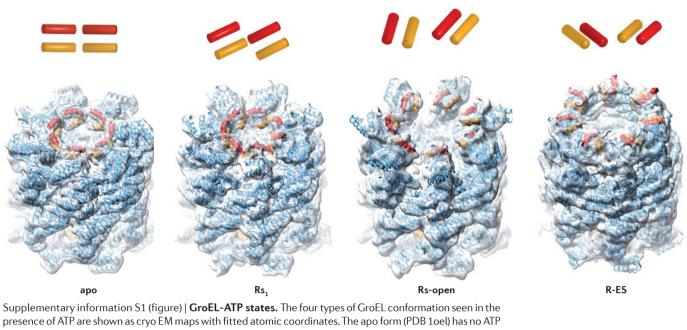
SUPPLEMENTARY INFORMATION



presence of ATP are shown as cryo EM maps with fitted atomic coordinates. The apo form (PDB 1oel) has no ATP bound, Rs1 (EMDB EMD-1997; PDB 4aaq) and Rs-open (EMDB EMD-1999; PDB 4aas) rings are fully occupied with ATP. The R-ES conformation (PDB 1svt) is the ATP and GroES-bound state, but GroES is not shown. Helices H and I, defining the position of the substrate binding sites, are shown in red and orange respectively, and their orientations are represented by the cartoon cylinders.