behavior? Another important question is what are the molecular mechanisms that are involved in this process? Dr. Turecki will address these questions during his presentation. He will present data focusing on the role of DNA methylation on specific gene systems in the hippocampus and other brain regions. In addition, he will present data from a recent genome-wide methylation analysis and characterize differential methylation associated with childhood adversity. The findings to be presented are consistent with results from animal studies, which have recently given us important insight into some of the epigenetic processes that modify behavior and result from early social environmental experiences. These results will be discussed in terms of a general conceptual framework for the understanding of how early-life adversity may influence suicide risk.

http://dx.doi.org/10.1016j.neurenf.2012.04.013

Su-L-05
The baby and the self
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Brain and behavioral development of fetuses and newborn infants are a rich source of information regarding what might constitute minimal self-awareness. Research indicates that newborns have feeling (subjective) experience. Unlike automata, they do not just sense and respond to proximal stimulations. In light of the explosive brain growth that takes place inside and outside of the womb, first signs of feeling as opposed to sensing experience are discussed. Feeling experience (as opposed to just sensing) is considered as the necessary condition for having minimal self-awareness. Both would co-emerge in develop- ment. However, minimal self-awareness is rapidly supplemented with an awareness that is not just perceptual, but also conceptual and ethical, primar- ily defined in relation to and by others. I will illustrate this point based on some empirical observations and will discuss this development as defining of what it means to be human (i.e., to be part of a uniquely self-conscious species).

http://dx.doi.org/10.1016j.neurenf.2012.04.014

Su-L-06
Neuropsychological and imaging endophenotypes of attention-deficit/hyperactivity disorder
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Attention-deficit/Hyperactivity Disorder (ADHD) is a common early-onset cli- nically and genetically heterogeneous neuropsychiatric disorder with executive functions (EF) and neurobiological deficits. This will review the neurocogni- tive endophenotypes for ADHD and summarize the endophenotype approach to validate ADHD based on studies in Taiwan. Our previous studies have demonstrat- ed EFs measured by the CANTAB, visual memory measured by the Delayed Matching to Sample, tau (L) of ex-Gaussian distribution of reaction time, time discrimination and time reproduction dual tasks as cognitive endophenotypes of ADHD; and DAT1 gene associated with ADHD inattentive type, inatten- tion symptoms and executive functions (e.g., spatial working memory). The association of ADHD with neurobiological deficits in the frontostriatal and fron- toparietal networks has been demonstrated from our morphometric, functional imaging and diffusion tensor imaging studies. For example, we found disturbed frontostriatal and cingulum microstructure integrity in ADHD that were corre- lated with impaired EF, attention controls, and ex-Gaussian parameters of reaction time.

http://dx.doi.org/10.1016j.neurenf.2012.04.015

Monday 23 July 2012

Mo-L-07
Interactive synchrony: A biobehavioral model of mutual influences in the formation of affiliative bonds in healthy and pathological development
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The talk will present our conceptual model of bio-behavioral synchrony – the coordination of physiological and behavioral responses between attachment partners during social contact – as a theoretical and empirical framework for the study of affiliative bonds and the origins of social reciprocity. I will describe how micro-level social behaviors in the gaze, vocal, affective, and touch modalities are integrated online with physiological processes and hormonal response to create dyad-specific attachments and support children’s capacity for social col- laboration. Studies across multiple attachments throughout life and following children from infancy to adolescence are presented to show that the extended oxytocin (OT) system provides the neurohormonal substrate for the develop- ment of affiliative bonds, is linked with distinct patterns of brain activations and genetic markers, and that mechanisms of cross-generation transmission relate to coordinated social behavior. Longitudinal studies in conditions associated with risk for social development, such as prematurity, maternal post-partum depression, or war-related trauma detail specific alterations to social behavior and neurohormonal systems and highlight specific targets for intervention. The findings suggest that human affiliation and social reciprocity develop within the matrix of biological attention and close behavioral synchrony. Results have conceptual implications for the study of inter-subjectivity and the formulation of a brain-based epistemology as well as translational implications for the integra- tion of OT and behavioral interventions for the treatment of social disorders origin- ating in early childhood.

