DAY 1

Keynote Forum

4th EuroSciCon Conference on

Neurology & Neurological Disorders

July 12-13, 2018 Paris, France

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A SYSTEM BIOLOGY APPROACH FOR MODELING THE BRAIN: FROM GENES TO CONSCIOUSNESS

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Given the tremendous complexity of brain organization, here I propose a strategy that dynamically links stages of brain organization from genes to consciousness, at four privileged structural levels: genes; transcription factors (TFs)–gene networks; synaptic epigenesis; and long-range connectivity. These structures are viewed as nested and reciprocally inter-regulated, with a hierarchical organization that proceeds on different timescales during the course of evolution and development. Interlevel bridging mechanisms include intrinsic variation-selection mechanisms, which offer a community of bottom-up and top-down models linking genes to consciousness in a stepwise manner. The proposed approach is to nest the various intertwined structural and functional levels that compose the brain into a coherent and open brain models community covering multiple timescales. A critical bridging role between the gene and neuronal levels is assigned to regulatory proteins termed TFs. TFs regulate disparate genes into coherent assemblies. The impact of the environment on brain synaptogenesis is modelled as activity-dependent selective stabilization pruning of synapses. Long-range connectivity, subject to developmental shaping through interactions with the physical, social, and cultural environment, is proposed to form the bridge between neuronal micro circuitry and higher cognitive functions by globally integrating the underlying neural organizations. A novel allosteric pharmacology of TFs is proposed for neuropsychiatric diseases

Biography

Prof. Jean-Pierre Changeux is a renowned neuroscientist. He received his PhD in 1964 and continued to postdoctoral fellowships at the University of California-Berkeley and at the Columbia University College of Physicians and Surgeons in New York. Changeux returned to the Institut Pasteur in 1967, where he remains since. He also served as professor at the College de France from 1975 through 2006. His numerous awards include the Wolf Prize in Medicine in 1982; the Carl-Gustav-Bernhard medal of the Swedish Academy of Science in 1991; the CNRS Gold medal in 1992; the Balzan Prize for Cognitive Neurosciences in 2001; the Lewis Thomas Prize for Writing about Science in 2005; the National Academy of Sciences' (NAS) Award in the Neurosciences in 2007; the Japanese Society for the Promotion of Science (JSPS) award for eminent scientists in 2012; and many others. He is also a member of many international scientific academies and holds honorary degrees from leading institutions worldwide.The research of Jean-Pierre Changeux has centred on the fundamental molecular and cellular mechanisms involved in the recognition of chemical signals and their transduction into biological activity.

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STIMULATION THERAPY OF GLAUCOMA BY COMPLEX-STRUCTURED (FRACTAL) OPTICAL SIGNALS

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Purpose: To evaluate the effect of low-intensity photo-stimulation with complex-structured optical signals on visual functions in patients with glaucoma.

Methods: For the stimulation, LED emitters embedded in virtual reality glasses were used, which forms light signals of complex structure with a given fractal dimension. In groups with suspected glaucoma (4 eyes), early primary open-angle glaucoma (POAG Ia, n=5), POAG IIa (n=13), and POAG IIIa (n=17), light stimulation was applied daily: course included 10 séances of 10min. Before and after the course of fractal stimulation, visual fields and colour recognition were examined with standard automatic perimetry (SAP) and the Farnsworth Munsell 100 Hue Colour Vision Test (FM).

Results: In the SAP, mean deviation (MD), which in norm should not exceed −2 dB, before / and after the treatment in averaging for groups of suspected glaucoma, POAG Ia, IIa and IIIa were, respectively, -0.48/-0.43dB, -1.68/-1.38dB, -3.42/-1.75dB, and -14.37/-9.98dB. The pattern standard deviation (PSD) before / and after the treatment for groups with suspected glaucoma, POAG Ia, IIa, and IIIa were, respectively, -1.87/-1,76dB, -1.84/-1.77dB, -1.99/-1.89dB and -6.58/-6.28dB. The FM test was applied to estimate the errors in recognition of green, blue, yellow colours (TES). Before / and after the treatment, the TES data for four mentioned groups consisted, respectively, -12.00/-7,50, -13.60/-11,40, -20.62/-18,62, and -36.53/-32,35.

