

Models in Development

Bio202

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Previous Themes

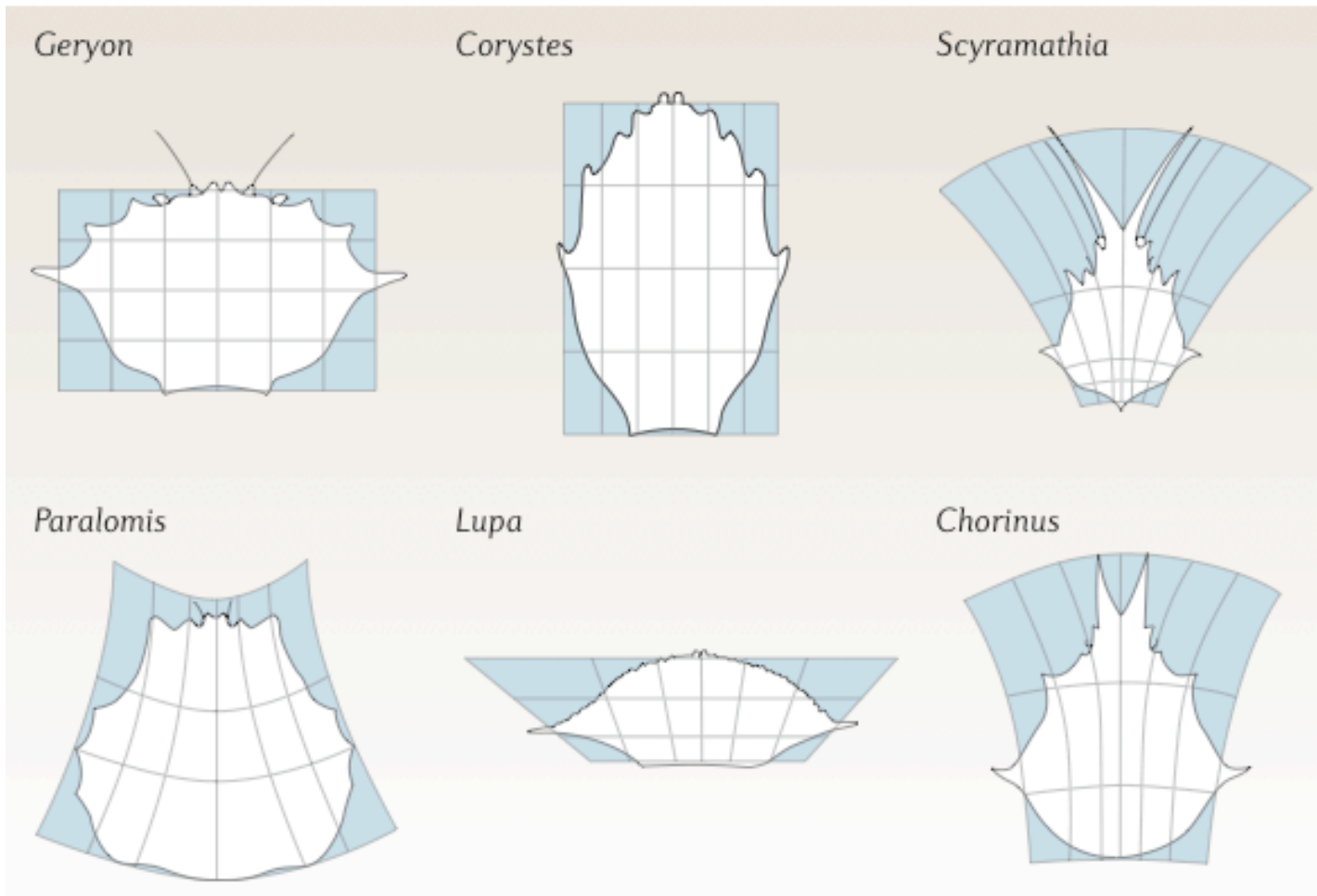
Theories of signal transduction

1. Complexity and constraints of signalling networks
2. Transcriptional networks
3. Activation & Inhibition
4. General models of input
5. Logic based models
6. Single input, feed-forward, dense-overlapping regulons
7. Protein modification based networks
8. Nuclear import

