Universität Basel

Research Project

Rare Coding Variants of Emotion-Related Brain Activation

Third-party funded project

Project title Rare Coding Variants of Emotion-Related Brain Activation
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Organisation / Research unit
Bereich Psychiatrie (Klinik) / Molekulare Neurowissenschaften (Papassotiropoulos)
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Background and aim: Brain activation during emotional processing, as quantified by means of functional magnetic resonance imaging (fMRI), is a key cognitive trait well amenable to imaging genetic studies: such brain activation is heritable, can be assessed in a valid and reliable manner, and has well-defined neural correlates. Alterations in emotional processing-related brain activation characterize a wide spectrum of neuropsychiatric psychiatric disorders such as schizophrenia, bipolar disorder, and depression.

Although human genetic studies have identified common genetic variants related to emotional processing-related brain activation, a major portion of the heritability, partly based on rare coding variants, remains unexplained, a phenomenon commonly termed “missing heritability”. Fortunately, recent advances in DNA sequencing technology are transforming human and medical genetics by enabling whole-exome and whole-genome sequencing at high coverage, thereby allowing the identification of rare variants.

Thus, the aim of this proposal is to identify rare coding variants associated with emotional processing-related brain activation.

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Methods: We will perform high-coverage exome sequencing in phenotypic extremes, i.e. groups of healthy young individuals with particularly high or low emotional processing-related brain activation. Independent samples will be used for replication of the top findings.

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Significance: By identifying rare coding variants related to emotional processing-related brain activation this study will contribute significantly to the understanding of the molecular mechanisms associated with emotional processing in humans. Ultimately, the results will help to improve understanding -and hopefully treatment- of neuropsychiatric disorders.

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