scientific Community. An important article has been recently published on "Atmospheric Environment" by Hazucha and Lefohn (Non linearity in Human Health response to Ozone).

It reviews the links between ozone concentrations and effects on health, as they are not so linear as believed.

This is also the case of the so-called PM10 (suspended dust), having a limit value of 40  $\mu\text{g}/\text{m}^3$  in Europe. In the United States the concentration levels are considered good until 54, fairly good until 154, unhealthy from 155 to 255 for sensible individuals and toxic over 255 (while in Europe limit values over 40  $\mu\text{g}/\text{m}^3$  give rise to traffic reductions. Further study has necessarily to be carried out!).

Climate, specially the sun, doesn't only imply risks. According to Hippocrates and Galen, from the Italian to the French and Russian School, some favourable climates have always been used as a therapeutic means. Lugano is still a Climatic Station, where the sick underwent air therapies until some decades ago. In order to reintroduce Bioclimatological studies, the L.U.de.S. University of Lugano ([www.uniludes.ch](http://www.uniludes.ch)), with its wonderful mountain and lake scenery, has founded the Institute of Biometeorology and Space Medicine ([www.biometeorologia.com](http://www.biometeorologia.com)): with its mission, it aims at analysing all new risks on the environment and the therapeutic potentialities of many favourable climates in Ticino and in Switzerland (see Davos), making also use of the studies on microgravity, that can supply us with new interpretation methods of the interactions between man and environment. In order to face these challenges, we have required the co-operation of many researchers as "Correspondant Scientists" coming from many countries and endowed with different competences.

Further co-operation is being carried out with Universities and research activity centres dealing with the challenges of science. CIFA together with Boris Vladimirsky and collaborators are giving an important contribution in order to keep on coping with the challenges launched by A.L. Chizhevsky, G. Piccardi, P. Faraone and F. Halberg in the field of Helium biology, Biometeorology and all elements of local and Cosmic Environment (Cosmobiology). The new Institute of Biometeorology and Space Medicine, with its 20<sup>th</sup> century tradition, aims at better contributing to the study of the secrets and balanced development of life on Earth and maybe also on other planets, where the man wishes to expand his science in a not so long future.

**Vincenzo Valenzi**

Director of the Institute of Biometeorology  
and Space Medicine of L.U.de.S.  
University  
in Lugano

# Clima e salute: tra rischi e benefici

Le bizzesse del tempo cominciano a preoccupare anche in Europa dove tra nord e sud a fine giugno si sono vissute situazioni difficili quanto diverse come le alte temperature del Mediterraneo e le alluvioni dell'Inghilterra.

E' stato anche scritto che l'inverno svizzero appena finito è stato il più caldo degli ultimi tempi paragonabile all'inverno del 1278. L'unica cosa certa è che nel Medio Evo l'attività umana non deve aver avuto un grande ruolo nell'evoluzione climatica come invece si sospetta oggi con il cosiddetto "Global Warming" e la continua crescita dell'inquinamento che sembrano essere un frutto problematico dell'imponente sviluppo sociale e industriale. Che fare?

Le risposte sono varie e spesso molto differenziate: si passa da visioni allarmistiche che richiedono radicali interventi di politica industriale e ambientale a punti di vista che negano un ruolo importante dello sviluppo industriale nei cambiamenti climatici e ambientali a cui assistiamo.

L'entità delle divergenze nella Comunità scientifica internazionale indica palesemente che non siamo davanti a un quadro di conoscenze di base condivise. Si impone quindi uno sforzo scientifico interdisciplinare internazionale che tenti di raggiungere maggiori conoscenze utilizzabili anche in sede legislativa e di ricerca e sviluppo. In questa direzione tali conoscenze potrebbero garantire lo sviluppo compatibile e largamente condiviso delle nostre società. E' il caso dell'Ozono atmosferico che è al centro di allarmi sia perché c'è ne poco nella stratosfera (il famoso buco dell'ozono), sia perché c'è ne sarebbe troppo nella troposfera e qui dove viviamo i limiti sono in corso di revisione da parte della comunità scientifica e un importante articolo è stato pubblicato di recente su Atmospheric Environment da parte di Hazucha e Lefohn (Non Linearity in Human health response to Ozone) che riesamina i rapporti tra concentrazioni di ozono ed effetti sulla salute che non sono lineari come si pensava.

E' anche il caso del cosiddetto PM10 (le polveri sospese) che in Europa presentano un limite di 40  $\mu\text{g}/\text{m}^3$  mentre negli Stati Uniti fino a 54 la concentrazione è considerata buona e fino a 154 è considerata moderatamente buona e solo da 155 a 255 viene considerato insalubre per soggetti sensibili, oltre i 255 è considerato tossico proprio (mentre in Europa si parte da oltre 40  $\mu\text{g}/\text{m}^3$  per il quale si blocca il traffico e si prendono misure varie. C'è da studiare ancora !

Ma nel clima, ed in particolare nel sole non ci sono solo rischi, da Ippocrate a Galeno dalla Scuola Italiana alla Scuola francese e russa alcuni climi favorevoli sono stati sempre usati come mezzo terapeutico e la stessa Lugano è ancora una Stazione Climatica dove fino a pochi decenni fa malati e predisposti praticavano le cure d'aria.

Per rilanciare gli studi Bioclimatologici la Libera Università degli Studi L.U.de.S. di Lugano ([www.uniludes.ch](http://www.uniludes.ch)), nello splendido scenario del lago e dei suoi monti, ha dato vita all'Istituto di Biometeorologia e Medicina Spaziale ([www.biometeorologia.com](http://www.biometeorologia.com)), con la *mission* di studiare i nuovi rischi presenti nell'ambiente e le sue ancora notevoli potenzialità terapeutiche insite in molti climi favorevoli presenti anche nel Ticino e nella Svizzera (vedi Davos), sfruttando anche gli studi microgravitazionali che possono darci nuove chiavi di interpretazione delle interazioni tra Uomo e ambiente. Per affrontare queste sfide abbiamo chiamato a collaborare all'Istituto come "*Correspondent Scientist*" molti ricercatori, provenienti da molti paesi e con varie competenze. E stiamo attivando collaborazioni con Università e centri di ricerca sulle frontiere della scienza. Nel CIFA, Boris Vladimirski e Coll., hanno contribuito a mantenere viva la frontiera aperta e approfondita in ordine di tempo, nello scorso '900, da Chizhevsky L., Piccardi R., da Faraone P. ed Halberg F., con una disciplina che fin d'allora si andava delineando e che oggi a buon diritto possiamo chiamare cosmobiologia. Una disciplina cioè che si occupa in genere delle influenze delle energie esterne alla biosfera (ad es.: l'attività solare) sui substrati biologici. Il nuovo Istituto di Biometeorologia e Medicina Spaziale nasce dunque nel solco della tradizione scientifica del Novecento con l'obiettivo di continuare a contribuire per meglio conoscere i segreti della vita e del suo equilibrato sviluppo sulla Terra. Ma osiamo dire, in un futuro forse non troppo remoto, con la speranza di potersi impegnare in tal senso perfino in altri pianeti dove l'Uomo volesse allargare la sua conoscenza.

**Vincenzo Valenzi**

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Università L.U. de S. di Lugano

# **Chronoastrobiology: proposal, nine conferences, heliogeomagnetics, transyears, near-weeks, near-decades, phylogenetic and ontogenetic memories.**

[Halberg F](#), [Cornélissen G](#), [Regal P](#), [Otsuka K](#), [Wang Z](#), [Katinas GS](#), [Siegelova J](#), [Homolka P](#), [Prikryl P](#), [Chibisov SM](#), [Holley DC](#), [Wendt HW](#), [Bingham C](#), [Palm SL](#), [Sonkowsky RP](#), [Sothorn RB](#), [Pales E](#), [Mikulecky M](#), [Tarquini R](#), [Perfetto F](#), [Salti R](#), [Maggioni C](#), [Jozsa R](#), [Konradov AA](#), [Kharlitskaya EV](#), [Revillam M](#), [Wan C](#), [Herold M](#), [Svutkina EV](#), [Masalov AV](#), [Faraone P](#), [Singh RB](#), [Singh RK](#), [Kumar A](#), [Singhs R](#), [Sundaram S](#), [Sarabandi T](#), [Pantaleoni G](#), [Watanabe Y](#), [Kumagai Y](#), [Gubin D](#), [Uezono K](#), [Olah A](#), [Borer K](#), [Kanabrockia EA](#), [Bathina S](#), [Haus E](#), [Hillman D](#), [Schwartzkopff O](#), [Bakken EE](#), [Zeman M](#).

