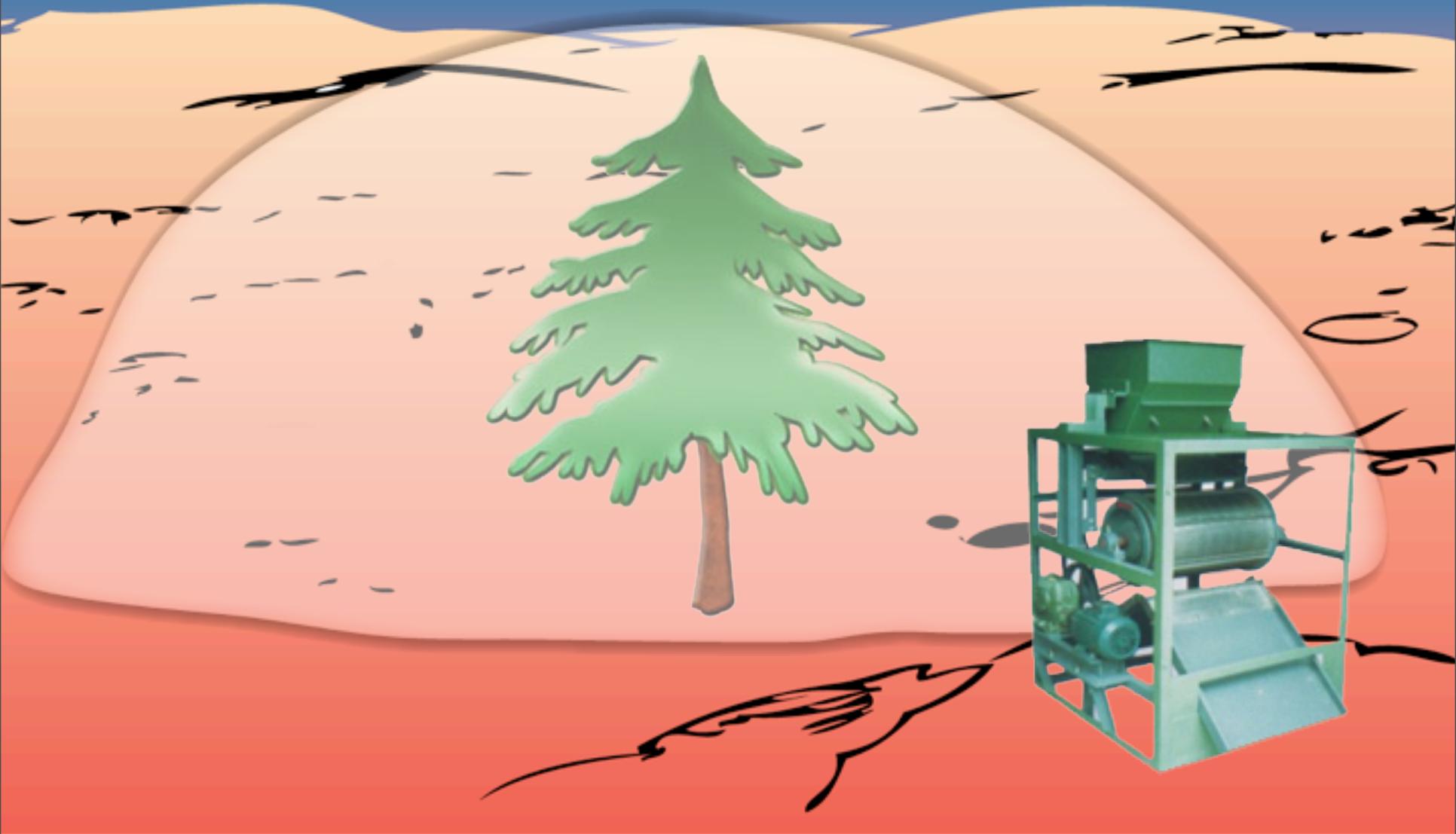


Modular design of new biological functions in lower metazoans

J. Christopher Anderson
Department of Bioengineering
UC Berkeley

Plants on Mars?



