PhD Diary 21st January

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Contents

1 DONE Give presentation

2 TODO Organise notes and follow up from Friday meeting

2.1 TODO Enzyme Kinetics

2.2 TODO Receptor binding / hill equation

3 TODO For $C(x,t) = 0$ compare discrete method to analytical method of same IC

4 Discrete equations for PD inclusion

As shown in equation: 1 a particular concentration C can be calculated for a cell i at any time point t and any 1D point j.

This equation incorporates a discrete equation for the diffusion problem that addresses the diffusive permeability of plasmodesmata, this is shown in equations: 2 - 6. For cases of edge of cells 0 and L the function Q is used to denote the average diffusion rate at these points. In the most simple case $Q(C) = C \times N$ where N is $\geq 0 \leq 1$

A decay term, which includes any method that a concentration could degrade (leaving through an unobserved method, becoming used in another process, arbitrary decay) is factored in by γ. Additionally a production value is included, β allows for an increase in concentration.

$$C^t_{i,j} = (C^{t-1}_{i,j} + D(C, i, L, j, t, \Delta x)) \times \gamma + \beta \tag{1}$$

$$D(C, i, L, j, t, \Delta x) = \begin{cases} Q(\alpha \dfrac{C^{t-1}_{i+1,0} - 2C^{t-1}_{i,L} + C^{t-1}_{i,L-1}}{\Delta x^2}), & \text{if j=L;} & (2) \\ & & (3) \\ Q(\alpha \dfrac{C^{t-1}_{i,1} - 2C^{t-1}_{i,0} + C^{t-1}_{i-1,L}}{\Delta x^2}) & \text{if j=0;} & (4) \\ & & (5) \\ \alpha \dfrac{C^{t-1}_{i,j+1} - 2C^{t-1}_{i,j} + C^{t-1}_{i,j-1}}{\Delta x^2}, & \text{otherwise;} & (6) \end{cases}$$

References