

Involvement of selenium-containing proteins in the blood-brain barrier

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The essential trace element selenium is of fundamental importance to mammalian biology. Selenium in the form of selenocysteine, the 21st amino acid, is an integral component of the active site of all selenoenzymes. It has thus important biological effects, particularly in the redox regulation of metabolic processes. Several selenocysteine-containing proteins have an effect as redox active compounds and therefore play a decisive role in the brain. There are several evidences that selenium has an interconnection with regard to the maintenance of the permeability of blood-brain barrier (BBB) such as multiple sclerosis, HIV, Parkinson disease and seizure. In the present study a co-culture model was established. It consists of astrocytes and endothelial cells to investigate the uptake and incorporation of selenium in the culture model. After labelling with ⁷⁵Se and proliferation the proteins of the involved cells were harvest separately and analysed via biochemical methods. In this way more than 18 selenium-containing proteins were detected in each of the cell types. The most important task is to identify which selenoprotein has a correlation to the permeability of the blood-brain barrier and to find out the amount of selenium, which is necessary to obtain the corresponding permeability effect. Recent results will be presented and discussed in detail.

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