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Exploring Links Between Autism and the Immune System

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ABSTRACT

Despite expanding research, the etiology or etiologies of autism and its underlying biological processes remain poorly understood. However, there is increasing evidence that immunological dysfunction occurs in many children with autism. Functional data of immune abnormalities are supported by genetic studies indicating a link between autism and genes that have immune functions. A complex interplay exists between the nervous and immune systems through a series of shared receptors and ligands, such as cytokines and chemokines, which are produced by immune cells and neurons alike. Such neuro-immune interactions begin early during embryogenesis and persist throughout an individual's lifetime. Altered immune activity during critical periods of neurodevelopment could lead to neurological dysfunction characteristic of autism. In children with autism, several lines of evidence point to increased immune activity in brain specimens, cerebrospinal fluid and periphery. In support of this, we have recently identified alterations in the number and function of specific immune cells in the blood of children with autism that may contribute to a dysfunctional immune response. This presentation will examine the current status of our research linking the immune response with autism.

BIO:

Paul Ashwood, Ph.D., is a Professor in the Department of Medical Microbiology and Immunology and with the M.I.N.D. Institute at the University of California, Davis. Dr. Ashwood pursues research to elucidate the cellular mechanism and processes underlying neurodevelopmental disorders. He earned his Ph.D. at King's College London where he focused on the role dietary particulates may play in causing inflammation in gastrointestinal diseases such as Crohn's disease. He received further research training in the stem cell biology laboratory of Dr. Nicholas Wright at Imperial College London and Cancer Research UK in London and post-doctoral research training on autism at University College London. His current studies are at the forefront of a rapidly evolving field of investigation into the role that immune response plays in children with neurodevelopmental conditions such as autism. He was the first to demonstrate links between immune dysfunction and the severity of impairments that are hallmark features of autism such as social interactions and communication. His work has highlighted the importance of innate immune pathways, gut-brain connections and the presence of autoimmunity in some children with autism. He is author of over 100 articles and has published more than anyone on immune dysfunction of autism. His articles have been cited frequently and many have been selected by the Faculty of 1000 as important contributions to the field or, appear as NIEHS papers of the month. For five years in a row, his articles have been highlighted by Autism Speaks as landmark papers of the year research achievements. He has received recognition for his innovative work including awards from the Autism Research Institute, Autism Speaks Foundation, Cure Autism Now, the Eden Institute Foundation, the National Alliance for Research on Schizophrenia and Depression (NARSAD), and the National Institutes for Health. He currently serves on several editorial boards including Brain Behavior and Immunity, Autism-open access journal, World Journal of Immunology and World Journal of Clinical Pediatrics and, regularly acts as a reviewer for major grant awarding bodies and leading research journals.