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"Chronoastrobiology: are we at the threshold of a new science? Is there a critical mass for scientific research?" A simple photograph of the planet earth from outer space was one of the greatest contributions of space exploration. It drove home in a glance that human survival depends upon the wobbly dynamics in a thin and fragile skin of water and gas that covers a small globe in a mostly cold and vast universe. This image raised the stakes in understanding our place in that universe, in finding out where we came from and in choosing a path for survival. Since that landmark photograph was taken, new astronomical and biomedical information and growing computer power have been revealing that organic life, including human life, is and has been connected to invisible (non-photic) forces, in that vast universe in some surprising ways. Every cell in our body is bathed in an external and internal environment of fluctuating magnetism. It is becoming clear that the fluctuations are primarily caused by an intimate and systematic interplay between forces within the bowels of the earth--which the great physician and father of magnetism William Gilbert called a 'small magnet'--and the thermonuclear turbulence within the sun, an enormously larger magnet than the earth, acting upon organisms, which are minuscule magnets. It follows and is also increasingly apparent that these external fluctuations in magnetic fields can affect virtually every circuit in the biological machinery to a lesser or greater degree, depending both on the particular biological system and on the particular properties of the magnetic fluctuations. The development of high technology instruments and computer power, already used to visualize the human heart and brain, is furthermore making it obvious that there is a statistically predictable time structure to the fluctuations in the sun's thermonuclear turbulence and thus to its magnetic interactions with the earth's own magnetic field and hence a time structure to the magnetic fields in organisms. Likewise in humans, and in at least those other species that have been studied, computer power has enabled us to discover statistically defined endogenous physiological rhythms and further direct effects that are associated with these invisible geo- and heliomagnetic cycles. Thus, what once might have been dismissed as noise in both magnetic and physiological data does in fact have structure. And we may be at the threshold of understanding the biological and medical meaning and consequences of these patterns and biological-astronomical linkages as well. Structures in time are called chronomes; their mapping in us and around us is called chronomics. The scientific study of chronomes is chronobiology. And the scientific study of all aspects of biology related to the cosmos has been called astrobiology. Hence we may dub the new study of time structures in biology with regard to influences from cosmo- helio- and geomagnetic rhythms chronoastrobiology. It has, of course, been understood for centuries that the movements of the earth in relation to the sun produce seasonal and daily cycles in light energy and that these have had profound effects on the evolution of life. It is now emerging that rhythmic events generated from within the sun itself, as a large turbulent magnet in its own right, can have direct effects upon life on earth. Moreover, comparative studies of diverse species indicate that there have also been ancient evolutionary effects shaping the endogenous chronomic physiological characteristics of life. Thus the rhythms of the sun can affect us not only directly, but also indirectly through the chronomic patterns that solar magnetic rhythms have created within our physiology in the remote past. For example, we can document the direct exogenous effects of given specific solar wind events upon human blood pressure and heart rate. We also have evidence of endogenous internal rhythms in blood pressure and heart rate that are close to but not identical to the period length of rhythms in the solar wind. These were installed genetically by natural selection at some

time in the distant geological past. This interpretive model of the data makes the prediction that the internal and external influences on heart rate and blood pressure can reinforce or cancel each other out at different times. A study of extensive clinical and physiological data shows that the interpretive model is robust and that internal and external effects are indeed augmentative at a statistically significant level. Chronoastrobiological studies are contributing to basic science--that is, our understanding is being expanded as we recognize heretofore unelaborated linkages of life to the complex dynamics of the sun, and even to heretofore unelaborated evolutionary phenomena. Once, one might have thought of solar storms as mere transient 'perturbations' to biology, with no lasting importance. Now we are on the brink of understanding that solar turbulences have played a role in shaping endogenous physiological chronomes. There is even documentation for correlations between solar magnetic cycles and psychological swings, eras of belligerence and of certain expressions of sacred or religious feelings. Chronoastrobiology can surely contribute to practical applications as well as to basic science. It can help develop refinements in our ability to live safely in outer space, where for example at the distance of the moon the magnetic influences of the sun will have an effect upon humans unshielded by the earth's native magnetic field. We should be better able to understand these influences as physiological and mechanical challenges, and to improve our estimations of the effects of exposure. Chronoastrobiology moreover holds great promise in broadening our perspectives and powers in medicine and public health right here upon the surface of the earth. Even the potential relevance of chronoastrobiology for practical environmental and agricultural challenges cannot be ruled out at this early stage in our understanding of the apparently ubiquitous effects of magnetism and hence perhaps of solar magnetism on life. The evidence already mentioned that fluctuations in solar magnetism can influence gross clinical phenomena such as rates of strokes and heart attacks, and related cardiovascular variables such as blood pressure and heart rate, should illustrate the point that the door is open to broad studies of clinical implications. The medical value of better understanding magnetic fluctuations as sources of variability in human physiology falls into several categories:

1) The design of improved analytical and experimental controls in medical research. Epidemiological analyses require that the multiple sources causing variability in physiological functions and clinical phenomena be identified and understood as thoroughly as possible, in order to estimate systematic alterations of any one variable.

2) Preventive medicine and the individual patients' care. There are no flat 'baselines', only reference chronomes. Magnetic fluctuations can be shown statistically to exacerbate health problems in some cases. The next step should be to determine whether vulnerable individuals can be identified by individual monitoring. Such vulnerable patients may then discover that they have the option to avoid circumstances associated with anxiety during solar storms, and/or pay special attention to their medication or other treatments. Prehabilitation by self-help can hopefully complement and eventually replace much costly rehabilitation.

3) Basic understanding of human physiological mechanisms. The chronomic organization of physiology implies a much more subtle dynamic integration of functions than is generally appreciated.

All three categories of medical value in turn pertain to the challenges for space science of exploring and colonizing the solar system. The earth's native magnetic field acts like an enormous umbrella that offers considerable protection on the surface from harsh solar winds of charged particles and magnetic fluxes. The umbrella becomes weaker with distance from the earth and will offer little protection for humans, other animals, and plants in colonies on the surface of the moon or beyond. Thus it is important before more distant colonization is planned or implemented to better understand those magnetism-related biological- solar interactions that now can be studied conveniently on earth. Thorough lifelong maps of chronomes should be generated and made available to the scientific world. Individual workers should not have to rediscover cycles and rhythms, which can be a confusing source of variation when ignored.

By contrast, once mapped, the endpoints of a spectral element in chromosomes can serve everybody, for instance for the detection of an elevation of vascular disease risk. Chromosome cartography from birth to death is a task for governments to implement, thereby serving the interests of transdisciplinary science and the general public alike. Governments have supported the systematic gathering of physical data for nearly two centuries on earth in order to serve exploration, trade, and battle on land and on the seas, and indeed agriculture. These government functions have been augmented enormously with satellite technology in more recent decades. The biological comparison with regard to government support and chromosomal needs would be the mapping of the human genome. The complete sequences of DNA might have eventually become available due simply to countless individual laboratories publishing piecemeal results in scattered journals. But there would have been enormous redundancy and confusion in assembling and piecing the information together. The waste of time and money involved in the redundancy and confusion would have been considerable. (ABSTRACT TRUNCATED)

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I. P. C. 2006

58<sup>TH</sup> Indian Pharmaceutical Congress

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PHARMA VISION 2020 :  
ROLES, RESPONSIBILITIES AND RESOURCES

Mumbai, December 1-3, 2006

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Symposium on Technologies That Changed Therapy

*WATER STRUCTURE AND LYOPHILIZATION*

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Extract of talk

Louis REY, Ph.D.

Aérial-Center of Technological Resources, Illkirch

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*WATER STRUCTURE AND HEALTH*

*Louis Rey*

Mr. President,  
Ladies and Gentlemen,

I consider it as a privilege to address this selected audience and would like, first of all, to express my gratitude to the Congress Organizers and more especially to Professor Madhusudan Rao, Convenor of the Scientific Services Committee. This is my fifth visit to India and it is always with great pleasure that I meet the Scientists and People of this Great Sub-Continent.

Your 2006 I.P.C. Meeting is targeting at developing technologies and, in that frame, research done on water-structure and freeze-drying / lyophilization is still at the leading edge despite it started already almost two centuries ago. Indeed, at first glance, it might appear provocative to claim that the ultra high dilutions technology, imagined by Dr. Samuel HAHNEMANN in the mid 19<sup>th</sup> Century, can still offer new perspectives in 2006 and it might equally look odd to say that since its discovery by BORDAS and D'ARSONVAL in 1906, lyophilization has remained a pioneering field. In that short presentation I shall attempt to show that both are developing areas which present many different openings for the Pharmaceutical Industry.

## **WATER AS A HEALTH MESSAGE**

Water is, indeed, by far, the largest natural liquid on Earth and the "Water Planet" accounts for close to 1.4 billion megatons of water, 75 p. 100 of it being in the oceans, seas, ice-caps, lakes and rivers, the remaining being held in underground water tables and in the ever whirling atmospheric masses.

Water has shaped the surface of the earth but it is also the unavoidable support of life. When it is extracted from living cells by drying or low-temperature freezing, most are killed and those which do survive enter a state of "suspended animation" which will last until the initial water content is restored.

As a chemical, water is a very strange compound with many anomalous properties (density, freezing point, specific heat, compressibility ...). Water scientists as José TEIXEIRA, H.E. STANLEY and Rustum ROY, have thoroughly described the very peculiar behaviour of this polar molecule which is susceptible to establish strong links with its neighbours by hydrogen bonding in tetrahedric arrangements. Moreover, in many cases, these building blocks can merge together in much more complex structures, 3-D clusters and polyhedric arrangements which appear to be specific. In presence of hydrophilic solutes, like Cl Na, the whole water mass gets organized as multiple shells around the dissolved ions, whilst, when a hydrophobic compound is added, water molecules enclose hollow clathrate structures. Similarly they coat nanobubbles with one or two layers as they are hydrodynamically bound to large molecules like proteins or nucleic acids.

All these structures, however, are in continuous motion and change at the pico-second level which drives José Teixeira to say : "there are no permanent clusters in liquid water". However, depending upon its prior treatment, these evanescent structures do appear, move and disappear to be regenerated again. In other terms, water is a statistically structured fluid.

This, ladies and gentlemen, is the very basis of homeopathy : try and develop in a water system a given structure by the combined action of intense mechanical stirring and successive dilution.

This, of course, is quite well known, but what is really new is that, today, we have novel experimental tools which allows us to challenge a long-lasting issue. Fundamentally, when a sample of water containing foreign compounds is diluted and dynamized in many successive operations until the added products have phased out, do we end up with a distinctive medium or



only an aliquot of the dilution fluid ? The answer given by low temperature thermoluminescence is quite clear : The ultra high dilutions have a given selective identity.

Without going in too many details, let us just explain the basic concept of this method. A representative sample of "dynamized" ultra high dilutions is frozen to liquid nitrogen temperature (-196°C / 77 K) and its ever moving dynamics turned in as a stable solid. We assume, then, that the statistically significant structures which were present in the original liquid are frozen stiff and appear now as isolated "defects" in the organized network of hexagonal ice. The material is further irradiated by Gamma Rays, X Rays or Electron Beams and the whole solid is "activated". It is then rewarmed progressively under a photo multiplier and / or spectrograph and, as thermal energy is fed in, the different traps containing the "activated species" empty the one after the other and, in doing so, they emit light. This thermoluminescent glow is some kind as a finger print of the frozen solid where "defects" play a leading role and since these defects are directly connected to the structure of the original liquid, this recording appears to be specific to the dilution.