http://dx.doi.org/10.1016j.neurenf.2012.04.016

Mo-L-08
Child psychiatrists. How are we seen? What do others think we know?
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The picture of child psychiatrists has evolved in some dramatic ways over the past half century, but curiously enough, no matter the changes some significant attributes remain the same. Child psychiatrists have long viewed themselves as having the skills to provide a comprehensive evaluation of child mental disorders and providing the appropriate treatment. In the early days this was strongly influenced by psychoanalysis. In the current era it is influence strongly by psychopharmacology and presumptive gene- tic influences. Throughout child psychiatrists continue to be viewed by many as ideologically bound, self-interested and often only to be sought after for those who are “crazy”. Why is this? What can be done to alter these disturbing images and counter-productive images? The inter-disciplinary set- ting of a IACAPAP congress is an important setting for these issues to be examined.

http://dx.doi.org/10.1016j.neurenf.2012.04.017

Mo-L-09
Genes and activity in development and brain disorders
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To construct the brain, a program is needed or at least an organised sequence of events. Yet, as in all biological reactions a feedback control to check that the
sequence is well performed is required. With my colleague N. Spitzer, I have suggested recently that neuronal activity plays that role serving as a checkpoint that verifies that all steps are performed as planned (Ben-Ari and Spitzer). Several conditions attest to the importance of that function. Thus, during brain development, ionic currents that generate the network patterns they generate or orchestrate follow a developmental sequence shifting from long lasting sloppy currents to faster timed locked currents that generate a plethora of different patterns contrasting with the paucity of diversity of immature patterns. Blocking these events early on heavily impact the outcome leading to malformed or malfunctioning cortices; for instance blocking the retina in utero affects the construction of visual units in the cortex. If so then the obvious next question concerns the consequences of these early alterations of brain activity. I have suggested elsewhere the ‘neuroarcheology’ concept stating the presence of early pre symptomatic architectural or electric signatures of brain disorders. The arguments are that neurological disorders like psychiatric ones are born much earlier than their clinical manifestation and many disorders may well be preceded by malformations in utero. The evidence for these statements will be provided during the conference. At any rate, we have recently obtained direct compelling experimental evidence of these issues. We used a variety of animal models of brain disorders including tuberous Sclerosis of Bourneville, double cortex etc and found that when neurons have these mutations in utero, they fail to migrate as well known from clinical observations. The important point is that when these misplaced neurons are recorded they have immature currents suggesting that neurons who do not fulfill their program remain ‘frozen’ at the developmental stage when the insult occurs. This has many clinical implications and not only conceptual ones. Indeed, we found that applications of drugs that specifically block these currents also block the seizures associated with this disease. These observations also indicate that even if gene therapy was possible, it would be useless in most of these disorders as the sequence of events triggered by the early malformation including the incorrect localization of the neuron and the wrong connections it made are the cause of the disease and not the original mutation of environmental insult. The fact that neurons keep their immature currents when misplaced paves the way for novel therapeutic perspectives based on drugs that block selectively these currents in the adult brain without affecting the adjacent ones. In keeping with this, we have succeeded to block seizures in the tuberous sclerosis animal model with a drug that selectively block the immature but not the adult form of NMDA receptors. To conclude, these observations show the importance of understanding brain development in order to cure brain disorders. I shall also show the therapeutic actions of a diuretic in the treatment of Autism in children based on these observations.

