

New neuron formation could increase capacity for new learning, at the expense of old memories

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New research presented today shows that formation of new neurons in the hippocampus - a brain region known for its importance in learning and remembering - could cause forgetting of old memories by causing a reorganization of existing brain circuits. Drs. Paul Frankland and Sheena Josselyn, both from the Hospital for Sick Children in Toronto, argue this reorganization could have the positive effect of clearing old memories, reducing interference and thereby increasing capacity for new learning. These results were presented at the 2013 Canadian Neuroscience Meeting, the annual meeting of the Canadian Association for Neuroscience - Association Canadienne des Neurosciences (CAN-ACN).

Researchers have long known of the phenomenon of infantile amnesia: This refers to the absence of long-term memory of events occurring within the first 2-3 years of life, and little long-term memories for events occurring until about 7 years of age. Studies have shown that though young children can remember events in the short term, these memories do not persist. This new study by Frankland and Josselyn shows that this amnesia is associated with high levels of new neuron production - a process called neurogenesis - in the hippocampus, and that more permanent [memory formation](#) is associated with a reduction in neurogenesis.

Dr. Frankland and Dr. Josselyn's approach was to look at retention of

memories in young mice in which they suppressed the usual high levels of neurogenesis in the hippocampus (thereby replicating the circuit stability normally observed in adult mice), but also in older mice in which they stimulated increased neurogenesis (thereby replicating the conditions normally seen in younger mice). Dr. Frankland was able to show a causal relationship between a reduction in neurogenesis and increased remembering, and the converse, decreased remembering when neurogenesis increased.

Dr. Frankland concludes: " Why infantile amnesia exists has long been a mystery. We think our new studies begin to explain why we have no memories from our earliest years."

Provided by Canadian Association for Neuroscience

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