Actually, this low temperature thermoluminescence is just the transposition at sub-zero temperatures of the classical thermoluminescence methods developed for dating ceramics or geological events and which have been in regular use in India since decennia thanks to the pioneering work of Professor GARTIA in Manipur. In our own studies we have found that ultra high dilutions - beyond the Avogadro number, which means dilutions in which all chemical products have disappeared - display, nevertheless, substantially different glow curves for Na Cl, Li Cl, histamine, potassium dichromate, all different from the solvent one. This, undoubtedly, demonstrates that, at the origin, the dilutions were structured under different and specific modes.

From our very recent, unpublished, experimental data it appears that the nanobubbles of the dissolved gases generated at the succussion time, might play an import role in this process.

As such, we may conclude that ultra high dilutions are susceptible to carry a specific "health message" and constitute the basis of a reliable therapy. At that point, it is not my purpose to endeavour to deal with the numerous clinical testing done in double blind, which have been reported by Philippe BELON, Michael FRASS and many others, in respectable international reviews, but I only want to show how very recent experimental work supports this idea. In doing so, I am perfectly aware that homeopathy has had for decennia its own detractors but I think that it is fair to say to this distinguished audience that "water-based health messages" conveyed by homeopathic preparations do lie on solid sound scientific basis and should get their due place in human therapeutics.

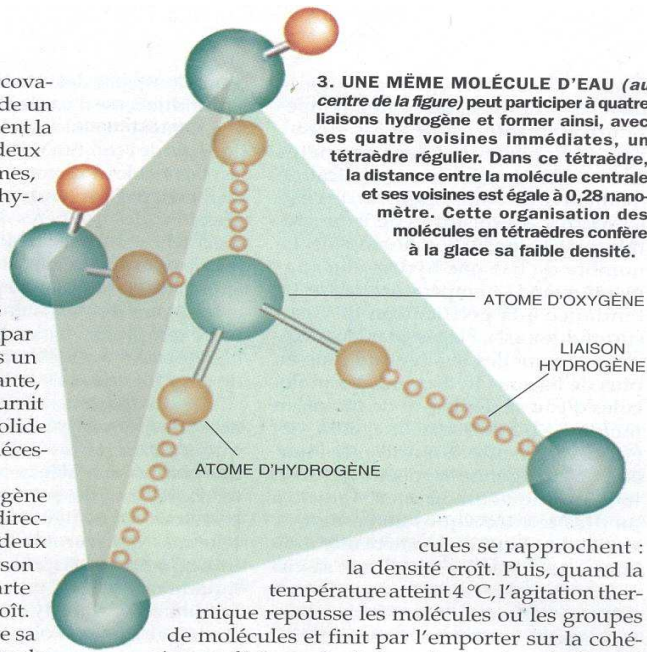
Ladies and Gentlemen, as a conclusion, may I quote His Excellency The Prime Minister of India, Dr. Manmohan SINGH who wrote in his message to the LIGA 2005 Conference in Berlin :

"The discovery of homeopathy ... proved to be a great boon for humanity by strengthening the immunity of the body ... As a holistic system of medicine it tries to address the conditions which create health disorders and, therefore, deals with the root of the problem" and Dr. Manmohan Singh to add "safety and efficiency of the homeopathic drugs and the absence of side effects has made it popular all over the world".

Ladies and Gentlemen, when we are planning our future actions in the health field for the best interest of mankind, let us not forget that we hold there an important asset which should not be overlooked since it comes as a natural complement to the use of biologicals and chemical drugs. With homeopathy we take care of the patient first, as a whole, and no longer address only his disease.

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 sion conférée par les liaisons hydrogène : la densité

José Teixeira – Pour la Science 285 2001

# L' inquinamento microbiologico dell'aria confinata.

(con particolare riferimento agli ospedali)

Convegno in Sirmione, dell'Accademia Internaz. di Milano , 21 Aprile 2007 .

**Faraone Piero** , past Medical Director of Rome Hygiene and Profilaxis. Laboratory.

## PREMESSA :

Per l'inquinamento microbico dell'aria confinata **manca purtroppo ancora una normativa .**

**Il D. Lgs 626/94 pur evidenziando la necessità di monitorare la presenza di potenziali specie patogene, non fornisce tuttavia valori di carica batterica o micetica a cui rapportarsi per valutare la qualità dell'aria degli ambienti di lavoro.**

**L' Amer. Confer. of Governmental Industrial Hygienists (ACGIH) non ritiene proponibili valori limite -soglia per i contaminanti biologici .**

L'A. di questa esposizione ha lo scopo di evidenziare alcune sue metodiche sperimentate per meglio dare all' indagine per un'aria confinata quel senso pratico che permetta di capirne le ragioni (1-10) e portare quindi alle misure preventive più adeguate .

## ESPOSIZIONE :

Utilizzando un dispositivo elettrico a pendolo , l' A si proponeva anni fa (2) di valutare gli spostamenti d'aria SA, provocati con la deambulazione, e vagliarne quindi l'influenza sulle conseguenti variazioni della CMT dei germi in sospensione nell'aria confinata .

Si utilizzava allo scopo uno stativo al quale era ancorato un pendolo formato da una sfera di gomma sottilissima ( *peso a vuoto, 25 g* ) dilatata da 30 litri di aria ; questa era tenuta sospesa a 0,50 metri dal suolo, da un filo di rame del diametro di 0.1 mm .

Oscillando il filo di rame toccava l'anello entro cui passava chiudendo così un circuito di corrente continua a 12 volts. La corrente attivata avviava un cronometro che misurava in cinquantenesimi di secondo l'entità dello spostamento d'aria(SA) prodotto da una persona nel camminare (Tempo di Contatto Elettrico o TCE ). Gli SA venivano intercettati a vari livelli dal suolo [ 0-0.5-1-2 e 3 metri ].

L'esperienza era condotta realizzando 27 test, praticati in 27 giorni diversi, tra il 1967 e il 1969. Il dispositivo utilizzato era posto al centro di un locale di 40-50 mc e i terreni colturali di agar tryptose erano esposti all'aria per la durata di 20' sia sulle 4 mensole dello stativo a varie altezze dal suolo che sul pavimento del locale. Tali terreni avrebbero dovuto rivelare le variazioni della CMT con le variazioni in più o in meno degli spostamenti d'aria . Il che veniva confermato dai risultati ottenuti .

Tab A [ TCE espresso in 50esimi di 1" ed in secondi ( *valori media* ) ]

II (LIEVE)	III (DISCRETO)	IV (MARCATO)	I Fasi (MOTO FATTO)
1500	4275	7352	( <i>val.media in 50esimi di 1"</i> )
30"	85"	147"	( <i>val.media in 1"</i> )
1000 / 1500	4000 / 4500	7000 / 7500	Range in 50 esimi di 1"
20" / 30"	80" / 90"	140" / 150"	Range in secondi

Passando dalla fase I e via via alla II , alla **III** e alla **IV** successivamente, si registravano Cariche Microbiche Totali crescenti [*mediamente 0.6 - 1.0 - 2 e 3 germi per 1 dm2 per 1'*]. Rispetto alla

quiete iniziale della fase I , la CMT aumentava cioè di 2, 3, 5 volte per l'aumentare del moto e quindi dello spostamento dell'aria .

Le CMT diminuivano passando in media da un calo iniziale di 1,1 nella fase V, ad uno intermedio nella VI pari a 0,6 e ad uno finale nella VII pari a 0,5 circa .

Rispetto al massimo cioè avuto in fase IV, la CMT riprendeva mediamente i valori avuti in fase iniziale di quiete, solo dopo 40'-60'.

Inoltre con 27 test fatti in giorni differenti, si è potuto individuare il valore medio raggiungibile in un locale ben pulito di recente, dopo un moto lieve e limitato di un tempo medio di contatto di 20 -30'' (Tab. A). Esso risultava essere pari a 1,0 germe x 1 dm2 x 1' (Faraone 1970).

La CMT dell'aria poi , via via passando dai valori trovati al suolo alle altezze successive prima indicate, diveniva in media il 90, il 70, il 45 e il 35% del valore massimo al suolo .

Si constatò pure che l'inq. micr. dell' aria in quiete assoluta e in perfetto isolamento, dopo esposizione dei terreni colturali all'aria, durante una nottata (*in media 801'*), ) era trascurabile .

Il 10 % cioè della CMT media (0,06) , avuta durante lo stato di quiete che precedeva ognuno dei test condotti con la deambulazione (0,6).

Questa differenza del 10 % . poteva considerarsi indicativa delle manualità praticate nella posa e il ritiro dei terreni colturali .

A titolo di confronto la CMT registrata in ambiente esterno, in 35 prelievi , durante il periodo dell'attuazione dei test prima detti, fu mediamente di 3,7 x 1 dm2 x 1' .

E cioè **3,7 volte maggiore** del valore medio precedentemente indicato ( 1,0 germe x 1 dm2 x 1' ) .

Successivamente si attuava un indagine con ventilazione forzata indotta (VFA)che mirava mettere in evidenza se la pulizia dei locali fosse stata ben condotta in vari locali di un ospedale di Milano ( 4,5,6 ) .

A tale scopo ci si è serviti di un grosso ventilatore tenuto sempre in condizioni di pulizia a specchio che era posizionato con la corona virtuale di rotazione [CR] , parallela e a 50 cm dal suolo e in un punto più possibilmente centrale del locale. Lo strumento veniva poi attivato ottenendo un flusso d' aria di 8 Km / h ( velocità così risultata con un anemometro posto a 10 cm dalla CR ) .

Il locale in esame era così trasformato per così dire, in un contenitore d'un grosso **frullatore** nel quale con l'aria animata , sarebbero restati veicolati la polvere e i microbi che fossero sfuggiti ad una precedente pulizia .

I terreni colturali erano posti, poggiati sul pavimento, a 50 cm dalla CR, in modo da evidenziare la contaminazione microbica che ne fosse risultata dopo l'esposizione di 20'.

