comments or questions before we begin?

What is an asocial organism?

A social organism?

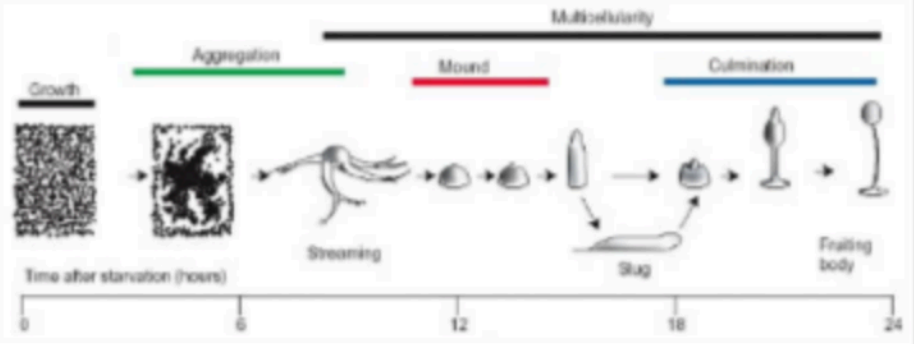
A eusocial organism?

A minimally social organism?
(sexual reproduction)

group: Generate a schematic of the key components of a social interaction system (including quorum sensing) and how they interact.

Next indicate which steps are vulnerable to “social cheaters”.

Consider the behavior of the cellular slime mold *Dictylostelium*. How is the multicellular slug like a true multicellular organism and how is it different?



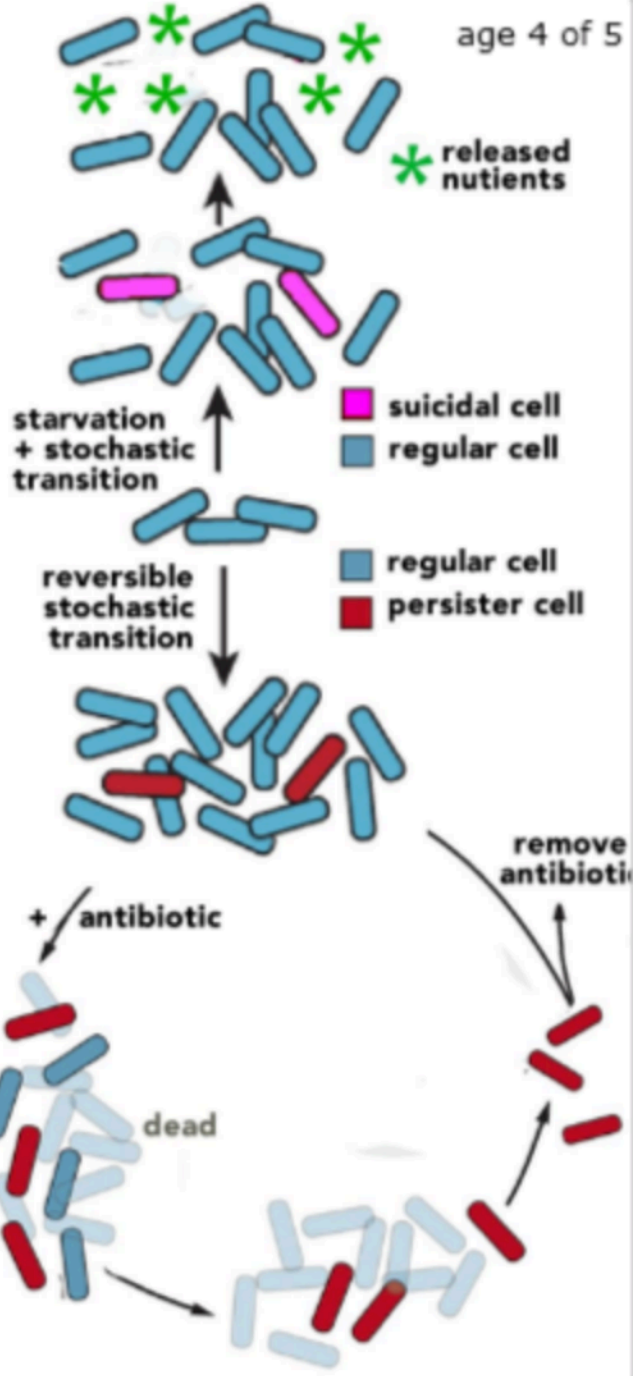
Thinking about Dictylostelium: typically 80% of the individuals become spores.

What would happen to the social interaction if the percentage was much less (say 20%)?

Thinking about Dictylostelium: what are possible alternatives to social cooperation?

Explain the logic for using quorum sensing to control the expression of "expensive" traits, such as programmed cell death, the expression of genes encoding light emitting protein systems, digestive enzymes, etc.

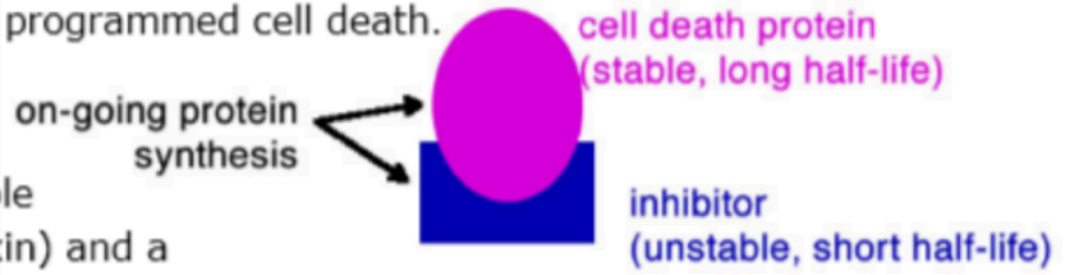
How might a population protect itself against an individula (a social cheater) that minimized its costs and maximized its benefits from the social behavior?



