C01 – MAKING EXTINCTION LAST: ROLE OF SPONTANEOUS ACTIVITY IN A MESOPREFRONTAL CIRCUITRY IN LONG-TERM EXTINCTION MEMORY CONSOLIDATION

STROH, ALBRECHT| PROF. DR. RER. NAT.
Mainz Animal Imaging Center (MAIC)
Institute of Microscopic Anatomy and Neurobiology
University Medical Center Mainz
Hanns-Dieter-Hüsch-Weg 19|55128 Mainz

since 2012

KALISCH, RAFFAEL|PROF. DR. RER. NAT.
Neuroimaging Center Mainz (NIC)
University Medical Center Mainz
Langenbeckstr. 1| 55131 Mainz

since 2012

The project investigates the role of spontaneous activity in the vmPFC and in its mesocortical dopaminergic inputs in the consolidation of fear extinction memories. Resting-state fMRI is used both in rodents and in humans. Physiological insights obtained from combining fMRI with Calcium recordings and optogenetics in rodents will deepen our understanding of neurobiological mechanisms in humans; advanced multivoxel analysis methods in humans, in turn, will guide and inform the analysis of fMRI and Calcium recording data in the rodent.

C02 - THE FUNCTIONAL CONTRIBUTIONS OF PREFRONTAL DOPAMINE AND NOREPINEPHRINE PROJECTIONS TO COGNITIVE AND SOCIAL RESILIENCE

DUVARCI, SEVIL| PH.D.
Institute for Neurophysiology, Neuroscience Center
Goethe University Frankfurt/Main
Theodor-Stern-Kai 7|60596 Frankfurt/Main

since 2014

C02 investigates how neuronal activity in the prefrontal cortex (PFC)-projecting dopamine (DA) and norepinephrine (NE) neurons and interactions between the PFC, ventral tegmental area and locus coeruleus promote resilience to stress-induced social, but mainly also cognitive, deficits. To this end, we will perform in vivo recordings of optogenetically identified PFC-projecting DA and NE neurons as well as simultaneous recordings of neural activity in all three structures in mice after chronic stressor exposure. We will examine the functional contributions of the PFC DA and NE projections to cognitive and social resilience. The causal role of resilience-associated neural activity patterns will be probed using optogenetic manipulations.

C03 - PSYCHOLOGICAL FLEXIBILITY AS ACTIVE RESILIENCE MECHANISM: NEUROCOGNITIVE MECHANISMS AND DOPAMINERGIC MEDIATION

FIEBACH, CHRISTIAN| PROF. DR. RER. NAT.
Institute of Psychology
Goethe University Frankfurt/Main
Theodor-W.-Adorno-Platz 6| 60323 Frankfurt/Main

since 2011

SCHRECKENBERGER, MATHIAS| PROF. DR. MED.
Department of Nuclear Medicine
University Medical Center Mainz
Langenbeckstr. 1| 55131 Mainz

since 2008

There exists substantial conceptual imprecision concerning the specific aspects of flexibility that promote resilience and their underlying neurobiological mechanisms. C03 will explore (i) the common and distinct neural bases of different facets of psychological flexibility (i.e., cognitive vs. affective vs. feedback-based flexibility), (ii) potential mechanistic links between psychological flexibility and the brain's response to stress (particularly dopamine-neurochemistry measured with Positron Emission Tomography), (iii) whether or not psychological flexibility can be maintained or even increased following stress, and (iv) to what degree resilience outcome can be predicted by (behavioral or neural) markers of psychological flexibility.