In sala operatoria si ebbero CMT medie inferiori a **0,5 gdm**; in altri locali del blocco operatorio di **0,8** e in locali esterni al blocco operatorio di **2,8** .

A stabilire un termine di confronto si controllavano anche locali non ospedalieri e cioè i locali di case di abitazione che mediamente davano una CMT di **3,9gdm** ; i locali di un laboratorio d'analisi che presentavano una CMT di **5,3** ; quelli di un ambulatorio prelievi con una CMT di **10,4** .

Quanto alla pulizia , dopo la fine di ogni attività, si appurava :

- che nel **blocco operatorio**, i pavimenti erano stati puliti a specchio e disinfettati .
- che nei **locali di abitazione** i pavimenti erano stati puliti con straccio umido e poi cerati .
- **che nei locali del laboratorio e in quelli dell'ambulatorio-prelievi** i pavimenti erano stati puliti con segatura umida e scopa .

Quindi **ponendo pari a 100 il dato-media riferito alla CMT maggiore** riscontrata negli esperimenti condotti (**ambulatorio prelievi**) risultavano le differenze evidenziate nella tabella 1 .

**Tabella 1**

<b>in sala operatoria</b> ( CMT media < 0,5gdm )	<b>il</b> 95,2 % in meno
<b>in altri locali del blocco oper.</b> (0,8)	<b>il</b> 92,3 % in meno
<b>in loc. osped. esterni al bloc.op.</b> (2,8)	<b>il</b> 73 % in meno
<b>in locali di abitazione</b> (3,9)	<b>il</b> 62,5 % in meno
<b>in locali- laboratorio-analisi</b> (5,3)	<b>il</b> 49 % in meno
<b>locali di ambulatorio prelievi</b> (10,4)	( <u>valore massimo o di riferimento</u> )

Si sottolinea comunque che **nell'ospedale di Milano qui esaminato, a seconda dei locali**, le CMT / media dopo la VFA, andavano da un minimo di < 0,5gdm a 0,8 e a 2,8 mentre nei locali non ospedalieri variavano da un minimo di 3,9 a 5,3 e a 10,4 germi .

Considerando i procedimenti di pulizia dei pavimenti prima indicati, si deduce che siano stati soprattutto questi a fare la differenza .

Si appurava pure in una **giornata particolarmente ventosa di 50-60 Km/h (4,7)**, che si era verificato un aumento marcato della CMT rispetto alle **medie riscontrate** solitamente negli stessi locali del blocco operatorio, a pulizia compiuta e in assenza di apertura di finestre, al momento dei prelievi .

<b>E cioè:</b>	in sala operatoria	si riscontravano	<b>CMT</b>	di <b>0,78</b> anziché 0,45 <b>gdm</b>
	in locale lavabi	„	„	<b>4,30</b> „ 0,54
	in loc.sterilizzazione	„	„	<b>8,70</b> „ 0,88
	in corridoio	„	„	<b>2,50</b> „ 0,60 .

Con valori media x locale di **4,07** anzichè **0,61** ( cioè 6,7 volte di più ) .

La CMT dell'aria variava soprattutto con l' aumento di gruppi di germi particolarmente indicativi per la loro consueta presenza nell'aria esterna : i cromogeni, gli sporigeni e i miceti [ifomiceti] .

Tale distinzione in gruppi fu ideata e proposta dall'A in una sua ricerca del 1971 (3) considerandolo uno schema semplice ed efficace per presentare in linea generale la flora microbica tipica dell'aria esterna . L' A., nello schema , incluse pure le micrococcacee che però all'esterno risultavano in modo irregolarmente variabile e meno frequentemente che nei locali confinati ; in essi anzi ne presentavano una caratteristica tipica in quanto legate alla presenza dell'uomo ( **4,5,6,8** ) .

In dettaglio a questo proposito l'A. puntualizza che nelle sue osservazioni :

- gli sporigeni (ad es.; le bacillaceae) prevalgono nella comune polvere della strada, dotate come sono le loro spore, di alta resistenza anche in presenza di condizioni di difficile sopravvivenza .

Presenti comunemente nell'aria esterna si sono riscontrati prevalere nelle stagioni fredde e in generale nelle giornate ventose .

- i cromogeni , tipici per dare colonie colorate( es.: le pseudomonadaceae), é un mix di germi presenti comunemente nell'aria e frequenti nel mondo vegetale . Con le variazioni stagionali l' A. ha visto prevalere all'esordio della buona stagione e diminuire in quella più fredda . Tali germi non risultano dotati di particolare resistenza all'ambiente come si è detto per gli sporigeni .

- i miceti (ifomiceti) diffusi nel mondo vegetale, sono abbastanza costantemente presenti nell'aria e l'A. li ha visti prevalere durante l'autunno ( in condizioni di particolare umidità e temperatura cioè)

Son notoriamente dotati di forme di resistenza all'ambiente esterno , superiore a quella dei cromogeni e assimilabile a quella degli sporigeni (presenza nella polvere)..

- le micrococcaceae (es.: lo stafilococco aureo), sono variamente e meno frequenti nell'aria esterna tranne che ovviamente, in presenza di affollamento di persone ( aumento delle goccioline di Fluegge ) . .

Nelle sue ricerche l'A. poteva concludere che l'inquinamento microbico dell'aria di un locale confinato tendeva ad avere le caratteristiche dell'aria esterna se prevaleva l'influenza di quest'ultima su quella tipica del locale confinato abitualmente frequentato dall'uomo. E ciò maggiormente, se il locale fosse stato isolato da diverso tempo dall'aria esterna.

In caso però di polverosità dell'aria esterna come ad esempio in giornate ventose anche di solo 10-20 kmh, si riscontravano un aumento di microrganismi come i miceti e gli sporigeni dotati notoriamente di particolari forme di resistenza all'ambiente.

In tali casi la facies microbica dell'aria ( 3 , 7 ) , assumeva una connotazione caratteristica e inconfondibile, ricca di questi germi che prevalevano in modo netto sugli altri .

L' A. é arrivato pure a **proporre , in mancanza di normativa , un indirizzo per la valutazione igienica sanitaria** , dando dei limiti orientativi alla contaminazione dell'aria confinata, limiti basati su indagini fatte in alcuni ospedali romani (10).

Per ogni prelievo , si esponevano i terreni colturali all'aria ambiente per 20' e a un metro da terra in piastre Petri di 90 mm .

Dai risultati si poteva ricavare il seguente orientamento per l' A. utile ad esprimere un giudizio orientativo igienico sanitario a indagini fatte (Tab.2) :

### Tabella 2

a) CMT	0 – 1 gdm	=	giudizio buono	(cioè favorevole)
b) CMT	>1 – 2 „	=	„ sufficiente	
c) CMT	>2 – 3 „	=	„ scadente	(cioè non favorevole)
d) CMT	> 3 „	=	„ insufficiente	„ „ „

**Si considerava infine un indice R** ricavato dal rapporto fra i dati favorevoli e non favorevoli **che avrebbe consentito il giudizio complessivo dei prelievi** .

Quando R fosse stato  $\geq 1$  , il giudizio igienico sanitario complessivo ricavato dai prelievi veniva considerato :

o appena soddisfacente ( 1 – 1,5 )

o soddisfacente ( 1,6 – 2 ) .

In tutti i casi invece che R fosse stato  $< 1$  , il giudizio i.s. sarebbe giudicato non soddisfacente . Naturalmente tanto più i prelievi fossero stati numerosi, tanto più il giudizio orientativo sarebbe stato a garanzia di una sua validità, utile ad intervenire con misure igienico sanitarie adeguate, per combattere l'inquinamento microbico riscontrato.

*Orientativamente come prevenzione efficace , si riteneva consigliabile per un locale di 50 mc , di fare almeno una decina di prelievi in giorni successivi dopo un'accurata pulizia iniziale .*

*E quindi applicare tutte le misure opportune a sanare una situazione non favorevole alla salute umana .*

Il limite di tolleranza della CMT dell'aria, in base alle nostre indagini , andrebbe calcolato con maggiore esigenza , in alcuni locali, quale è ad esempio, una **sala operatoria** .

**E cioè** valori di < 0,5 dopo ventilazione forzata e di < 1 in stato di quiete prima dell'inizio dell'attività ( come ad es.al mattino, dopo varie ore dalla pulizia e in calma protratta, ad es.dalla sera prima ) . Sono valori che si sono **dimostrati raggiungibili** in indagini fatte in un ospedale di Milano negli anni 70 ( 2, 4, 5, 8 ) .

**Durante l'attività operatoria purtroppo si é visto però facilmente superare** quel limite ottimale di 1 di CMT, che si é accennato in precedenza come ottenibile , in ambienti confinati opportunamente puliti e in presenza di moto molto misurato .

**Tale limite** , si precisa però, è difficilmente raggiungibile senza una disciplina nei movimenti , nel numero delle persone e nel comportamento umano [ il **fattore umano** (5,6,8,9)si é visto come il più ostico a potersi regolare allineandolo adeguatamente alle esigenze necessarie per una valida prevenzione ospedaliera.] .

La pulizia, la disinfezione dei pavimenti e delle superfici con mezzi fisici e chimici unitamente alla cura igienica dell'ambiente si sono dimostrati invece più alla portata di chi tentasse una valida prevenzione in ospedale. Lo schema comunque che si è arrivati a proporre dopo le indagini fatte in ospedali romani, alla fine degli anni ottanta, sembra essere quello più praticabile e quindi più convincente.

Altro fattore difficoltoso s'è dimostrata essere la sistematica ricerca dei portatori di ceppi patogeni (Faraone 1975) a scopo di prevenzione.