Bioreactors on Mars?



Simple devices.

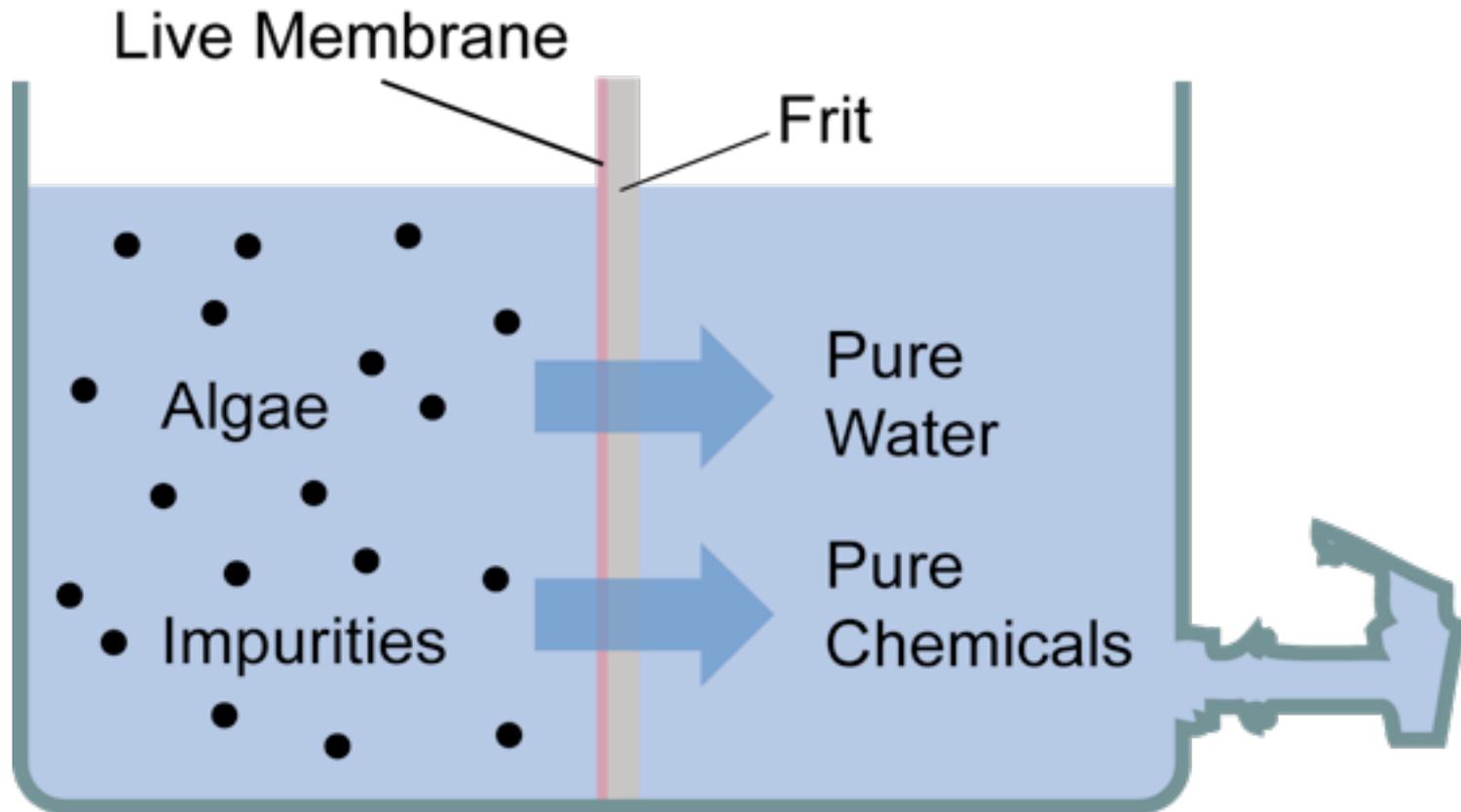


Self-isolating chemicals

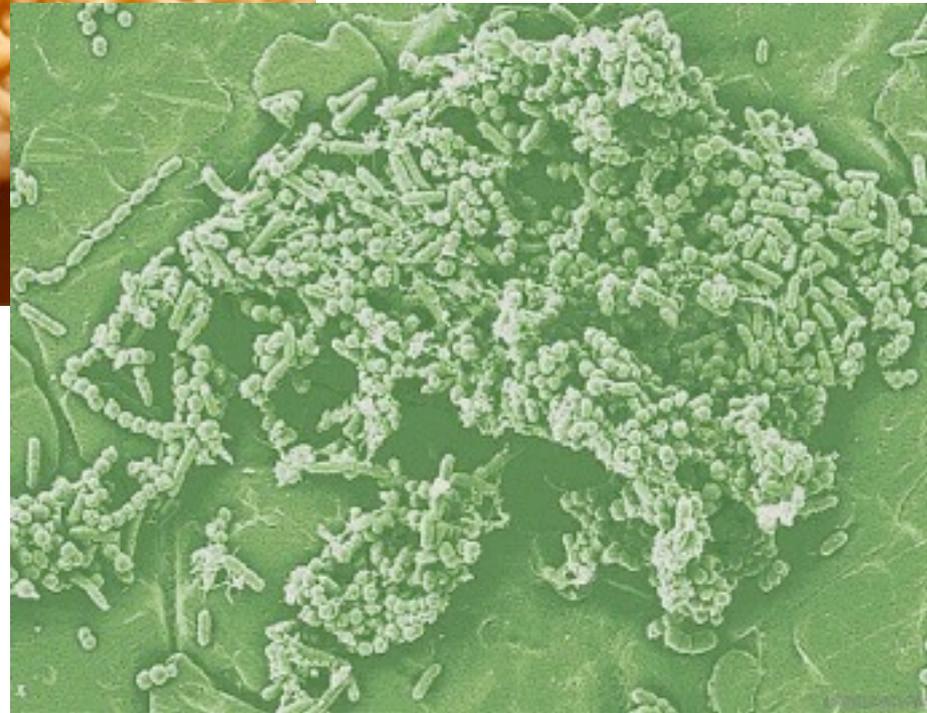
