

## Metabolic control of long-term memory across species

While the strong link between nutrition and cognitive function has been appreciated since the days of the early Greek philosophers, the mechanisms bridging metabolism to neural function remain largely unknown. In the last decades, many studies have connected mitochondrial dysfunction and neurological disease, showing that impaired metabolic states in neurons subsequently cause brain dysfunction. However, a major unsolved question has arisen: given that dysfunctional neuronal metabolism impairs brain function, can the opposite perturbation, i.e. increasing neurometabolism, boost brain function? In this talk I will show our efforts on tackling this issue in insects and mammals, exploring how scaling up synapse metabolism can boost higher order brain functions. Using novel genetic perturbations to accelerate mitochondrial metabolism in firing neurons, we find that metabolic enhancement in neurons of memory centers of flies and rodents can significantly improve long-term memory in both species. These findings suggest that metabolism is a key factor in modulating brain efficiency and cognitive abilities, offering new perspectives on the potential for metabolic interventions in cognition.

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**Date:** Tuesday 23 January 2024  
**Time:** 9:00 am – 10:00 pm  
**Venue:** Nucleus/MBG auditorium (1871-120)  
**Address:** Universitetsbyen 81, 8000 Aarhus C

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