Conclusion: Low-intensive fractal photo-stimulation significantly improves the SAP indices and colour recognition in eyes with different stages of glaucoma. The pronounced effect of fractal stimulation for the advanced POAG can indicate that at any stage of glaucoma, in the general population of ganglion cells there is a significant percentage of cells that are yet at the plastic phase of reversible functional changes and capable of responding positively to medical or physical neuroprotective therapy. Further confirmation of the stability of effects is required in studies on a more massive cohort.

Biography

Marina V Zueva, Professor of Pathophysiology received her PhD and Biological Science D from Moscow Helmholtz Research Institute of Eye Diseases. Currently, she is the Head of the Division of Clinical Physiology of Vision at the Moscow Helmholtz Research Institute of Eye Diseases. She is a member of International Society of Clinical Electrophysiology of Vision (ISCEV), European Association on Vision and Eye Research (EVER), European Society of Retina Specialists (EURETINA), Society for Research on Biological Rhythms (SRBR). She has published over 15 peer-reviewed full-length papers in English (over 100 in Russian) and presented near 70 topics at international conferences.

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FAILURE OF PERIVASCULAR DRAINAGE AND PATHOGENESIS OF NEURODEGENERATIVE DISEASES

Roxana O Carare
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The brain lacks traditional lymphatic vessels. Instead, interstitial fluid is eliminated along the basement membranes of capillaries and basement membranes surrounding smooth muscle cells of arteries, towards the surface of the brain. These intramural periarterial drainage pathways become modified with ageing, possession of apolipoprotein E4 genotype, hyperlipidemia, resulting in the accumulation of aggregated proteins such as amyloid-beta (A) in the walls of arteries as cerebral amyloid angiopathy. Soluble antigens are eliminated from the brain along the intramural periarterial drainage pathways, towards the cervical lymph nodes. Arteries in the grey matter of the brain possess a layer of leptomeninges as advenitita, whereas arteries in the white matter have two such layers, with a potential perivascular space that becomes dilated when drainage of fluid is impaired in the grey matter. The motive force for efficient clearance of fluids is provided by the contractions of smooth muscle cells and therapeutic strategies to facilitate the clearance of fluid and prevent neurodegenerative diseases may be based on adrenergic and cholinergic interventions.

Biography

Roxana Carare is a medically qualified Clinical Neuroanatomist who has graduated in General Medicine in Bucharest Romania in 1996 and completed her PhD in Experimental Neuropathology in the Faculty of Medicine, University of Southampton, UK. She has a rich educational portfolio and leads research into the lymphatic drainage pathways of the brain. She has published more than 50 papers in peer- reviewed journals, 4 book chapters and has been serving as a Board Member on international organisations and an Editorial Board Member of repute for several journals.

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IMMEDIATE NON MEDICINAL HEALING FOR PERSONALITY DEVELOPMENT , NEUROTIC DISEASES, PSYCHOSOMATIC SYMPTOMS AND DISEASES

Hadi Eltonsi
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Statement of the problem: Clients receiving psychotherapy require several sessions even with drugs and use of will power over time.

Purpose of the treatment: Achieving immediate non medicinal effortless painless healing without complications for personality development, relief of neurotic disease, psychosomatic symptoms and diseases, treating emotional obesity and smoking.

Method: After joint analysis with client and definition of psychological and physical goals of treatment, the healer as a trained behavioural, cognitive and logo psychotherapist arrives with client to a new corrected understanding of the case and roots of conflicts in childhood, taking around 2 hours, then in less than an hour performs non-verbal interpersonal hypnosis with transfer of energy and telepathy to client till deep sleep when he implants the required personality, ideas, emotions, motives and attitudes into the subconscious embodying the required state. The subconscious and conscious mind will have same agreed upon analysis and targets for immediate results in that session of 3 hours

Results: The healer got patent in Egypt 2016 for his discovery of the immediate healing for personality development and for mentioned purposes. Up until now, treated more than 700 cases aging between 12 and 80 years with relief of more than 80% of cases either totally or mostly.

