**Supplemental Table 1. Cryo-EM data collection, refinement, and validations.**

|  |  |  |
| --- | --- | --- |
|  | **Dnf1–Lem3** | **Dnf2–Lem3** |
|  | **Apo** | **E1-ADP** | **E2P** | **Apo** | **E1-ATP** | **E1-ADP** | **E2P- transition** | **E2P** |
| **Data collection and processing** |  |  |  |  |  |  |  |  |
| Magnification (k) | 130 | 130 | 130 | 130 | 130 | 130 | 130 | 130 |
| Voltage (kV) | 300 | 300 | 300 | 300 | 300 | 300 | 300 | 300 |
| Electron expo- sure (e–/Å2) | 64 | 64 | 64 | 60 | 60 | 60 | 60 | 60 |
| Defocus range  (-μm) | 1.0-2.0 | 1.0-2.0 | 1.0-2.0 | 1.0-2.0 | 1.5-3.0 | 1.5-3.0 | 1.5-3.0 | 1.5-3.0 |
| Pixel size (Å) | 0.826 | 0.826 | 0.826 | 1.029 | 0.826 | 0.826 | 0.826 | 0.826 |
| Symmetry imposed | C1 | C1 | C1 | C1 | C1 | C1 | C1 | C1 |
| Micrograph # | 4,074 | 6,038 | 4,764 | 1,438 | 3,665 | 5683 | 5683 | 3260 |
| Initial particle # | 1,358,323 | 2,257,199 | 2,094,437 | 509,555 | 844,464 | 1,010,708 | 1,010,708 | 1,095,601 |
| Final particle # | 473,761 | 716,510 | 590,043 | 190,753 | 358,687 | 266,218 | 127,442 | 763,661 |
| Map resolution (Å) | 3.00 | 3.25 | 2.82 | 3.08 | 3.85 | 4.05 | 3.98 | 3.50 |
| FSC threshold | 0.143 | 0.143 | 0.143 | 0.143 | 0.143 | 0.143 | 0.143 | 0.143 |
| Map resolution (Å) | 3.12 | 3.25 | 2.82 | 3.08 | 3.85 | 4.05 | 3.98 | 3.50 |
|  |  |  |  |  |  |  |  |  |
| **Refinement** |  |  |  |  |  |  |  |  |
| Map sharpening *B* factor (Å2) | 116.5 | 178.9 | 116.2 | 102.5 | 195.8 | 243.3 | 197.8 | 180.0 |
| Model compo- sitionNon-hydrogen atomsProtein residues Ligands & glycans | 11150133210 | 11235132214 | 13121155214 | 10369124717 | 10684127420 | 11960147114 | 12521153415 | 12879154518 |
| *B* factors (Å2) Protein Ligand | 8167 | 3945 | 4734 | 8656 | 4847 | 175174 | 166158 | 5850 |
| R.m.s. deviations Bond lengths (Å) Bond angles (°) | 0.010.8 | 0.010.9 | 0.011.1 | 0.0040.6 | 0.0030.6 | 0.0020.6 | 0.0020.6 | 0.0030.6 |
| ValidationMolProbity scoreClashscorePoor rotamers (%) | 2.4131 | 2.5111 | 2.0111 | 2.1141 | 2.1120 | 2.1120 | 2.0130 | 2.1131 |
| Ramachandran plot Favored (%) Allowed (%) Disallowed (%) | 93.07.00 | 91.98.10 | 95.64.40 | 93.06.90 | 90.79.20 | 93.16.90 | 93.95.90 | 92.97.10 |