In cases of social interactions, there are signals and receptors:

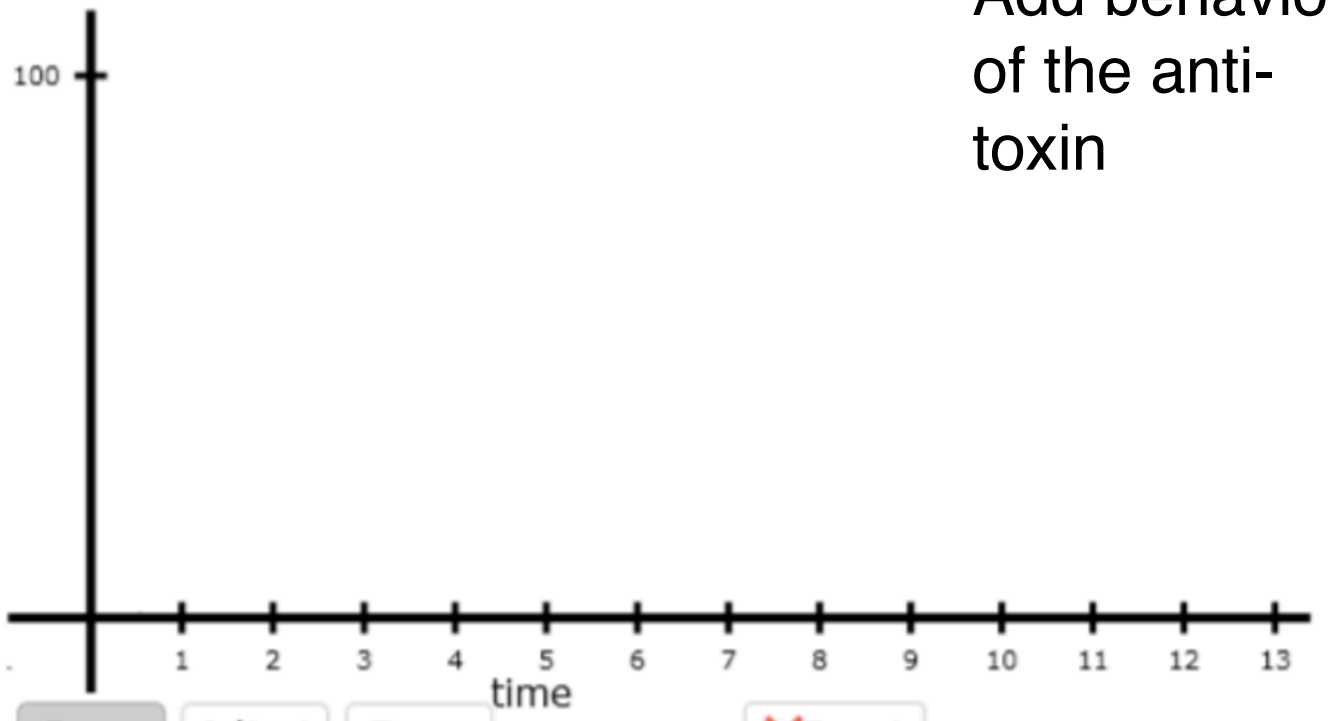
how are threshold effects attained
at the molecular level?

Social behavior can be enforced in various ways. One is by "advertising" the fact that individuals are willing to behave socially, another is by "addicting" individuals to the behavior - for example through what is known as programmed cell death.



Cell death can be based on a so-called "addiction module" consisting of a stable (long half-life) cell death protein (a toxin) and a unstable (short half-life) inhibitor (an anti-toxin). **Draw** the concentration of cell death (toxin) molecules as a function of time (x-axis) Assume that all protein synthesis stops at time = 4.

Add behavior of the anti-toxin



explain you logic

Draw Adjust Erase Reset

10-Chapter 4.2 read pages 96 - 101 first

what are the benefits of multicellularity?	
what are the benefits of being unicellular?	
How is it that all organisms are not multicellular or unicellular?	

Examples of types of cells found in multicellular organism.

How are such types of cells generated?

How might defense against social cheaters occur in more complex (and larger societies)?

Answers more appropriate for discussion in a political science course

Consider cooperation between identical organisms (slime mold amoeba) versus dimorphic organisms (many animals) with different contributions to producing viable offspring

sexual cooperation and selection

Defining male and female (biologically)

What is and what drives sexual dimorphism?

how does social behavior complicate the situation

Sex redefined

The idea of two sexes is simplistic. Biologists now think there is a wider spectrum than that.

Claire Ainsworth

Questions to answer:

56. What type(s) of mutation would enable an organism to escape a cell death module?
57. What types of mechanisms enable organisms (cells) to recognize each other as cooperators?
58. What strategies can be used to defend against the effects of cheaters in a population?
59. How would these mechanisms apply to social interactions?
60. Make a model for the process that could lead to the evolution of social interactions.
61. What factors limit the complexity of a unicellular organism?
62. Is the schooling or herd behavior seen in various types of animals (such as fish and cows) a homologous or an analogous trait?

Wed. 27 Sept	Chapter 4.3 Social and Sexual Selection	85-106	**Complete** beSocratic #12
Friday. 29 Sept	**REVIEW for midterm #1**		previous midterm
Monday 2 Oct.	**first midterm exam**		exam answers