

Alzheimer's Disease (AD) is one of the most frequent medical conditions in the population older than 65. Worldwide, ca. 30 million people are affected, and approximately 200 thousand in Poland. It is predicted that the number of patients will triple until 2050. Despite the fact that AD affects the increasing fraction of the population, its primary cause remains unknown. Also, methods of its cure are still lacking. Amyloid beta ($A\beta$) peptides participate in the pathology leading to neuronal death and brain damage. These peptides undergo aggregation and also may form complexes with Zn(II) and Cu(II) ions. These processes are neurotoxic. Albumin may have a significant effect on these phenomena, decreasing the ability of $A\beta$ peptides to aggregate. Both $A\beta$ peptides and albumin possess metal binding sites and in addition interact with each other. These features may be of key importance for prevention of formation of toxic oligomers of these peptides.

I intend to verify this concept using many experimental methods of research, including circular dichroism, microscale thermophoresis, electronic spectroscopy, mass spectrometry, isothermic calorimetry and differential scanning calorimetry. This will empower me not only to determine the binding constants for the HSA/ $A\beta$ complex in the absence and presence of metal ions, but also to provide full description of thermodynamic parameters of the studied reactions, including changes of enthalpy, entropy, free energy and heat capacity.

In this way I intend to investigate the influence albumin may exert on toxic properties of $A\beta$ peptides. The results of proposed studies will contribute significantly to enlarging knowledge on processes related to the development of AD. The issue of HSA/ $A\beta$ complex formation has not been studied very thoroughly, despite the reports on a possible important role of this protein in the process of clearance of $A\beta$ peptides from the brain. The role of metal ions in this process has not been studied at all. Therefore, my results may be very important from the point of view of millions of people worldwide.