Development and Dynamics

- Genetic programmes
- Morphogens
- Patterns
- Forces

Theory of Transformations



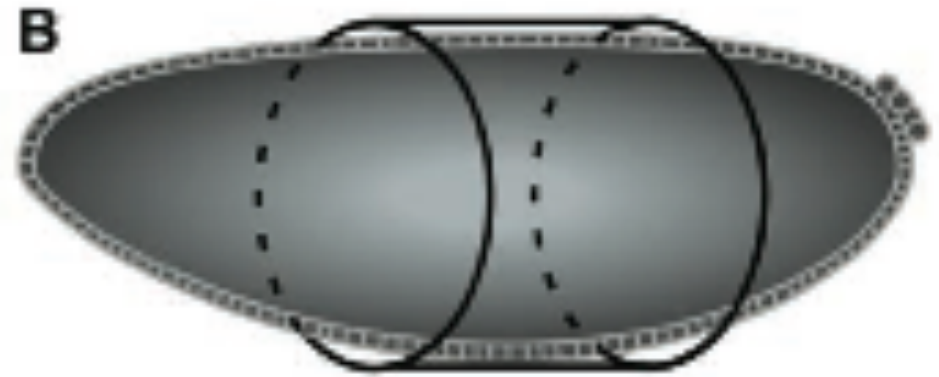
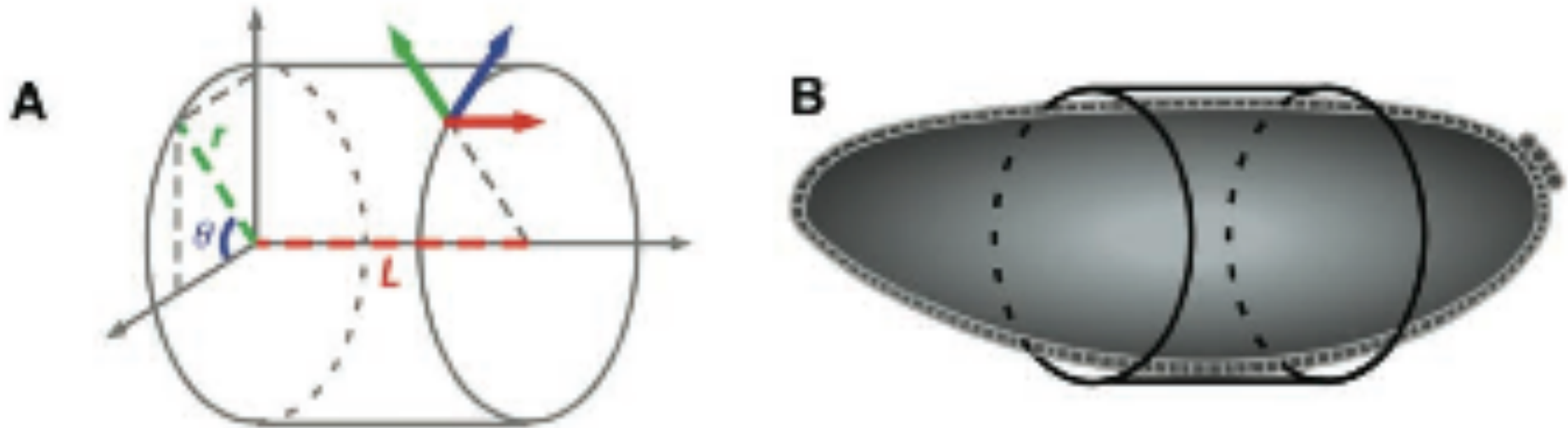
Cartesian grid

