Structual Investigation on Proteasome α7 ring in solution

Masaaki Sugiyama, Eiji Kurimot*, Toshiharu Fukunaga, Koichi Kato*
*Research Reactor Institute Kyoto University, Nagoya City University**

The 20S proteasome is known as a degrading factory for an unnecessary protein and then plays a very important role in protein-metabolic and immune systems. This huge complex protein has a hollow cylindrical shape consisting of four rings, α, β, β, α-rings. Both α and β rings are heptamers with α1-α7 subunits and β1-β7 ones, respectively. It has been reported that α7 subunits in the solution also make a (homo) heptamer ring similar to a true (hetero) α-ring and then two rings make one dimer[1], which we call "double ring". But the detailed structure of this double ring is not clarified. Therefore, we perfomed SANS experiment of proteasome α7 ring solution in order to solve the packing structure in detail.

The SANS experiment was carried out with SANS-U spectrometer of ISSP of University of Tokyo installed at JRR-3 of JAEA. The sample was proteasome α7 solution with the concentration of 5mg/ml. The observed SANS intensity was corrected for background, cell, buffer scattering, and transmission factor.

Fihure 1(a) shows structural parameters of packing structure of double ring: L is a radius of a ring and D is a distance between two rings. Figure 1(b) shows the observed SANS profile and some simulated SANS curves of which L is 42 Å and D is varied from 35 to 45 Å. As you can see from Fig. 2, the best compromised values are D of 35 Å in L of 42 Å: With the other value of L, the SANS curves show the larger divation in all D values. With this structure model, analysis of a subunit exchange kinetics are now in progress.

Reference

81) M.Sugiyama, K.Hamada, K.Kato, E.Kurimoto, K.Okamoto, Y.Morimoto, S.Ikeda, S.Naito, M.Furusaka, K.Itoh, K.Mori, and T.Fukunaga, Nucl. Inst. Method A, **600** (2009) 272-274.

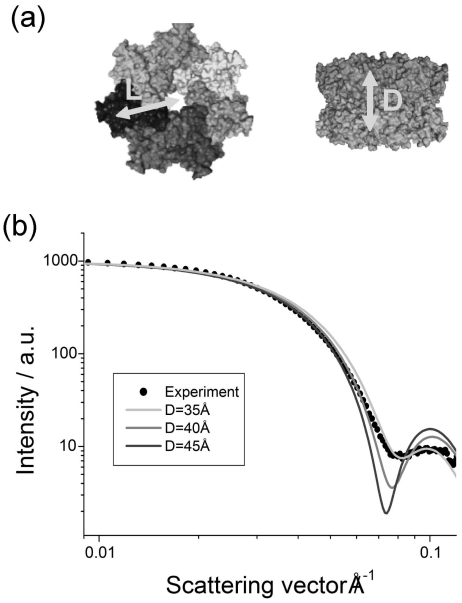

Fig. 1. Figure 1. (a)Structure parameters of a double ring.(b) Experimental and simulated SANS profiles of proteasome α ring.