Two genes help older brain gain new cells

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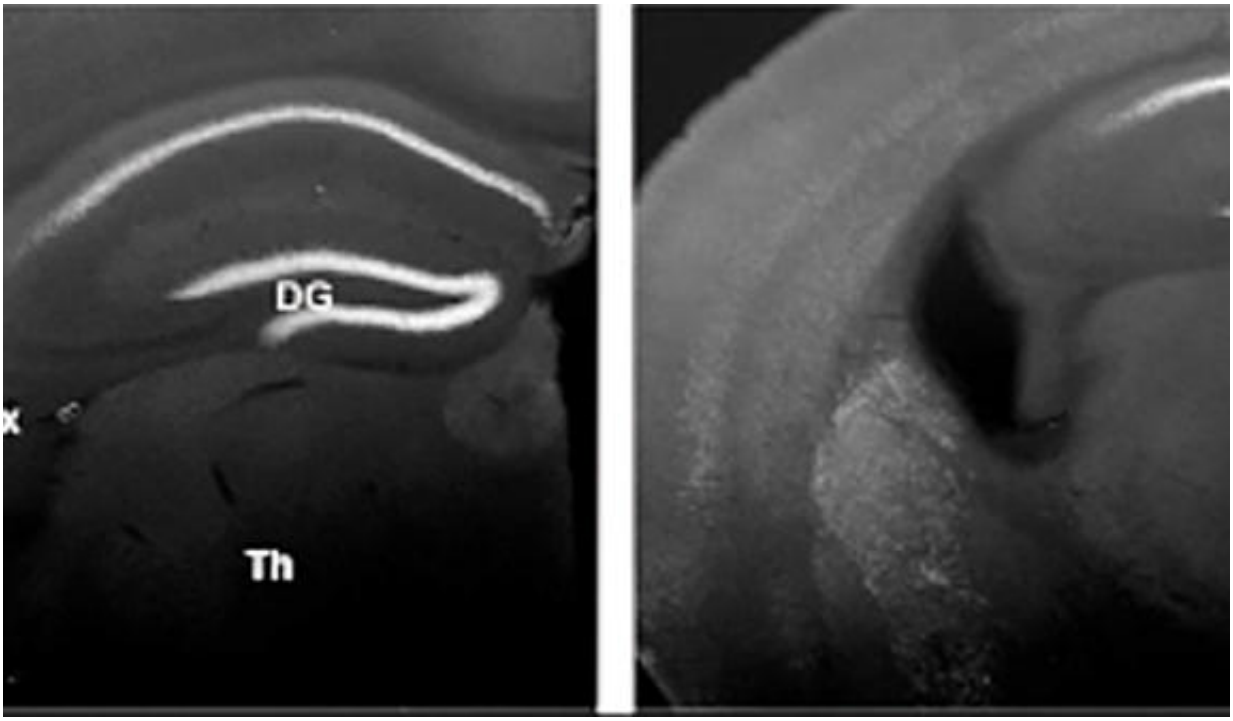

The absence of two key genes dramatically shrinks number of neural stem cells (right). Credit: Yale University

Two genes act as molecular midwives to the birth of neurons in adult mammals and when inactivated in mice cause symptoms of Fragile X Syndrome, a major cause of mental retardation, a new Yale University study has shown.

In humans as well as mice, most neurons are created prior to birth and

few new brain cells are produced as adults. The new study identified two genes that are crucial to creation of neurons in the brain region responsible for learning and memory. When the two Pumilio genes—PUM1 and PUM2—are knocked out in mice, few neural stem cells are created in this region, which becomes very small. The mice can no longer navigate mazes and exhibit the same pathology as humans with Fragile X Syndrome.

The genes control whether RNA that has already been transcribed actually go on to create proteins, a little studied step of gene regulation with major biological implications, said senior author Haifan Lin, the Eugene Higgins Professor of Cell Biology, and professor of genetics and of obstetrics, gynecology, and reproductive sciences as well as director of the Yale Stem Cell Center.

Meng Zhang, a graduate student in the Lin lab, was lead author of the study published Aug. 15 in the journal *Genes & Development*.

Provided by Yale University