Simple transformations

Model of differences in

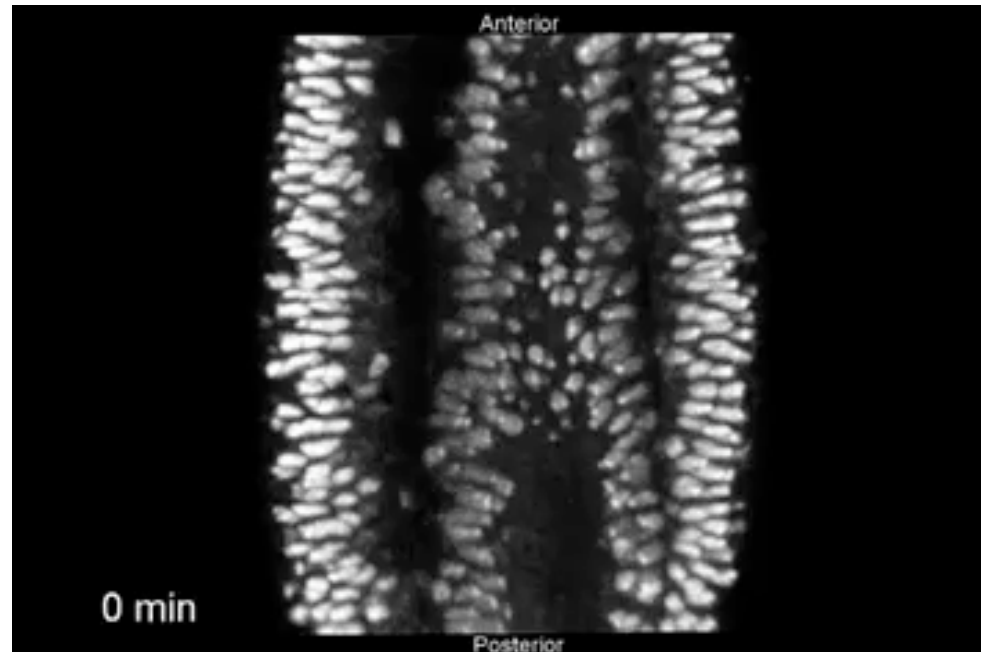
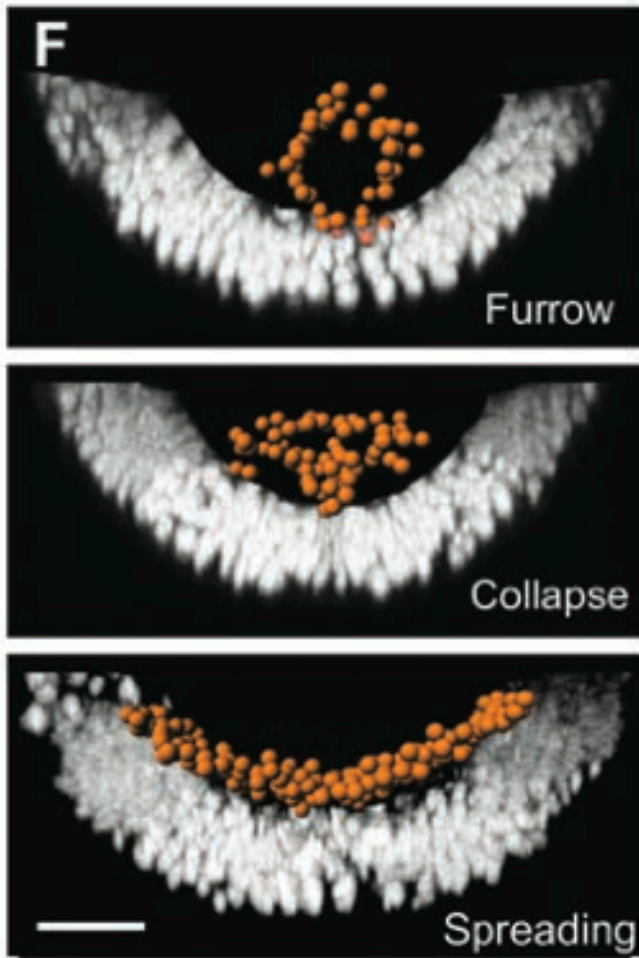
Adult stages of organisms
(Crustaceans)

Drosophila Embryo



Position of cells in tracked in cylindrical coordinates at stage 6 of Drosophila embryo

