

The background features a series of concentric circles in light gray, some solid and some dashed, creating a ripple effect. A large red speech bubble is centered on the page, containing the title and names.

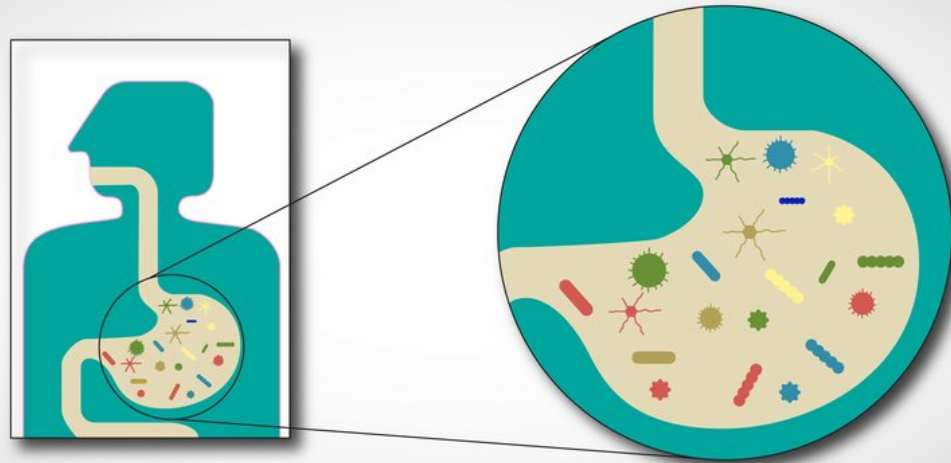
The art of rearing sterile mosquitoes

Ruby Harrison

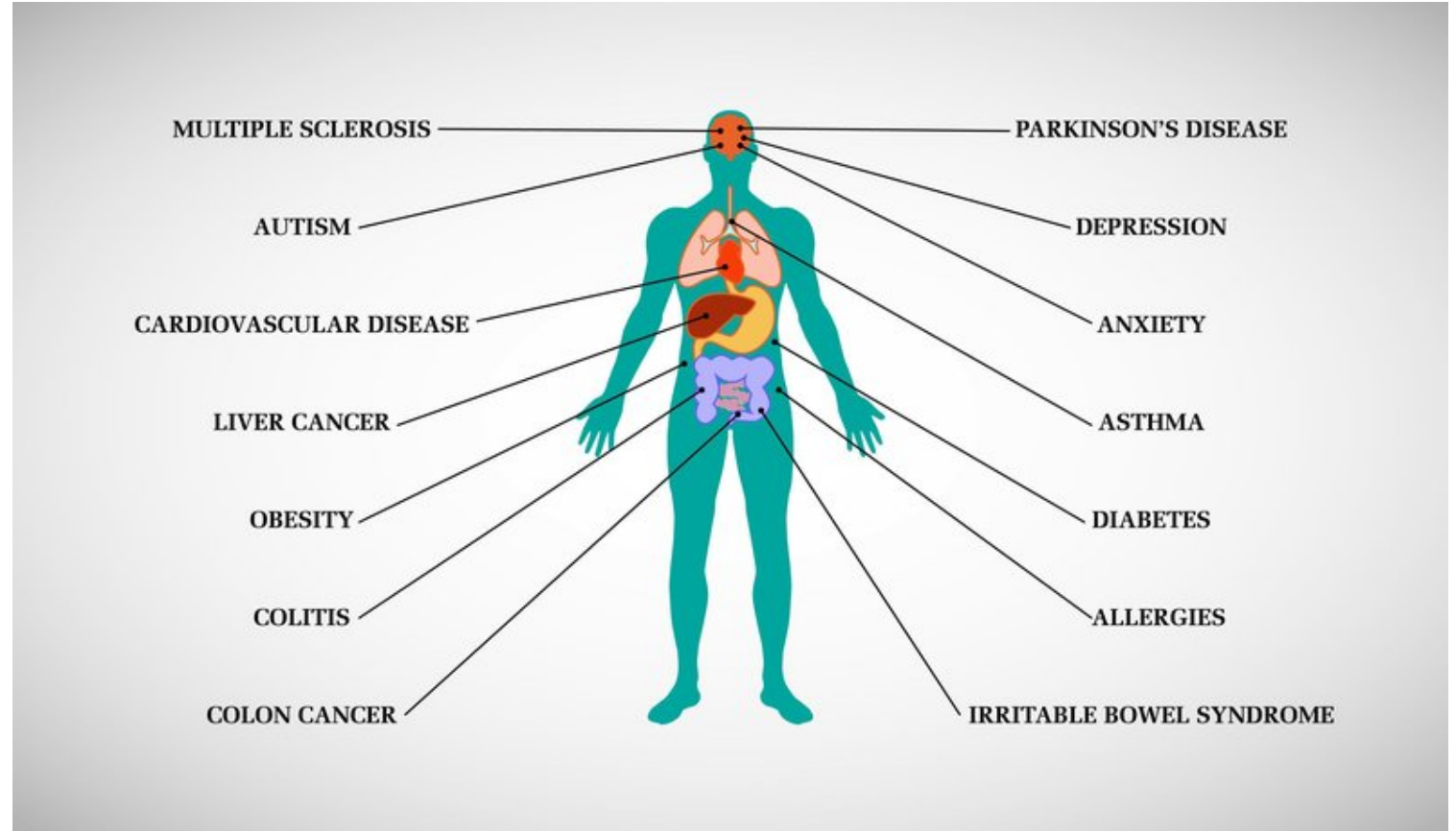
Mark Brown

Mike Strand

Defining the microbiota



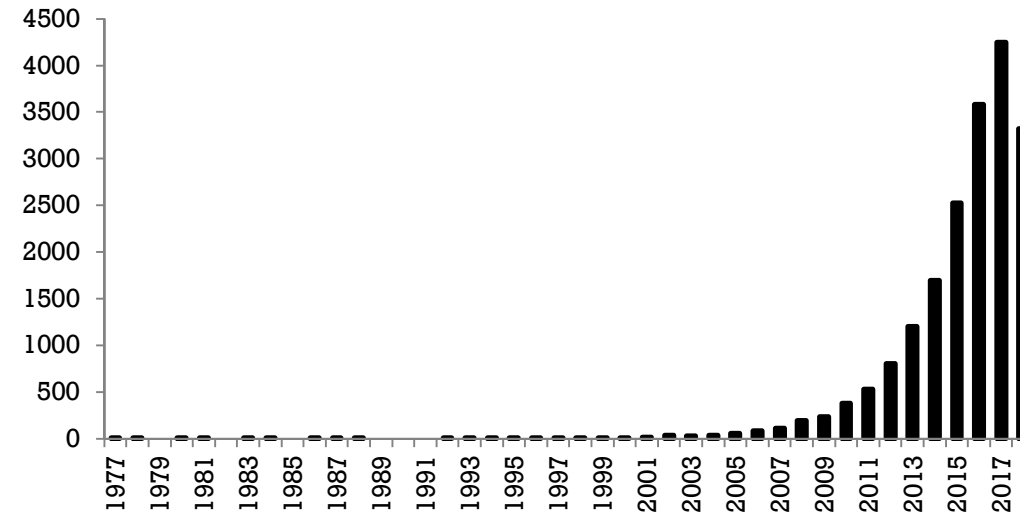
