ORAL SESSION: Neurodevelopmental Disorders and Environmental Impact

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Oral Sessions

Presentations

A multi-analysis approach to task-modulated functional connectivity in autism

Autism spectrum disorder (ASD) is a neurodevelopmental condition with key deficits in social functioning. Neuroimaging evidence points to alterations of large-scale functional connectivity networks involving social brain areas[1,2.]. However, these findings are mainly based on resting state studies, leaving unclear the effect of autism on functional connectivity in the active brain during social information processing. The Longitudinal European Autism Project[3] allows to address this question with a well-powered dataset of 205 individuals with ASD and 189 typically developing (TD) subjects aged 6 to 30 years who underwent functional magnetic resonance imaging (fMRI) during tasks involving social cognition[4] and emotion processing[5]. We studied effects of task, sex, age and diagnosis on functional connectivity using established approaches (seeded connectivity) along with a novel, multivariate method for supervised dimensionality reduction referred to as SPADE (Spatial Patterns for Discriminative Estimation)[6].

Presenter

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Gray Matter Co-Alteration Networks in Autism Spectrum Disorder: A Meta-

Connectomic Approach

The conceptual and empirical developments of connectomics present novel opportunities for understanding neuropsychiatric conditions, which can be considered as neural systems disorders [4,5]. Despite great advances in the field of neuroimaging, gray matter (GM) alteration graphs are extremely difficult to investigate. Recently, a novel meta-analytic methodology has been developed so as to identify a morphometric co-alteration network (MCN) by analysing voxel-based morphometry (VBM) data [1,6]. Consistently with the idea of network-level problems underlying autism spectrum disorder (ASD) [8], we examined the topological characteristics of co-alteration architecture of GM alterations in individuals with ASD.

Presenter

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Aberrant social orienting and extrinsic functional connectivity during natural viewing in autism

Autism spectrum disorder (ASD) is a developmental disorder marked by impaired social interaction and stereotyped behaviors. These symptoms are generally assessed using subjective evaluations during semi-structured diagnostic interviews. By contrast, the underlying differences in brain function are often studied entirely without task, using measures of intrinsic functional connectivity. While such studies have revealed promising results on group differences, linking these findings to specific behavioral effects is difficult. Here, we measured unconstrained social behavior during real-life social interaction, by means of motion tracking, and perception of socio-emotional events in short movies during fMRI to link the within-subject behavioral and neural signatures of ASD. We expected that patients would exhibit aberrant interpersonal orienting behavior and that their brain activity patterns would be less correlated between subjects. Our main question was whether the idiosyncracy of brain activity in the ASD group were related to idiosyncratic social behavior.

Presenter

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Functional cartography of cognitive dysfunction in focal epilepsies: a multiscale task-fMRI analysis

Cognitive impairment is a major comorbidity of epilepsy. Most cognitive fMRI studies focus on the archetypal focal syndrome, temporal lobe epilepsy (TLE). Knowledge of the neural correlates of cognitive dysfunction in another common focal epilepsy, frontal lobe epilepsy (FLE), is limited. Here, we employ neuropsychological tests and four

fMRI tasks to probe the organization of networks subserving language and working memory (WM) in FLE, and establish whether patterns of dysfunction in FLE overlap with those identified in TLE. We complement voxel-based activation maps with analysis of effects across established functional networks [1], and profile activation patterns in relation to a macroscale functional gradient, reflecting an organizational principle of whole-brain connectivity [2,3]. We further investigate the relationship between task-related functional profiles and cognitive scores, and test associations with disease-related variables.

Presenter

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United States

Harmonious family climate mediates the impact of socioeconomic status on child brain function

Children growing up in poverty or low socioeconomic status (SES) circumstances are vulnerable to negative changes in the brain and cognitive development (Farah, 2017). Not all children who grow up in a vile environment, however, experience these adverse consequences. Recent research suggests that, at a certain level, supportive parenting along with low levels of conflict could offset cognitive disadvantages that beset children in low-SES circumstances or even poverty (Brody et al., 2016). But little has been examined to the protective benefits of positive family interactions on neural networks in childhood. The current study tried to understand this question with the data of 11,875 children (9-to-10 years) from the Adolescent Brain Cognitive Development study (release 2.0.1: https://nda.nih.gov/study.html?id=721).

Presenter

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Cannabis Use During Adolescence Is Associated With Altered Cerebral Cortical Development

Emerging evidence suggests that changes in endocannabinoid signaling can significantly influence aspects of mammalian brain development. Evidence further indicates that the adolescent brain may be particularly sensitive to disruptions in normative fluctuations in endocannabinoid signaling, resulting in altered neurodevelopment and enduring behavioral effects. Despite such findings in the animal literature, surprisingly few longitudinal neuroimaging studies have examined putative ties between cannabis use and adolescent brain development. Herein, we examine the association between self-reported cannabis use and cerebral cortical development in a longitudinal, community-based sample of adolescents.

Presenter

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