Conclusion: Immediate non medicinal revolutionary life transforming healing for a wide spectrum of cases achieving higher grades of maturity, insight, harmony and efficiency saving client time, effort, interests and complications. Also used to maturate community leaders to be a trouble shooter model efficient leaders with team spirt. The healing can heal these diseases in one session of almost 3 hours and transform the personality in same time and way as above mentioned, so it is highly recommended for those clients who cannot afford loosing time and interest in long treatments especially with drug secondary effects. It creates mature individuals able to have a happy successful life.

Biography

Hadi Eltonsi a Medical Graduate trained in group Psychotherapy , Hypnosis, Silva mind control, NLP, Reiki Master, Pranic Healing,Life Couch, Mantra Yuga meditation among others courses for psychic powers, family constellation thru his medical study and practice then as a Diplomat and Ambassador. He performed many TV, Radio interviews and seminars apart of two short American films about his work or inspired by his skills which were shown in international film festivals; the second got an award in Venice 2017v

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NOVEL INSIGHTS IN THE TREATMENT OF PARKINSON'S DISEASE

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Parkinson's Disease (PD) is the second most common neurodegenerative disorder worldwide effecting 1% of the population over 60 years of age. In addition to its restrictive effects in motor function, autonomus nervous system and cognitive functions are also effected. When levodopa is combined with peripheral decarboxylase inhibitors, symptom relief has been observed for a couple of years, however, many adverse effects including dyskinesias occur. Amantadine, anticholinergics, entecapone/talcapone, selegiline, dopaminergic receptor agonists all work for a limited period of time. Gene therapy, fetal substantia nigra tissue implantation have all been tried, however, the results have been inconclusive. Antiapoptotic drugs, glutamate antagonists and antiinflammatory drugs were used for their antioxidant effects and deep brain stimulation has also been applied as functional neurosurgery. Some vaccines have also been tried after the significant role of neuroinflammation has become evident. In the studies conducted in our laboratory, the anticonvulsant drug valproic acid has been found to be effective by producing antioxidant and antiapoptotic effects. Epigenetic modulation was also effective. In an animal model of Parkinson's disease developed in rats stereotaxic injection of 6-OHDA (8µg/2µL) or saline (2µL) to the right substantia nigra pars compacta was done. The following coordinates of substantia nigra pars compacta was used: (AP) = −4.8 mm, (ML) = −1.8 mm and (DV) = −8.2 mm. Only the rats showing pronounced rotational behaviour (more than 5 contralateral turns) were included in the study after apomorphine (0.5 mg/kg sc) test. The effects of valproic acid were compared with levodopa. The studies are underway to study the molecular mechanisms behind Parkinson's disease.

Biography

Ece Genç has been with Yeditepe University Department of Medical Pharmacology since 2004 where she teaches Medical as well as Dentistry students and conducts research. Previously she has an experience as a Professor at the Pharmacology Department of İstanbul Faculty of Medicine, Visiting Professor at Clinical Neuroscience Branch of National Institutes of Health USA, Lab Manager at Department of Pharmacology of University of California Irvine, instructor at California State University Los Angeles. She was a Post-doctoral fellow at Max-Planck Institute for Experimental Medicine Biochemical Pharmacology Department. Her major areas of interest are Neuropharmacology and Pharmacogenetics.

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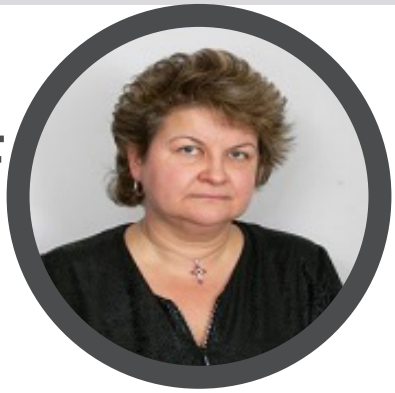
NEUROREHABILITATION - A MODERN APPROACH TO BRAIN ACTIVATION (IMPACT ON QUALITY OF LIFE OF NEUROLOGICAL AND NEUROSURGICAL PATIENTS



Ivet B Koleva[1], Borislav R Yoshinov[2] and Radoslav D Yoshinov[3]

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[3]Bulgarian Academy of Sciences – Sofia, Bulgaria

