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Metabolomics profiles in children with pediatric acute-onset neuropsychiatric syndrome and autism spectrum disorder

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Pediatric acute onset neuropsychiatric syndrome (PANS) is a recently described disorder presenting with: abrupt onset of obsessive compulsive symptoms and/or severe eating restriction, with at least two concomitant cognitive, motor, behavioral, or affective symptoms such as anxiety and/or irritability/depression (Swedo et al. 2012). PANS is a complex syndrome with a number of etiologies and disease mechanisms rising from an immune/inflammatory reaction triggered by various agents. Since a panel of specific biomarkers is still lack, the diagnosis of PANS must be currently based on the identification of the specific symptomatic constellation (Gagliano et al, 2020). However, numerous research groups are trying to find objective biomarkers (Gagliano et al, 2021). One promising research field is the study of metabolomics pattern. A significantly different plasma metabolic profile from that of healthy controls was recently found in a group of PANS children (Murgia et al 2021), suggesting the involvement of some neurotransmission patterns (tryptophan, glycine, histamine/histidine) as well as a more general state of neuroinflammation and oxidative stress (glutamine, 2-Hydroxybutyrate, and tryptophan-kynurenine pathway). Then, an extension of the metabolomics analysis to a group of patients with autism spectrum disorder (ASD) (Gagliano et al, 2022), showed a metabolomic separation of ASD both from healthy controls (with skewed concentrations of asparagine, aspartate, betaine, glycine, lactate, glucose, and pyruvate) and PANS (with differences in arginine, aspartate, betaine, choline, creatine phosphate, glycine, pyruvate, and tryptophan). Tryptophan and glycine appeared as neuroinflammatory fingerprints of PANS and ASD, respectively. In particular, a reduction in glycine could affect NMDA-R excitatory tone, overall impairing downstream glutamatergic, dopaminergic, and GABAergic transmissions. At the same time, metabolomic similarities between PANS and ASD were found suggesting a putative role of N-methyl-D-aspartate receptor (NMDA-R) dysfunction in both disorders. This metabolomics studies offer new insights into biological mechanisms underpinning disorders probably sustained by immunological and inflammatory alterations.

Biography

Antonella Gagliano completed her first degrees at the University of Messina (Sicily- Italy) in 1995 and her PhD at the University of Naples Federico II in 1999. She was assistant professor of research in child and adolescent neurology and psychiatry unit, department of human pathology "Gaetano Barresi", University of Messina since Jan 1999 to Oct 2018. Then she became associate professor of child neuropsychiatry at the department of biomedical science, University of Cagliari, Sardinia. Currently, she is associate professor of child neuropsychiatry at the department of health science, neurology unit, "Magna Graecia" University of Catanzaro, Italy. She is a child and adolescent psychiatrist and researcher with a particular interest in ADHD, specific learning disorder, autism spectrum disorder, PANS/PANDAS and educational and psychopharmacological treatment.