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

Alpha-synuclein in Parkinson's disease

Ben-Men-1 cells ingest neurotoxic peptides amyloid-β (Aβ1-40) and protein Alpha-synuclein up to about 10-fold more efficiently compared to neuronal-like SH-SY5Y cells. Aβ1-40 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 Aβ25-35 and α-synuclein was similar between Ben-Men-1 and SH-SY5Y cells, mitochondrial function in Ben-Men-1 was significantly more robust to Aβ25-35 treatment compared to neuronal-like SHSY5Y cells. Similarly, Ben-Men-1 were significantly less susceptible to Aβ25-35-induced cell death than neuronal-like cells. Furthermore, co-culture with Ben-Men-1 offered significant protection to neuronal-like cells against Aβ25-35-induced apoptosis. This study reveals for the first time the function of meningothelial cells as scavengers of neurotoxic Aβ 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 meningothelial cells. Exp Cell Res. 2020 Nov 15;396(2):112322. doi: 10.1016/j.yexcr.2020.112322. Epub 2020 Oct 15. PMID: 33068559.