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Function and activity-dependent regulation of adult neurogenesis

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ABSTRACT OF THE TALK

Epidemiological data clearly indicate that activity is beneficial for successful aging. Neurogenesis in the adult hippocampus is regulated in response to both cognitive and physical activity and might thus contribute to this effect, whose biological basis is still so poorly understood. Physical activity in mice prevented the age-dependent decline in hippocampal precursor cell proliferation but did not lead to sustained net neurogenesis, presumably because the appropriate survival-promoting stimulus was missing. Learning might be that appropriate stimuulus. But what is the function of adult-generated neurons? We developed a hypothesis relating adult neurogenesis to the long-term optimization of the mossy fiber connection between the dentate gyrus, where adult neurogenesis occurs, and CA3. This hypothesis could be tested in a computational model and an experiment, in which we knocked down adult neurogenesis. From the results a hypothesis was generated about the functional contribution of activity-dependently regulated adult neurogenesis to cognition across the lifespan.