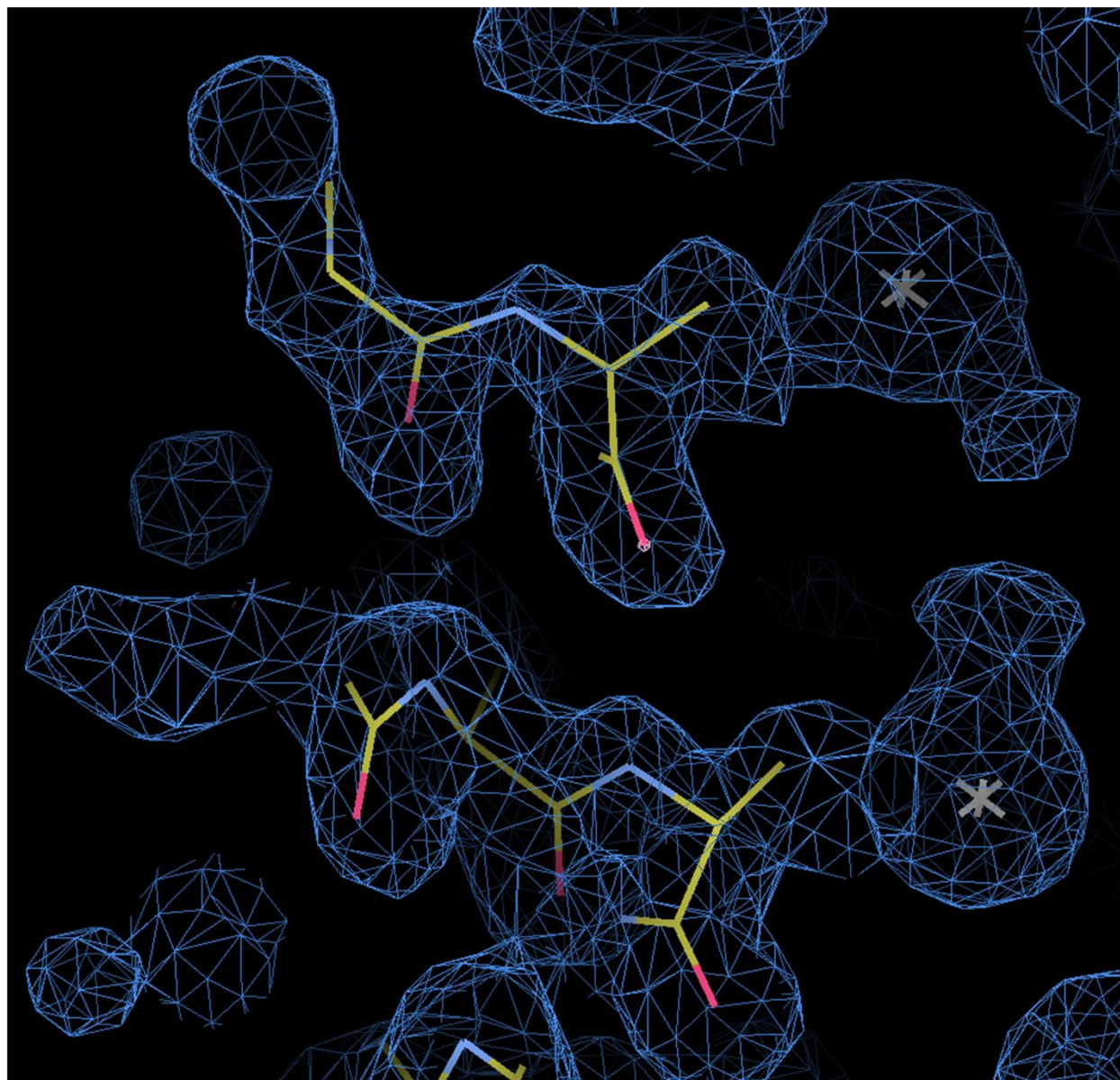
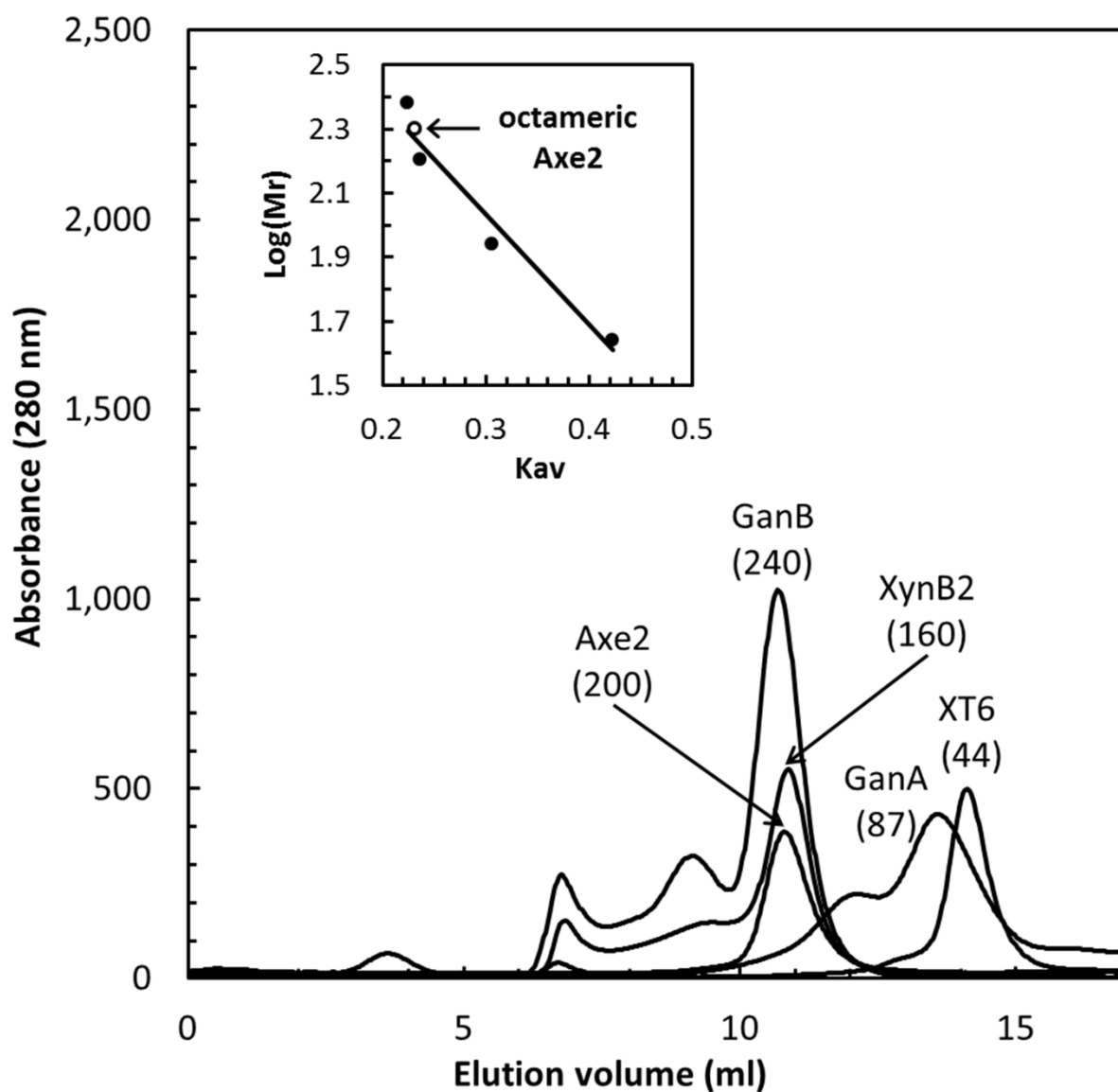


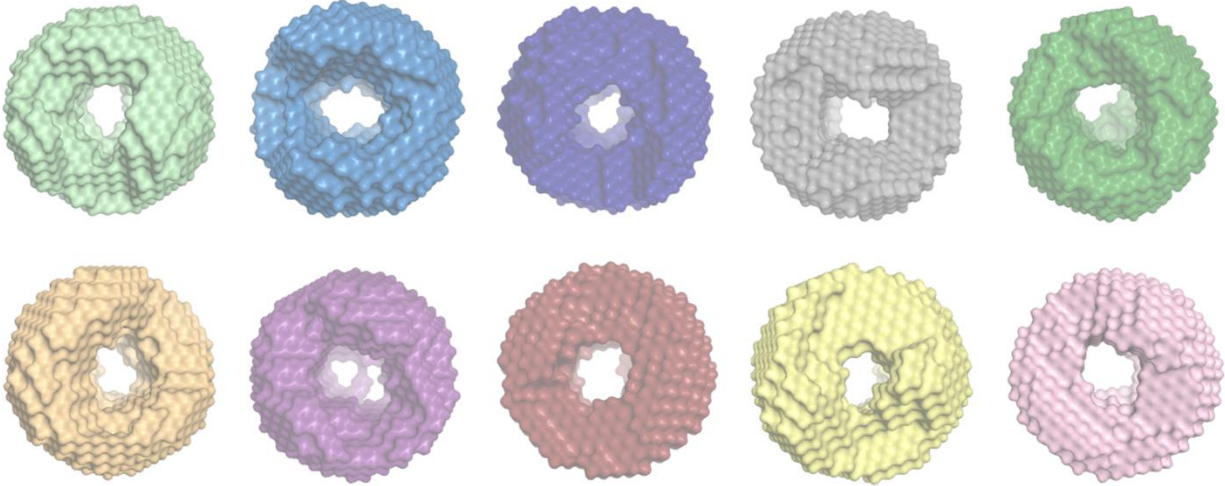
## Supporting Information



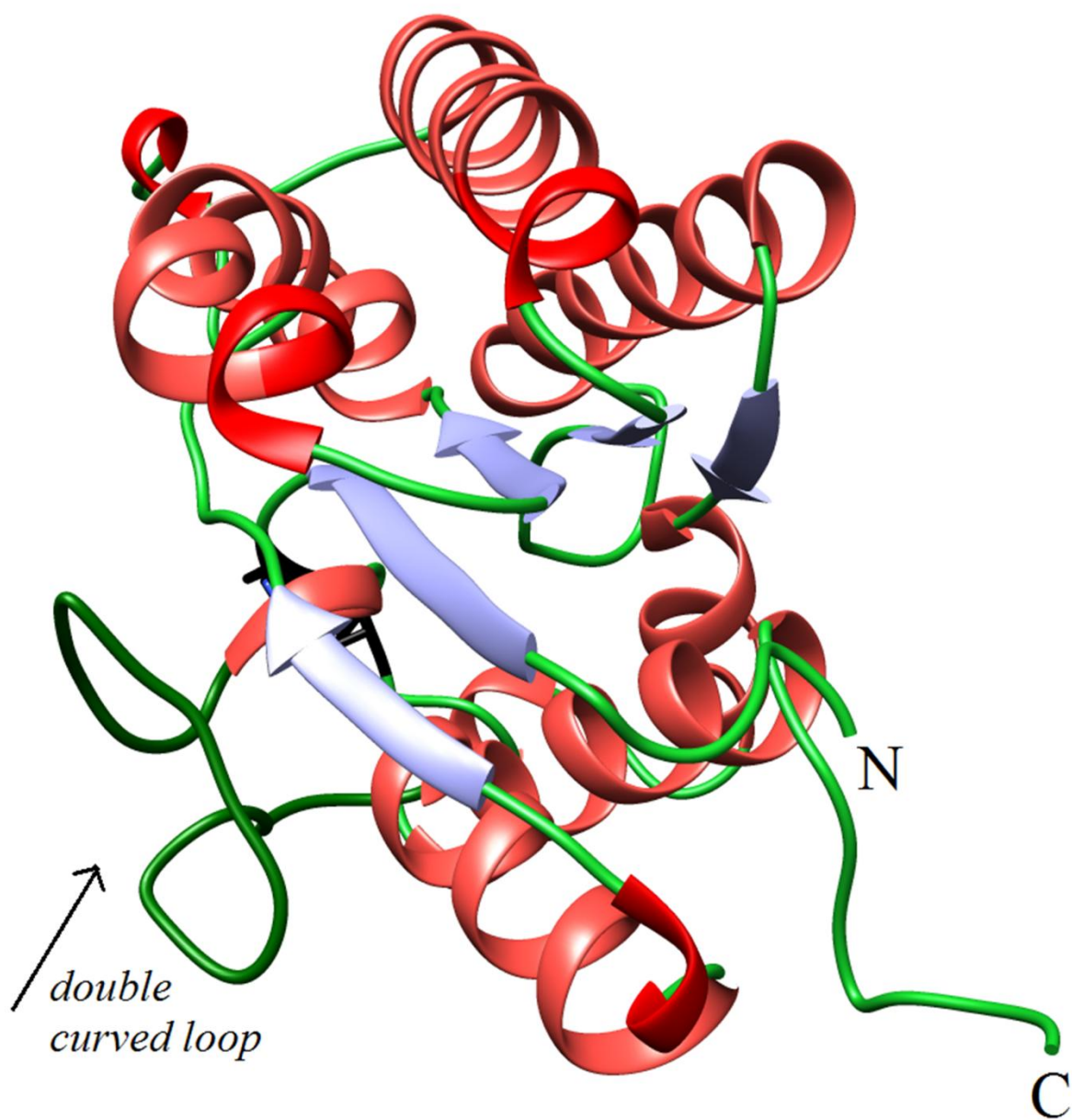
**Figure S1:** Section of the initial electron density map (as obtained from the SAD analysis) and the corresponding poly-alanine model built from it. This section shows two of the Selenium-methionine sites (Selenium atoms are presented as grey stars) and demonstrate the relatively clear tracing of the polypeptide chain, even at the initial electron density map. This map is at 1.70Å resolution and contoured at 1 sigma level.



**Figure S2:** Size determination of Axe2 in solution. The chromatograms (overlaid) of the standard proteins (XT6, GanA XynB2, and GanB) and WT Axe2 were obtained by Superose 12 filtration column applied with 200 $\mu$ l protein samples. The proteins were eluted at room temperature with 50 mM Tris-Cl buffer, pH7, containing 0.1 M NaCl and 0.02% sodium azide. The molecular weights (KDa) are given in parentheses. The inset shows the linear regression of the protein standards used for molecular weight determination (filled circles) and the position of WT Axe2 (open circle).