Functions of the microbiota



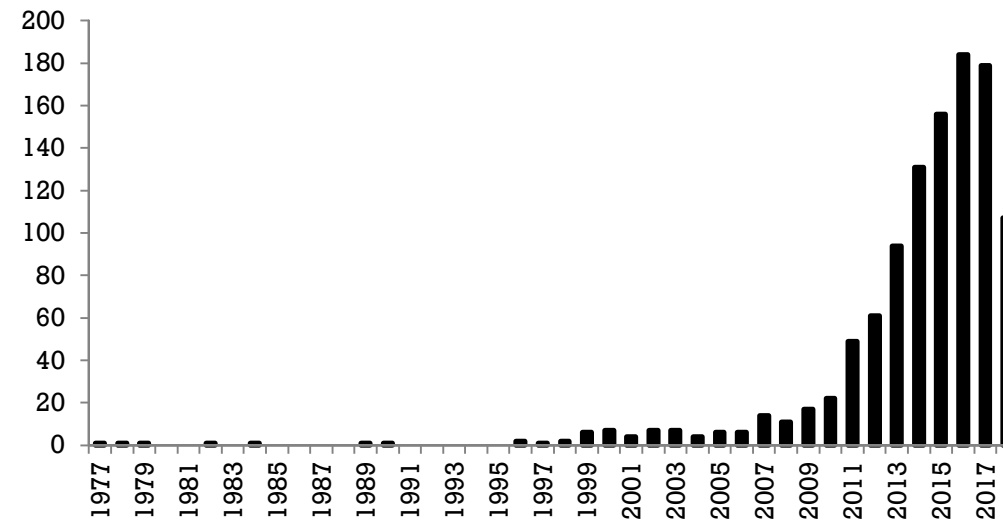
Interest in the
microbiota

Pub Med citations 1977-present

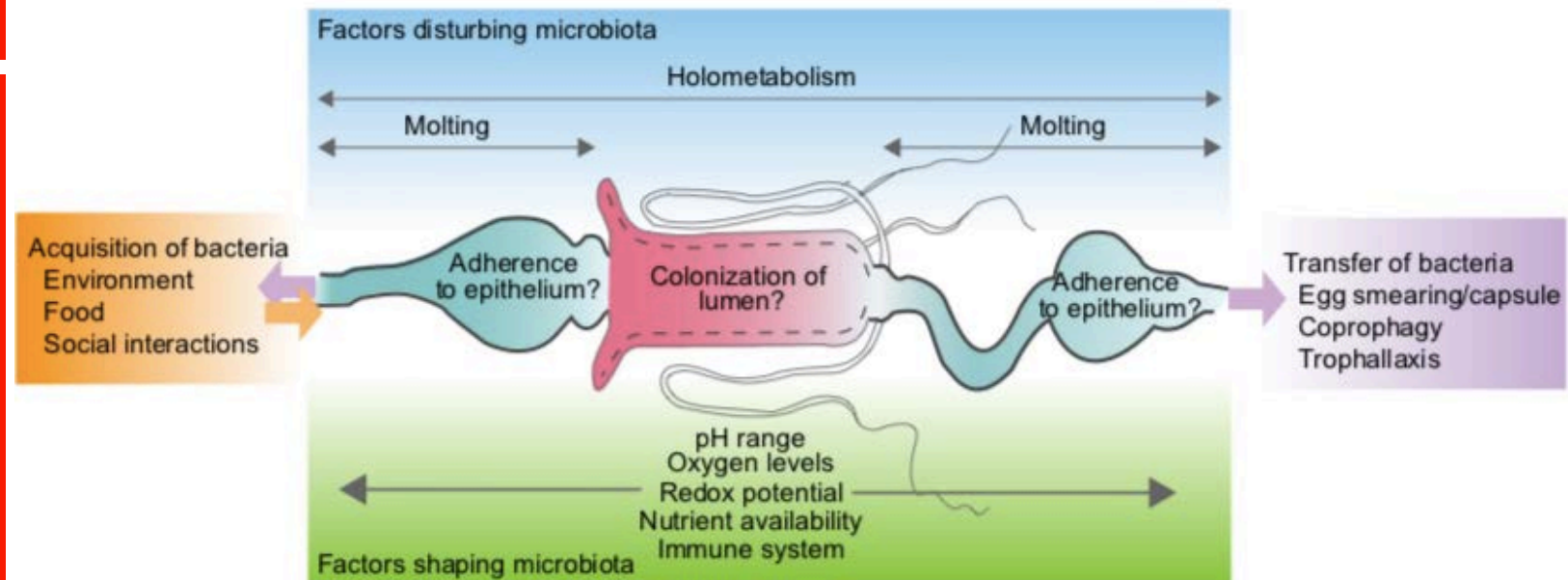
"Gut Microbiota"



"Insect" & "Microbiota"



