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^{31}P-MR SPECTROSCOPY IN MONOZYGOTIC TWINS DISCORDANT FOR SCHIZOPHRENIA / SCHIZOAFFECTIVE DISORDERS

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Introduction: Magnetic resonance spectroscopy (MRS) using 2D-chemical shift imaging (CSI) allows the quantification of brain metabolites in vivo across several brain regions. Previous studies using ^{31}Phosphorus MRS have shown alterations of phospholipid compounds and high-energy phosphates like ATP in prefrontal and temporal regions in schizophrenia.

Aim: We used a monozygotic (MZ) co-twin study design to examine whether metabolic alterations are due to genetic effects or the expression of disease phenotype.

Methods: ^{31}P-MRS with 2D-CSI was applied at 1.5 T in 8 MZ twin pairs (3 male, 5 female; mean age 33.8, SD 13.1) discordant for a DSM-IV and ICD-10 diagnosis of either schizophrenia (4 pairs), acute schizophreniform psychosis (1 pair), or schizoaffective disorder (3 pairs)) and 8 age- and gender-matched healthy control MZ twins (mean age: 32.9, SD 14.3). Metabolic profiles were compared using oneway ANOVAs.

Results: Voxel-wise comparisons between affected twins and healthy control twins revealed increased PDE concentrations in right cerebellum and increased ATP concentrations in right frontal cortex, insular cortex and bilateral cerebellum. Alterations in energy metabolism were shown in healthy co-twins compared to healthy control twins with an increase in PDE concentrations in right posterior lateral cerebellum, an increase in ATP concentration in left lateral prefrontal cortex as well as left anterior/ lateral temporal cortex and an increase in PCr in left lateral prefrontal cortex.

Conclusions: Our findings suggest that metabolic alterations in schizophrenia result from a combination of both genetic effects and disease manifestation, which can be further explored in larger twin samples.

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