

TRANSCULTURAL PERSPECTIVE ON CONSCIOUSNESS: A BRIDGE BETWEEN ANTHROPOLOGY, MEDICINE AND PHYSICS

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(With the collaboration of Giuseppe Vitiello, Mario Simoes and Jorge Martines)

ABSTRACT: The Unesco Chair “Anthropology of Health, biosphere and Healing System” inside the University of Genoa (IT) is a unique experience inside the University of Genoa that stems from a cultural necessity to fill and a wealth of knowledge to preserve health, environment and treatment strategies considered strictly connected in modern medicine. This new, integrated approach contradicts and overcomes the traditional separation between humanities and scientific medicine and treatments. Health and approach to treatment strategies are not uniform around the worlds; the universal baseline is quality assurance of investigation in science

The need to establish connections between Medicine, especially in the therapeutic aspect (healing), and all the information already obtained from the mind-matter phenomenology has led to much experimentation and theorizing in this border and transcultural area.

The research group formed by anthropologist who have studied altered states of consciousness in different cultures, medical doctors, quantum physicists and molecular biologists will try to define a transcultural perspective on consciousness merging anthropology, medicine and physics.

In particular, the research field site is located in Mayantuyacu, a traditional healing center located in the Peruvian Amazon where the ancient art of *ashanika* healing is set.

Mayantuyacu is situated on the bank of a river with thermal water at 100 ° flowing in the middle of the forest. Around the central Maloca, where is the common life, were built to accommodate malocas other people who come to Mayantuyacu to know and to seek treatment from knowing millennial *ashanika* and properties of thousands of plants including plants teacher.

The following elements were firstly analyzed and considered the bridge from a traditional healing system to a new paradigm in medicine:

1. music called *icaros*,
2. master plants like *ayahuasca* involved during the healing ceremonies.

KEYWORDS: Ethnomedicine; Teaching plants; Electromagnetic energy; Consciousness

The Unesco Chair “Anthropology of Health, biosphere and Healing System” inside the University of Genoa (IT) is a unique experience inside the University of Genoa that stems from a cultural necessity to fill and a wealth of knowledge to preserve health, environment and treatment strategies considered strictly connected in modern medicine. This new, integrated approach contradicts and overcomes the traditional separation between humanities and scientific medicine and treatments. Health and approach to treatment strategies are not uniform around the worlds; the universal baseline is quality assurance of investigation in science.

The Unesco Chair is strictly connected with the *Ethnomedicine Scarpa Museum* located in Genoa. Its collection, which includes over 1500 artefacts collected worldwide over 50 years of field research, is of matchless value in the field of Health Studies. Several researchers from different cultural backgrounds have investigated together the geographical diversity of instruments exhibited in the collection and the related armamentarium of treatment. The Museum owns a unique collection of objects originating from over 100 human groups portraying different medical traditions of the world. The Museum’s approach to the various types of Traditional Medicine implies a highly relevant reading of the sanitary, anthropological, social and ecologic problems connected to human health and environment.

In this research context, we know that every human population, in every age, through his own particular culture, builds a representation of the world, resulting therefore in particular constructions of the body and therefore of health and disease.

The medical-anthropological and ethnomedical researches have shown that, contrary to what happens in biomedicine, cultural definitions of the disease in other populations are characterized by the non-independence of the imbalances of health in relation other dominions of social reality as the family organization, political relations between groups and environmental interactions.

In the western world the technological approach to care has separated the disease from the rest of one's life, making it an entirely separate chapter. This situation is often justified by the need to isolate the object of scientific study to better understand how it works. But it is a surreptitious confusion between the theoretical isolation of the object (essential not only in medicine or science, but in the construction of any model of the world) and the isolation of a real object. The patient does not live his illness as an exemplum of the scientific object, but as a real complex social situation. And by its very nature, medicine is a matter of relationship: it arises from the interaction between a technical-professional, varied from culture's own doctor, whose task is to bypass the secular culture that permeates the judgment, and attitudes of patient.

The most recent studies around the "non-biological determinants of disease", reproduce models and patterns of care study of biomedicine closer together with other medical knowledge for a long time kept a distance from opinionated Western science.

The same applies to the most recent developments in ethnopharmacology that bring us closer to therapeutic practices that we believed distant in time and space.

The history of *Homo sapiens sapiens* "*sub-species medicinae*" has not finished to give us interesting surprises. We know that right from the most distant prehistoric, healing sites were identified for a particular energy and environmental shape. The sensitivity towards nature, plants, rocks, exposure to light or in the dark of night shelters, areas of plant growth, are a crucial aspects in the identification and selection of suitable *topos* for healing. The site has always been a part of the therapy.