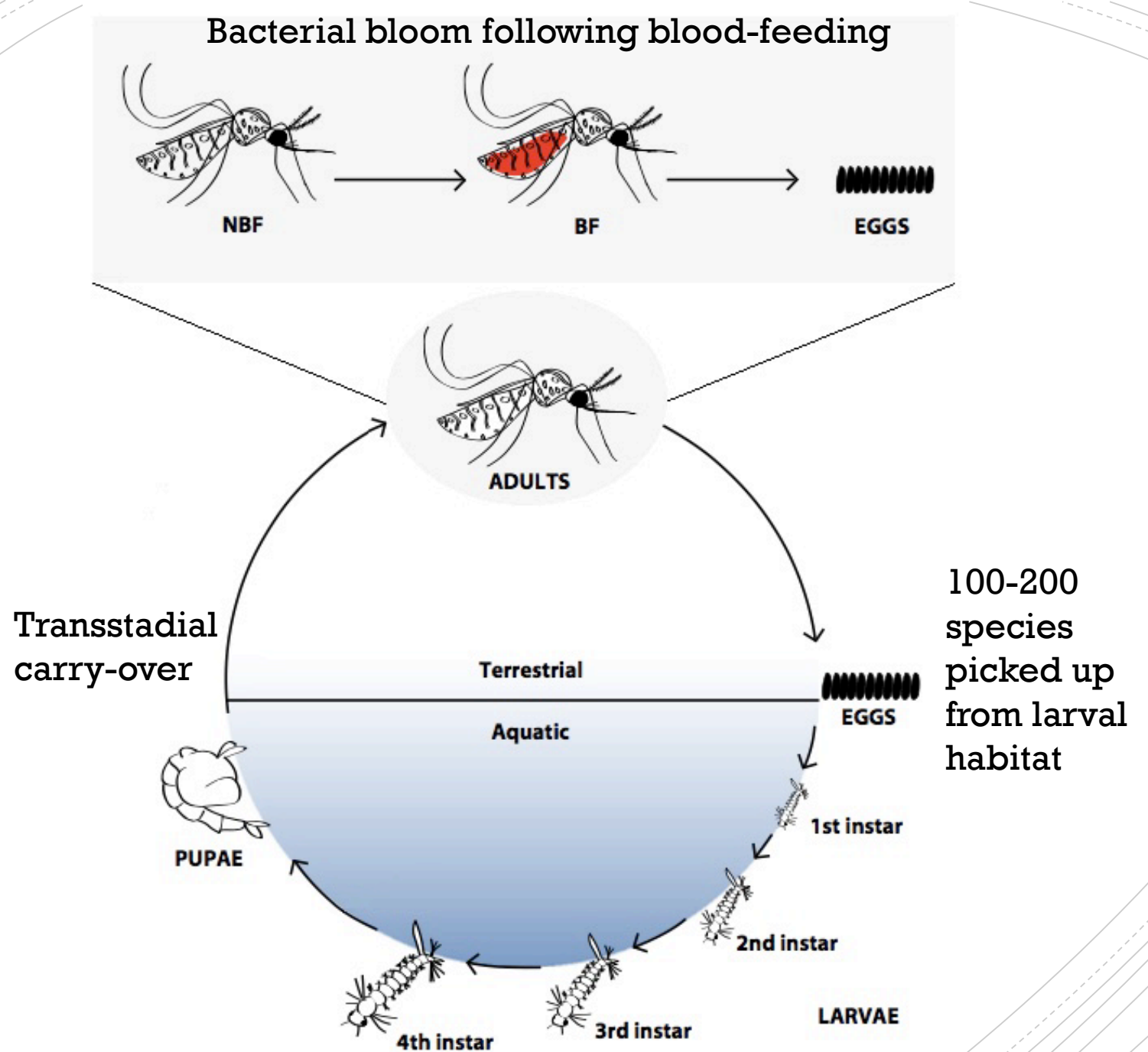
Insect-microbe interactions



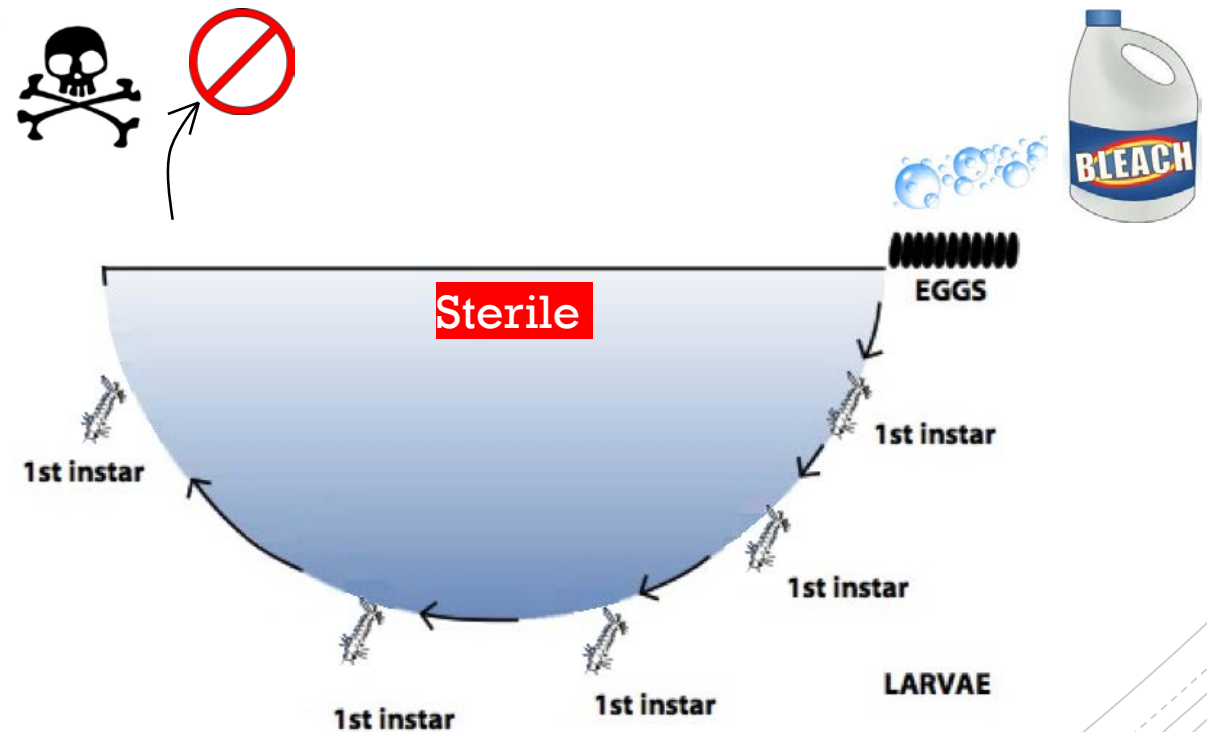