C04 - GOAL PURSUIT DESPITE EMOTIONAL DISTRACTION: NEURAL NETWORK MECHANISMS OF EMOTIONAL INTERFERENCE INHIBITION AND THEIR ROLE FOR RESILIENCE

TÜSCHER, OLIVER| PD DR. MED.
Department of Psychiatry and Psychotherapy
University Medical Center Mainz
Untere Zahlbacher Str. 8| 55131 Mainz

since 2015

WIBRAL, MICHAEL| PROF. DR. RER. NAT.
MEG Unit, Brain Imaging Center
Goethe University Frankfurt/Main
Heinrich Hoffmann Strasse 10| 60528 Frankfurt/Main

since 2012

Using EEG, C04 will identify neural markers of emotional stimulus interference inhibition, focusing on beta band oscillatory activity. It will be tested whether these markers generalize across to-be-protected goal-directed cognitive functions and whether they are associated with resilience - in subjects provided by Z03. By simultaneous EEG/MEG, C04 will elucidate the neural basis of these markers to understand their network-level mechanisms, specifically in relation to the dynamics of information transfer.

C05 - COGNITIVE EMOTION REGULATION IN THE FACE OF STRESS

WESSA, MICHÈLE|PROF. DR. SC. HUM.
Department of Clinical Psychology and Neuropsychology
Institute of Psychology
Johannes Gutenberg-University Mainz
Wallstraße 3| 55122 Mainz

since 2013

Cognitive reappraisal is an effective emotion regulation strategy that can be considered a key resilience mechanism. Yet, there is a research gap with respect to the question how and through which mechanisms cognitive reappraisal is impaired by circumstantial stressors (e.g., social evaluative stress). In C05 we will 1) investigate stress-related neural correlates of cognitive reappraisal with a particular emphasis on the related dynamics of endocrine stress responses, 2) identify individual differences in neurobiological, endocrine and behavioral measures predicting successful reappraisal under stress with the aim to 3) test these identified predictors as putative resilience mechanisms.

C06 - SEEING THE GOOD MORE THAN THE BAD: NEURAL MECHANISMS OF POSITIVITY BIASES IN INFORMATION PROCESSING AND THEIR ROLE FOR RESILIENCE

BASTEN, ULRIKE|DR. PHIL. NAT.
Institute of Psychology
Goethe University Frankfurt/Main
Theodor-W.-Adorno-Platz 6|60323 Frankfurt/Main

since 2011

FIEBACH, CHRISTIAN|PROF. DR. RER. NAT.
Institute of Psychology
Goethe University Frankfurt/Main
Theodor-W.-Adorno-Platz 6| 60323 Frankfurt/Main

since 2011

C06 will investigate the neural mechanisms underlying positivity biases in cognitive processing using three established cognitive paradigms to assess positivity biases in attention, interpretation, and decision making. fMRI will be used to (a) identify neural mechanisms explaining individual differences in behaviorally expressed cognitive bias and (b) investigate chances in neural mechanisms following the experimental induction of positivity bias by a cognitive bias modification training. We will further investigate whether positivity biases in cognitive and neural processing are maintained or activated under stress and relate neural markers of positivity bias to success in emotion regulation (C05), extinction learning (B01), and resilience outcome (Z03).

C07 - NEURAL CORRELATES OF INSTRUMENTAL CONTROL: IMMUNIZATION AS POTENTIAL RESILIENCE MECHANISM

WESSA, MICHÈLE|PROF. DR. SC. HUM**.**
Department of Clinical Psychology and Neuropsychology
Institute of Psychology
Johannes Gutenberg-University Mainz
Wallstraße 3| 55122 Mainz

since 2013

REIF, ANDREAS|PROF. DR. MED.
Department of Psychiatry, Psychosomatic Medicine and Psychotherapy
University Hospital Frankfurt
Heinrich-Hoffmann-Str. 10|60528 Frankfurt/Main

since 2014

Actual or perceived controllability over a stressor likely contributes to stress resilience. Three mechanisms are important in this context: stress immunization, learned helplessness and self-efficacy expectancy. C07 will investigate the neural and behavioral correlates of stressor controllability in healthy humans with respect to these three mechanisms. Further, individuals characterized for stress resilience (RT2-score) by central project Z03 will be investigated to test whether the behavioral and neural mechanisms underlying actual and perceived controllability differentiate as a function of resilient outcome.