

**Title:** Supplementary Movie 1.

**Description:** Conformations of MthK with varying degrees of the AG opening, obtained with the AMBER force field.

**Title:** Supplementary Movie 2.

**Description:** Conformations of MthK with varying degrees of the AG opening, obtained with the CHARMM force field.

**Title:** Supplementary Movie 3.

**Description:** Collective motion of MthK that maximally correlates with T59 widening, obtained with the functional mode analysis in the CHARMM force field.

**Title:** Supplementary Movie 4.

**Description:** Collective motion of MthK that maximally correlates with T59 widening, obtained with the functional mode analysis in the AMBER force field.

**Title:** Supplementary Software.

**Description:** FORTRAN code analysing various properties of GROMACS (.xtc) trajectories of potassium channels - number of ion permeation events, occupancy of each site in the selectivity filter, and flips of carbonyl oxygens.