52a The Effect of Various Small Heat Shock Proteins on Prevention of Beta Amyloid Aggregation and Toxicity

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β-amyloid (Aβ) is a main component of senile plaques in Alzheimer's disease (AD). Aβ readily forms fibrils via a conformational change. Aβ is toxic in vitro when it is aggregated. Many research groups have focused on prevention of Aβ aggregation and toxicity. Recently we found that Hsp20 from B. Bovis prevented Aβ aggregation and toxicity at very low mole ratios of small heat shock protein to Aβ. In this work, we explore the mechanism of Hsp20 interaction with Aβ and compare its activity to several other small heat shock proteins. Our results suggest that Hsp20 interacts with Aβ via multivalent binding, which leads to productive aggregation prevention and toxicity prevention over a very limited range of protein concentrations. Other small heat shock proteins interact with Aβ via different mechanisms and while they are able to prevent Aβ aggregation, they can't prevent Aβ toxicity. These results highlight the unique properties of Hsp20 in Aβ aggregation and toxicity prevention. Understanding the mechanism of Hsp20-Aβ interaction may provide insights on how best to design the next generation of aggregation and toxicity inhibitors for AD.