

Description of Additional Supplementary Files

File name: Supplementary Movie 1

Description: A rotational motion from the *sfLptB₂FGC* LPS bound structure to the *sfLptB₂FGC* AMP-PNP bound structure from a side view. A rotational motion from the *sfLptB₂FGC* LPS bound structure to the *sfLptB₂FGC* AMP-PNP bound structure and then return to the LPS bound state from the side view of lateral gate TM1G/TM5F. The *sfLptB₂FGC* LPS bound structure is in the same colour scheme of Fig3, except TM helix of LptC in magenta as LptG. The *sfLptB₂FGC* AMP-PNP bound structure in orange. The LptB₂FGC is rotated at counter-clockwise direction to close the channel and push LPS out of the cavity, while the LptB₂FGC is rotated at clockwise direction to open the channel to extract LPS from the IM.

File name: Supplementary Movie 2

Description: A rotational motion from the *sfLptB₂FGC* LPS bound structure to the *sfLptB₂FGC* AMP-PNP structure from a side view of 180° rotation along y-axis of movie 1. A rotational motion from the *sfLptB₂FGC* LPS bound structure to the *sfLptB₂FGC* AMP-PNP structure and then return to the LPS bound state from the side view of lateral gate TM1F/TM5G. The *sfLptB₂FGC* LPS bound structure is in the same colour scheme as that of Fig3. The *sfLptB₂FGC* AMP-PNP bound structure in orange. The LptB₂FGC is rotated at counter-clockwise direction to close the channel and push LPS out of the cavity, while the LptB₂FGC is rotated at clockwise direction to open the channel to extract LPS from the IM.