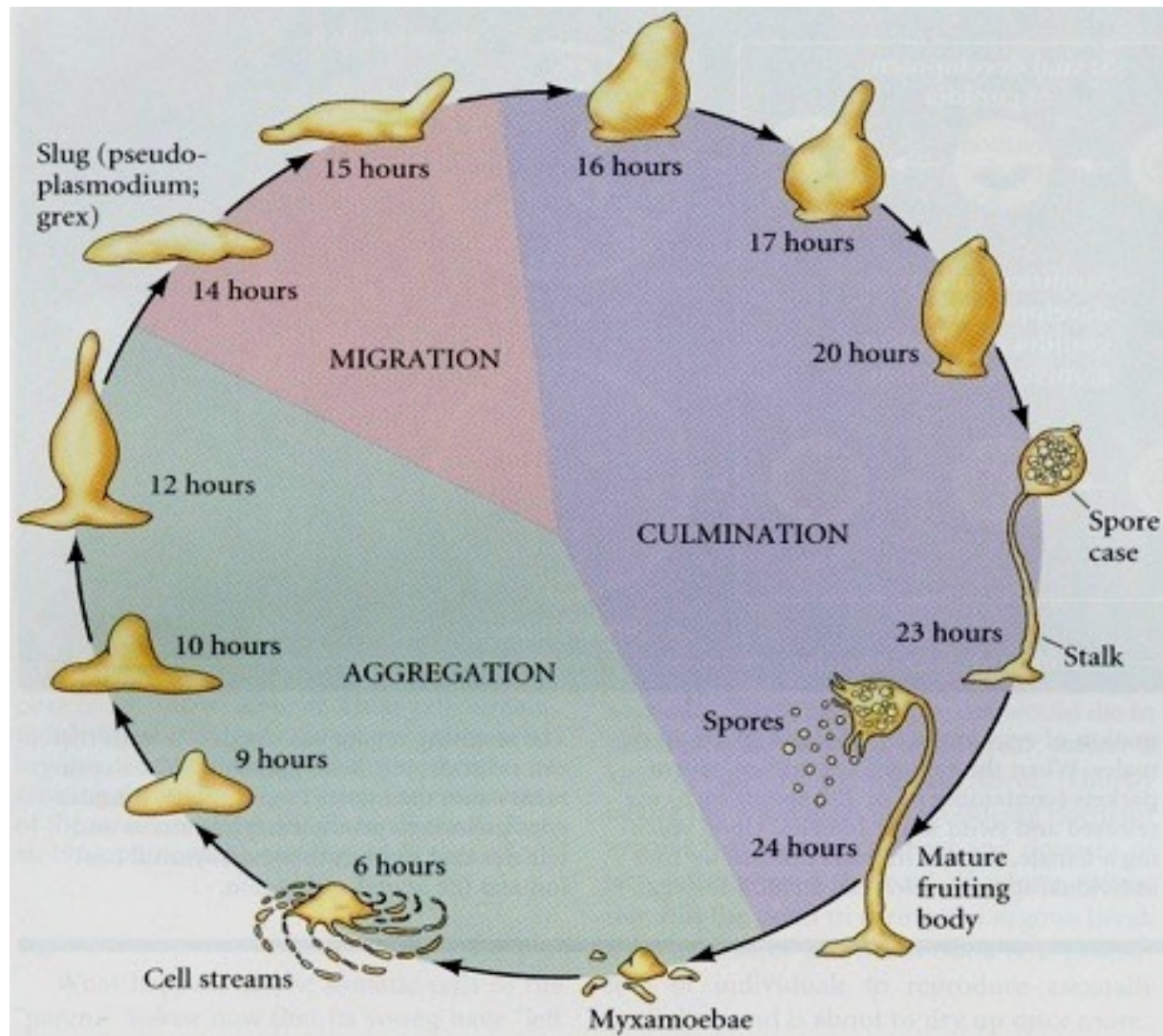


Dynamic Metaphor vs. Dynamic Measure

Metaphor: State Space / Order Parameter
Measures: Attractor strength / Stability



Order parameter: the qualitatively different states

Control parameter: available food (actually concentration of a chemical that is released if they are starving)

Experiments:

Find out if the process is reversible... add food

perturb the system during the various phases...

the degrees of freedom of the individual components are increasingly constrained by the interaction:

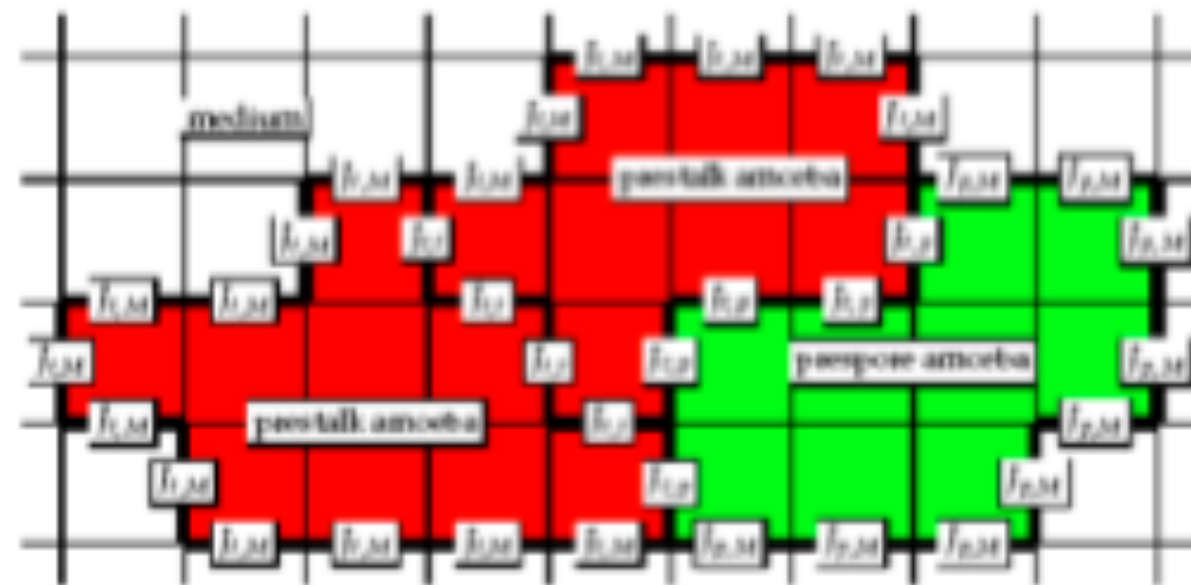
free living amoebae... slug... immovable sporing pod

nb State space and Phase Space (or: Diagram) are different concepts, but often used interchangeably to describe a State Space... see slide 18

From Pattern Formation to Morphogenesis

Multicellular Coordination in *Dictyostelium Discoideum*

A.F.M. Marée (2000). PhD Thesis, UU.



Two-Scale Cellular Automata with Differential Adhesion

$$H_{\sigma} = \sum_{\text{all } \sigma, \sigma' \text{ neighbours}} \frac{J_{\sigma, \sigma'}}{2} + \sum_{\text{all } \sigma, \text{medium neighbours}} J_{\sigma, \text{medium}} + \lambda(v_{\sigma} - V)^2, \quad (1.1)$$

Mathematical model of *Dictyostelium*