

**Table 2. Model for molecular reactions and transport in the simulations on the template**

Row	Reaction/ transport	Description	ODE contribution (rate/flux)	Parameters
1	$0 \rightarrow A_i$	Auxin production	$c_A$	$c_A$
2	$A_i \rightarrow 0$	Auxin degradation	$d_A A_i$	$d_A$
3	$A_{ij} \rightarrow 0$	Auxin degradation	$d_A A_{ij}$	$d_A$
4	$A_i \rightarrow A_{ij}$	Passive auxin ( $AH$ ) transport, cell to wall	$a_{ij} D_{\text{efflux}} A_i$	$D_{\text{efflux}} = p_{AH} f_{AH}^{\text{cell}}$
5	$A_{ij} \rightarrow A_i$	Passive auxin ( $AH$ ) transport, wall to cell	$a_{ij} D_{\text{influx}} A_{ij}$	$D_{\text{influx}} = p_{AH} f_{AH}^{\text{wall}}$
6	$A_{ij} \rightarrow A_{i'j'}$	Auxin diffusion within walls	$\frac{a_{ij i' k}}{d_{ij i' k}} D_A A_{ij}$	$D_A$
7	$A_i \xrightarrow{P_{ij}} A_{ij}$	Active PIN1 dep. auxin ( $A^-$ ) transport, cell to wall	$a_{ij} T_{\text{efflux}} P_{ij} \frac{A_i}{K_A + A_i}$	$T_{\text{efflux}} = p_{A^-} f_{A^-}^{\text{cell}} N_{\text{efflux}}, K_A$
8	$A_{ij} \xrightarrow{P_{ij}} A_i$	Active PIN1 dep. auxin ( $A^-$ ) transport, wall to cell	$a_{ij} T_{\text{influx}} P_{ij} \frac{A_{ij}}{K_A + A_{ij}}$	$T_{\text{influx}} = p_{A^-} f_{A^-}^{\text{wall}} N_{\text{influx}}, K_A$
9	$P_i \xrightarrow{A_j} P_{ij}$	Auxin dependent PIN1 cycling, cell to membrane	$a_{ij} k_1 \frac{A_j^n}{K^n + A_j^n}$	$k_1, K, n$
10	$P_{ij} \rightarrow P_i$	Pin1 cycling, membrane to cell	$a_{ij} k_2 P_{ij}$	$k_2$

Note that in some simulations the PIN1 extracted from the template is used and no PIN1 update is applied. Ordinary differential equation (ODE).