

## **The cell biology of forgetting: Spontaneous synaptic remodeling and its relationship to memory retention and decay**

Initiative: zukunft.niedersachsen (nur ausgewählte Ausschreibungen)

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The brain consists of a vast network of nerve cells connected by synapses - cellular devices specialized for the transmission of information. According to a fundamental doctrine in neuroscience, changes to synapse strength, cued by experience or sensory input, represent a major mechanism by which nervous systems learn new tasks or store new memories. An implicit, yet often ignored corollary of this assertion is that strengths of synaptic connections should not change spontaneously, that is, in manners unrelated to functionally relevant cues. Recent studies suggest, however, that synapse strengths do change spontaneously and to large degrees. While attempts have been made to reconcile these findings with the canonical view of synapses as 'information storage devices', an unexplored possibility is that spontaneous changes to synapse strength drive forgetting - the gradual decay of memories and acquired skills. This research project aims to critically test this possibility. The core idea is to experimentally manipulate rates of spontaneous synapse change and examine how these manipulations affect the (in)stability of network function, memory retention and behavioral flexibility. To that end, it will employ approaches ranging from molecular manipulations, imaging and electrophysiology to animal models and behavioral assays. We expect that this project will provide exciting information on the physiological and behavioral consequences of spontaneous synapse change and the manners by which information might be preserved in face of such change. It is the hope that this project will open new avenues for understanding memory decay and behavioral flexibility under both physiological and pathological conditions.

### **Projektbeteiligte**

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