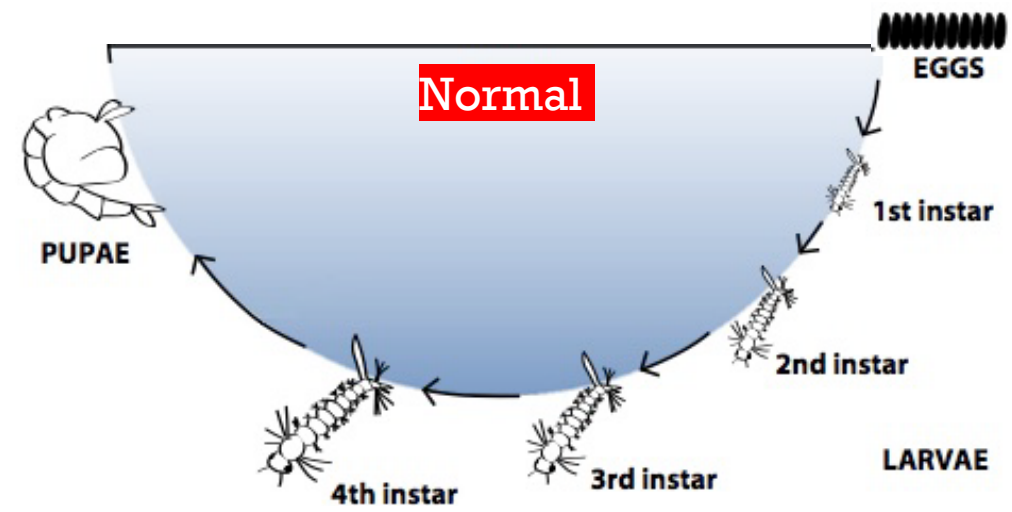
Microbiota of blood-feeding insects



