

Supplementary Figure S1

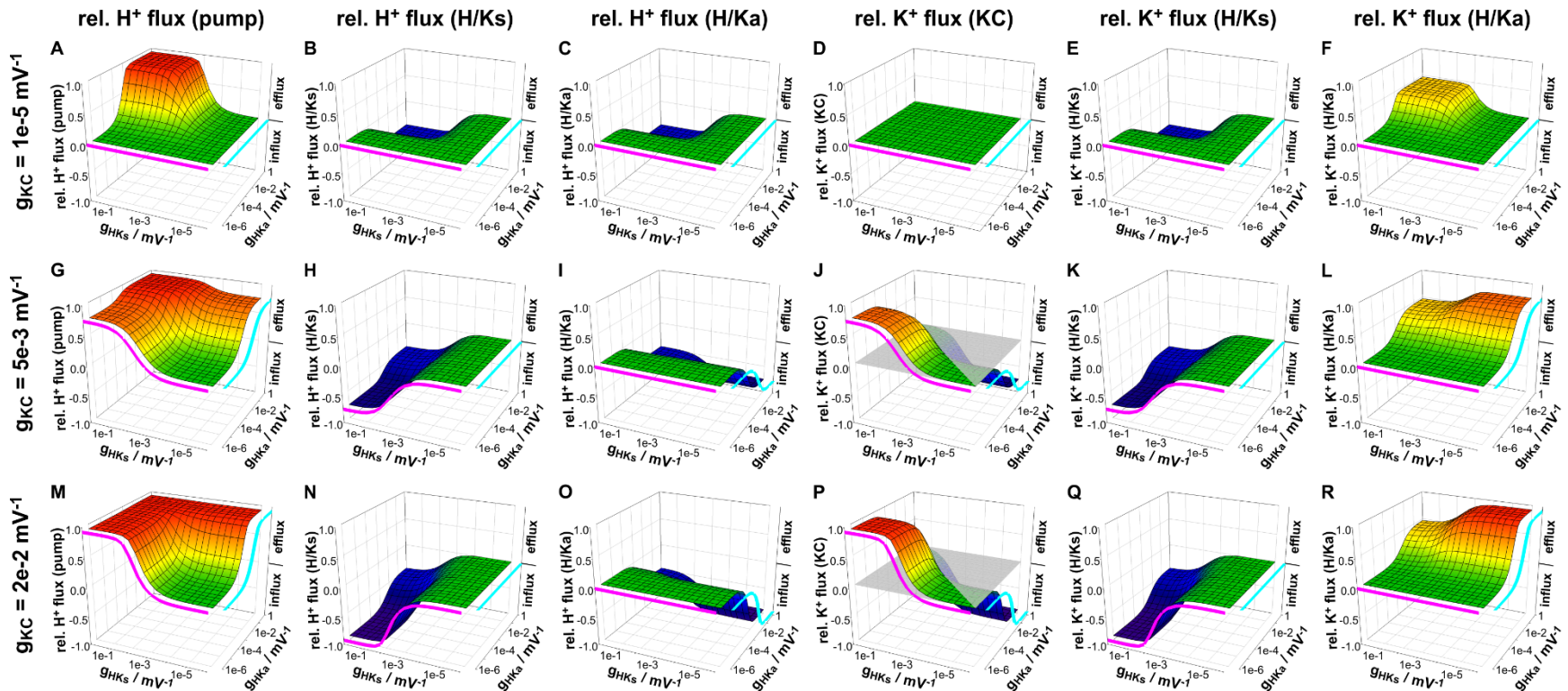


Figure S1. H⁺ and K⁺ fluxes through the different transporters in homeostatic (steady state) conditions. Dependency of the H⁺ and K⁺ fluxes on the activities of the K⁺ channels (g_{KC}), H⁺/K⁺ symporters (g_{HKs}) and H⁺/K⁺ antiporters (g_{HKa}). (**A, G, M**) Relative H⁺ flux mediated by the H⁺ ATPase. (**B, H, N**) Relative H⁺ flux mediated by the H⁺/K⁺ symporter. (**C, I, O**) Relative H⁺ flux mediated by the H⁺/K⁺ antiporter. (**D, J, P**) Relative K⁺ flux mediated by the K⁺ channel. (**E, K, Q**) Relative K⁺ flux mediated by the H⁺/K⁺ symporter. (**F, L, R**) Relative K⁺ flux mediated by the H⁺/K⁺ antiporter. The fluxes are shown relative to the maximal H⁺ efflux that can be generated by the H⁺ ATPase ($J_{Hmax} = I_{Hmax}/e_0$). Data were calculated for the case $n_s = 1$, $n_a = 1$, $V_{0,pump} = -200$ mV, and $E_H = +57.6$ mV ($\Delta pH = 1$). The magenta lines show the values in the absence of active H⁺/K⁺ antiporters ($g_{HKa} = 0$), whereas the cyan lines indicate the values in the absence of active H⁺/K⁺ symporters ($g_{HKs} = 0$).