Oxygen / Hydrogen



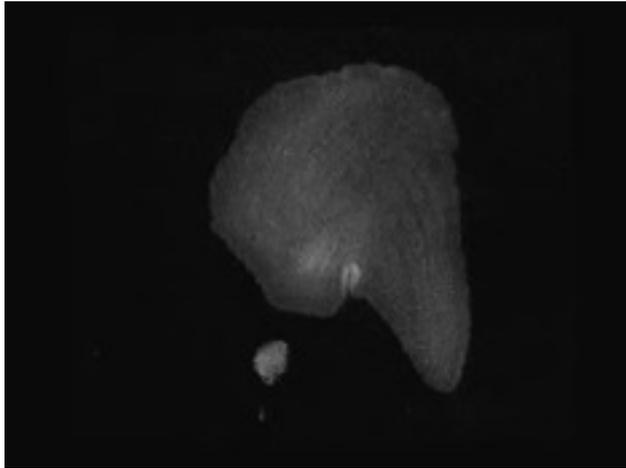
Live Membranes



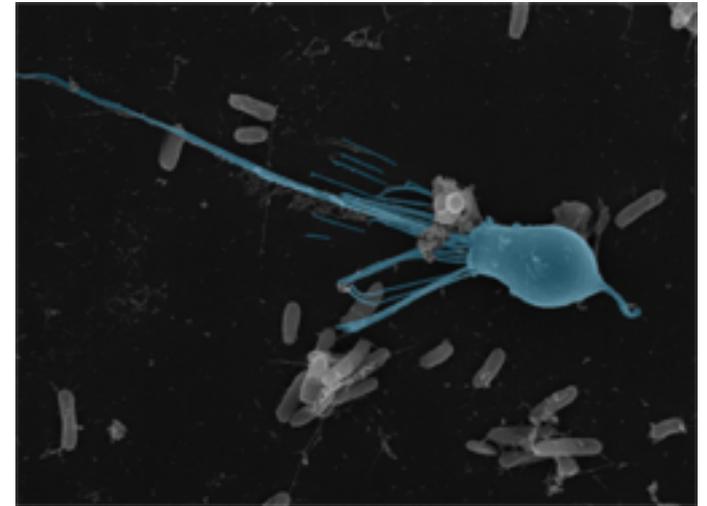
What's a live membrane?