L'A. ritiene infine utile il confronto dei dati limite da noi proposti (in tab.2) con quelli più recenti (in tab 3 e 4) presentati dalla **CONTARP** [Consulenza Tecnica Accertamento Rischi e Prevenzione, in collab. con l' INAIL] "Il monitoraggio microbiologico negli ambienti di lavoro. Campionamento e analisi." di **Patrizia Anzidei e Coll.**, Marzo 2005. [Sito: www.inail.it/prevenzionerischio/prodotti/LINEE\\_GUIDA\\_microbiologiche.doc](http://www.inail.it/prevenzionerischio/prodotti/LINEE_GUIDA_microbiologiche.doc)

**TABELLA 3**

(European Collaborative Action, 1993) –

Tipologia di ambiente	( UFC/piastra)
<b>Ambienti ad altissimo rischio (A)</b>	
<i>Ultra clean room, isolamento protettivo, sale operatorie per protesi auricolari, alcune lavorazioni dell'industria elettronica e farmaceutica</i>	5
<b>Ambienti ad alto rischio (B)</b>	
Clean room <u>sale operatorie</u> per chirurgia generale, rianimazione, dialisi, alcune lavorazioni dell'industria elettronica e farmaceutica, laboratori di microbiologia	25
<b>Ambienti a medio rischio (C)</b>	
<u>Ambulatori</u> , laboratori, industrie alimentari, cucine, ristoranti, opifici	50
<b>Ambienti a basso rischio (D)</b>	
<u>Corsie d'ospedali</u> , servizi, uffici	75

**TABELLA 4**

**Limiti dati dalla CONTARP**

**Limiti da noi dati (o riscontrati, valori media)**

**Ambienti ad alto rischio (B)**

25 = 1,965 (arrotond. 1,9)

**0,5 / VAF ° e 0-1 \*** ( < 0,5 sala ; bloc. oper. 0,8 ;  
5,3 labor. microb. )

**Ambienti a medio rischio (C)**

50 = 3,931 (arrotond. 3,9)

**1-2 \*** ( 10,4 ambulatorio )

**Ambienti a basso rischio (D)**

75 = 5,897 (arrotond. 5,9)

**1-2 \*** ( 2-8 loc. osp. esterno al blocco oper. )

## **NOTE alle tabelle 3 e 4 :**

**UFC** = numero di **Unità Formanti Colonia** . (°) vedere la seconda parte della presente relazione dove è descritta la **metodica VAF** .

(\*) vedere i **limiti** che qui si sono consigliati per le CMT nell'aria confinata e **riportati nella tabella 2** , dopo le nostre esperienze. .

**(A)** *Ultra clean room, isolamento protettivo, sale operatorie per protesi auricolari, alcune lavorazioni dell'industria elettronica e farmaceutica*

**(B)** *Clean room sale operatorie per chirurgia generale, rianimazione, dialisi, alcune lavorazioni dell'industria elettronica e farmaceutica, laboratori di microbiologia*

**(C)** *Ambulatori, laboratori, industrie alimentari, cucine, ristoranti, opifici*

**(D)** *Corsie d'ospedali, servizi, uffici*

A (D) l'A. della presente relazione, associerebbe anche i locali di abitazione .

I dati-limite tollerati sono indicati dalla CONTARP nella **tabella 3** . Tali dati sono stati da noi commutati in germi x 1 dm<sup>2</sup> x 1' allo scopo di permettere, un utile confronto con i nostri riportati accanto, in corsivo, nella **tab. 4** .

I nostri dati limite citati nella **tabella 2**, si sono avuti utilizzando piastre del diametro di 90mm, esposte all'aria per 20' anziché 30' come nei test della CONTARP qui riferiti . Di ciò si é tenuto conto per commutare questi ultimi in CMT espresse in germi x 1dm<sup>2</sup> x 1 minuto primo e consentire così un corretto confronto ..

## **CONCLUSIONI**

**L'esposizione si può considerare divisa in tre parti :**

**La prima** verte sugli studi dei germi presenti nell'aria confinata permettendo di vagliare **l'influenza del movimento dell'aria**, nel condizionare la maggiore o minore presenza dei microrganismi in sospensione nel mezzo aereo, a **vari livelli dal suolo**.

Si é inoltre suggerito orientativamente i **limiti** delle **CMT** da consigliare come riferimento per avere un' accettabile condizione igienica ambientale dal punto di vista microbiologico [1germe x 1 dm<sup>2</sup> x 1'] .

**La seconda** ha consentito da indagini da noi condotte **in alcuni nosocomi di Milano e in altri ambienti confinati** :

- di vagliare **l'accuratezza** della sua **pulizia di fondo**(*ventilazione forzata indotta nel locale*) ,
- l'influenza della ventilazione proveniente dall'esterno (**vento**)
- l'influenza prevedibile dell'**affollamento umano** nei locali
- la **differenza** essenziale fra germi più frequenti nell'**aria confinata** in confronto con quanto si verifici nell'**aria esterna**

**La terza** con le indagini da noi condotte **in alcuni nosocomi di Roma** , **ci siamo permessi di suggerire un criterio globale per vagliare le condizioni igieniche** con un indice igienico di riferimento(**indice R**)ricavato dal rapporto fra tutti i risultati microbiologici favorevoli e quelli non favorevoli complessivamente raccolti, pur **in assenza di una normativa** su tali tipi d'indagine

Da quanto fatto se ne ricava un **quadro complessivo** che permette di valutare in modo completo l'influenza della presenza di microrganismi nell'aria di un ambiente confinato , considerando :

- Gli ***spostamenti d'aria*** indotti dall'attività umana.
- I vari ***livelli dal suolo*** interessati.
- L'accuratezza e il ***tipo di pulizia di fondo*** di un locale.



- La differenza fondamentale fra i **gruppi di batteri** più frequenti nell'aria confinata e quelli nell'aria esterna .
- **Il fattore umano** come presenza nei locali.
- L'importanza del **vento**.
- Un possibile **criterio igienico di riferimento** in assenza di una normativa sui limiti delle cariche batteriche, riscontrabili nell'aria confinata .

### SCHEMI RIASSUNTIVI ( gdm, in valori media)

N° PASSI	TCE	MOTO	gdm
Assenti	ass	ass	<b>0,6</b>
10-20	20''-30''	Limitato	<b>1</b>
30-40	80''-90''	Discreto	<b>2</b>
50-60	140''-150''	Marcato	<b>3</b>

INQUINAM. ARIA (CMT) ai vari livelli dal Suolo

mt	0,0	<b>100 %</b>	
	0,5	<b>90</b>	CONTEMPORANEA
	1,0	<b>70</b>	CMT ESTERNA <b>3,7gdm</b>
	2,0	<b>45</b>	
	3,0	<b>35</b>	

Dalla QUIETE (F I) alle fasi di MOTO (II-III-IV) si hanno DATI **2 - 3 - 5** VOLTE MAGGIORI

**Lo stato di contaminaz.iniziale si riacquista dopo 40'-60' circa**

### VAF

CONDIZ.AMBIENTALI: *assenza di moto*  
*finestre non aperte*  
*distanza dalla pulizia di almeno 2 h .*

SALA OPERATORIA	<b>0,5 gdm</b>
BLOCCO OPERAT.	<b>0,8</b>
FUORI BLOCCO OPERAT.	<b>2,8</b>
ABITAZIONI	<b>3,9 gdm</b>
LABOR.ANALISI	<b>5,3</b>
AMBUL.PRELIEVI	<b>10,4</b>

IN UN GIORNO VENTOSO : Blocco Operatorio **4,07 gdm**  
per confronto : 0,60 dopo quiete in fase I del.test .  
prima del test .

0,06 dopo quiete prolungata notturna

## FATTORE "R"

### GIUDIZIO sulle CMT in gdm

0-1 = BUONO

DATI FAVOREVOLI

>1-2 = SUFFICIENTE

.....

>2-3 = SCADENTE

DATI NON FAVOREVOLI

>3 = INSUFFICIENTE

### GIUDIZIO IG. SANITARIO COMPLESSIVO O GIS

RAPPORTO DATI CMT FAVOREVOLI / DATI CMT NON FAVOREVOLI = **FATTORE R**

R = 1-1,5 GIS APPENA SODDISFACENTE

R = 1,6-2 GIS SODDISFACENTE

R = < 1 GIS NON SODDISFACENTE

### **ALCUNI CONFRONTI con ALTRE VALUTAZIONI**

#### **CONTARP / INAIL**

#### **AUTORE Presente Indagine**

SALA OPER. 1,9 val.gdm cons.

1 (0,5 se VF) val.gdm consigliato

LAB.MICROB. 1,9 val. gdm cons.

5,3 valore gdm trovato

AMBUL.PREL. 3,9 val. gdm cons.

10,4 „ „ „

LOC.OSPEDALIERI.

extra blocco op. 6 val.gdm cons.

2 – 8 valori gdm trovati

in blocco oper .

1 – 2 valori gdm consigliati

*IL DLGS 626 /94 suggerisce valori limite solo per monitorare specie patogene .*

*.L'ACGIH (american conference gov.industrial higienists ) dice non prevedibili limiti soglia per contaminanti biologici .*

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**Faraone Piero**

**The hygienic judgment problem of air microbiological pollution in hospital rooms and also in confined air generally, derived from law default to give search methods and fit microbial limits.**

*Relationship of SIRMIONE for April 2007*

**Faraone Piero**, past Medical Director of Rome Hygiene and Profil. Laboratory.

At the end of the years 60, Á. tried to appraise the air moving provoked by walking to sift its influenza on the consequent variations of the number of air bacteria (TCM), in the air of a room. In the supporting structure a copper thread was suspended having at the end a ball of thin rubber as pendulum. This ball oscillating for the air moving produced a contact of copper thread with an iron ring within which it passed, closing in this way, a circuit of 12 volts - direct current.

This current enabled a chronometer that measured in 1/50<sup>th</sup> of 1" (Time of Electric Contact or TCE) the entity of the air moving produced by walking.

The A. premises that in the conducted experiments the value of the TCM (or Total Counted Microbes) was express in germs x 1 dm<sup>2</sup> x 1 minute (or **gdm**). He performed 27 experimental test days from 1967 to 1969, in his study-room of his Institute in Milan( 2 ).