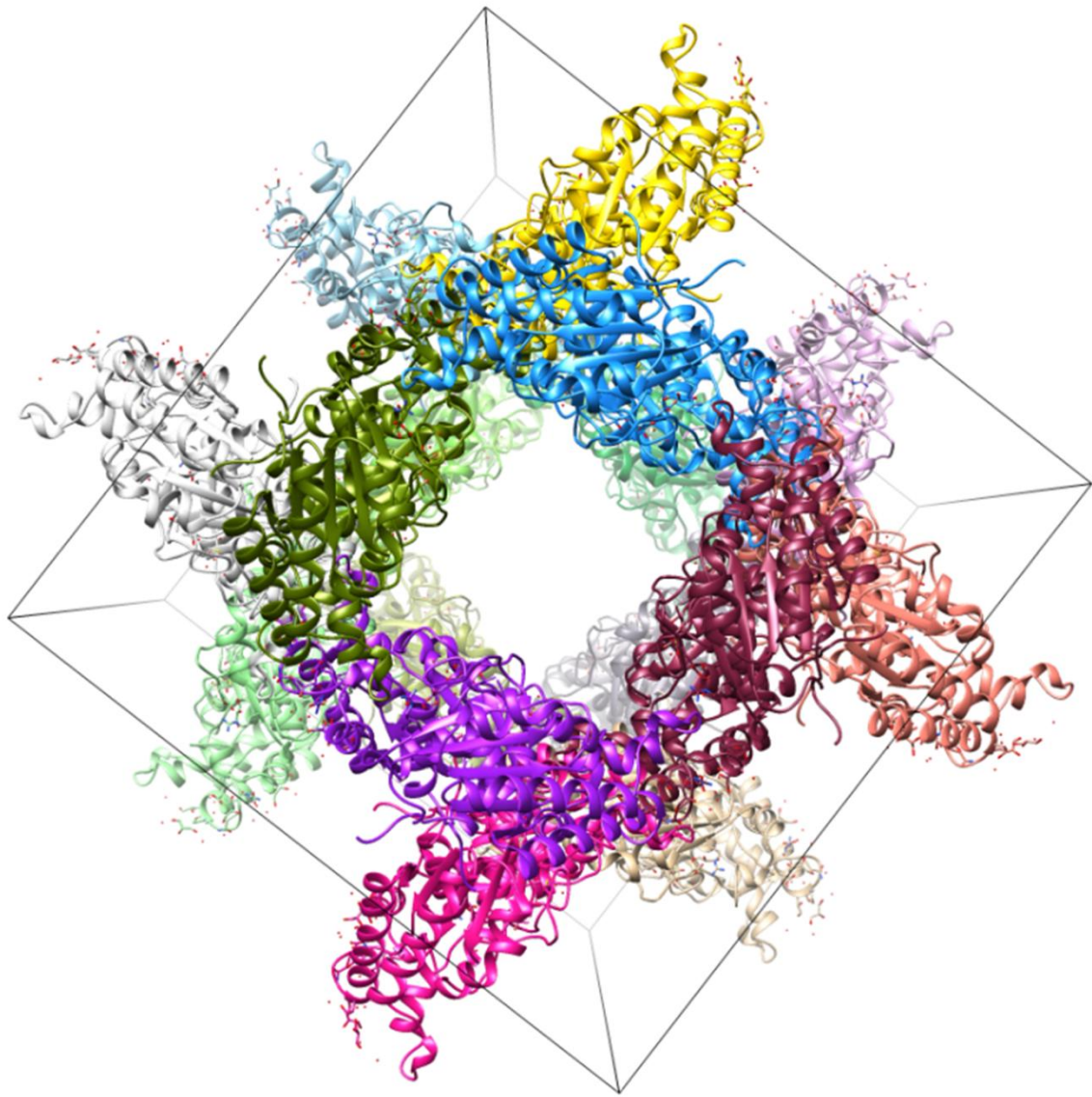


**Figure S3:** Ten independent *ab initio* models of Axe2 WT. All models show, to various degrees of definition, the overall torus shape and the central cavity of the Axe2 octamer.