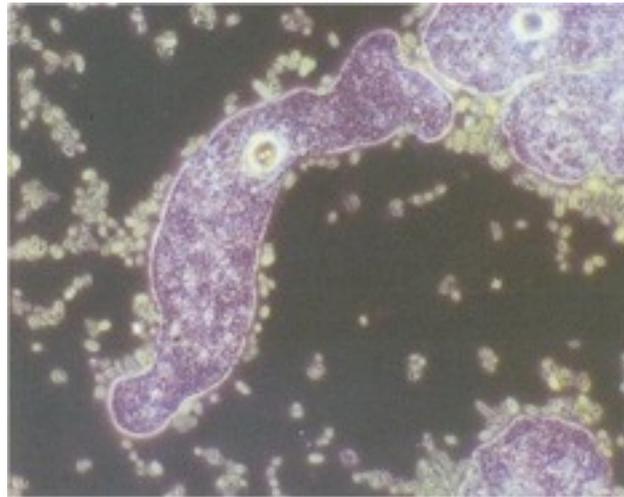
Lower Phagocytic Metazoans



Trichoplax adhaerens

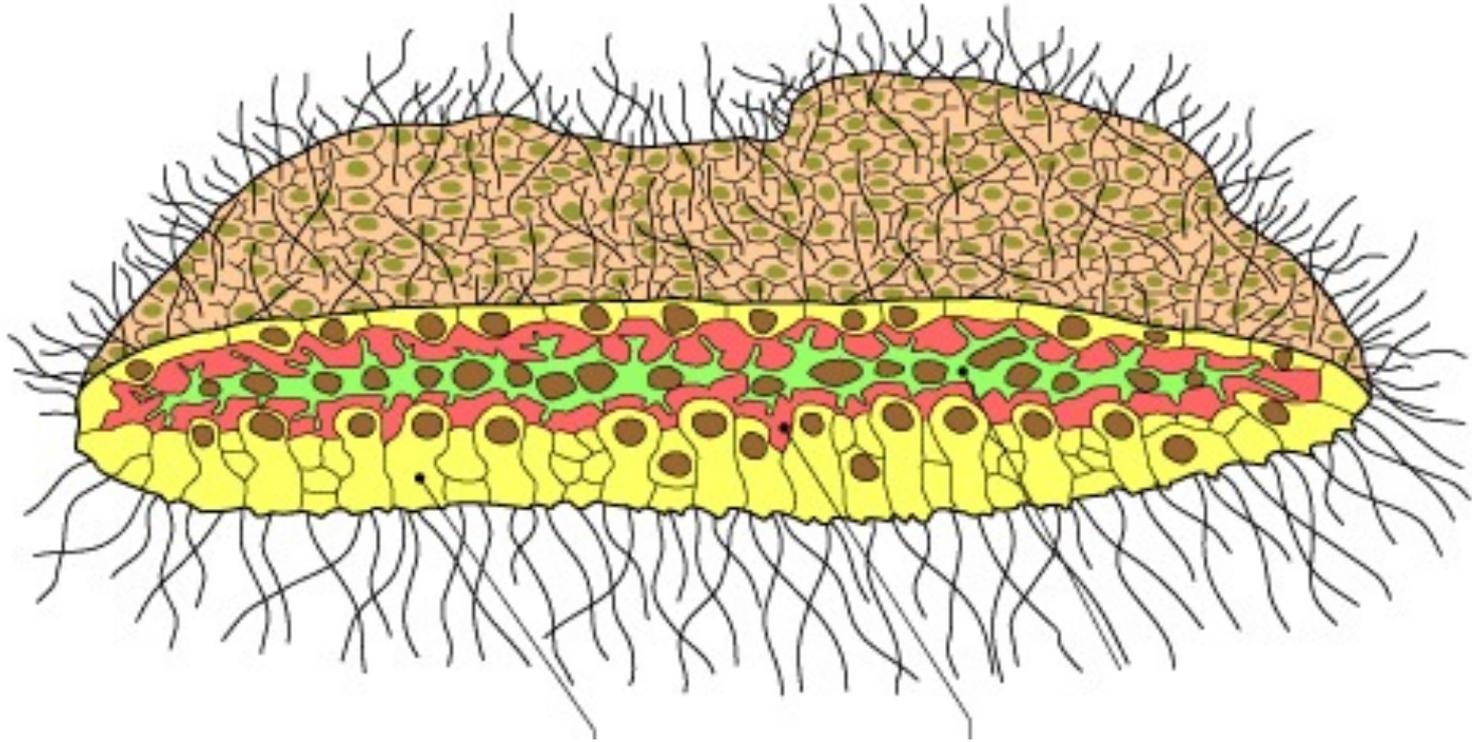


Monosiga brevicollis



Naegleria gruberi

Trichoplax adhaerens

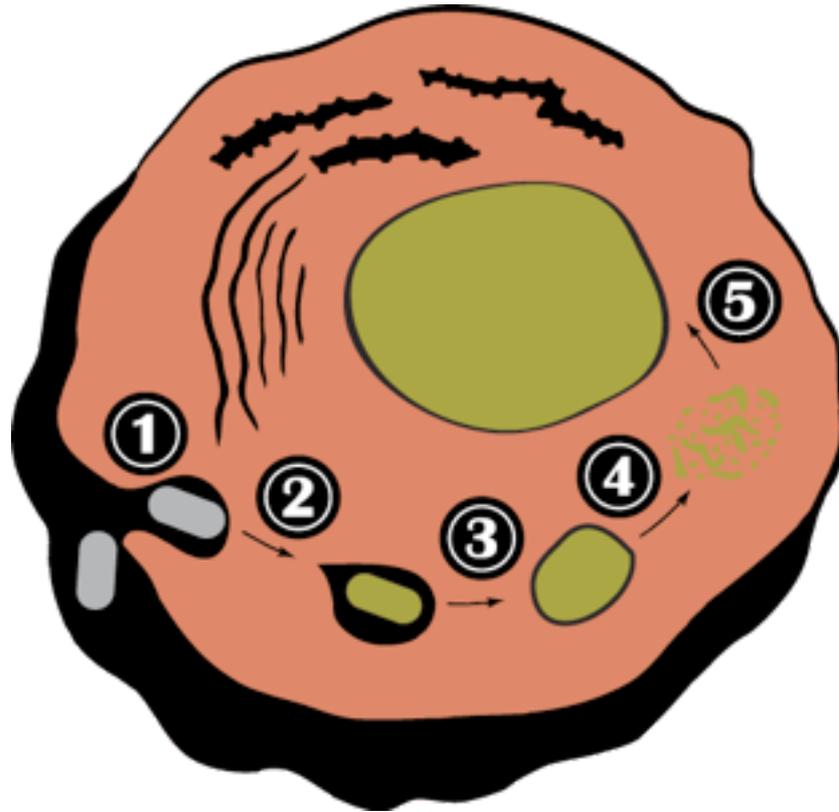


Lower Phagocytic Metazoans

(choanoflagellates and Trichoplax in particular)

- Fast growing as plants/animals/fungi go
 - Some grow in saltwater, some in fresh water
 - Eat algae, bacteria, and debris
 - Some have plastids
 - Adherent or non-adherent
 - Exposed and robust cytoplasmic membranes
 - Potential to form epithelia
 - Can be dessicated
 - Biochemically indistinguishable from animals
 - Capable of a G0 state
- ...but most are genetically intractable