It was noted that the gdm was 0.6, in a well clean place, after a quiet period for 1 hour at least.

The air moving provoked by walking were recorded and express in TCE (Tab. 1).

The TCM were respectively 2, 3 and 5 times more greater than initial TCM of quiet conditions with 0,6 gdm, in passing to phase of limited motion with TCE of 30" about [10-20 steps] , and to discreet motion with TCE of 80-90" [30-40 steps ] and to greater motion with TCE of 140-150" [50 - 60 steps] .

And then, it was necessary successively, a quiet time of [40 – 60] to have again the initial conditions of microbial air pollution before the starting of this test.

Moreover the CMT found at the ground level (~ 1,7 gdm) was falling in comparison of those of several heights considered so that the air microbial pollutions were medially the 90 , 70 , 45 and 35 % of ground level gdm ; they were respectively ~ 1.5 at 0.5m ; ~ 1,2 at 1.0 m and 0.8 at 2.0 m .

To have a comparison during in these test, the TMC of external air was on the same time, in average of 3,7 gdm and that is 3,7 times greater of the sued midrange value as indicative of good hygiene [1,0 gdm, as it's before said].

Later time we performed in a hospital of Milan in 1971 and 1975(4, **5**, **6**) an investigation with induced forced ventilation (VFA) that aimed to put in evidence if the cleaning of the places had been well done.

To such purpose it was used a big held fan that was always perfectly clean and positioned with the crown of rotation [CR] parallel to the ground and 50 cm from the floor in the central area of the place.

The tool was enabled getting an air flux of 8 Km / hr, measured with a wind gauge set to 10 cm by the aforesaid CR.

The place in examination stayed so transformed as a vessel of blender, in which it would have been carried dust and microbes that were escaped the cleaning affected before the experiments through the animate air.

They in average had inferior CMT to 0.5 in the operating room; of 0.8 in other places of the operating block, of 2.8 in the locations out of operating block.

Were controlled also other rooms to establish a comparison with hospital rooms.

The CMTs resulted were medially 3.9 in location of residence; 5.3 in location of a laboratory of analysis and 10.4 in location of a medical ambulatory .The procedures of cleaning of the floors were supposed to do the TCM differences .The A. also ascertained that in a particularly windy day (50-60 Km/hr) (4, **7**) a marked increasing of the CMT was occurred in comparison to the average usually found in the same places of the operating block after finished cleaning and in not opening windows during the test. It resulted overall, in such circumstance, a midrange TCM of 4.07 gdm rather than of 0.61 (and that is 6 - 7 times greater).

At the end the A. could conclude that the microbial pollution of the air of a place confined have the characteristics of the outdoor air bacteria if this prevails with his influence on typical bacteria of the confined place where the micrococcaceae usually were frequent for the man presence. In the external air these microbes resulted instead less frequent (3).

**The A. had the personal intuition in his experiments on the end of '60 years (3) to assemble the germs of the air, in several Groups that it here will go to point out:**

- The **sporigenes** (to es.; the bacillaceaes) they prevail in the common dust of the road endowed as they are also the spores of tall resistance in presence l/you/he/she condition us of difficulty survivorship. You commonly introduce in the outdoor air they prevail in the cold seasons and and in general in the windy days.

- The **cromogenes** are typical to give coloured colonies (es.: the psudomonadaceaes). It is commonly a mix of present germs in the air and presents in kind in the vegetable environment that you/they are seen to prevail to the debut of the good season with the seasonal variations and to decrease in that colder. They are not endowed with particular resistance as you/he/she is said some sporigenis.

- The **mycetes** (ifomycetes) they are constantly enough present in the air and they prevail during autumn (in conditions of particular humidity and temperature). Offspring endowed with forms of resistance to the outdoor environment, superior to that of the cromogenis and assimilable to that of the sporigenis.

- The **micrococcaceae** (es.: the staphylococcus, less frequent aureo), sono variedly in the air outdoor presence excepted of human overcrowdings (upsurge of the droplets of Fluegge).

– The **Remaining microorganisms** that are not present in previous groups before said.

The A. classifying as said before the air micro organisms, simplifying his study at the top without losing himself in too many details, to sift in essential lines his research.

The A. finally arrived to do some experiences in 1987 in some Roman hospitals (10). In these experiments realized several test as more practical address for the sanitary hygienic assessment of the confined air. This, in deficiency of actual sanitary legislation, Cultural Petri plates of 90 mms were exposed to the confined air for 20' and at 1 meter from the ground level. From the results the following practical suggestion could be drawn in this table 1:

1) TCM of 0-1 gdm	judgment good	(that is favorable)
2) TCM > 1-2 „	judg. good with reserve	( „ „ „ ) (*)
3) TCM > 2-3 „	judg. not so bad	(that is not favorable)
4) TCM > 3 „	„ „ „	( „ „ „ „ )

Considering an **R index**, drawn by the relationship among every favourable data and not favourable is possible to arrive generally to a convincing overhead judgment of the results in a whole hospital or in someone of his part.

**If R index was > 1 the trailing judgment was or scarcely satisfactory (1-1,5) or satisfactory (1,6-2).**

**If instead R were <1, the trailing judgment was not satisfactory.**

**Generally it would be advisable for a place of 50 mc, to do at least about ten specimens in following days and after an accurate initial cleaning, considering that to re-establish the calm after an activity of job, quite a lot minutes are needed (40'-60'). But it would be more opportune also that the cleaning should be done some hour before to make more sure stable air-conditions before the air pollution samplings.**

**(\*)** The data-limes in this area need much more further samplings .

The limit of tolerance of the air TCM, in base to our investigations, it should be reckoned with greater demand, in some locations where the health hazard is greater so as it may be in an operating room.

The values of <0,5 gdm after a forced ventilation and of <1 gdm in state of peace immediately before the beginning of the activity of job, are shown as attainable limits and therefore advisable for the A.

During the operating activity it is easily seen instead to overcome the optimal limit of 1gdm of TCM that was mentioned to the beginning, obtainable in confined environments of other dedication (i.e.: personal residences and offices) opportunely cleansed and also in presence of limited motion (2).

Such limit in fact it is hardly attainable (**5, 6, 8, 9**) without a discipline of the movements (i.e.: avoiding those ineffectual), of the number of the people (the overcrowding) and of the behaviour (as to shout or worse and in the particular cases to sneeze and to cough).

The human factor is seen how is the most tiresome to be regulated adequately for an effective hospital prevention.

The cleaning, the disinfection of the floors and the surfaces with physicists and/or chemists means to the right hygienic care of the environment, they are shown instead more easy to be realized.

Other difficult factor is also shown in the systematic search of the pathogenic microbes carriers (**8, 9**).

The scheme however that A. has come to propose after the experiences in the Roman hospitals, at the end of the eighties, is seemed to be convincing.

To every way it holds here him to remember the limits suggested by a publication realized by the CONTARP in collaborating with INAIL, through the specialists in working hygiene, Anzidei P, Giovinazzo R., Venanzetti F. and Coll. ("*Microbial sampling in work locations*", 2005, [www.inail.it/prevenzionerischio/prodotti/LINEE\\_GUIDA\\_microbiologiche.doc](http://www.inail.it/prevenzionerischio/prodotti/LINEE_GUIDA_microbiologiche.doc) ).

The data from them diffused have been here commuted in germs x 1 dm<sup>2</sup> x 1' or gdm. This was possible knowing the difference of the time of exposure of Petri cultural plates (30') from them used in comparing with us (20') .

CONTARP gave 1.9 gdm as a threshold in the operating rooms, where we advised a threshold of 1 gdm or 0.5 gdm after artificially forced ventilation or AFV.

From them it was anticipated a limit of 1.9gdm in the lab. of microbiology and we found a value in average of 5.3 gdm.

They advised a threshold of 3,9gdm in the clinic ambulatory where we found values of 10.4 gdm.

From CONTARP expectation a limit as tolerable was ~ 6 gdm. In hospital locations generally that does not belong to an operating block.

We had found values from 2 to 8 gdm in these types of locations but we advised limits from 1 to 2 gdm in the locations of the operating block particularly.

We can conclude that a clear comparison seems not always possible.

Without considering the ig. sanitary judgments suggested by A. with index R, stay not entirely comparable with the data brought by Anzidei and Coll..

It is always correct to remember that it is important to appraise the possible presence of types of pathogen in the pollution from the bacteria of human origin and animal.

In the air confined is fundamentally important the purpose to appraise the efficiency of the exchanges of air (lavage of the spoiled air) both that this does it with air opportunely filtered both that this does it in opening the windows but to have obviously only clean air.

It misses unfortunately still, a legislation that gives the criterions to have an Ig. Sanitary Judgment to appraise the microbial pollution of the air.

This is a problem that still stays critical, especially for the hospitals and for all the places where overcrowding of people is possible (1).

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**Faraone Piero**

## **BIO-Quantum PHYSICS:**

### **" 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](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](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](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.

#### **Article:**

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 an 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 conduct 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 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. 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

The DNA-Antenna have some similarity with the The “Casimir Effect” of Energy production from the Zero Point in quantum mechanics. Paul Dirac predicts that invisible particles in QUANTUM-MECHANICS could become materialized for a short time and that these virtual particle appearances should exert a force that is measurable. Therefore Hendrik Casimir (*Phys. Rev.* 73, 360, 1948) predicts and after was verified using non-conductive plates, the production of positive forces, generates by activity in the vacuum . This effect is very powerful at small distances.

