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Macromolecule-mediated chaperoning function *in vivo* and its implications in the protein aggregation-associated problems

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Proteins frequently encounter misfolding and aggregation during their biogenesis and their life cycles in the cell. Importantly, protein aggregation is closely associated with many of debilitating neurodegenerative disorders, including Alzheimer's disease, Parkinson's disease, Huntington's disease and prion-caused diseases. Thus, the understanding of protein aggregation in vivo in terms of chaperoning function has been of great importance in modern biology. The molecular chaperones such as HSP60 and HSP70 have been widely believed to assist protein folding by preventing aggregation via transient binding to the exposed hydrophobic regions of non-native substrates. Nevertheless, most proteins can fold without their assistance in vivo. Traditionally, hydrophobic interaction-mediated substrate recognition and stabilization against aggregation have provided a conceptual framework for the understanding of the action mechanism of molecular chaperones. In contrast, my recent research has shown that the surface charges (probably resulting in electrostatic repulsions) and steric hindrance of macromolecules (ribosomes, RNA, and molecular chaperones as well) interacting with aggregationprone proteins could be key factors responsible for preventing aggregation. Of note, this proposed mechanism is fundamentally different from the prevailing hydrophobic interaction-mediated stabilization against aggregation, thus giving new insights into our understanding of protein aggregation in terms of chaperoning function *in vivo*. Furthermore, the implications of my research in the above protein aggregation problems will be presented.

Biography

Seongil Choi has completed his Ph.D in 2004 and postdoctoral studies from Yonsei, University. He is a research professor at Yonsei University. He has published 11 papers in reputed journals. His research has been aimed at elucidating the chaperoning roles of macromolecules interacting with proteins during de novo folding *in vivo*.