ERA-NET Neuron

NEWSLETTER 27

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News From NEURON II

Now Open! Excellent Paper in Neuroscience Award (EPNA) 2017 for outstanding scientific publications by early career scientists published in 2016. The EPNA is endowed with 3,000 EUR. The deadline for applications is October 15th, 2017. For more details - http://neuron-eranet.eu/en/758.php

Joint Mid-Term Symposium of JTC NEURON 2015 on "Neurodevelopmental Disorders" & ELSA NEURON 2015 on "Ethical, Legal, and Social Aspects of Neuroscience", will take place in Riga, Latvia on September 18-19th.

From the desk of the coordinator | September 2017

Marlies Dorlöchter

At a recent conference, I was struck by a simple demonstration: One of the speakers asked the audience to indicate if they personally knew someone affected by a mental condition. Every single participant raised their hand!

According to the WHO one in four people in the world will be affected by mental or neurological disorders at some point in their life. Mental health disorders are a major and persistent societal challenge for public health, quality-of-life, and economy. To tackle those challenges multidisciplinary approaches and collaborations across different nations are indispensable. The ERA-NET NEURON aims to put forward the understanding of mechanisms, but also the diagnosis and treatment of mental health disorders, and dedicates the next joint transnational call for research proposals to this topic. Accordingly, NEURON organized last May a scientific symposium where invited experts presented their views from different angles on "Emerging fields in mental health".

Funded by the European Commission

More information can be found on our website
http://www.neuron-eranet.eu/index.php
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Produced by CSO-MOH, IL

Participants at the Symposium 'Emerging fields in mental health' in Amsterdam, The Netherlands, May 2017

In a round table discussion, patient representatives contributed their perspective towards needs-based focus of translational research. This followed up on NEURON's earlier symposium on how to reinforce interaction between scientists, clinicians and society in the field of brain research.

The ideas, directions and recommendations from this exchange will contribute to the design of the upcoming joint call and will thus influence the funded research. Some ideas and priorities discussed at the symposium have already been commented on in an editorial in The Lancet Psychiatry.

This newsletter summarizes the "Emerging fields in mental health" Symposium, and you can find below the abstracts of all intriguing speakers of the day.

For September, I am looking forward to a Symposium where NEURON-funded projects from the research fields of "Neurodevelopmental Disorders" and "Ethical, Legal, and Social Aspects (ELSA) of Neuroscience" will present their midterm results. In 2015, NEURON for the first time launched two parallel calls, one as usual in a biomedical area and another one in a special variety of scientific disciplines - life sciences cooperating with humanities. Researchers will present and reflect on the developments of their collaborations and their progress, successes and challenges. We will discuss with them advances of health research and the implications for patients and society.

Sincerely yours,
Marlies Dorlöchter

EMERGING FIELDS IN MENTAL HEALTH

Symposium and Panel Discussion

The symposium "Emerging fields in mental health" held in Amsterdam on May 2017 served as a consultation step for the NEURON funding organizations in order to receive an update in the field and help shape the next joint call for proposals. Six renowned speakers from various fields of research in Mental Health and Disorders presented overviews about the research areas. The NEURON Scientific Advisory Board and additional experts were invited for a subsequent panel discussion with representatives of funding organizations in NEURON. Representatives of the European Psychiatric Association (EPA), the Global Alliance of Mental Illness Advocacy Networks-Europe (GAMIAN), the ROAMER (Roadmap for Mental health research in Europe) project and The Lancet Psychiatry expressed their views about important issues in their respective areas. The Symposium concluded in an intriguing discussion raising many important topics related to the NEURON 2018 call. Below are the abstracts of the day fascinating talks.