http://dx.doi.org/10.1016/j.neurenf.2012.04.018

Mo-L-10
At last! Hard evidence for the negative effect of stress and the positive effect of sensitive mothering for brain development in preterm infants
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Anecdotal evidence, cross-sectional and animal studies, and theory suggest an association between quality of the environment and the structure of the developing infant brain. However “hard” evidence, including randomised controlled trials (RCTs) in human populations is lacking. We present evidence of this association from magnetic resonance imaging (MRI) studies in very preterm infants. Post-acquisition analyses of MRI scans yield volumes of different brain matter (cortical grey matter, white matter, cerebro-spinal fluid etc), within brain areas (frontal, occipital etc). (i) The allostatic (stress) loads of still hospitalised preterm infants were collated using the Neonatal Infant Stressor Scale (NISS). Relationships between NISS scores and brain development at term equivalent age will be presented. (ii) A RCT intervention trained mothers of still-hospitalised preterm infants to lessen infant stress during handling and mother-infant interactions. Term MRI data show improved white matter development in the brains of infants of intervention compared with control mothers.

http://dx.doi.org/10.1016/j.neurenf.2012.04.019

Mo-L-11
Development of bonding and psychopathology
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Humans are fundamentally social creatures who are ‘motivated’ to be with others. In this the role of the oxytocin (OT) system is examined as it relates to bond formation and psychopathology. OT is synthesized in the brain and throughout the body, including in the heart, thymus, gastrointestinal tract, as well as reproductive organs. The distribution of the OT receptor system in both the brain and periphery is even more far-reaching and its expression is subject to changes over the course of development. The OT system functions as an important element within a complex, developmentally sensitive biobehavioral system. Other elements include sensory inputs, the salience, reward, and threat detection pathways, the hypothalamic-pituitary-gonadal axis, and the hypothalamic-pituitary-adrenal stress response axis. Despite an ever expanding scientific literature, key unresolved questions remain concerning the interplay of the central and peripheral components of this complex biobehavioral system that dynamically engages the brain and the body as humans interact with social partners over the course of development. Evidence is also accumulating that a deeper understanding of the mechanisms underlying OT’s effects on social engagement will inform our understanding of Autism Spectrum Disorders (ASD). We are currently in the midst of assessing whether modulating OT levels will induce specific effects on social behavior and patterns of neural activation in children and adolescents with ASD. Although OT appears to be a key element in this unfolding story, it is surely not the only one. Moving forward, we must continue to examine the relationships between OT and other components in our highly complex biological and emotional worlds, and how they produce the rich and highly nuanced, dynamic interpersonal relationships that are characteristic of our species.

http://dx.doi.org/10.1016/j.neurenf.2012.04.020

Mo-L-12
The variance of normal growth and maturation: A neglected factor when exploring psychopathology in children and adolescents
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From conception to adulthood the human brain undergoes a profound and complex development as a result of the interplay between genetic and environmental factors. As the development proceeds, the brain becomes more and more specialized and its function is better adapted to meet the needs of the organism. This is reflected in the development of the mental functions, which are also affected by the environment in which the child is raised. The brain development in children and adolescents is a complex process that is influenced by several factors, such as genetics, environment, and individual differences. The current understanding of brain development in children and adolescents is based on a combination of various methods, including neuroimaging, behavioral assessments, and psychometric tests. The methods available at the time being, such as EEG, questionnaires, repeated measure of intelligence over time etc. and today by using modern techniques including MR and fMRI of brain development.

From the early IQ-tests originating from Alfred Binet in France and until today, IQ in growing children is measured by correlating the learning age/mental age based upon test results to the chronological age. In each age group, the variance of learning age/mental age is of significant importance. Data from randomized 12 year-old girls from the general population show that their mental age varies considerably. As with age, IQ and school achievements changes and finally that boys and girls do differ. From the early IQ-tests originating from Alfred Binet in France and until today, IQ in growing children is measured by correlating the learning age/mental age based upon test results to the chronological age. In each age group, the variance of learning age/mental age is of significant importance. Data from randomized 12 year-old girls from the general population show that their mental age varies considerably from age 9 years to age 18 years! Modern MR-findings do indicate that:

– Children with ADHD have brains developing normally but at a slower rate.