Fig. 7. Illustration of the Auxin transport and PIN1 cycling models. (*A*) AH (weak acid form) transport. (*B*) A^- (anion form) transport. Note that also the A^- influx is dependent on P_{ij}. This rate is low compared with the efflux, and this mechanism is not illustrated. (*C*) PIN1 cycling model.

Fig. 8. (*A*) pH dependence of the fraction of the different auxin variants. The lines show the dependence and the points show the values used in the simulations. (*B*) Membrane voltage dependence of the factors in the PIN1 mediated transport. The absolute value of the membrane potential is used on the x axis in the plot.

Fig. 9. Auxin equilibrium concentrations for simulations on the template with extracted PIN1 concentrations. K_{A} in the MM-description of active auxin concentration is varied from $K_{\mathrm{A}} = 1$, to boundaries estimated in Mitchison (1). (*A*) $K_{\mathrm{A}} = 0.3$. (*B*) $K_{\mathrm{A}} = 2.0$.

1. Mitchison, G. J. (1980) *Proc. R. Soc. London Ser. B* **209**, 489-511.

Fig. 10. Auxin equilibrium concentrations for simulations on the template with extracted PIN1 concentrations. The p_{A^-} in the active auxin transport terms are varied twofold from the value $p_{\mathrm{A}^-} = 12.4$ estimated by Goldsmith *et al.* (1). (*A*) $0.5p_{\mathrm{A}^-}$. (*B*) $2.0p_{\mathrm{A}^-}$.

1. Goldsmith, M. H., Goldsmith, T. H. & Martin, M. H. (1981) *Proc. Natl. Acad. Sci. USA.* **78**, 976-980.

Fig. 11. Auxin equilibrium concentrations for simulations on the template with extracted PIN1 concentrations. The auxin levels (production) is varied twofold from the value $c_{\mathrm{A}} = 0.1$. (*A*) $0.5c_{\mathrm{A}}$. (*B*) $2.0c_{\mathrm{A}}$.

Fig. 12. (*A*) Eigenvalue distribution for similar values of D/TP as used in the simulations presented in Fig. 3. The homogeneous state is unstable if the maximal eigenvalue is larger than zero. (*B*) Distance between peaks at initial dynamics around the unstable homogeneous fixed point as a function of D/TP.

Fig. 13. Optimization for the PIN1 cycling model using a nonlinear auxin dependence for the cellular to membrane term. The parameters that are optimized and shown in the plots are the relative internalization/membranalization strengths, $K_{\mathrm{P}} = k_2/k_1$, and the Hill coefficient and constant, n, K. (*A*) Mean squared error, E_{tot} for different parameter values. (*B*) Solutions found by restarting the local optimizer 100 times with different initial parameter values. The optimimum parameter set chosen for further investigations is also marked in the plot ($n = 3.0$, $K = 0.4$, and $K_{\mathrm{P}} = 0.4$).