PhD Diary Week Beginning 3rd December

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Contents

1 Papers to read [0%]

1.1 TODO Read Regine Kahmann's Papers [0%]

1.1.1 TODO Ustilago maydis effectors and their impact on virulence (Lanver et al., 2017)

1.1.2 TODO How filamentous plant pathogen effectors are translocated to host cells (Lo Presti and Kahmann, 2017)

1.1.3 TODO A secreted Ustilago maydis effector promotes virulence by targeting anthocyanin biosynthesis in maize (Tanaka et al., 2014)

1.2 TODO Intercellular and systemic trafficking of RNAs (Liu and Chen, 2018)

2 TODO Re-read Eva's thesis

- Make particular note of the diffusion constants

3 DONE Research viscosity of cytosol

- It's similar enough to water that we can safely make that assumption for modelling at this level: (Bicknese et al., 1993)

4 TODO Compare chitin movement via apoplast vs. S.A. via symplast

- Look at other potential defence hormones

5 DONE Formalise the H_θ

- H_θ : Apoplastic diffusion of the elicitor chitin can explain defence activation in plant cells

6 TODO Show how parameter changes would alter predictions in diffusion models

7 TODO Build analytical solution to 1D diffusion [16%]

- ☒ Find out what I don't know, so I can begin learning it
- ☐ Read up on ODEs
- ☐ Read up on PDEs
- ☐ Learn how to separate variables of PDE/ODE
- ☐ https://www.youtube.com/watch?v=HKvP2ESjJbA&list=PLwIFHT1FWIUJYuP5y6YEM4WWrY4kEmIuS
- ☐ https://www.youtube.com/watch?v=LYsIBqjQTdI&list=PLF6061160B55B0203

8 Salicylic acid activates PDLP5 production

- S.a. -> ++PDLP5 -> PD Callose Deposition -> PD Closure
- (Wang et al., 2013)

8.1 TODO Lym2 interactions from Chitin and relationship to PDLP cycle

- Faulkner et al. (2013)

9 1D diffusion of hormones through cells

9.1 Assumptions

- Cell length $L = 50\mu m$
- Radius of salicylic acid molecule = 3.65 Å
  - $D \approx 671\mu m^2/s$
- Plasmodesmata permeability $q = 1\mu m/s$

9.2 When would SA overtake Chitin

Assuming no PD slow down, and

References

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