The objective of current work is to emphasize on the impact of neurorehabilitation as a contemporaneous approach to Brain Activation. The goal was to prove and evaluate the efficacy of application of different modalities and methods of the physical and rehabilitation medicine (PRM) on independence and quality of life of neurological and neurosurgical patients. We effectuated a composition, clinical application and approbation of complex neurorehabilitation algorithms in patients with neurological and with neurosurgical conditions. Patients were divided into a lot of groups and subgroups, in each one we applied a different neurorehabilitation complex, composed by a synergic combination of natural and pre-formed physical modalities (electrical currents, laser, cryo/thermo-agents, hydro-/balneo-/ peloido-therapy; physiotherapy and occupational therapy). Patients were controlled before, during and at the end of the neurorehabilitation course and one month after its end - using a battery of traditional and contemporaneous objective methods: tests and scales for motor deficiency, balance and coordination; functional grip of the upper limb; gait and independent motion; independence in activities in daily living (ADL: self-service, family, professional and social life); depression and anxiety; visual analogue scale of pain; vibroesthesiometry; thermosensibility; laser Doppler flowmetry; ICF assessment. Based on detailed qualitative and quantitative evaluation, we proved the efficacy of application of different neurorehabilitation programmes – on different types and levels of sensory, motor and functional deficiency. In conclusion, we emphasize on the capacity of physical modalities for functional recovery and amelioration of independence in everyday life of patients with diseases and conditions of the nervous systems. Our opinion (based on 30 years clinical practice) is that neurorehabilitation must be considered as an important approach to brain activation and must be involved in the everyday clinical practice of neurological and neurosurgical wards.

Biography

Ivet B Koleva is a Medical Doctor, Specialist in Neurology, Physical and Rehabilitation Medicine (PRM) with European certification in PRM. She has completed three scientific theses: PhD in PRM, PhD in Pedagogics, Doctor of Medical Sciences in PRM [PhD thesis on Physical Prevention and Therapy of Diabetic Polyneuropathy; thesis for Doctor-es-Medical Sciences on Neurorehabilitation in patients with socially important neurological diseases]. She has published more than 100 papers in Bulgarian and international scientific journals, author of monographs and manuals in the fields of Physical Medicine, Neurorehabilitation, Neuro-ergotherapy, Grasp and Gait rehabilitation, Functional evaluation, Pain management. She is a Member of national and international associations of PRM. She is the President of Bulgarian Neurorehabilitation Society and Editor-In-Chief of the Bulgarian scientific magazine Neurorehabilitation (from 2006). Actually, she is Professor at the Medical University of Sofia, Bulgaria.

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NONINVASIVE BRAIN STIMULATION FOR ENHANCING RECOVERY AFTER STROKE

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After focal ischemic injury of brain such as stroke, activity of remaining neural network is changed to optimize neural resources for recovery of function. Neuroplasticity plays an important role in coordinating neural interactions on different levels from cellular changes to wide-range cortical remapping for recovery from ischemic brain injury such as stroke. An experience-dependent synaptic and circuit plasticity remodels synaptic buttons and connections by repeated sensory experience. Modulation of neuroplasticity may enhance the rehabilitative outcome and functional restoration after stroke; therefore, it is a crucial topic of neurorehabilitation. Noninvasive brain stimulation (NBS) has recently been adopted for modulating neural excitability in a noninvasive manner and consequently enhancing neural recovery after stroke. The most popular noninvasive methods of neuromodulation include transcranial magnetic stimulation (TMS), transcranial direct current stimulation (tDCS), and transcranial alternating current stimulation (tACS). After a stroke, interhemispheric imbalance of cerebral cortical excitability occurs and cortical activity in the contralesional hemisphere is abnormally increased. On the other hand, brain activity in the ipsilesional hemisphere is decreased by interhemispheric inhibition of the contralesional hemisphere. NBS has been used to recover disrupted interhemispheric balance caused by stroke onset by modulating cortical excitability over specific brain regions. Cortical excitability can be modulated depending on the frequency of rTMS and the tDCS direction of current. This intervention can lead to the improvement of residual motor function by inducing neural plasticity. NBS has been mainly performed to restore abnormal interhemispheric balance by facilitating ipsilesional primary motor cortex (M1) excitability or by inhibiting contralesional M1 excitability. Recently, more challenging approaches, such as stimulation of two or more sites or use of dual modalities have been studied in stroke patients. One of the considerations on the effect of NBS is individual variation of its responsiveness. Diverse factors such as individual skull and cortical morphology, lesion location and severity, genetic polymorphism, etc. are considered as the intrinsic factors affecting individual response variability. The individually-tailored neural network modulation by customized NBS technique considering multiple influencing factors may enhance functional recovery and provide successful neurorehabilitation outcome after stroke. The modulating effect of NBS can expand to the interconnected subcortical network areas beyond the site of cortical stimulation. Use of multimodal functional neuroimaging methods such as functional magnetic resonance imaging (fMRI), diffusion tensor imaging (DTI), electroencephalography (EEG), functional near infrared spectroscopy (fNIRS) can demonstrate the network effect of NBS. Neural plasticity after stroke can be seen from microscopic to macroscopic levels. This process may be spontaneous or induced by training, although the former occurs only within a critical period after injury. A novel neurorehabilitation strategy of using personalized NBS methods in combination with various rehabilitation techniques can further maximize functional recovery after stroke.