Celso Arango

MENTAL HEALTH RESEARCH PRIORITIES FOR EUROPE

Celso Arango

Department of Psychiatry, Gregorio Marañón General, University Hospital, Madrid, Spain

Funding for Psychiatry Research to mitigate its effects lags far behind the cost of mental and brain disorders to society. ROAMER is a project funded by the European Commission, under the Seventh Framework Programme, to create a coordinated road map for the promotion and integration of Mental Health and well-being research across Europe, based on a common methodology and conceptual framework that covers the full spectrum of Biological, Psychological, Epidemiological, Public Health, Social and Economic Aspects Of Mental Health and well-being. ROAMER combined a consortium of renown Mental Health research scientists, with a methodologically sound, pragmatic and comprehensive approach with an extensive stakeholder involvement. Results from ROAMER were based on systematic reviews of published work and consensus decision making by multidisciplinary scientific experts and affected stakeholders (more than 1000 in total): individuals with mental health problems and their families, health-care workers, policy makers, and funders. The six priorities identified were: Preventing mental disorders, promoting Mental Health and focusing on young people, Focusing on causal mechanisms of mental disorders, Setting up international collaborations and networks for mental health research, Developing and implementing new and better interventions for mental health and well-being, Reducing stigma and empowering service users and carers and Research into health and social systems. Research into these six priorities over the next 5-10 years, should help to close the biggest gaps in mental health research in Europe, and in turn overcome the substantial challenges caused by mental disorders.

Nicoletta Berardi

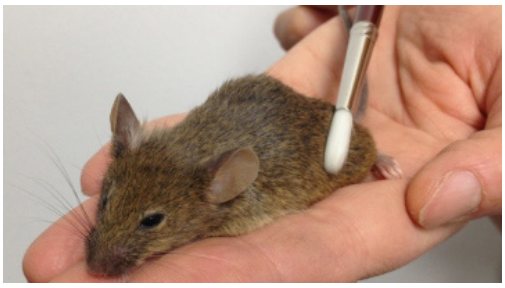
PERTINENT MODELS

Nicoletta Berardi

Department of Neuroscience, University of Florence, Florence, Italy

Resilience is the ability to cope with negative or traumatic events, to reorganize adaptively to promote well being in the face of adversities. To understand what makes someone resilient may facilitate the design of interventions aimed at preventing or rescuing negative effects of adverse events.

We shall see that there is a virtuous spiral from human to animal models to humans for identification and validation of protective factors and molecules. Mechanisms underlying resilience in mental health are environmental, genetic and epigenetic, and impact on precise neural circuits through plastic adaptive changes, which might be exploited to promote resilience in vulnerable subjects. We shall discuss open point and missing knowledge in Gene x Environment approaches and in epigenetic approaches to understand resilience. These data, in addition to knowledge advancement, would provide clues towards better, personalized, treatments.



Hackman et al., 2010; Baldini et al., 2013; Turecki and Meaney, 2016

Positive early experiences - high levels of maternal care, Massage or Enriched Environment during the first period of life - produce a long lasting effect on anxiety-like behavior, evident when animals are adult, affecting hippocampal GR expression, BDNF, circulating IGF-1.

IGF treatment mimicks the effects of massage and Enriched Environment.


Marion Leboyer

IMMUNO-PSYCHIATRY DISORDERS

Marion Leboyer

INSERM U955, Pôle de Psychiatrie Hôpitaux Universitaires Henri Mondor, Université Paris-Est, Fondation FondaMental, Créteil, France

Major psychiatric disorders such as bipolar disorder (BD), schizophrenia (SZ), Autism Spectrum Disorders (ASD) are best conceived as multifactorial disorder, caused by gene-environment interactions, such as infections and stress interacting in multiple hit models with immuno-genetically background resulting in low grade immuno-inflammatory abnormalities which may in turn induce the development of metabolic and autoimmune comorbidities, reactivate human endogenous retroviruses and/or increased gastro intestinal barriers permeability.

Exploring the control of innate immune responses in BD, we found that associations between functional genetic variants of Toll-Like-Receptors may reduce defence against infections during perinatal period. We also reported interaction between early-life stress and TLR2 risk genotype. This fits with a two-hit model where immune-related genetic susceptibility contributes to abnormal responses to perinatal infections establishing a lower threshold for subsequent stress-triggered events. Persistence of infectious stigma may also be responsible for the reactivation of human endogenous retroviruses whose envelope protein, displaying inflammation and neurotoxicity, is over-expressed in patients with BD or SZ. Recently, circulating auto-antibodies against the neuronal glutamate NMDA receptor were described in immune encephalitis, but also in psychotic patients, where they show capacities to disorganize NMDAR molecular complexes.

Targeting these dysimmune pathways open up new avenues for biomarker discovery and innovative therapeutic strategies in major psychiatric disorders.

