

Stewart H. Mostofsky, MD

MIND Institute Distinguished Lecturer Series – March 12, 2014

Biographical Information

Stewart H. Mostofsky, MD, is director of the Laboratory for Neurocognitive and Imaging Research (LNIR), as well as medical director of the Center for Autism and Related Disorders (CARD), at the Kennedy Krieger Institute. He received his medical degree in 1990 through the Rensselaer Polytechnic Institute-Albany Medical College six-year program, where he won the Jack Spitalny Prize for exceptional achievement in pediatrics. Dr. Mostofsky completed residency training in Pediatrics and Pediatric Neurology at the University of Minnesota, and following this came to Kennedy Krieger Institute (KKI) in 1995 for a fellowship in Developmental Cognitive Neurology. He has since continued as faculty at KKI and Johns Hopkins University, focusing his clinical and research activities on working with children with developmental disorders, in particular autism and ADHD. Dr. Mostofsky's research activities integrate neurological and behavioral assessments of sensorimotor and cognitive function, anatomical and functional neuroimaging, and electrophysiologic/brain stimulation approaches. Recognizing that many children with autism and with ADHD have substantial difficulties with motor control and learning, this work has focused on identifying patterns of sensorimotor dysfunction in autism and ADHD, and the subsequent use of this information to both better understand the brain bases of these disorders and identify novel approaches for therapy. Currently, he is PI on three NIH R01 projects involving use of behavioral and neuroimaging techniques to investigate the neurologic basis of, and emerging therapeutic approaches for, autism (NINDS: NS048527) and ADHD (NIMH: MH085328, NIMH: MH078160-061A).

Presentation Abstract (4:30 pm presentation)

Motor and Social Skill Function: Connecting Learning and Brain Function in Autism

Internal action models refer to sensory-motor programs that form the brain basis for a wide range of skilled behavior and for understanding others' actions. Development of these action models, particularly those reliant on visual cues from the external world, depends on connectivity between distant brain regions. Studies of children with autism reveal anomalous patterns of motor learning and impaired execution of skilled motor gestures. These findings robustly correlate with measures of social and communicative function, suggesting that anomalous action model formation may contribute to impaired development of social and communicative, as well as motor, capacity in autism. Motor signs can be measured with a high degree of precision and the neurologic basis of motor function is well mapped out such that deviations observed in autism can readily be understood at the brain level. This line of study can therefore lead to important advances in understanding the neural basis of autism and, more critically, can be used to guide effective therapies targeted at improving social, communicative, and motor function. Here we will present findings revealing that: 1) children with autism show a distinctly anomalous pattern of motor learning, with a bias towards reliance on proprioceptive, rather than visual, feedback; 2) this anomalous pattern of motor learning is associated with the severity of motor skill deficits, as well as the social skill deficits that define the core features of autism; and 3) children with autism show decreased intrinsic visual-motor connectivity in functional MRI that is associated with the core symptoms exhibited by children with autism. Evidence of anomalous motor learning in autism and its association with motor skill impairments and deficits in social and communicative skills will be presented, as will convergent data from neuroimaging techniques, revealing that these motor and social skill impairments may be related to abnormalities in visual-motor connectivity.