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## Upregulation of zif268 in passive avoidance learning

Memory is one of the most important functions of the nervous system. It allows animals to remember that they have to pick up their kids after soccer practice. It helps animals survive by identifying relatives, dangerous predators, poisonous food, etc. We have two forms of memory: short term memory (STM) and long term memory (LTM). The difference between these two types of memory is that LTM requires new gene expression and STM does not. That is, the formation of long-term memories requires that the learning experience cause neurons to use information coded by DNA (genes) to make changes in them. These changes reflect the formation of LTM. The goal of this project is to see if the expression of a gene, zif268, is upregulated in response to a specific type of associative learning. Zif268 is an “immediate early gene” (IEG) that is rapidly and transiently activated in response to neuronal activation and can be detected by measuring zif268 mRNA. We tested our hypothesis using a passive avoidance learning task. The animals learn that when they step down from a platform area they will receive a very brief, low level footshock. The hippocampus is the brain region required for LTM formation in this task. In situ hybridization demonstrated an increase of zif268 mRNA in the CA1 subregion of the hippocampus. The control groups (a naïve group and a context-exposure group), did not show any difference in zif268 mRNA levels. Our results indicate that this upregulation of zif268 expression is not due merely to the shock administered to the animal but is due to associative learning resulting in the formation of LTM.

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