Somehow the emergence of modern medicine and the indifferent localization of the sites linked to care therapies and the undifferentiated urbanization, has in fact neglected, apart from a few isolated cases, this aspect of the cultures of health.

In this historical moment in which researchers from western medicine and indigenous representatives of ethnomedicine are trying to create a bridge between past and the future of medical science exchanging knowledge and experiences, there is perhaps space to bring greater awareness to the relationship between care, environment and traditional knowledge.

An example of this collaboration emerges from a new perspective of one of the most debated subject in modern science: consciousness.

Science, and especially Medical Anthropology, Neuroscience and the Physics of Consciousness progresses, tools and new understanding have been developed that will allow for the transfer of much of that basic science into clinical practice.

This transfer doesn't only concern the clinical practice exclusively with mental disease but also the regular clinical practice where a person or a patient, using his, or her mind, can influence the progression of disease, becoming what one could rightly call a therapeutic partner.

This is an old issue in different cultures that uses different "states of consciousness" to foster the healing process.

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1. ICAROS

Oscillation and synchronization of multiple oscillators is a fascinating manifestation of self-organization in the Universe. There is now recent and compelling evidence that celestial mechanics is mirrored in molecular biology. Coupling of oscillatory patterns, and their synchronization into a Rhythm is emerging as the underpinning of essential processes of life. Until recently, the standard view has conceived the mammalian circadian clock as a kind of orchestrator located at the level of suprachiasmatic nuclei and spreading through the living organism.

Ethnomedicine, the study of the traditional or ancestral medicine of the various populations of the world, deals with a space-time vision of the preventive, hygienic and curative procedures, whether they tend towards the more magic-religious or the merely empirical. In all traditional healing systems belonging to different cultures the Sounds are part of each traditional healing systems: mantras in the Eastern world, *icaros* in the Amazonian ethnic medicine, prayers in western world.

PHYSICAL ENERGY FOR THE HEALING OF DISEASED ORGANS: A NEW PARADIGM IN REGENERATIVE MEDICINE AND REVERSION OF CELLULAR AGEING

Chronic degenerative diseases, including cardiovascular diseases, represent a major health problem in modern society, where they occur as widespread diseases within the context of diabetes, obesity, and atherosclerosis.

Although stem cells hold remarkable promise for handling multiple disorders, these cells are currently isolated from the donor tissues by methods that require the use of enzymes and separative centrifugations. Moreover, to obtain sufficient cell yield prior to transplantation, stem cells are usually “expanded” (cultured) *in vitro* for multiple passages, in an environment that is remarkably different from that experienced in both healthy and diseased tissues. From a regulatory standpoint, these cells are “subjected to extensive manipulation” and, according to the worldwide established rules by both the European Medicines Agency (EMA) and the Food and Drug Administration (FDA), they are considered as Advanced Therapy Medicinal Products (ATMPs). Accordingly, the chance of translation into clinical settings is remarkably delayed due to requirement for compliance with cumbersome “cell manufacturing” in observation of the current Good Manufacturing Practice (cGMP) Guidelines.

Nonetheless, it is now increasingly becoming evident that the human body harbors multipotent stem cells within different “niches”, including the bone marrow, dental pulp, and adipose tissue. Moreover, resident stem cells with various grading of potentiality can be virtually found in any adult organ. These findings raise the larger question as to whether the chance for effective cell therapy should be more closely related to the efforts of promoting the endogenous tissue healing ability by resident stem cells, rather than relying on stem cell transplantation.

For decades Scientists have attempted to drive stem cell fate through the use of chemistry. We have shown for the first time the possibility to use a physical energy to drive stem cell growth and differentiation. To this end, we found that extremely low frequency magnetic fields (ELF-MF) were able to afford a high yield of stem cell differentiation into myocardial cells (1,2).

More recently, we discovered that extremely low-intensity electromagnetic energy could be delivered to cultured cells with a Radio Electric Asymmetric Conveyor, an innovative device delivering radio electric asymmetrically conveyed fields (REACF) of 2.4 GHz with its conveyor electrodes immersed into the culture medium (3,4). The REAC technology was originally designed to convey asymmetrically the radio electric currents resulting from the interaction between the weak electromagnetic field produced by the instrument (5,6), with a radiated power of about 2 mW, and the

electromagnetic field generated by the human body, with a radiated power of about 54 mW (7). REAC exposure of human subjects has been previously proven to be efficacious in ameliorating stress-related depression and anxiety (8-12), and promoting the repair of surgical wounds (13) and injury (14).