In similar way the "**Gene-Ons**" model, where the biological energy are 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. (see: [http://www.edscuola.it/archivio/lre/dna\\_come\\_antenna\\_biologica.htm](http://www.edscuola.it/archivio/lre/dna_come_antenna_biologica.htm))

### **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-evolutionary character existing between genes and proteins that permits the best folding 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 it is necessary to open the DNA ,and 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 the “information”, this 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, 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 Greek scientist by the “*Eidola*” e.g a pure qualitative image or symbolic simulacra 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 terms of the antique scientific & humanistic integrated conceptualization , about the existence an intermediate hidden level based on a qualitative matrix of codex transformation that becomes 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 complementarity belongs 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" 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 an 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 resonant tunnelling in “**.ons**” particles , e.g . the effective energy forms (able to do work), collapsed from 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 watching-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 this because into a fixed space/time Euclidean diagrams, where the time has a linear dimension of successive arbitrary timing instants arbitrarily it is forbidden any possible time’s simultaneity. Viceversa “simultaneity” for spreading over the entire cell the Gene-signals, is no more in contrast in the context of a crucial innovation of a Virtual representation 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 caused by quantum fluctuation 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 ( $s_1t_1 + s_2t_2$ ), 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 the tunnelling effect can be 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 of the mind, 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 the knowledge about contribution of the catalysis to the transformation path, can be only obtained through some experimental data.

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](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](http://www.edscuola.it/archivio/lre/chemical_bases.htm). Differently from my colleagues I think that to build up 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 therefore the effect of the catalyst activity it is the observable changes of the rate 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 Energy. 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 , i.e. otherwise all the reactions would not be able 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. *Neurological cognitive sciences, today 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>). In true the fundamental bases of the unity of science are familiar in Aristotle (340 BC) in fact he said : "Metaphysics is universal and is exclusively concerned with primary substance". Definitely we need to keep in mind 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. Otherwise we believe that the highly structured information activities directed by the evolution catalytic adaptive exchanges among the triadic interaction of Information, free-Energy and Matter generates a system that gradually produces macroscopic mutations that will be considered as caused by 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. For instance utilizing an electronic image, the two not Euclidean (s1t1+s2t2) and Euclidean (s1s2s3,t) structured worlds, can be seen as two asymmetrical Space-Time circuits, working as a parallel system , 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 fluctuations the wave/particles to the Euclidean circuit where can be originated the observable “... ons”.

To accept this model of an exchange between “*virtual and objective reality*” we need to choose a solution in order to escape from the following dilemma:

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

Therefore for this challenging dilemma 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 imply:

**“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:

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

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

- *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 advance 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>*

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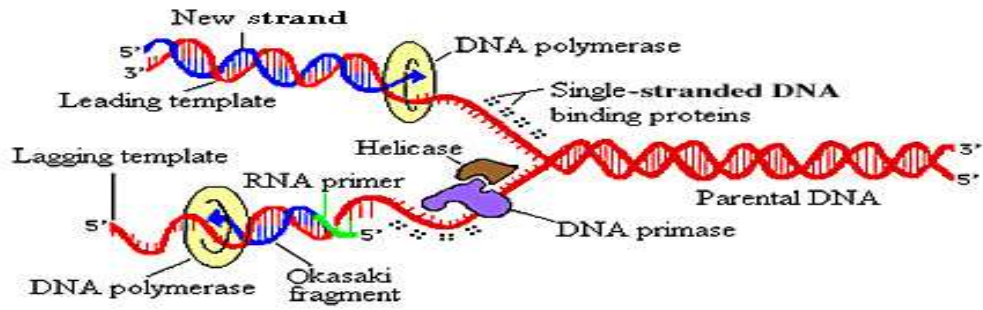
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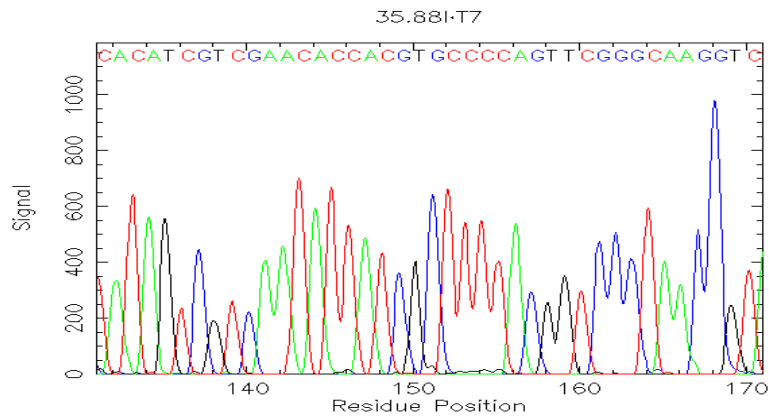
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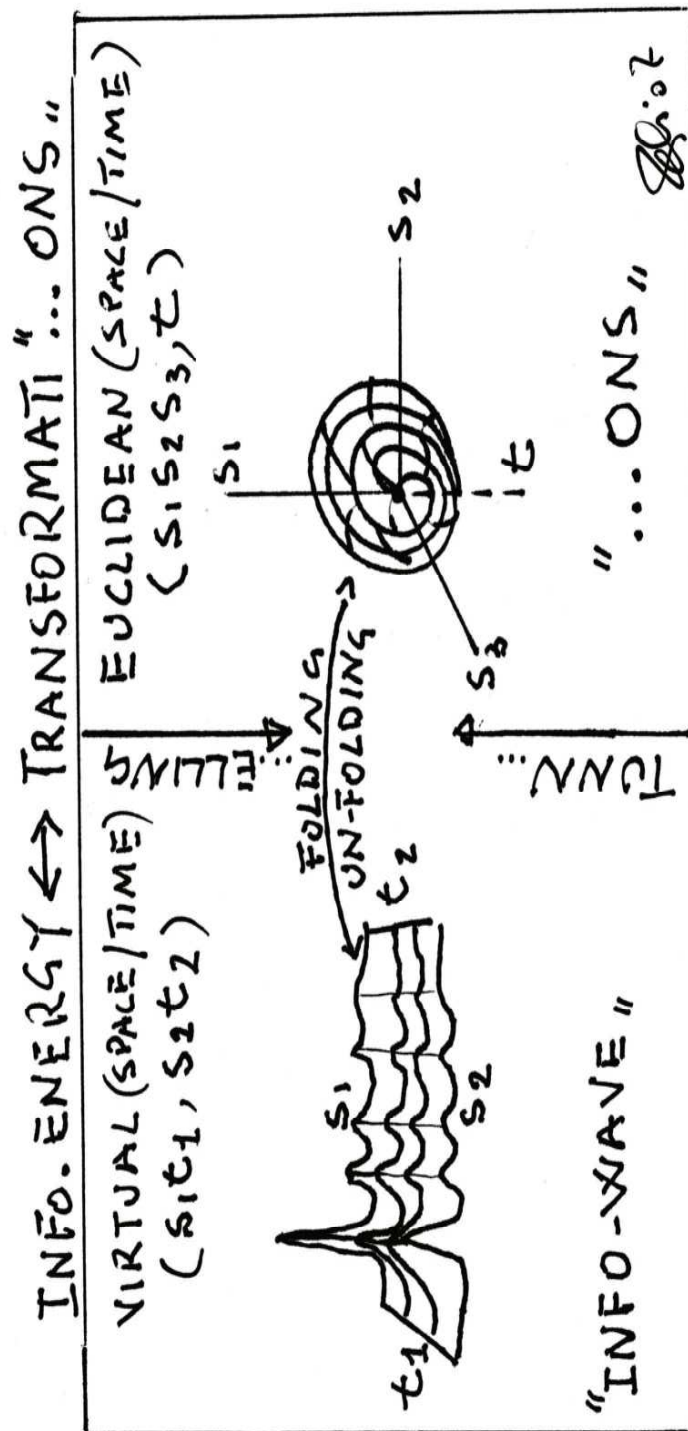


## Collaboration of Proteins at the Replication Fork



**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 a hyperflat space time where the variation of Space (w.s) = konstant at infinitum as the variation of time (w.t) = konstant . Therefore the race w.s / w.t is ZERO at any time so that the simultaneity is a property of the virtual hyperflat biimensional space and time.

For other transdisciplinary Conceptual references see - Bi-dimensional Time In art and Science : the existence of a bidimensional time is not a new idea; artists such as Cubists were inspired by intuition of non-Euclidean space and created pictures of modern art anticipating alternative perceptions of space-time.

- See: [http://www.edscuola.it/archivio/lre/tempo\\_bidimensionale.htm](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.

# Some Summaries to Remarking

*“ Effects of pulsed Magnetic Fields of Low Intensity on Biological Systems & Basic Research on this Phenomenon . . , Magnets , vol.6, n.4, 4-13, 1992,*

**Kokoschinegg P.(1), Fischer G.(2) .**

- (1) Institute for Biophysics and Ray Research , Henndorf / Salzburg , Austria .
- (2) Department of Medical Bioclimatology, Hygiene Institute of the University of Graz , Austria.

Growth experiments with plants showed, that the growth of the plants could be remarkably influenced by an interaction of a static magnetic field only on the watering water. Water is influenced by the magnetic field in a persistent way . This is only thinkable, if one assumes that in the water are existing supra regional structures of order, which are obtaining an information potential. The same was also proved by high frequency , high voltage photographs on fluids, which showed more criteria of order in high structure fluids as symmetry and sharpness of the lines .

The present investigations showed in a clear way, that magnetic fields with an induction of several hundred nT till micron T are causing biological effects. The level of effect in humans could be the basic vegetative systems, as it is described by Pischiger. Fluids in biological systems are representing active feedback control systems, which are able to react to magnetic fields .

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*“ Effects of Weak 16 2/3 Hz Magnetic Fields on Growth Parameters of Young Sunflower and Wheat Seedlings. . , Bioelectromagnetics 25: 638-641, 2004 .*

**Fischer G.(1), Tausz M.(2), Koch M.(1), Grill D.(3) .**

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- (2) Forest Science Centre, Dep.of Sustainability and Environment & University of Melbourne, Creswick, Victoria, Australia
- (3) Institut fur Pflanzenwissenschaften, Karl-Franzens Unvers. Graz , Graz , Austria.

Previous studies on effects of magnetic fields on plants focussed on the power frequencies (50-60 Hz), but in Austria and Germany electric railways are powered by a frequency of 162/3 Hz . In the present study , sunflower and wheat seedlings were exposed to 162/3 Hz sinusoidal 20 microT(rms) vertical magnetic fields. Seeds were germinated in a germination roll and grown for 12 days under continued exposure. Seven series with sunflower and six series with wheat were done over 2 years.