Biography

Yun- Hee Kim of Samsung Medical Center, Seoul has an expertise in Rehabilitation. She is Professor at the Department of Physical and Rehabilitation Medicine, Sungkyunkwan University. Her Research interest includes, Stroke, Brain Injury, Vascular Dementia, Sensorimotor Rehabilitation, Cognitive Rehabilitation, Speech Rehabilitation and Central Pain. She had completed her PhD in 1996, from Yonsei University Graduate School, Department of Neuroanatomy.

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X-RAY PHASE CONTRAST TOMOGRAPHY REVEALS EARLY VASCULAR ALTERATIONS AND NEURONAL LOSS IN NEUROLOGICAL DISORDERS

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Techniques previously used to investigate damage to vascular and neuronal networks in neurological disorders suffer from several limitations. In particular, 2D imaging restricts spatial coverage, entails destructive sample preparation, and may lead to data misinterpretation due to lack of information on the third dimension. In contrast, recent ex-vivo study in mice demonstrated that imaging by X-ray phase-contrast tomography (XPCT) enables the study of the 3D distribution of both vasculature and neuronal networks, without sample sectioning or specific preparation. We have generated and quantified multiscale XPCT to evaluate alterations in vascular and neuronal networks at relevant disease phases of the animal model for multiple sclerosis, experimental autoimmune encephalomyelitis (EAE), in affected mice and to understand how treatment with mesenchymal stem cells (MSC) modifies them. A direct 3D morphological description of EAE lesions is provided at both vascular and neuronal levels at two different length scales, from the whole spinal cord up to capillaries and single cell. Such a multi-scale direct analysis has never been performed to understand EAE pathology and address the effect of an innovative therapeutic strategy. The results strongly indicate i) a trend in alteration of the micron vessels and occlusions in the capillaries, an observation never obtained in tissue without the use of a contrast agent; ii) neuronal alterations with massive loss of lower motor neurons. Such vascular and neuronal alterations were considerably reduced in MSC-treated mice. We have also applied XPCT to the investigation of other neurodegenerative disorders, i.e. Alzheimer and amyotrophic lateral sclerosis (ALS) and the results will be presented.

Biography

A Cedola completed her PhD degree at the University Joseph Fourier in Grenoble (France) with an experimental thesis at European Synchrotron Radiation Facility (ESRF). She is currently permanent Senior Scientist of the National Research Council (CNR) at Institute of Nanotechnology in Rome. She is enabled Associate Professor of Experimental Physics. She is responsible of the X-ray physics group at CNR in Rome; Member of Two Management Committees of the European Science Foundation Project COST and Scientific Committee of several international conferences on physics and X-ray optics. She is in the Editorial Board of the Journal *Scientific Reports –Nature* , She is currently principal investigator of the following financed projects: H2020 FET-Open *VOXEL* 665207 project. She holds Marie Skłodowska-Curie Individual Fellowship (*BiominAB-3D*). She works on X-ray imaging, X-ray Phase Contrast Tomography applied to Biomedical applications. She received several invitation to plenary and talks. She has more than 120 publications with citations about 1400 citations.

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