EUROPEAN SCIENCE FOUNDATION
SETTING SCIENCE AGENDAS FOR EUROPE

EUROCORES Programme
European Collaborative Research

EuroSTRESS
Stress and Mental Health

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Stress and Mental Health (EuroSTRESS)

Repetitive and uncontrollable stress is known to be a powerful risk factor for mental disorders. Whether an individual will respond adaptively or mal-adaptively to a stressor is defined by his/her genetics, developmental history and the environment in adulthood. In particular, traumatic experiences in early life, notably neglect or abuse during childhood, could considerably add to the risk of subsequent psychiatric illnesses including major depression, psychosis and post traumatic stress disorder. The societal and economic burden of these stress-related illnesses is enormous. Hence it is of great importance to come to a better understanding of how these stressors influence mental health.

The EUROCORES programme EuroSTRESS will focus on two key questions in an interdisciplinary fashion:

- How can the combination of early life experience and genetic evoke lasting changes in signalling pathways within the brain which result in altered behaviour and increased vulnerability to negative effects of stress in adulthood?
- How can periods of repetitive stress or traumatic events in adulthood (against a background of life history and genetic vulnerability) disrupt brain function such that the chances of the manifestation of specific psychiatric disorders are increased?

List of funded Collaborative Research Projects (CRPs)

Temperament, Synaptic Plasticity and Adaptive Capacity: influence of stress during adolescence (STRESS DURING ADOLESCENCE)

(NFR, NWO [ZonMw], SNF)

This CRP will focus on adolescence as an important developmental period modulating the adult vulnerability to depression in an interdisciplinary approach in humans and animal models. First, how stress during adolescence might modulate a (genetic) predisposition for depression at adulthood will be analysed. Second, the hypothesis will be tested that individual variation in behavioural flexibility and the underlying mechanisms of neuronal plasticity are fundamental in the adult vulnerability to depression.

Project Leader:

Professor Jacob Koolhaas
University of Groningen, Netherlands

Principal Investigators:

Professor Clive Bramham
University of Bergen, Norway

Professor Johannes Ormel*
University of Groningen, Netherlands

Dr. Thierry Steimer
University Hospital, University of Geneva, Switzerland

Vulnerable Phenotypes for Stress-related Mental Disorders: focus on glucocorticoids (BALANCE)

(MRC, NWO [ZonMw], SNF)

A fundamental question in stress research is why some individuals become vulnerable to affective disease, while others are resilient and gain strength from stressful experiences. In this multidisciplinary programme, we focus on a translational approach to explore the role of the stress mediators, notably the glucocorticoid stress hormone endproduct of the hypothalamic-pituitary-adrenal (HPA) axis. Secreted glucocorticoids target the limbic brain, where their actions on emotional arousal, cognition and motivation are mediated by mineralocorticoid and glucocorticoid receptors (MR and GR). The hypothesis that, in an appropriate context, the imbalance in MR-driven activation of the stress reaction with GR-mediated suppression enhances the risk for dysregulation in emotional and cognitive processes will be tested. This context depends on already identified genetic factors and the outcome of previous early life experiences that have prepared the individual for the life ahead.

Project Leader:

Professor E. Ronald De Kloet
University of Leiden, Netherlands

Principal Investigators:

Professor Dominique De Quervain
University of Zurich, Switzerland

Professor Tommy Olsson
Umeå University Hospital, Sweden

Professor Jonathan R. Seckl
Western General Hospital, University of Edinburgh, United Kingdom

* Research funded in part by sources other than the participating organisations listed on page 5

Developmental Origins of Stress and Mental Health (DOME)

(AKA, NWO [ZonMw])

Factors leading to stress-related disorders may be traced back to the prenatal environment. Mechanisms by which prenatal exposures operate to change biobehavioural stress mediators are not understood. Animal studies suggest that prenatal overexposure to glucocorticoids – as a consequence of exogenous exposures, e.g. carbenoxolone, or experimental manipulations, e.g. a low protein diet – which alters function of the foeto-placental glucocorticoid barrier, may be a mechanistic factor.

Project Leader:

Professor Katri Räikkönen
University of Helsinki, Finland

Principal Investigators:

Professor Johan Eriksson
University of Helsinki, Finland

Professor Leif Groop*
University of Lund, Malmö, Sweden

Professor David Phillips*
University of Southampton, United Kingdom

Dr. Tessa Roseboom
Academic Medical Center, Amsterdam, Netherlands

Associated Partner:

Dr. Susan Ozanne
University of Cambridge, United Kingdom

The Effect of Prenatal Stress on Hypothalamic – Pituitary – Adrenal (HPA) – Axis Function and Neurodevelopment: a gene-environment interaction study (PELS)

(FWO, MRC, NWO [ZonMw])

Animal studies have shown that early life stress at moments when critical developmental processes are taking place in parts of the nervous system or neuronal circuits involved in HPA-axis functioning (e.g., hippocampus, amygdala, prefrontal cortex) may induce epigenetic changes that alter later function of the HPA axis and cause more anxiety, enhanced stress sensitivity and impaired cognitive and emotional development, especially in genetically susceptible individuals. The two aims of this CRP are: (1) to determine the contribution of various types of antenatal maternal stress, including work stress and antenatal maternal cortisol level, for offspring birth outcome and neurodevelopment in early childhood; (2) to determine whether prenatal stress exposure interacts with measures of genetic susceptibility (i.e. specific candidate genes related to HPA-axis function) in predicting offspring birth outcome and neurodevelopment.

Project Leader:

Professor Bea Van Den Bergh
University of Tilburg, Netherlands

Principal Investigators:

Professor Stephan Claes
University of Leuven, Belgium

Professor Vivette Glover
Imperial College London, United Kingdom

Associated Partner:

Dr. Alina Rodriguez
Uppsala University, Sweden

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The aim of the European Collaborative Research (EUROCORES) Scheme is to enable researchers in different European countries to develop collaboration and scientific synergy in areas where European scale and scope are required to reach the critical mass necessary for top class science in a global context.
The scheme provides a flexible framework which allows national basic research funding and performing organisations to join forces to support excellent European research in and across all scientific areas.
Until the end of 2008, scientific coordination and networking was funded through the EC FP6 Programme, under contract no. ERAS-CT-2003-980409. As of 2009, the National Funding Organisations provide the funding for the scientific coordination and networking in addition to the research funding.

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ACTIVITIES TO BE ORGANISED WITHIN THE FRAME OF THE EUROCORES PROGRAMME EuroSTRESS IN 2009:

Summer school 2009:
Neurodevelopmental Programming and Phenotypic Plasticity: Implications for Healthy Ageing and Longevity.
7-13 September 2009, Rhodes, Greece.

THE FOLLOWING NATIONAL FUNDING ORGANISATIONS SUPPORT THE EuroSTRESS PROGRAMME:

Fonds voor Wetenschappelijk Onderzoek-Vlaanderen (FWO)
Research Foundation Flanders, Belgium

Suomen Akatemia/Finlands Akademi (AKA)
Academy of Finland, Finland

Nederlandse organisatie voor gezondheidsonderzoek en zorginnovatie (ZonMw)
Netherlands Organisation for Health Research and Development, Netherlands

Norges Forskningsråd (NFR)
Research Council of Norway, Norway

Vetenskapsrådet (VR)
Swedish Research Council, Sweden

Schweizerischer Nationalfonds (SNF)
Swiss National Science Foundation,
Switzerland

Medical Research Council (MRC)
United Kingdom

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