Gastrulation in Drosophila Development



FGF dependent movement of cells

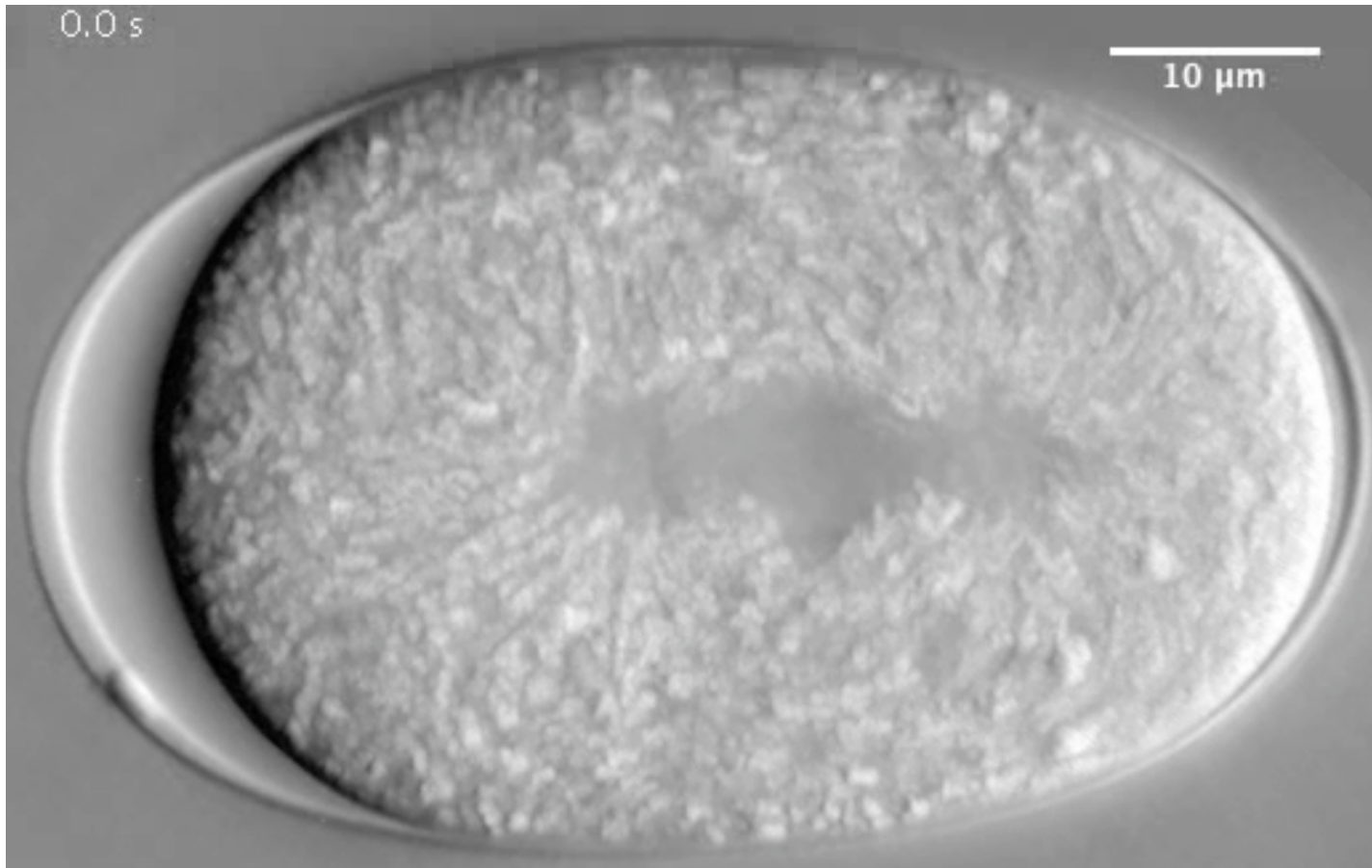
Collective Cell Mechanics

Guided by developmental gradients

20 μm

McMohan (2008)