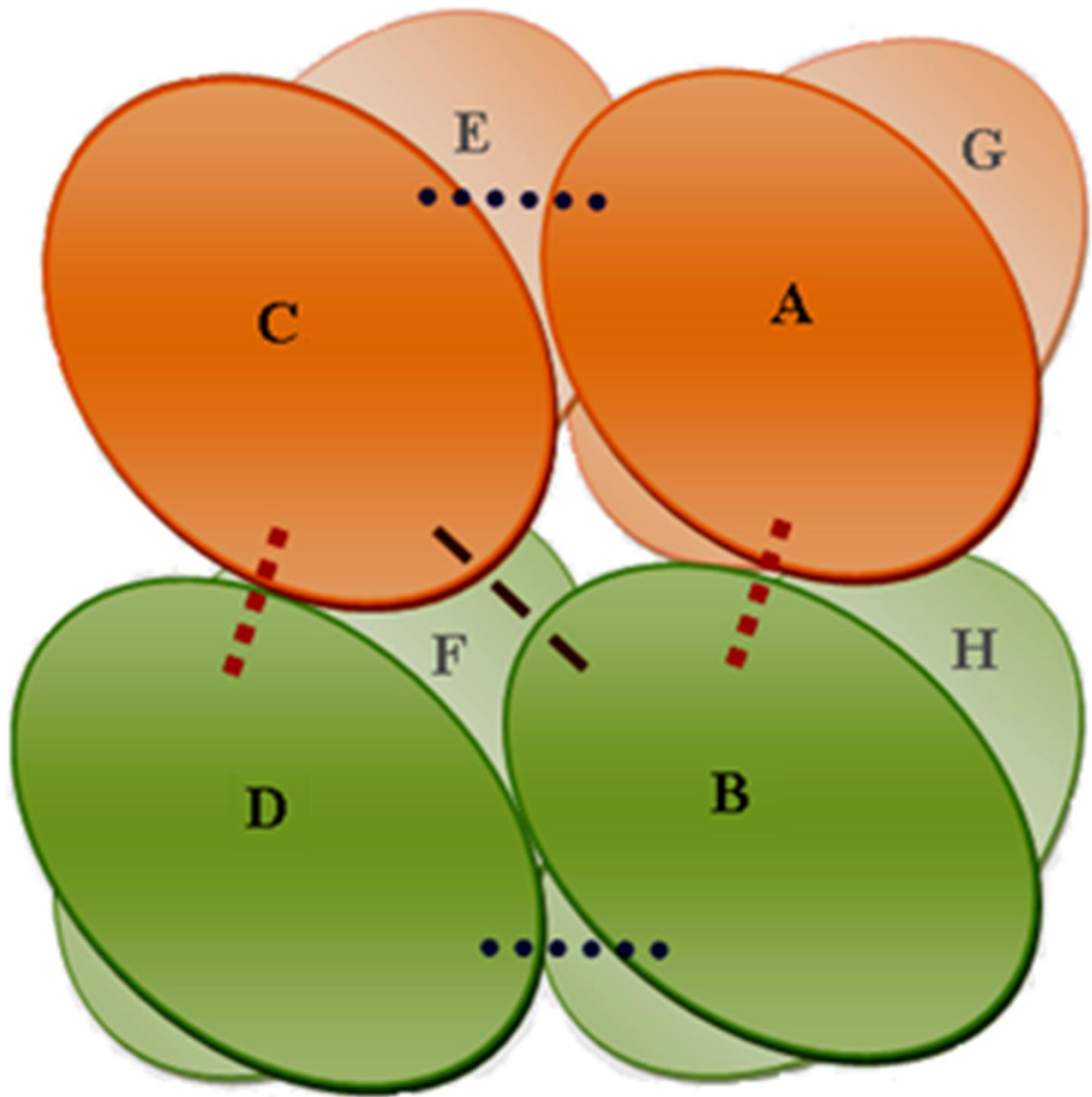


**Figure S4:** View of the Axe2 monomer from a different angle, about 90 degrees from 3a around the vertical axis, showing the "double-curved loop" and the N and C termini.