The role of the microbiota in mosquitoes



The role of the microbiota in larvae

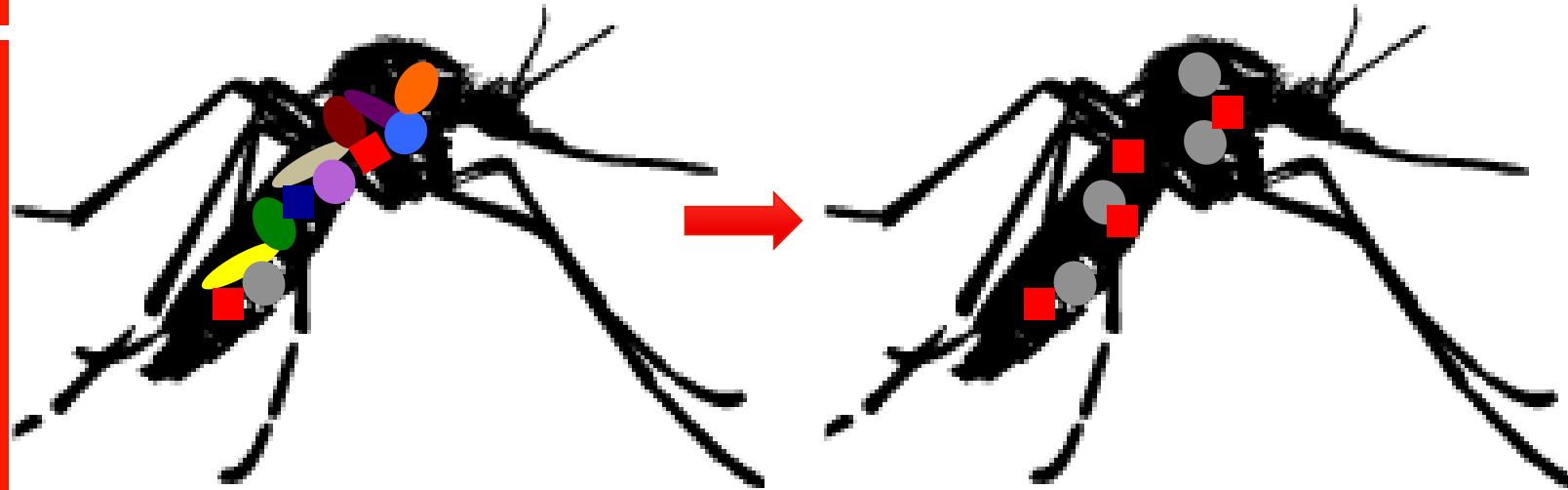


The role of the microbiota in adults

- What are the potential roles of the microbiota in adult mosquitoes?
- So far, the literature suggests the gut bacteria may influence:
 - Vector competence
 - Immune system function
 - Blood meal digestion
 - Fecundity
 - Insecticide resistance?

