Synthetic glucocorticoid impacts learning and memory function with transgenerational effects: Study

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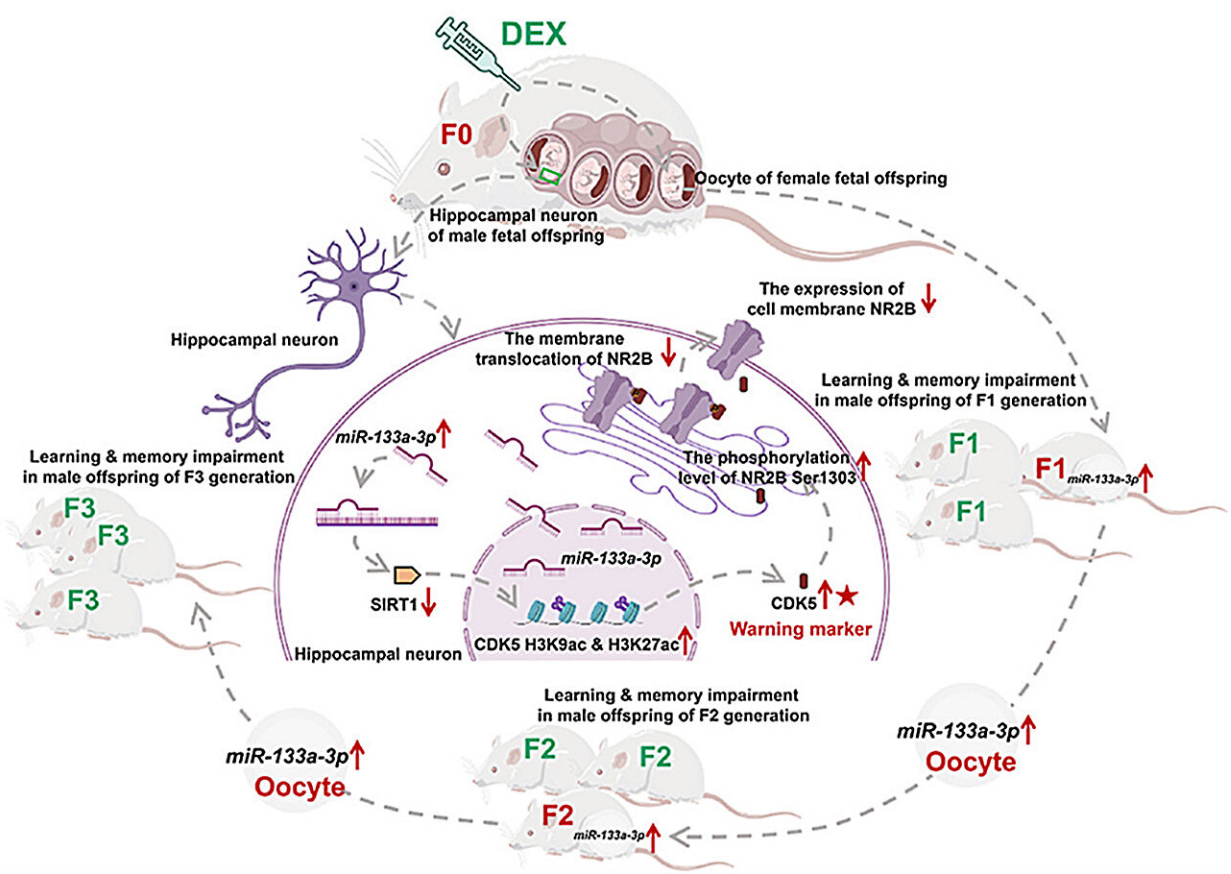

Credit: *Acta Pharmaceutica Sinica B* (2023). DOI: 10.1016/j.apsb.2023.05.013

A new article published in *Acta Pharmaceutica Sinica B* discusses how

gestational dexamethasone exposure impacts hippocampal excitatory synaptic transmission and learning and memory function with transgenerational effects.

The formation of learning and memory is regulated by synaptic plasticity in hippocampal neurons. The authors of this article explored how gestational exposure to dexamethasone, a synthetic glucocorticoid commonly used in clinical practice, has lasting effects on offspring's learning and memory.

Adult offspring rats of prenatal dexamethasone exposure (PDE) displayed significant impairments in novelty recognition and spatial learning memory, with some phenotypes maintained transgenerationally. PDE impaired synaptic transmission of hippocampal excitatory neurons in offspring of F1 to F3 generations, and abnormalities of neurotransmitters and receptors would impair synaptic plasticity and lead to impaired learning and memory, but these changes failed to carry over to offspring of F5 and F7 generations.

Mechanistically, the altered hippocampal miR-133a-3p-SIRT1-CDK5-NR2B signaling axis in PDE multigeneration caused the inhibition of excitatory synaptic transmission, which might be related to oocyte-specific high expression and transmission of miR-133a-3p.

Together, PDE affects hippocampal excitatory synaptic transmission, with lasting consequences across generations, and CDK5 in offspring's peripheral blood might be used as an early warning marker for fetal-originated learning and memory impairment.

More information: Mingcui Luo et al, Gestational dexamethasone exposure impacts hippocampal excitatory synaptic transmission and learning and memory function with transgenerational effects, *Acta Pharmaceutica Sinica B* (2023). DOI: 10.1016/j.apsb.2023.05.013