



**Supplementary figure 3. Surface exposure of  $\alpha$  subunit C-termini.** The 20S proteasome is shown in cartoon representation painted in green while the C-termini of  $\alpha$  subunits are highlighted as red spheres. The exposed position of the C-termini is important because the 6 $\times$ HA epitope was added to each  $\alpha$  subunit at this position; tagging in this way is presumably relatively nonperturbing of  $\alpha$  subunit structure. Note that only the C-termini of  $\alpha 1$ ,  $\alpha 2$ , and  $\alpha 6$  are visualized in this 20S proteasome model (PDB: 1RYP<sup>2</sup>); the C-terminal tails of the other  $\alpha$  subunits are presumably disordered.