

Andrew Zimmerman, M.D.

M.I.N.D. Institute Distinguished Lecturer Series – April 8, 2009

Biographical Information

Dr. Andrew Zimmerman is a pediatric neurologist at the Kennedy Krieger Institute, with a special interest in behavioral neurology and autism. He received his A.B. from Princeton and his M.D. from Columbia University in 1970. After training in pediatrics at the University of Michigan, Dr. Zimmerman served as a clinical associate in the Developmental and Metabolic Neurology Branch of NINDS at NIH. He came to the John Hopkins University School of Medicine in 1974 as a fellow in pediatric neurology, and received its Certificate of Excellence in Teaching in 1977.

Zimmerman carries out medical evaluations of children and adults with symptoms of autism and other behavioral problems that are neurologically based. He has been interested in research into possible relationships between nervous system disorders and the immune system. A variety of different studies have shown that from 30 to 70 percent of children with autism have distinct abnormalities in their immune systems, including decreased immunoglobulins and T cells, as well as altered lymphocyte and natural killer cell functions. However, there is no evidence, as yet, that children with autism have increased susceptibility to infections, or that specific therapies for the immune system can alter their symptoms. Dr. Zimmerman and his colleagues recently found that rheumatoid arthritis and other autoimmune disorders are more common than expected in the families of children with autism. This led to speculation that autoimmune disorders might be a sign of genetic susceptibility to autism. Such a predisposition may act through genes associated with the human lymphocyte antigens, which commonly have specific associations with autoimmune disorders. These genetic effects most likely begin before birth and might be modified by the mother's, as well as the father's, genes. This may lead to disruption in normal development of the immune, as well as the nervous, systems in the fetus. It is hoped that a better understanding of the links between the developing immune and nervous systems will eventually improve the treatment of persons with autism.

Presentation Abstracts

Effects of Fever in Autism: Clues to Pathogenesis and Treatment (4 pm)

Positive effects of illness and fever on behavior and language have been observed frequently in persons with autism, and raise important questions about the nature of the factors that underlie cortical network functions in this disorder. Clinical changes take place rapidly and are transient, may precede the onset of fever, or persist after it has subsided. Anecdotal reports also suggest that similar changes may occur during the application of external heat, with pain, in adults as well as children, and in other neurodevelopmental disorders. Immunological mediators such as cytokines and chemokines may affect neuronal function, neuronal-neuroglial interactions and synaptic plasticity. Neurotrophins and growth factors may also affect cortical organization and neural circuitry. Fever may have both direct and indirect effects on cellular signal transduction, neurotransmitters and synaptic transmission. Clinical studies as well as cellular and animal models of fever may provide useful leads to understanding and treating autism.

The "Fever Effect" and Search for the Holy Grail in Autism (6 pm)

Autism is a multifaceted disorder that presents many challenges to families and researchers. A majority of children with autism have been found to have positive changes in behavior and language during fever and illness, which seem to occur more frequently in autism than in other neurological disorders. Such changes can be quite dramatic when they occur, and suggest that underlying brain networks are more intact, but under-connected, than they were previously thought to be. Reports from families of the effects of fever in autism led to a study that confirmed their reports, and subsequent anecdotal reports have expanded the spectrum to include all ages as well as other disorders. There are likely to be many and varied genetic, metabolic and immunological "markers" in autism. However, several repeating clinical patterns, such as the "fever effect," early brain overgrowth and developmental regression, might correlate to these markers and lead us to understand the basic biological mechanisms that contribute to causing – and also treating – autism.