Thomas Schlaepfer

INNOVATIVE TREATMENTS

Thomas Schlaepfer

Department of Psychiatry and Psychotherapy, University Hospital Freiburg, Germany

The recent introduction of Deep Brain Stimulation (DBS) for treatment resistant psychiatric disorders might very well lead to the most significant development in clinical psychiatry of the last forty years – possibly offering a rise of hope for patients to whom medicine had hitherto little to offer. Furthermore, translational research on neuromodulation will allow us to glean something about the underlying cause of patient's illnesses before figuring out a treatment that addresses the source of the problem.

Major depression offers perhaps the best example of the rapid progress being made in understanding the biology of mental illness. Studies on the underlying neurobiology of major depression have typically focused on the description of biological differences between patients and healthy subjects such as alterations of monoaminergic or endocrine systems. Psychotropic drugs work by altering neurochemistry to a large extent in widespread regions of the brain, many of which may be unrelated to depression. We believe that more focused, targeted treatment approaches that modulate specific networks in the brain – specifically structures mediating rewarding responses to emotional stimuli - will prove a more effective approach to help treatment-resistant patients. In other words, whereas existing depression treatments approach this disease as a general brain dysfunction, a more complete and appropriate treatment will arise from thinking of depression as a dysfunction of specific brain networks that mediate mood and reward signals.

A better understanding of defined dysfunctions in these networks will invariably lead to a better understanding of patients afflicted with depression and perhaps contribute to a de-stigmatization of psychiatric patients and the medical specialty treating them.

Philippe Delespaul

ECOLOGICAL MONITORING: TOOLS FOR PERSONALISED MENTAL HEALTH IN RESEARCH AND CLINICAL PRACTICE

Philippe Delespaul

Psychiatry & Neuropsychology, Maastricht University, The Netherlands

Mental health casts an increasing burden on society. In contrast, the burden due to somatic illness it is decreasing. The primary reason is that mental health is more contextualised. In cardiology, high blood pressure is often successfully reduced with a pill, while stop smoking, drinking, reduce weight and engage in exercises is equally effective. Mental health lacks the 'easy' interventions and primarily relies on help that requires active involvement of the individual. Therefore, mental health are often comparable to lifestyle interventions in somatic illness. They often require sustained motivation, behavior change in the context of changing temptations and challenges of daily life.

Classic diagnostic information (depression, anxiety, schizophrenia) has only limited value in the field of daily life adaptational strategies and clinicians need different knowledge and skills.

The relevant information for behavioral, cognitive and emotional coaching is not only when individuals succumb to their vulnerabilities (ill-being). It is even more important to understand how subjects are resilient (well-being). These strategies are within the individual's own repertoire.

New ecological assessment techniques (experience sampling method — ESM also ecological momentary assessment — EMA) assess changing mental states by sampling moments and collect multidimensionally documented snapshots of the individual in normal life situation. These methods make use of self-reports and are increasingly easy to implement with available smartphone technology.

Because the diagnostic information is generated by the subjects and reviewed in by the clinician, a collaborative shared decision situation is created. This maximises the involvement of the individual and activates the motivation that is needed to induce change.


Robb Rutledge

COMPUTATIONAL MODELISATION

Robb Rutledge

Max Planck UCL Centre for Computational Psychiatry and Ageing Research, UK

The societal costs of psychiatric disorders are enormous. The new field of computational psychiatry proposes to characterize psychiatric disorders in terms of aberrant computations. Computational models can bridge across different levels (e.g., genetic, neural circuits, cognitive, etc.) and species, potentially providing computational markers useful for predicting clinical outcomes. The value-based decision-making framework has been particularly influential. Values for different options are compared during decision making. Dopamine neurons represent a reward prediction error signal, the difference between experienced and predicted rewards, and this error signal is used to update value estimates that inform future decisions. In decision-making tasks, momentary subjective feelings of happiness are explained not by task earnings, but by the history of expectations and prediction errors. Changes in happiness relate both to dopamine and neural activity in the ventral striatum measured with fMRI. Depression and anxiety are associated with changes in learning, risk taking, and subjective states that computational models can describe. In the future, large-scale computational phenotyping using smartphones and online data collection can be combined with MRI scans to describe heterogeneity in mood disorders and to predict clinical outcomes.