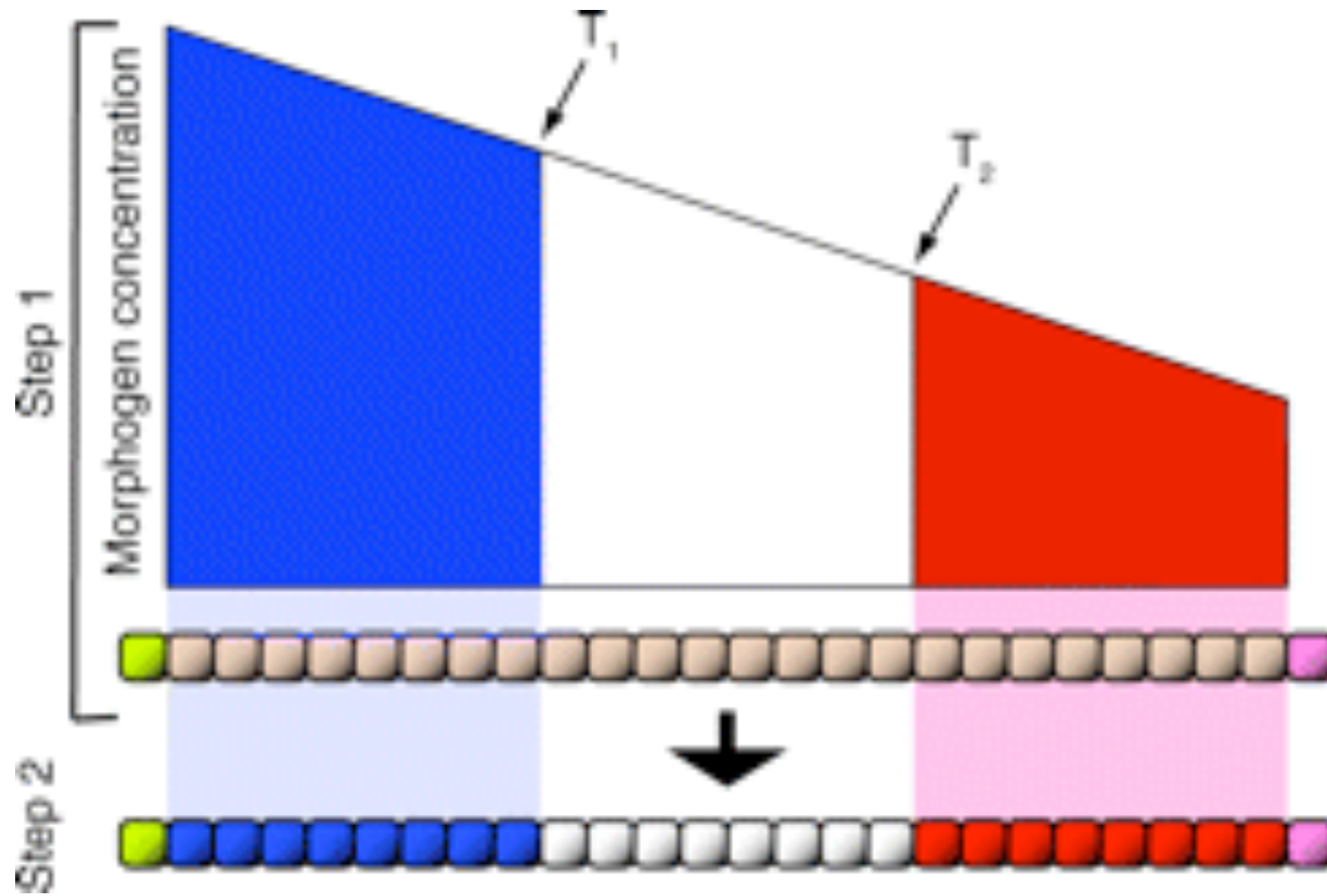
Oscillations in *C. elegans* Embryo 1st Division



