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American College of Neuropsychopharmacology

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Immune cells help prune connections between brain cells and may be a link between inflammation and autism

Hollywood, FL (December 12, 2013) – A new study shows that immune reactions in the brain play a key role in regulating the connectivity between brain cells and influence risk of autism. The data were presented today at the American College of Neuropsychopharmacology (ACNP) Annual Meeting.

The chemical connections between neurons, termed synapses, regulate information flow in the brain and disruptions in synaptic communication are responsible for practically all types of neurodevelopment and psychiatric disorders. A new study highlights a key role for the immune system in the brain in controlling synaptic communication between neurons and implicates altered immune reactions in autism.

In the study, led by Beth Stevens of Boston Children's Hospital at Harvard Medical School, specialized immune cells in the brain, termed microglia, are shown to prune synaptic connections between neurons to ensure that only those that are in regular use are maintained while those that are not used regularly are broken down. In this manner, only those synapses that are required for proper brain function persist.

The investigators found that those synapses that were not in regular use were “tagged” by the complement system, which is usually associated with immune reactions to invading pathogens in the body and serve to boost immune reactions against such pathogens. Tagging inactive synapses triggered their “engulfment” by microglia in the brain in much the same way that white blood cells “eat” invading pathogens in the body.

Interestingly, deficits in microglia engulfment of synapses were observed in two mouse models of autism. This observation may help explain the well-known association between immune reactions in the brain during early development and

As noted by Dr. Stevens, *“Our findings have important implications for understanding mechanisms underlying synaptic and microglia dysfunction in autism, Rett Syndrome and other neurodevelopment disorders”*.

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ACNP, founded in 1961, is a professional organization of more than 700 leading scientists, including four Nobel Laureates. The mission of ACNP is to further research and education in neuropsychopharmacology and related fields in the following ways: promoting the interaction of a

broad range of scientific disciplines of brain and behavior in order to advance the understanding of prevention and treatment of disease of the nervous system including psychiatric, neurological, behavioral and addictive disorders; encouraging scientists to enter research careers in fields related to these disorders and their treatment; and ensuring the dissemination of relevant scientific advances.