Bootstrapping genetic tools



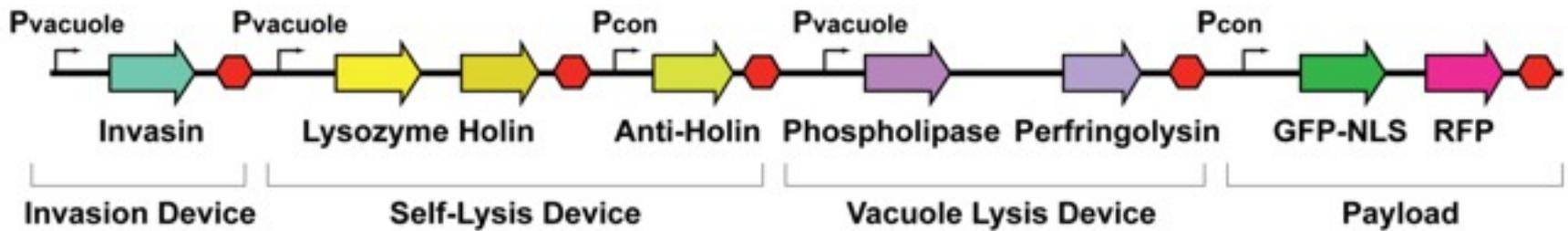
Bootstrapping genetic tools



Payload Delivery Device



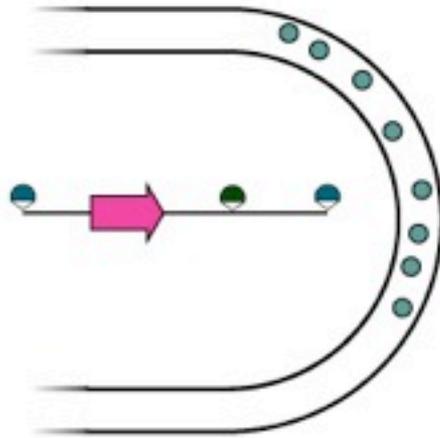
Jin Huh



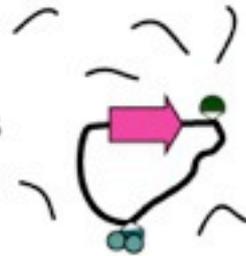
(Mammalian) Payload Delivery Device

Transposon Delivery iGEM 2010

Delivery Bacterium

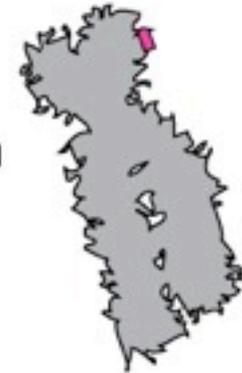


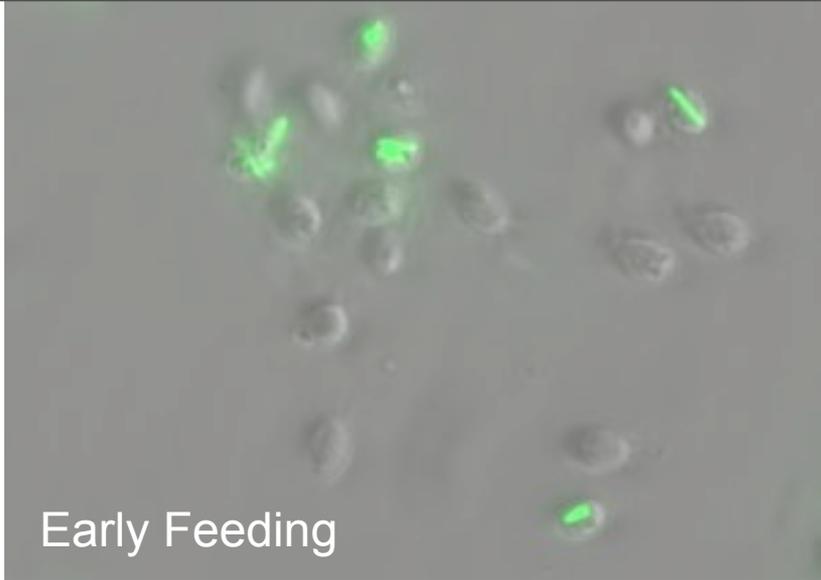