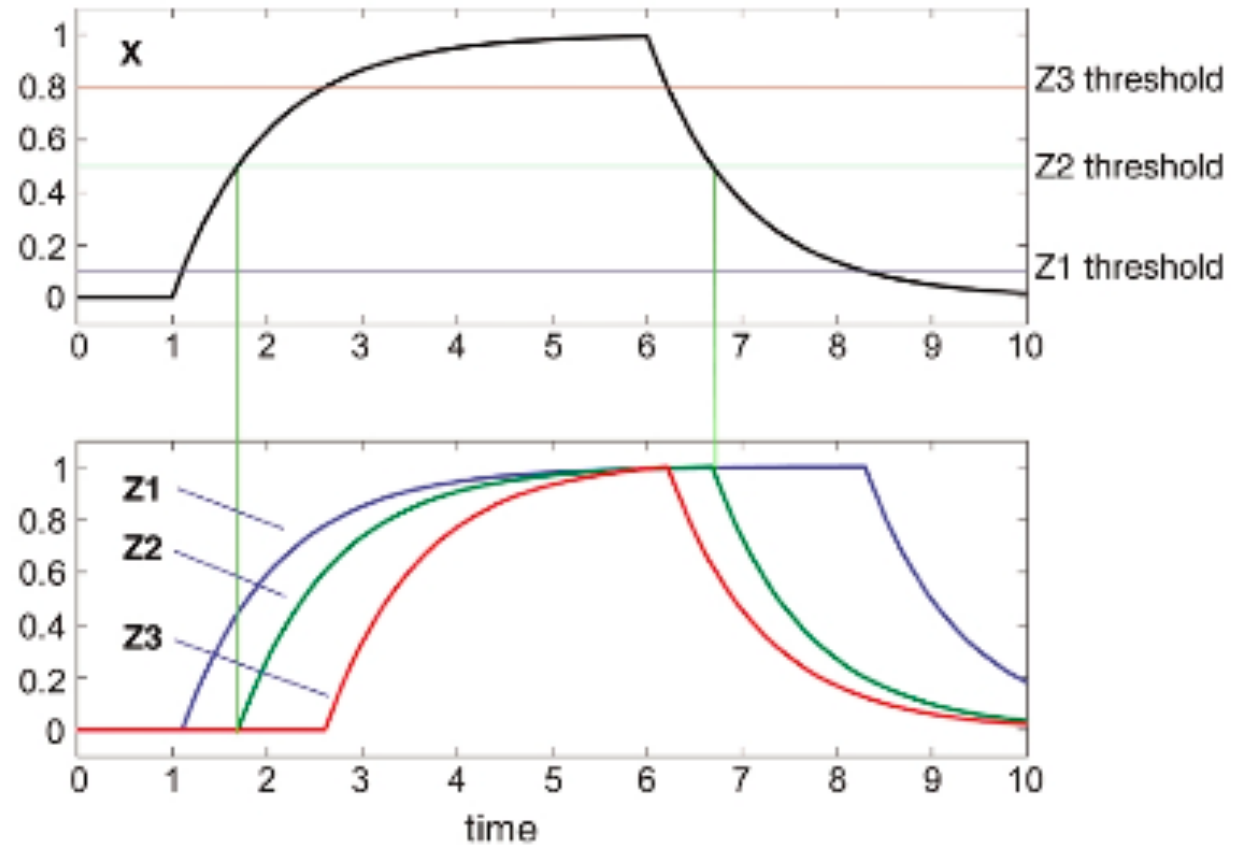
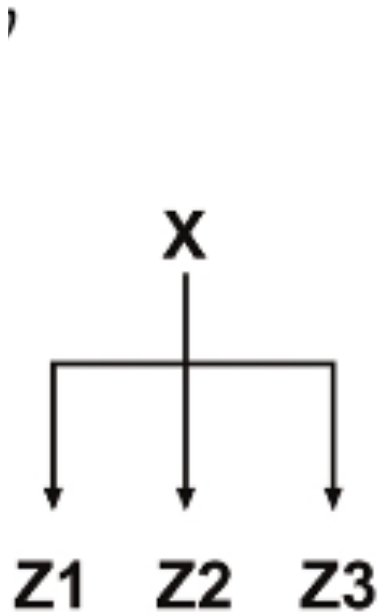
Positional Specification

- Morphogens
- Diffusion
- Reaction
- Degradation
- Cell modification
- Fate determination

French Flag Model



Single Input Module



Next

Models of development
cell-cell interaction