

Alpha-synuclein

Alpha-synuclein is a protein that is primarily found in the brain, particularly in the presynaptic terminals of neurons.

Alpha-synuclein in Parkinson's disease

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Ben-Men-1 cells ingest neurotoxic peptides amyloid- β (A β 1-40) and protein **Alpha-synuclein** up to about 10-fold more efficiently compared to neuronal-like SH-SY5Y cells. A β 1-40 and α -synuclein are mainly taken up via macropinocytosis. Caveolar endocytosis in addition contributes to α -synuclein ingestion. Upon uptake, both are trafficked towards lysosomal degradation. While production of reactive oxygen species (ROS) following exposure to A β 25-35 and α -synuclein was similar between Ben-Men-1 and SH-SY5Y cells, mitochondrial function in Ben-Men-1 was significantly more robust to A β 25-35 treatment compared to neuronal-like SHSY5Y cells. Similarly, Ben-Men-1 were significantly less susceptible to A β 25-35-induced cell death than neuronal-like cells. Furthermore, co-culture with Ben-Men-1 offered significant protection to neuronal-like cells against A β 25-35-induced apoptosis. This study reveals for the first time the function of meningotheial cells as scavengers of neurotoxic A β and α -synuclein, thereby connecting these cells to neuroprotective processes and suggesting a new mechanism and pathway for clearing neurotoxic substances from the CSF ¹⁾.

¹⁾

Hemion C, Li J, Kohler C, Scholl HPN, Meyer P, Killer HE, Neutzner A. Clearance of neurotoxic peptides and proteins by meningotheial cells. Exp Cell Res. 2020 Nov 15;396(2):112322. doi: 10.1016/j.yexcr.2020.112322. Epub 2020 Oct 15. PMID: 33068559.

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