Self-Lysis



Transposome

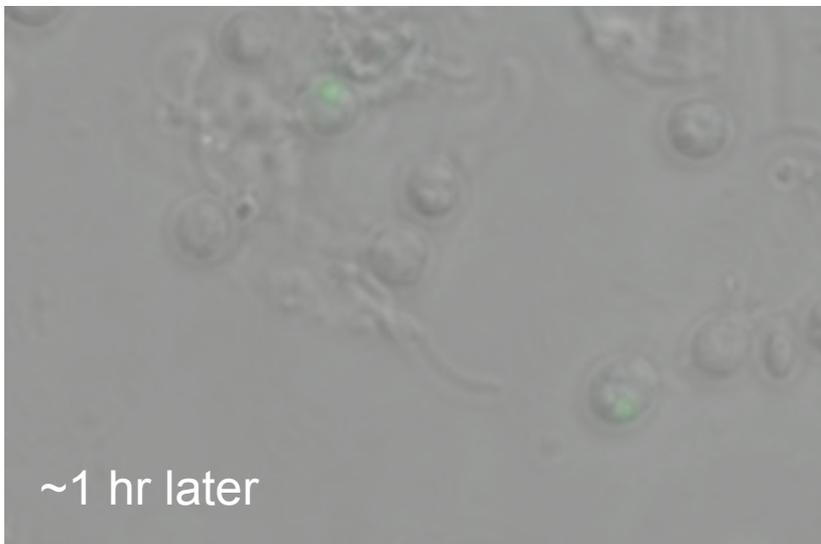
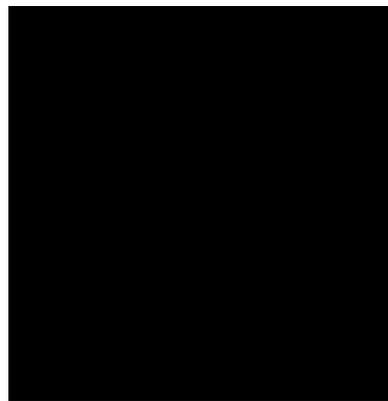
Nuclear entry and integration





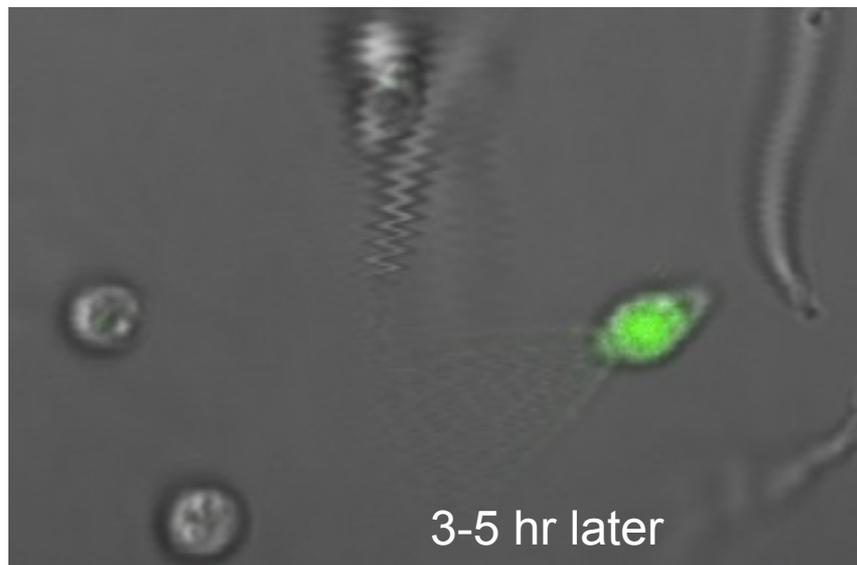
Early Feeding

Without Payload
Delivery



~1 hr later

With Payload
Delivery:



3-5 hr later

Acknowledgements

iGEM 2010 Team

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