Sunflowers seedlings exposed to experimental magnetic field showed small, but significant increases in total fresh weights, shoot fresh weights, and root fresh weights, whereas dry weights and germination rates remained unaffected. Experimentally treated wheat exhibited marginally(but significantly) higher root fresh and dry weights, total fresh weights, and higher germination rates .

**“ Adjuvante Behandlung der Gonarthrose mit schwachen pulsierenden Magnetfeldern. Ergebnisse einer prospektiven, plazebo-kontrollierten vergleichenden Therapiestudie ., Z Orthop. 143: 544-550, 2005 .**  
**( Adjuvant Treatment of Osteo Arthritis of the knee with Weak Pulsing Magnetic Fields. Resuls of a Prospective. Placebo Controlled Trial )**

**Fischer G.(1), Pelka R.B.(2), Barovic J.(3) .**

- (1) Institut fur Hygiene an der Univers. Graz , Osterreich .
- (2) Abteilung fur Andewandte Statistik, Univers. der Bundeswehr Munchen .
- (3) Abteilung fur Physiotherapie Allgemeines Krankenhaus Marburg, Drau, Slowenien .

**Purpose** : The aim of this study was ther objective control of the therapeutic effect of weak pulsing magnetic fields ( series of periodically repeating square pulses increasing according to an e-function, frequencies of 10, 20, 30, and 200-300 Hz ) by means of a double-blind study on osteoarthritis of the knee . Measured parameters were the Knee Society score, pain sensation, blood count and cardiocirculatory values . **Methods** : 36 placebo and 35 verum test persons ( all with a knee gap smaller than 3 mm ) were exposed daily for 16 minutes over 6 weeks to a low frequency magnetic fielf ( flux densities increasing gradually from 3,4 up to 13,6 microT ) encompassing the whole body. The last data collection was made 4 weeks after the end of treatment. **Results** : Principally, the statistically ensured results exclusively favour the used magnetic field therapy ; by far the greatest number of at least significant differences was found at the end of the whole treatment, lasting 6 weeks. In particular, it is striking that all 4 questioned pain scales showed at least significant improvements in favour of the verum collective; also the walking distance was increased. As another confirmed fact, even after 4 weeks without therapy the persistence of several functional and analgesic effect could be documented. **Conclusions** : Predominantly, on the one hand, pain relief in osteoarthritis patients was confirmed by a double-blind trial, on the other hand, increases in mobility could be proved. Furthermore, we describe mainly the modes of action of low frequency magnetic energy and 3 physical concepts that are seen as the connecting link between electromagnetic fields coupled into connective tissue and biochemical repair and growth processes in bones and cartilage. Proceeding from the results of this and preceding studies, one has to consider seriously whether this kind of magnetic field application should not be employed as cost-effective and side effect-free alternative or adjuvant form of therapy in the field of orthopaedic disorders .

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***Il prof. Fischer Gerard , docente all' Institut fur Hygiene an der Univers. Graz , Osterreich , autore delle ricerche delle quali qui se ne sono menzionati alcune sintesi , é intervenuto con una sua interessante comunicazione al Convegno di Sirmione del 21 aprile 2007, sulle acque termali e le sue terapie. Iniziativa promossa dall'International Academy of Sciences di Milano attraverso la guida del suo Rettore prof. Roberto Gualtierotti .***

***Fischer ha descritto le sue esperienze sull'influenza benefica esercitata dai campi magnetici su forme infiammatorie in genere, su quelle artritiche in particolare e su aspetti interessanti di tali applicazioni che si sono evidenziati i durante la sua lunga sperimentazione nelle cure della salute umana.***

***L'A. é entrato nel dettaglio nel descrivere i metodi seguiti nel praticare le terapie utilizzando i campi magnetici, dandone esauriente interpretazione scientifica.***

***E' un'esperienza interessante la sua che merita di essere estesa nel campo delle terapie utilizzate per giovare alla salute umana in varie forme patologiche quali ad esempio le forme di natura artritica ma anche per scoprirne altre vantaggiose applicazioni che lo stesso Fischer ha in parte accennato .***

**Faraone dr. Piero, Medico Igienista Microbiologo, Vice Presidente del CIFA, già Direttore Medico del Lab.Prov.d'Igiene e Prof. Di Roma, nonchè Membro dell'International Academy of Milano**

## ECOSUD 2007

**Sixth International Conference on Ecosystems and Sustainable Development**  
**5 - 7 September, 2007, Coimbra, Portugal .**

**Organised by:** Wessex Institute of Technology, UK ; The University of Coimbra, Portugal ; The University of Siena, Italy

**In Collaboration with:** The International Journal of Ecodynamics

**Sponsored by:** WIT Transactions on Ecology and the Environment

**Incorporating the:** [Prigogine Awards 2007](#)

The aim of the Conference is to encourage and facilitate the interdisciplinary communication between scientists, engineers and professionals working in ecological systems and sustainable development. Emphasis will be given to those areas that will most benefit from the application of scientific methods for sustainable development, including the conservation of natural systems around the world. The Conference objectives have evolved over the years, seeking to integrate thermodynamics, ecology and economics into "ecodynamics".



### III International Conference

**COSMOS AND BIOSPHERE: Cosmic Weather and Biological Process**  
**1 - 6 October, Sudak, Crimea, Ukraine**

[http://www.science-center.net/cbc/index\\_e.php?&i=0&n=0\\_e](http://www.science-center.net/cbc/index_e.php?&i=0&n=0_e)

## Organizers

- International Committee for Research and Study of Environmental Factors (CIFA)
- Ukrainian Biophysical Society
- Taras Shevchenko National University of Kiev
- Vladimir Vernadsky Taurida National University
- Crimean Scientific Center of National Academy of Science of Ukraine and Ministry of Education and Science of Ukraine
- Crimean Astrophysical Observatory
- Moscow State M.V. Lomonosov University
- Space Research Institute of NAS of Ukraine
- Biometeorology and Space Medicine Institute of Libera Università Degli Studi Di Scienze Umane e Tecnologiche di Lugano (CH)

## General Aim of Conference

The Conference will be devoted to the 100-anniversary from birthday of the founder of heliobiology A.L. Chizhevsky. The general aim of conference is the integration of interdisciplinary efforts of investigators from different countries to study of the mechanisms of influence of cosmic weather upon ecological, medico-biological and physical-chemical processes.

**Conference of the International Institute of Refrigeration (IIR) in  
cooperation with Aériat**

***New Ventures  
in Freeze-Drying***

**November 8-9, 2007**

**STRASBOURG (France)**

**Main Themes for the conference**

- Basic understanding of formulation, low-temperature behaviour of solutions and alternatives to bulking agents for highly diluted systems.
- Equipment monitoring and automation.
- Use of solvents and co-solvents.
- Development of continuous processes for parenteral products and their potential coupling with a final in-line sterilization step by irradiation.
- Structure and physical properties of Freeze-Dried Products (Microscopy, BET)
- Is Process Analytical Technology (P.A.T.) compatible with a multi-step operation such as Lyophilization?
- Prospects and potential Developments in Freeze-Drying.

**If you intend to present a communication, we should receive your abstract as soon as possible.**

**Key-Note and Position Papers**

**M. GALAN** – *Innovation and R and D Director – IMA TELSTAR – Terrassa – Spain*  
***Monitoring and control Equipment for industrial freeze-drying of delicate products.***

**T. JALANTI** – *Director MICROSCAN Services – Lausanne – Switzerland*  
***Structure and ultra-structure of freeze-dried products.***

**P. MATEJTSCHUK** - *Principal Scientist, Standardisation Science, National Institute for Biological Standards & Control (NIBSC) – London – United Kingdom*  
***The application of analytical methods and model systems in the lyophilization of complex biomolecules.***

**J.C MAY** – *Former head of F.D.A, C.B.E.R., Analytical Chemistry – Rockville - USA*  
***Role and Determination of Residual Moisture in Freeze-Dried Injectable Biological Products***

**L. REY** – *Scientific Adviser – Aériat – Illkirch – France*  
***Leading edge prospects in freeze-drying.***

**D. TEAGARDEN** - *Research Fellow - Pharmaceutical Sciences - Global Biologics - Pfizer, Inc. - USA*

*Practical aspects of freeze-drying of pharmaceutical and biological products using non-aqueous co-solvent systems*

**D.Q. WANG** - *Dept. Head of Formulation, Freeze-drying and Drug Delivery - Global CMC Development Biologicals - Bayer Pharmaceuticals - USA*

*Quality by design in freeze-drying process development for biopharmaceuticals.*

**F. KUNTZ** – *Project Manager – Aérial – Illkirch – France*

*Freeze Drying and Irradiation: promising techniques for the preparation of sterile parenterals*

## Registration Fees

**Before 15 September 2007**

550 euros

**After 15 September 2007**

700 euros

Tabletop Displays: please contact us

**Please Note:**

Payment includes VAT and should be made in euros.

**Fees include**

Conference programme, list of delegates

Lunch and coffee/tea breaks on 8 – 9 November

Summaries of presentations

The conference reception and dinner

## Event Language

Both presentations and discussion will take place in English

## How to register

Register on-line via our website: [www.aerial-crt.com](http://www.aerial-crt.com)

**Do not miss it – see you in Strasbourg!**

For Organizing Committee

Rachel GROUBET, PhD - Aérial

# News from Cifa

**The general aim of CIFA** is to organize, on international scale, interdisciplinary cooperation in the research and scientific investigation of environmental factors responsible for fluctuating phenomena in exact, natural and human sciences. In this connection CIFA is especially concerned with the development of research work putting in evidence, and possibly identifying, all factors directly or indirectly involved in fluctuating phenomena, and the systems sensitive to them. This will concern as well as applied research.

**CIFA**\* est la **siegle social** du Comité International de Recherche et d'étude de Facteurs de l'Ambiance). In english is **ICEF** : International Committee for research and study of Environmental Factors.

**The committee is a non-profit organization.**

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