Exposure of cultured mouse embryonic stem cells to REACF was found to afford expression of pluripotentiality and high-throughput of commitment towards myocardial, neuronal and skeletal muscle differentiation (3,4). Similar results are now available in human mesenchymal stem cells (15).

Very recently, we succeeded in the use of REAC-REACF to achieve a direct reprogramming of human dermal skin fibroblasts into cardiac, neuronal and skeletal muscle lineages (16). For the first time, human non-stem somatic adult cells were reprogrammed to a pluripotent state without being “frozen” in such intermediate condition, but rather being rapidly committed to a high-yield of fates that have long been pursued as major target lineages in Regenerative Medicine. These results were achieved without the use of potentially risky viral vector-mediated gene delivery, and without the needs of cumbersome and expensive chemistry (16). Moreover, this strategy avoided the persistence of stray cells that haven’t fully differentiated and might have the ability to turn into an unwanted cell type, like a tumor or a cell that just doesn’t fulfill the desired requirement(s) for a targeted tissue repair (16).

Recent evidence suggests that ageing-related diseases could result in an accelerated loss of self-renewal capability of adult stem cells, normally involved in replacing damaged cellular elements. We demonstrated that REAC was also effective in counteracting the expression of the senescence marker beta-galactosidase, and was effective in preserving the normal cellular morphology in human adipose-derived mesenchymal stem cells for many passages in culture (17). Moreover, we found that REAC exposure elicited a significant downregulation in the expression of the senescence mediator genes p16INK4, ARF, p53 and p21^{CIP1} (18). Differently from untreated cells, REAC treated hASCs maintained their typical fibroblast-like morphology and exhibited a multilineage potential even at late passages, as shown by the remarkable preservation of commitment to osteogenic, adipogenic, chondrogenic, and vasculogenic fates, both at morphologic and gene expression levels (18). These findings prompt the hypothesis that electromagnetic energy may be exploited to antagonize *in vivo* senescence of tissue-resident or transplanted stem cells playing an important role in clinical treatment of age-related processes.

On the whole, the above reported findings clearly show the feasibility of using physical energy to resume (stem) cell pluripotentiality and pave the way to innovative strategies for the Regenerative Medicine.

2. MASTER PLANTS

Recently studies in the literature have shown that the research on a single neuron is not sufficient to explain all phenomena of the brain and provide a complete model for consciousness. Penrose and Hameroff have proposed a theoretical model in which consciousness emerges from biophysical processes acting at the subcellular level and involving the structures of the cytoskeleton. Consciousness is attributed to quantum and computation of cytoskeleton proteins organized in a network of microtubules inside neurons. It has been shown that the use of certain plants typical of different Traditional Medical Systems activates the protein network of the cytoskeleton with the achievement of “different states” of consciousness. Psychotropic substances inside these plants interact with human neurotransmitters activating biochemical pathways that may cause changes at different levels like cognitive, emotional, mind-body interaction. This create an interaction between the biochemical networks of the plant and the human one allowing the possibility to have a “communication” inter-kingdom.

According to recent researches a vegetable neurons may serve as a model to test therapies against degenerative disease of the nervous system, however, being a more simplified version of those human.

This project aims:

- to study the Master Plants from a Ethno medical point of view considering the medical plants properties
- to study the properties of Master Plants like intelligence and reactivity to different stimuli in the prof. Mancuso laboratory focused on Plants neurobiology: www.linv.org;
- to understand the Master Plants ability to produce non-ordinary states of consciuosness in humans as a starting point to understand consciousness, neurodegenerative disease and other disorders of the nervous system. The study will evaluate the subjects' mood states and electroencephalography (EEG) recordings in the pre-, during- and post treatment, mapping out the brain areas involved in subjects who took the master plant with fMRI as compared with control conditions;
- to develop development of new clinical research protocols and new drugs obtained from plants of traditional medicine;
- to suppose as in the traditional healing systems that a continuous diet with these plants.

The project aims to promote a long-term study on consciousness starting from the idea of expanded states of consciousness induced by teacher plant. The project will involve a high level multidisciplinary team. The project aims to create knowledge for the understanding of consciousness, neurodegenerative diseases and other disorders of the nervous system and for the development of new clinical research protocols and new drugs obtained from plants belonging to traditional healing systems.

The study of "connettoma" of the the brain or the cytoarchitecture of this organ helps to simulate and to shed light on the shortcomings of the network, the cause of many mental illnesses paving the way for new drug targets, so as to attack the disease from a structural point of view.

RESEARCH PLAN AND METHODS

Recently studies in the literature have shown that the research on a single neuron is not sufficient to explain all phenomena of the brain and provide a complete model for consciousness.

