Department of Psychiatry and Psychotherapy
Division of Child and Adolescent Mental Health

Address
Schwabachanlage 6 and 10
91054 Erlangen
Phone: +49 9131 8539122
Fax: +49 9131 8539126
www.kinderpsychiatrie.uk-erlangen.de

Head of Division
Prof. Dr. med. Gunther H. Moll

Contact
Theresa Prell
Phone: +49 9131 8539122
Fax: +49 9131 8539126
kjp-kontakt@uk-erlangen.de

Research Focus
• Prenatal and early risk factors for child development: FRANCES – Franco-olian Cognition and Emotion Studies
• Stress regulation in healthy children and in children and adolescents with generalized anxiety disorder
• Neural processing of emotional and disorder specific stimuli in girls with eating disorders
• Genes to behavior: Unlocking the code for early detection of reading disorder
• Parenting stress in the context of mental health treatments for children and adolescents
• Therapeutic interventions - Clinical effects and underlying mechanisms
• Molecular and epigenetic consequences of pre- and postnatal trauma in a mouse model

Structure of the Division
Professorships: 1
Personnel: 144
• Doctors (of Medicine): 24
• Scientists: 5 (thereof funded externally: 2)
• Graduate students: 12

Clinical focus areas
• Attention deficit/hyperactivity disorder (ADHD)
• Tic and obsessive-compulsive disorders
• Anxiety and depressive disorders
• Posttraumatic stress disorders
• Eating disorders
• Autism spectrum disorders
• Reduced intelligence with psychiatric comorbidity
• Regulation, feeding and behavior disorders in early childhood

Research
The aims of the scientific projects of our Division are to contribute to a better understanding of the developmental processes and the neurobiological basis of emotional and behavioral disorders in children and adolescents and to learn more about the neuronal mechanisms of therapeutic interventions.

The main topics addressed by the research unit (headed by PD Dr. H. Heinrich and PD Dr. O. Kratz) are described below.

Prenatal and early risk factors for child development: FRANCES – Franco-olian Cognition and Emotion Studies
Pt: Dr. A. Echler
The longitudinal study with 250 families which is conducted in cooperation with the Departments of Obstetrics and Gynecology and of Psychiatry and Psychotherapy examines the long-term effects of prenatal risks (including alcohol consumption, depression, stress) on children adapted age between 6-8 years. Child development status was operationalized in a multi-level design (cognitive, emotional, social factors): In addition to neuropsychological and neurophysiological measures, neurobiological markers are of interest (e.g. alcohol metabolites in the meconium of the newborn; child and mother saliva/ hair cortisol concentrations; epigenetic data from child buccal cells). Results indicate that even 'subliminal' alcohol consumption has negative effects on child brain development and that prenatal depressive symptoms affect a child’s stress system which seems to be partly mediated by epigenetic changes in the DNA.

In cooperation with the Division of Pediatric Cardiology, we have added a sample of children with a risk factor of early life stress, i.e. children with a congenital simple ventricular septal defect which was surgically corrected in infancy, to compare their developmental status with the FRANCES cohort. Deficits in language development were observed which were moderated by positive parenting behavior.

Funding: Robert Enke Foundation

Stress regulation in healthy children and in children and adolescents with generalized anxiety disorder
Pt: Dr. Y. Golub
To study the regulation of the HPA-axis in healthy children and in children suffering from generalized anxiety, several methods of cortisol measurements were applied. We investigated and compared basal and stress-induced saliva/plasma cortisol and the long-term hair cortisol levels. We report age dependency of several basal and reactive cortisol parameters. Furthermore, children with internalizing symptoms showed significantly lower one-month hair cortisol levels. In children and adolescents with generalized anxiety, an up-regulation of the basal cortisol values and a blunted HPA-axis response to stress was observed. In addition, we found an upregulation of the peripheral NPY values in the children with generalized anxiety. The remission of clinical symptoms correlated with a normalization of function of both, HPA- and NPY systems, respectively. Altogether, integrating reactive, basal and cumulative cortisol measurements can lead to our understanding of the age dependent complex changes in the regulation of the stress system that take place in the course of mental disorders.

