

Table S1, Related to Experimental Procedures. Parameters used in the model.

Parameter	Description	Value	Value
		(leading end)	(trailing end)
h	Thickness of cortical layer, nm	100	
E_c	Elastic constant of the cortical layer, kPa	6	
b	Width of the narrow channel, μm	3	
D	Diffusivity of ions, $\mu m^2 / s$	500	
η	Viscosity of the cytoplasm, $Pa \cdot s$	0.001	
ξ_w	Friction coefficient between the cell and the channel wall, $Pa \cdot s / m$	8×10^8	
Π_{out}	Osmotic pressure outside the cell, MPa	0.88	
σ_a	Active stress inside the cortex, Pa	-100	
m	The integer in the constitutive law	4	
σ_c	Threshold stress of MS channel, Pa	900	300
σ_s	Saturating stress of MS channel, Pa	2700	900
$\Delta\Pi_c$	Critical osmotic pressure difference of ion pump, GPa	$6000\Pi_{out,f}$	$6000\Pi_{out,b}$
α	Rate constant of water transport, $m \cdot Pa^{-1} \cdot s^{-1}$	10^{-12}	10^{-12}
β	Rate constant of ion flux across MS channels, $mol \cdot m^{-2} \cdot Pa^{-1} \cdot s^{-1}$	5×10^{-6}	5×10^{-6}
γ	Rate constant of ion flux across ion transporters, $mol \cdot m^{-2} \cdot Pa^{-1} \cdot s^{-1}$	5.1×10^{-13}	5×10^{-13}