

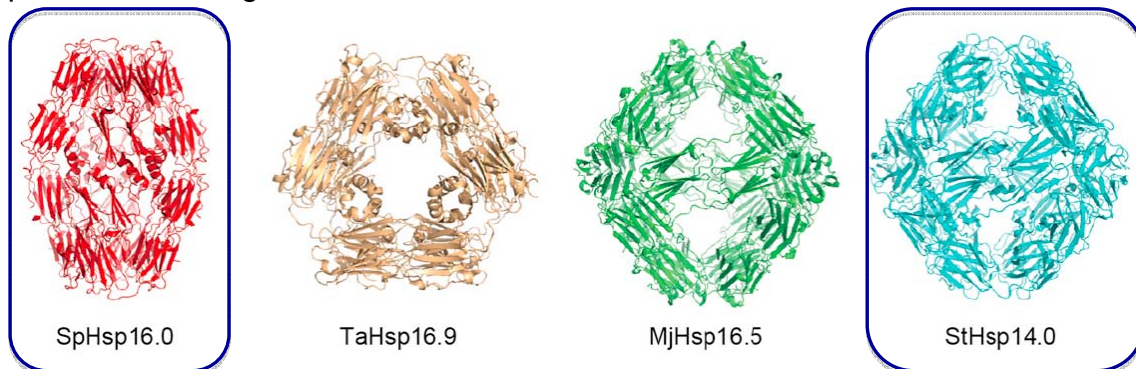
## 分子生物学科セミナー

# Structure and functional mechanism of small heat shock proteins

## 分子シャペロン sHsp の構造と機能

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The small heat shock protein (sHsp), categorized into a class of molecular chaperones, binds and stabilizes denatured proteins for the purpose of preventing aggregation. We have been studying the structure and function of sHsps from archaea and *Schizosaccharomyces pombe*. StHsp14.0 of *Sulfolobus tokodaii* exists as a spherical 24meric oligomer, and the oligomer dissociates to exhibit chaperone function over 80°C. Small angle X-ray scattering (SAXS) study of StHsp14.0 variants has shown that a partially dissociated oligomer of StHsp14.0 protects a denatured protein. The structure of SpHsp16.0 from *S. pombe* was determined with X-ray crystallography and SAXS. Both results indicate that 16 monomers of SpHsp16.0 form an elongated sphere. The interaction between an unfolded protein and SpHsp16.0 is transient. Other chaperones captured unfolded proteins that were protected by TkHsp20.0 at the elevated temperatures and enhanced refolding of them in an ATP dependent manner. Based on these results, we propose a model for the molecular chaperone function of sHsp. In the heat shock response, sHsp is the first aid chaperone to treat thermally damaged proteins. After exposure to heat shock conditions, the oligomer of sHsp partially dissociates to expose hydrophobic surface and protect thermally denatured proteins from aggregation. The interaction seems to be transient. Other chaperones (Hsp) capture the protected unfolded proteins for productive folding after the end of thermal stress.



\* 分子生物学特論4及び生命科学（企）の授業の一環です。

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