the corresponding biotechnological applications. Most importantly, it is involved in a wide range of diseases, including some of the most prevalent neurodegenerative disorders. Denaturation of human carbonic anhydrase II (HCA II) (EC 4.2.1.1) is irreversible, therefore any efforts in order to induce reversibility can be important. In this report, we show the chaperone ability of silica nanoparticle supported imidazolium ionic liquid (SNImIL) on HCA II at pH 7.75. The mechanism for chaperone activity of SNImIL as a nano chaperon on aggregation and percentage of reversibility of HCA II was investigated by various techniques such as UV–Vis, fluorescence spectroscopy and differential scanning calorimetry (DSC). The results shown the percentage of reversibility of HCA II is increased up to %42 in the presence of SNImIL after 24 hours incubation and also decreased the aggregation rate.

Keywords: Human Carbonic Anhydrase II, Silica Nanoparticle Supported Imidazolium Ionic Liquid, Reversibility, Differential Scanning Calorimetry, Aggregation Rate.

Abstract No.131

A Comparative Study of Non-Hydrolytic Activities of Acetyl and Butyrylcholinesterase Enzymes and Their Impact on The Formation of Beta-Amyloid Aggregation

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Alzheimer disease (AD) is one of the most common neurodegenerative dementias, caused by silent plaques that are created by fibril formation of beta amyloid (Aβ) peptide. Aβ, is a portion of transmembrane receptor-like amyloid precursor protein (APP) in neuron cells. Recent investigations have shown that acetylcholinesterase (AChE) plays a crucial role in the promotion of Aβ aggregation beside its role in the rapid hydrolysis of the neurotransmitter acetylcholine (ACh). Butyrylcholinesterase (BChE), because of similar structure and function to AChE may also have role in thia phenomena. Both AChE and BChE have a peripheral anionic site, beside their active site, and it is proposed that it is involved in the promotion of amyloid fibrillation presumably through interactions with Aβ. In this study we have investigated about this promotive effect of AChE and BChE on amyloid aggregation in vitro. Our preliminary results showed that both enzymes could significantly increase Aβ42 thioflavine T (ThT) fluorescence intensity, considered as a quantitive index of amyloid aggregation, when they were incubated with Aβ. In the continuation of these studies we will examine the synergistic effects of these two enzymes (if any) and the effects of their inhibitors of Aβ aggregation, with the use of techniques such as circular dichroism (CD) and atomic force microscopy (AFM) in addition to thioflavine T fluorescence spectroscopy.

Keywords: Beta Amyloid (Aβ), Fibril Formation, Acetylcholinesterase (AChE), Butyrylcholinesterase (BChE).

Abstract No.132

Effects of Ionic Strength and Chaotropic Agents on Lysozyme Aggregation

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Protein aggregation is an important topic in biological research, and investigations on the mechanisms of amyloid aggregation in brain and other tissues is of prime importance. Human lysozyme (HuL) is an amyloidogenic protein that its mutant variants cause hereditary systemic amyloidosis. Since hen egg white lysozyme (HEWL) and HuL have a high degree of structural and sequential homology, it has been used as a model protein in this study to investigate the mechanism of amyloid formation of proteins. In this study we examined different concentrations of sodium chloride (0.1, 0.3, 0.5, 1, 1.5, 50, 100 and 500 mM NaCl) to see at which concentration of NaCl the lysozyme aggregation could be affected significantly. Our investigation showed that at all of the above concentrations, aggregation of lysozyme still occurred. Our results showed that only 500 mM concentration of sodium chloride could decrease aggregation of lysozyme molecules significantly. We obtained our data through Thioflavin T (ThT) fluorescence, circular dichroism (CD) spectroscopy and atomic force microscopy (AFM). In the continuation of present study we will also examine different concentration of chaotropic agents such as urea, guanidine hydrochloride (GuHCl) and guanidinium thiocyanate (GITC) on lysozyme aggregation. In vitro experiments not only help to decipher the complex molecular mechanisms of amyloid fibrillation, but also would help to design therapeutic agents against devastating pathological conditions such as neurodegenerative diseases and systemic amyloidosis.

Keywords: Aggregation, Hen lysozyme, Ionic strength, Chaotropic agent, Amiloid fibrils.