Neural processing of emotional and disorder specific stimuli in girls with eating disorders
Pt: Dr. S. Hornadasch
In adolescent girls with eating disorders (anorexia nervosa, bulimia nervosa) and typically developing girls, gaze behavior and central nervous and peripheral physiological responses were studied when viewing body scheme pictures of overweight, normal weight, and overweight women. Patients with eating disorders showed longer fixation times for uncloned body regions (visual attentional bias towards body shape-related information) and patients with anorexia nervosa were found to have the highest amplitude in an EEG event-related component (reflecting motivated attention) following pictures of strongly overweight women. By including adult patients suffering from anorexia nervosa and matching healthy controls, we were able to look at developmental aspects of the disorder and found age-specific effects e.g. for ratings of female body stimuli and for fMRI data reflecting neural processing of food stimuli.

Funding: Alexander von Humboldt Foundation
Parenting stress in the context of mental health treatments for children and adolescents

PI: Dr. V. Irlbauer-Muller
The parents of children and adolescents utilizing mental health treatments face special challenges: Their stress levels can be assessed with an appropriate questionnaire which was presented to the parents of 166 children and adolescents (age: 11-18 years) who initially presented at our Division. The results illustrate high levels of parenting stress which increased when the parents described the symptoms of their child or adolescent to be high. Regarding the bidirectionality of the parent-child-interaction, these results show how important it is to assess parenting stress and to create mental health treatments for children and adolescents which are context- or parent-centered.

Therapeutic interventions – Clinical effects and underlying mechanisms

PI: Dr. P. Studer
Neurofeedback involves a brain-computer interface which enables to learn self-control over specific aspects of neural (EEG) activity. In our earlier studies, conducted with colleagues from Göttingen, we could demonstrate the clinical effectiveness of neurofeedback (theta/beta and slow cortical potential training) as a therapeutic module in the treatment of children with ADHD. Our recent studies (‘short-term studies’) aimed at how to optimize neurofeedback training and learn more about the mechanisms underlying a successful training (‘neuroplasticity’). Special light concepts are used to stabilize circadian rhythms in patients with psychiatric disorders (affective disorders, ADHD subtypes). We installed a light laboratory to test the clinical success of light therapy in future trials. In a pilot study, funded by the ELAN funds, the effects of different light conditions on sleep and attention/arousal were investigated in healthy adolescents. Preliminary results indicate at least a positive effect of blue (i.e. stimulating) light on attentional measures (reaction time variability).

Molecular and epigenetic consequences of pre- and postnatal trauma in a mouse model

PI: Dr. Y. Golub
We applied our mouse model of prenatal trauma to investigate trauma-induced regulation changes of several stress-related genes at the molecular-epigenetic level. mRNA expression levels were quantified and DNA methylation were measured for these stress-related genes in the dorsal hippocampus of traumatized dams and their offspring. We could show decreased expression of the Crhr1 and Nr3c2 genes in traumatized mothers which were reflected by increased methylation levels of several CpG islands of these genes. In pups an opposite regulation of the Crhr1 expression was observed. We could furthermore show a decrease in the expression of the Fkbp5 in the embryonic hypothalamus of traumatized pups which persisted into the adulthood. Our findings support the hypothesis that trauma-induced neuroendocrine and behavioral alterations are associated with stable changes of the methylation and expression of stress-related genes from in utero time point on.

Teaching

The Division of Child and Adolescent Mental Health is involved in compulsory and elective courses in the curriculum of the degree program human medicine. MD theses as well as Bachelor’s and Master’s theses (mainly in psychology) are supervised.

Publications

Solati J, Kleinhaut E, Kratz O, Moll GH, Golub Y. Inverse effects of lipopolysaccharides on anxiety in pregnant mice and their offspring. Physiol Behav 2015, 139:369-74

International Cooperations

Dr. M. Arms, Brainclinics, Nijmegen: The Netherlands
Dr. T. Ros, University of Geneva, Geneva: Switzerland
Dr. C. McCabe, School of Psychology and Clinical Linguage Sciences, Reading: UK