

P004 α -Crystallin protection of the enzymes against inactivation is influenced by macromolecular crowding

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The high concentration of small and large molecules in the living cell creates an environment completely different from the diluted one, used in the *in vitro* experiments. The macromolecular crowding theory predicted that under such conditions a significant enhancement of macromolecular associations and protein aggregation occur. In order to prevent aggregation, the cells employ molecular chaperones to shield the exposed hydrophobic surfaces of the unfolded polypeptide chains. However, there are only few data concerning the effect of macromolecular crowding on the activity of molecular chaperones. It is already known that α -crystallin, a major lens protein and a small heat shock protein prevented heat-induced aggregation of proteins *in vitro* and protected enzymes against the inactivation induced by sugars, cyanate or steroids. In the present work we demonstrated that the chaperone activity of α -crystallin to protect enzymes against glycation-induced inactivation was influenced by the presence of dextran, PEG and BSA at crowding concentrations. α -Crystallin protected completely each of the two enzymes against glycation-induced inactivation, but only partially in the presence of crowding agents. The results show that macromolecular crowding agents, although considered inert compounds influenced the enzymatic activity of native enzymes and the effect is both agent and "substrate protein" specific.