Brain changes in adolescent males shown in new research

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Every parent knows that teenagers, who undergo changes in hormones during puberty, are often fraught with drama.

Now, a Georgia State University scientist has found that those hormones in males may be key to changes in a part of the brain responsible for social behaviors.

Bradley Cooke, assistant professor of neuroscience at GSU, has found that in male Siberian hamsters, a part of the brain called the medial nucleus of the amygdala increased by nearly 25 percent during puberty. The results have been published in a new study in the *Journal of Neuroendocrinology*.

The increase in the size of the brain region was accompanied by an increase in the size of individual nerve cells, called neurons, and there was a strong trend towards more neurons overall. In addition, the connections between neurons, called synapses, were found to have increased as well.

“Taken together, these findings indicate that the medial amygdala is reorganized during puberty,” said Cooke, a member of GSU’s Neuroscience Institute.

The growth of the medial nucleus of the amygdala, responsible for changes in aggression and other behaviors, is believed to be related to the rising levels of testosterone during puberty, he said.

“This makes sense because the medial nucleus of the amygdala is sensitive to testosterone, and is packed with receptors for this hormone,” Cooke explained.

Due to the difference in hormones between males and females, the growth of this brain region is most likely not the same in females, he said.

Cooke said he doesn’t believe that the changes are permanent, because if male rats are robbed of testosterone, the brain region shrinks to the same size as females.

Going forward, Cooke and his team want to see if parts of neurons called dendrites – branches of the cells which help to form connections, or synapses, between neurons – change in shape. He would also like to further explore how new neurons are formed during puberty.

“The concept that the amygdala may form new neurons at any other time than at the embryonic stage is completely radical,” he said. “It’s a very unique idea in the field of neuroscience.”

More information: The study, “Synaptic reorganization of the medial amygdala during puberty,” appears in the *Journal of Neuroendocrinology*, 2011 Jan;23(1): 65-73.

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