

Treating dementia and other brain disorders with natural glycans

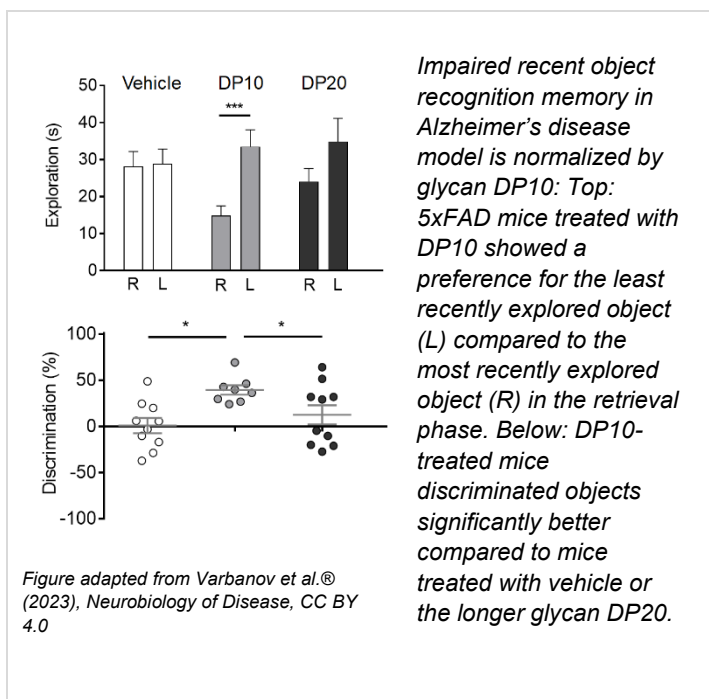
Keywords: neurological disorder, Schizophrenia and Dementia, loss of memory, neural plasticity, glycans, polysialic acid, NCAM

INVENTION NOVELTY

Natural glycans known as polysialic acid have been shown to improve memory functions and support cell vitality, making them a treatment option for dementia and other brain disorders

VALUE PROPOSITION

Neurological and neuropsychiatric disorders remain an area of great medical need both for prevention and therapy. Loss of memory in these diseases is linked to deficits in neural and synaptic plasticity - a fundamental mechanism that so far cannot be supported therapeutically with the necessary efficiency. However, synaptic plasticity can be modulated pharmacologically and is a potential target for disease modifying strategies and symptomatic treatment.



TECHNOLOGY DESCRIPTION

Neural and synaptic plasticity is mediated by functionally important glycans forming part of the extracellular matrix and cell adhesion molecules. Among these is polysialic acid (polySia), a polymer formed of the sialic acid residues, which is predominantly carried by the neural cell adhesion molecule NCAM. PolySia is synthesized by concerted action of two enzymes resulting in a high variability with respect to the polymer length. Alterations in polySia homeostasis have been associated with neuropsychiatric and neurological disorders, including schizophrenia, bipolar disorder, depression, and Alzheimer's disease. Using size-defined polySia fragments and their derivatives, we identified compounds, which efficiently improved memory functions and supported cell vitality. The polySia compounds have been shown to be deliverable to the brain by systemic administration, to cause stable and potent specific receptor inhibition, re-establishment of long-term potentiation in the prefrontal cortex and hippocampus as well as reestablishment of recent object recognition in *in vivo* mouse models of schizophrenia and dementia.

COMMERCIAL OPPORTUNITY

Licensing and/or co-development.

DEVELOPMENT STATUS

In vivo data. Preclinical development.

PATENT SITUATION

A priority application was filed in July 2018, followed by a PCT application in July 2019, a U.S. national phase application in January 2021, and a European regional application in February 2021.

FURTHER READING

Kochlamazashvili et al., 2010. NCAM-associated polysialic acid regulates synaptic plasticity and learning by restraining the signaling through GluN2B-containing NMDA receptors. *J. Neurosci.* Varbanov and Dityatev, 2017. Regulation of extrasynaptic signaling by polysialylated NCAM: Impact for synaptic plasticity and cognitive functions. *Mol Cell Neurosci.*