Scientists uncover key developmental mechanisms of the amygdala

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For the first time, scientists at Children's National Medical Center have successfully identified a key developmental program for the amygdala—the part of the limbic system that impacts how the brain creates emotional memories and responses.

This knowledge could help scientists to better understand autism and similar disorders in which altered function of this region is known to occur.

The findings, published in the February edition of *Nature Neuroscience*, identify a group (otherwise known as a pool) of precursor cells of neurons that are earmarked specifically for the amygdala and comprise part of a unique system of growth and development for this portion of the brain.

"Despite its central role in normal brain function and behavior, little has been known about how neuronal cell diversity is generated during development of the amygdala," said senior author Joshua Corbin, PhD, of the Center for Neuroscience Research at Children's National. "It was thought that development of this region occurred similarly to other brain structures like the cerebral cortex, but our findings indicate that a specific precursor pool exists that is pre-assigned exclusively to the limbic system. It is a breakthrough to our understanding of this little studied region of the brain."

Using studies of embryonic mice, Corbin and his team located two

specific pools of precursor cells marked by the transcription factor Dbx1 that migrate from both the ventral pallium and the preoptic area—a previously undiscovered pool of migratory cells—to create the requisite mix of excitatory and inhibitory neurons that ultimately comprise the amygdala. Remarkably, the preoptic area precursor cells are exclusive contributors to the development of the limbic system, and no other portion of the brain.

"Altered function of the amygdala is a hallmark characteristic of disorders such as autism," said Dr. Corbin. "A more clear understanding of the normal development of this important brain structure provides a roadmap to understand the consequences of altered brain development in neurodevelopmental disorders."

Paper: Complete text pre-published online at: www.nature.com/neuro/journal/v … ent/abs/nn.2241.html .

Source: Children's National Medical Center

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