

Permissive conditions for Neurogenesis in the adult CNS

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The adult brain contains stem cells but in only two privileged brain regions new neurons originate from these precursor cells. This process, called "adult neurogenesis", is regulated by activity. Different types of activity affect different stages of neuronal development. It seems that comparatively non-specific stimuli, such as physical activity, directly influence the stem and precursor cells themselves. In contrast, more specific activity, such as learning stimuli, increase the survival of newborn neurons. In order to maintain cellular plasticity during aging the effects of physical and cognitive activity may have to come together. Aim of the research group is to understand the neurobiological mechanisms underlying the activity-dependent regulation of adult neurogenesis. The immediate cellular microenvironment of the stem cells, the so-called "niche", mediates the external stimuli to the stem cells and is permissive for neuronal development. In other brain regions this does not occur. The genetics of such processes is highly complex. The present focus of the work is to decipher the genetic networks that control the activity-dependent regulation of adult neurogenesis and to study the necessary characteristics of "activity" in this context and the details of how such activity is mediated to the cells of the niche.

Projektbeteiligte

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