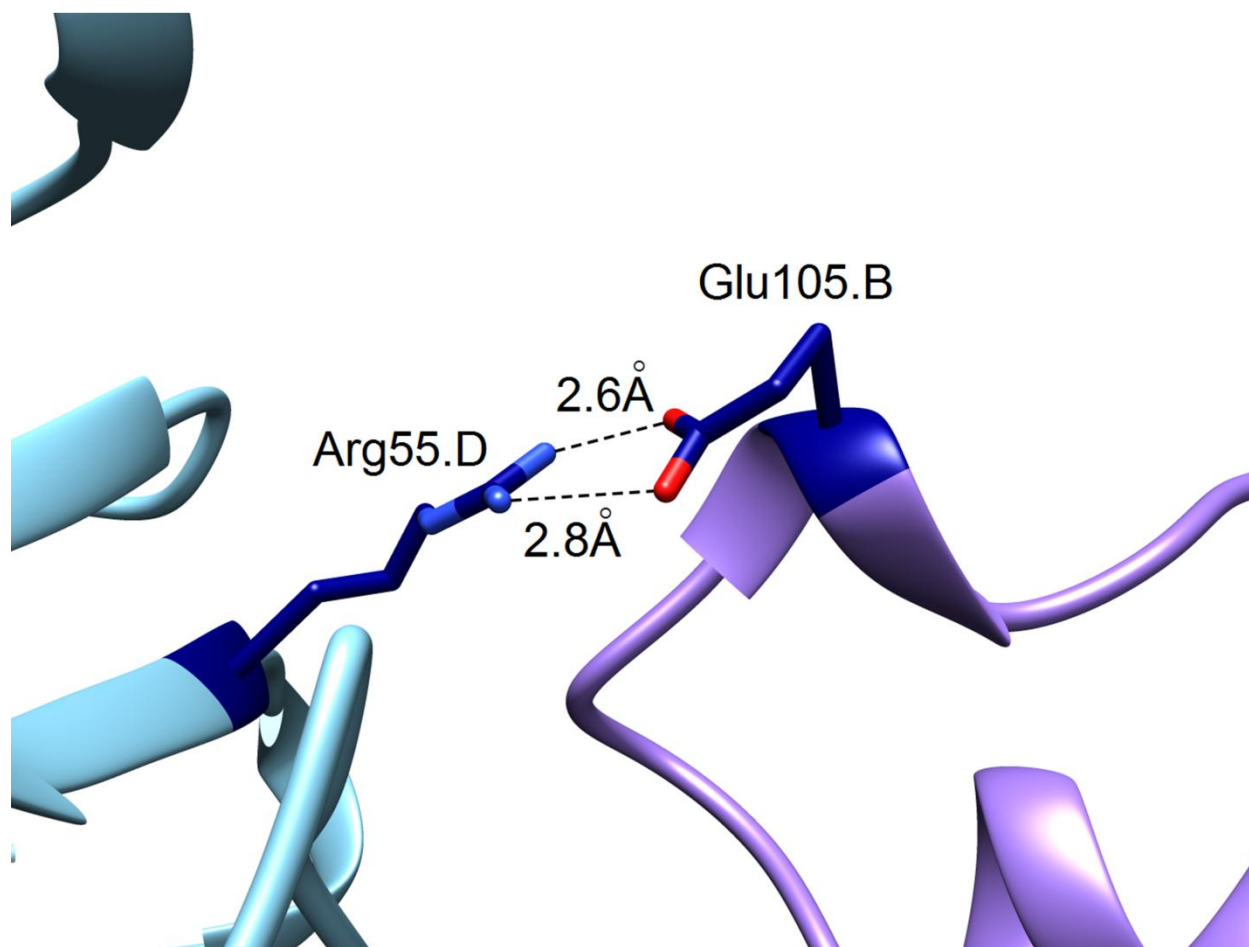




**Figure S5:** A view along the long axis of the unit cell of Axe2, demonstrating that the arrangement of the asymmetric units around the C4 axis leads to the octameric assembly observed.



**Figure S6:** A side view of the Axe2 octamer scheme shown in Figure 5b. Blue dotted lines represent the salt bridge interactions forming the tetramers, red dotted lines represent the interactions holding the "AU dimers" together, and brown lines represent the "hydrogen bond cluster" holding the octamer together.



**Figure S7:** The salt bridge formed by residues Arg55 and Glu105, holding together the two tetramers of Axe2.