

Supplemental Information

Structure of a Blm10 Complex Reveals Common Mechanisms for Proteasome Binding and Gate Opening

Kianoush Sadre-Bazzaz, Frank G. Whitby, Howard Robinson, Tim Formosa, and Christopher P. Hill

Figure S1, related to Figure 1

A number of observations argue that the crystal structure is not unduly influenced by lattice contacts. First, the four Blm10 complexes in the asymmetric unit are closely similar to each other and to reconstructions by electron cryomicroscopy (Iwanczyk et al., 2006; Ortega et al., 2005). Second, conserved residues mediate stabilizing contacts between Blm10 segments that are distant in amino acid sequence (panel A). Third, Blm10 wraps around the end of the proteasome barrel to contact all seven proteasome α -subunits in an interface that buries more than 10,000 \AA^2 of solvent accessible surface area (Figure 1E) and largely defines the Blm10 conformation. Fourth, a cluster of conserved residues from HR6 to HR9 and from HR30 to beyond HR32, contact each other and residues near the N-terminus of proteasome subunits $\alpha 5$ and $\alpha 6$ (panels B-D) to help define the pore conformation and define the relative orientations of the upper and lower turns of the Blm10 solenoid. Fifth, the 3.4 \AA crystal structure described here of the complex with Blm10 lacking the first 50 residues appears identical to the crystal structures of full-length Blm10 complexes with proteasome observed in two different crystal forms at lower (4.0 \AA and 4.4 \AA) resolution (data not shown).

- (A) Blm10 (white) with selected linker segments that stabilize the structure (color). The close-up views illustrate the role of conserved residues (underlined, panel E) that make stabilizing interactions.
- (B) Proteasome $\alpha 5$ and $\alpha 6$ N-terminal residues (black) are extended and make extensive contacts with Blm10, including residues that are conserved and also stabilize the relative orientation of the two tiers of the Blm10 solenoid.
- (C) Stereoview showing details of $\alpha 5$ N-terminal residues and their contacts. Conserved residues are underlined.
- (D) Same as panel D, but for $\alpha 6$ contacts.