Supplementary Figure S2

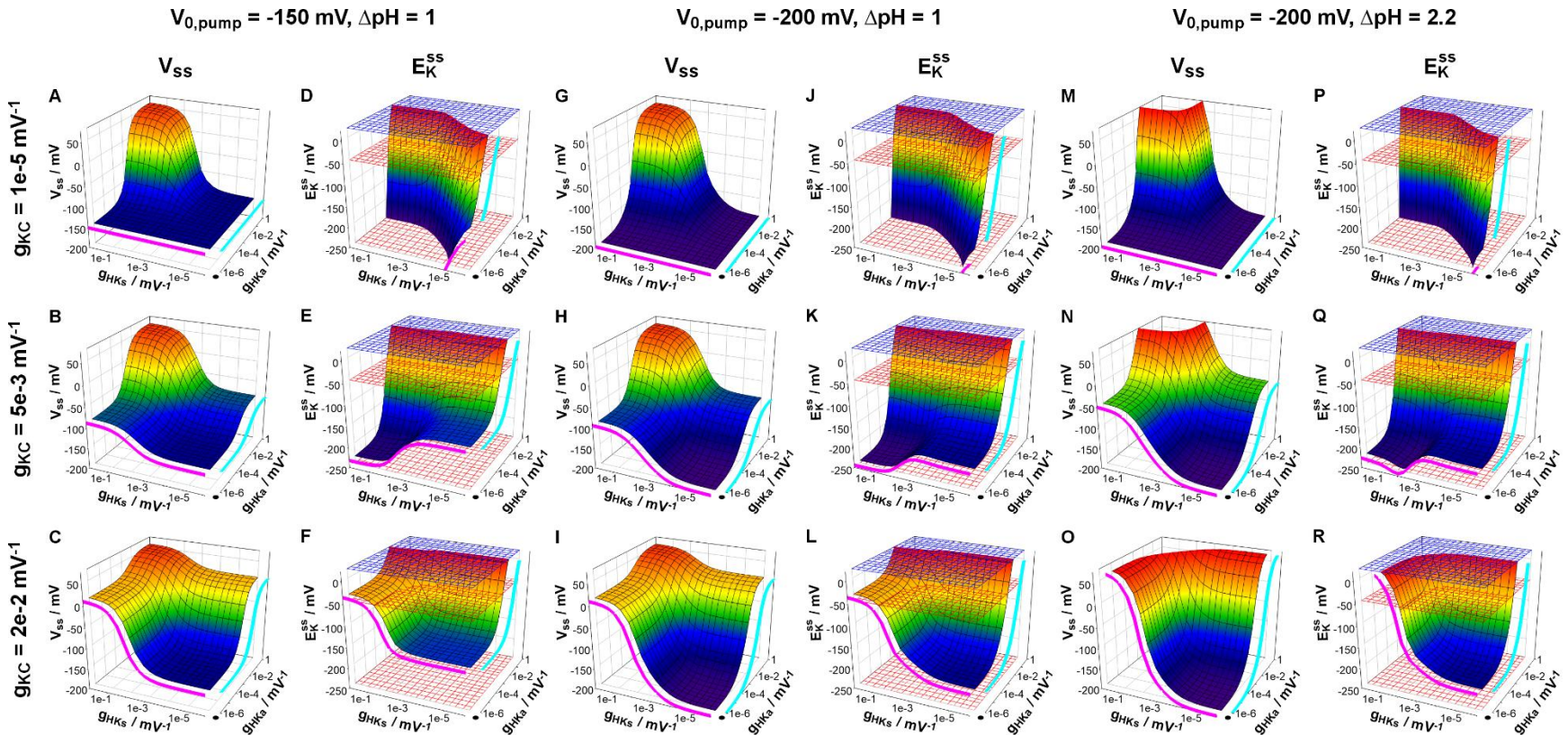


Figure S2. Membrane voltage and K^+ gradient in homeostatic (steady state) conditions for different values of $V_{0,pump}$ and E_H . Membrane voltage (V_{ss} , **A-C, G-I, M-O**) and K^+ gradient (E_K^{ss} , **D-F, J-L, P-R**) in steady state for selected values of the activity of K^+ channels (g_{Kc}), H^+/K^+ symporters (g_{HKs}) and H^+/K^+ antiporters (g_{HKa}). Data were calculated for the case $n_s = 1$, $n_a = 1$, with (**A-F**) $V_{0,pump} = -150$ mV, and $E_H = +57.6$ mV ($\Delta pH = 1$), (**G-L**) $V_{0,pump} = -200$ mV, and $E_H = +57.6$ mV ($\Delta pH = 1$), and (**M-R**) $V_{0,pump} = -200$ mV, and $E_H = +126.6$ mV ($\Delta pH = 2.2$). The magenta lines show the values in the absence of active H^+/K^+ antiporters ($g_{HKa} = 0$), whereas the cyan lines indicate the values in the absence of active H^+/K^+ symporters ($g_{HKs} = 0$). The blue and red meshes limit roughly the physiologically relevant ranges for E_K^{ss} (between +20 mV, i.e. $[K^+]_{out}/[K^+]_{in} \approx 267\text{mM}/120\text{mM}$ and -50 mV, i.e. $[K^+]_{out}/[K^+]_{in} \approx 16\text{mM}/120\text{mM}$, for an endomembrane, and between -50 mV and -250 mV, i.e. $[K^+]_{out}/[K^+]_{in} \approx 5\mu\text{M}/120\text{mM}$, for the plasma membrane).