Roger Penrose and Stuart Hameroff have proposed a theoretical model in which consciousness emerges from biophysical processes acting at the subcellular level and involving the structures of the cytoskeleton.

Consciousness is attributed to quantum and computation of cytoskeleton proteins organized in anetwork of microtubules inside neurons.

It has been shown that the use of certain plants typical of different Traditional Medical Systems defined "master" or "teaching" activates the protein network of the cytoskeleton with the achievement of "different states" of consciousness.

Master plants are the most important medicinal plants in these traditional healing systems because they able to create a widening of consciousness and stimulation of different brain networks.

Psychotropic substances inside these plants interact with human neurotransmitters activating biochemical pathways that may cause changes at different levels like cognitive, emotional, mind-body interaction.

This create an interaction between the biochemical networks of the plant and the human one allowing the possibility to have a "communication" inter-Kingdom.

According to the studies of Professor Mancuso in Florence and the Medical Research Council in Cambridge, vegetable neurons may serve as a model to test therapies against degenerative disease of the nervous system such as Parkinson's and Alzheimer's, however, being a more simplified version of those human.

The study is a randomized-controlled clinical trial, international and multicentered.

OBJECTIVES

THIS PROJECT AIMS:

- to study the Master Plants from a Ethno medical point of view considering the medical plants properties
- to study the properties of Master Plants like intelligence and reactivity to different stimuli
- to understand the Master Plants ability to produce non-ordinary states of consciuosness in humans as a starting point to understand consciousness, neurodegenerative disease and other disorders of the nervous system. The study will evaluate the subjects' mood states and electroencephalography (EEG) recordings in the pre-, during- and post treatment, mapping out the brain areas involved in subjects who took the master plant with fMRI as compared with control conditions;
- to develop development of new clinical research protocols and new drugs obtained from plants of traditional medicine;
- to suppose as in the traditional healing systems that a continuous diet with these plants.
- Obtaining permission: ethical committee

ACTIVITIES

In Vitro Studies has target cell will use:

Healty adult human (HN) neuronal cells;

Neuronal cells with degenerative desease (Parkinson, Alzheimer).

Human neuronal cell cultures (HN) were used to test the pathways activate by the master plants in healthy cells and in cell cultures affecting from neurodegenerative desease and how these plants can influence the gene expression of neurotransmitters.

The involvement of dopaminergic pathways shows a possible use of these plants for example in Parkinson's disease and other neurodegenerative deseases.

This interdisciplinary study (ethnomedical, ethnopharmacology, neurological) can be very helpful with regard to the current state of knowledge in the exploration of new integrated system of investigation in the fields of neuroscience, neurology and integrative medicine: neurons plant, interactions between biochemical networks such as inter-Kingdom.

The formulation of new guidelines for structured research in the filed of integrated medicine referring also to phytovigilance and interaction between plants use and drugs.

The project has different strategic promises in the treatment of neuronal deseases and a new

knowledge on consciousness.

Indeed the project aims at developing apps and an international web portal to support citizens and patient in the diagnosis, treatment and rehabilitation with a particular reference to the interaction between plants and drugs.

OUTCOMES

1. In vitro

- If the use of neuronal cell plant proves a valid model of investigation for the study of the mechanisms and pathways involved in neurodegenerative diseases it could be used to test new gene therapies without any ethical implication as in the case of the use of cell neuronal animals.
- Evaluation of the effect of teacher plants neuro-pharmacology obtained from plants on the survival of neurons or degenerative process.
- Testing the effect of new drugs from master plants obtained on the survival of neurons or on the degenerative process.
- Treatments neuro-protective.
- The presence of precursors of neurotransmitters or growth factors, antioxidant molecules capable of crossing the blood brain barrier, or able to stimulate / inhibit production of neurotransmitters present in plants maestro.

2. Trial clinical

To use combinations of molecules that target different cellular systems, even in advanced stages of degenerative disease of the damaged cell systems

EXPECTED OUTPUTS

With this work you will get scientific several publications in various disciplines, from neuroscience, to ethnopharmacology, neurobiology plant, ethnomedicine and genetics.

Ethnomedical work will include the publication of a text on the master plants used in the different medical system investigated with particular attention to those plants with a potential neuroprotective effect.

Some seminars will be organised to disseminate ethnomedical researches as a potential resource for the recovery of new phytodrugs.

In particular, the project outputs will be:

- n. 1 research on master plant from microbiological point of view, physical and neuroscientific
- n. 3 studies on the evaluation and feasibility of clinical trials aimed to test the efficacy of some plants

master of mental disorders and neurodegenerative

- n. 1 two years training course on phytoteraphy

Indeed some applications will be developed on interactions between plants and drugs and a web portal for citizen's information

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