Supplementary Figure S3

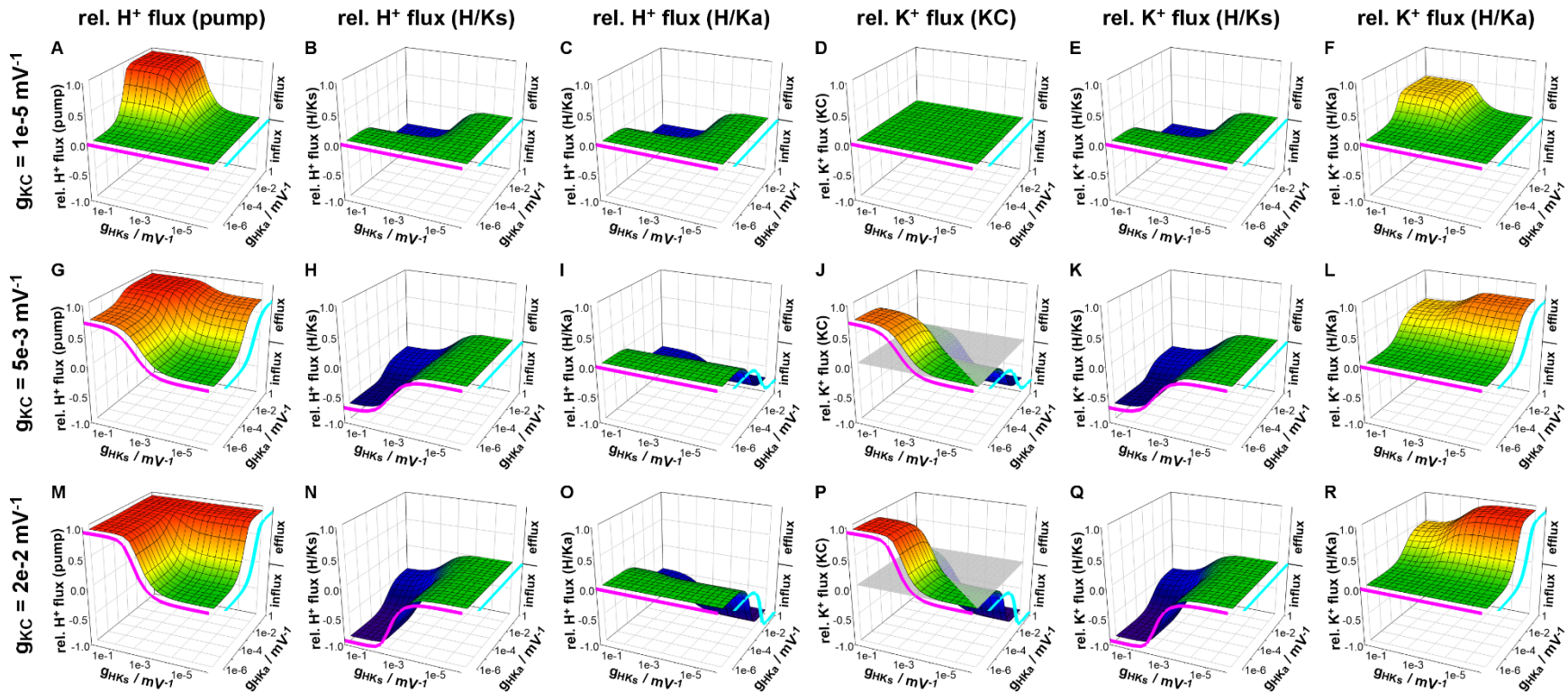
 $V_{0,pump} = -150$ mV

Figure S3. H⁺ and K⁺ fluxes through the different transporters in homeostatic (steady state) conditions for $V_{0,pump} = -150$ mV. Dependency of the H⁺ and K⁺ fluxes on the activities of the K⁺ channels (g_{KC}), H⁺/K⁺ symporters (g_{HKs}) and H⁺/K⁺ antiporters (g_{HKa}). (A, G, M) Relative H⁺ flux mediated by the H⁺ ATPase. (B, H, N) Relative H⁺ flux mediated by the H⁺/K⁺ symporter. (C, I, O) Relative H⁺ flux mediated by the H⁺/K⁺ antiporter. (D, J, P) Relative K⁺ flux mediated by the K⁺ channel. (E, K, Q) Relative K⁺ flux mediated by the H⁺/K⁺ symporter. (F, L, R) Relative K⁺ flux mediated by the H⁺/K⁺ antiporter. The fluxes are shown relative to the maximal H⁺ efflux that can be generated by the H⁺ ATPase ($J_{Hmax} = I_{Hmax}/e_0$). Data were calculated for the case $n_s = 1$, $n_a = 1$, $V_{0,pump} = -150$ mV. The magenta lines show the values in the absence of active H⁺/K⁺ antiporters ($g_{HKa} = 0$), whereas the cyan lines indicate the values in the absence of active H⁺/K⁺ symporters ($g_{HKs} = 0$).