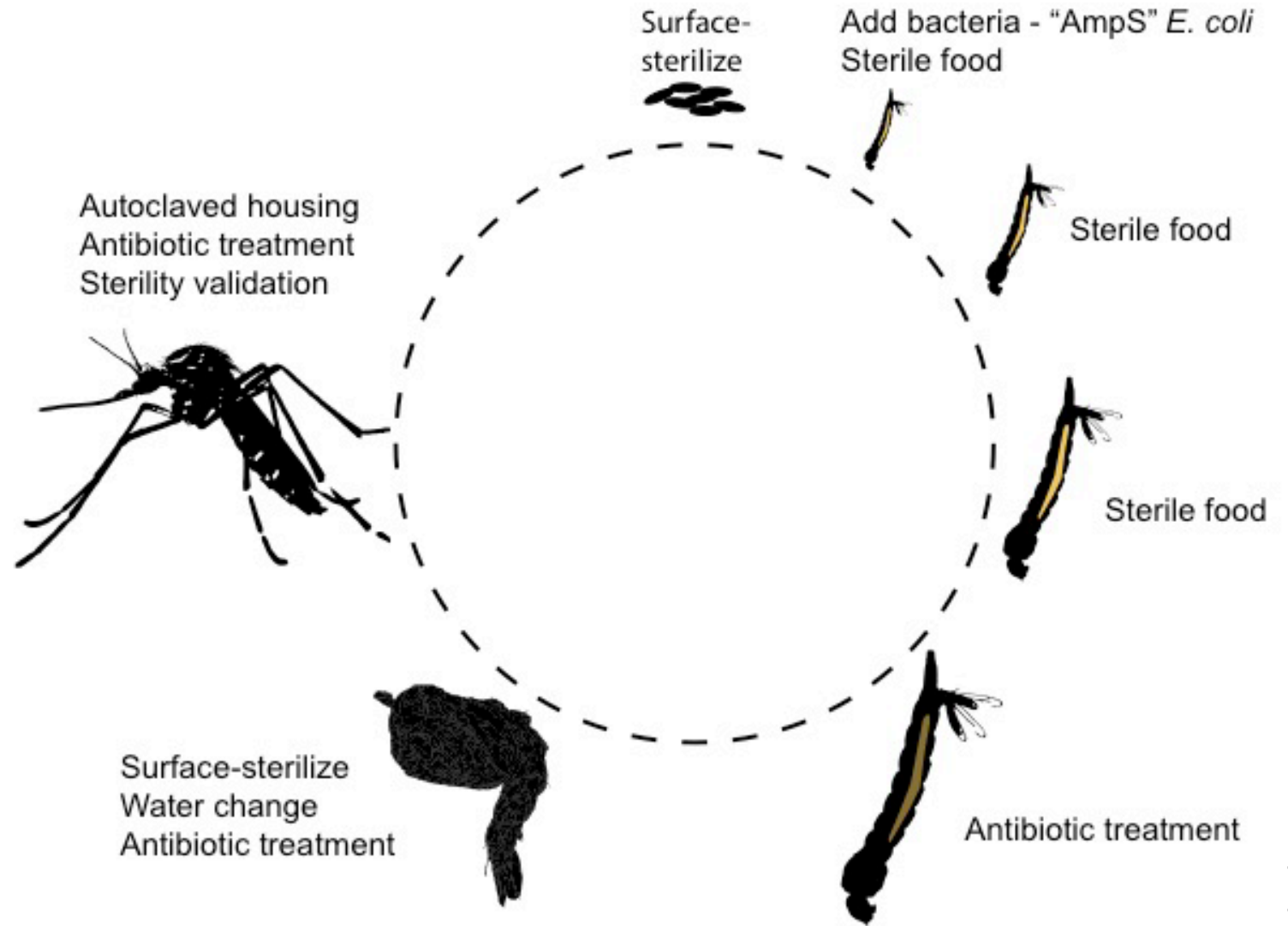
The need for a
sterile rearing
system

Tetracycline
Kanamycin
Gentamycin
Streptomycin
... and so on

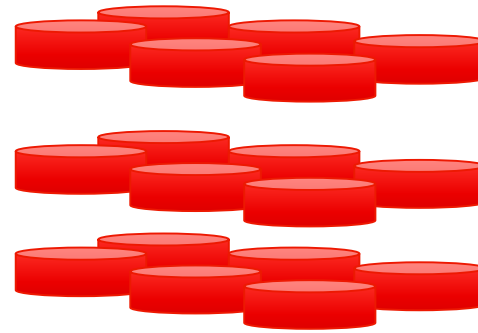


Oral antibiotics don't fully clear adult mosquitoes!

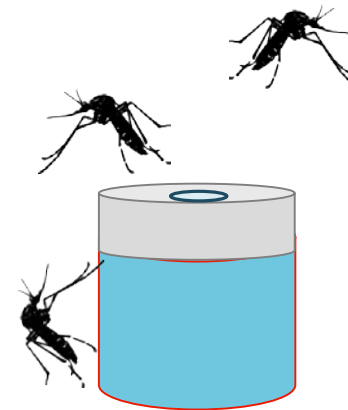
Methods to rear sterile adult mosquitoes



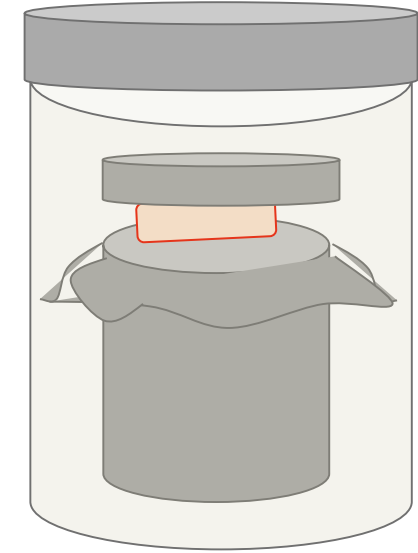
Methods to rear sterile adult mosquitoes



Larvae reared
in 6-well plates



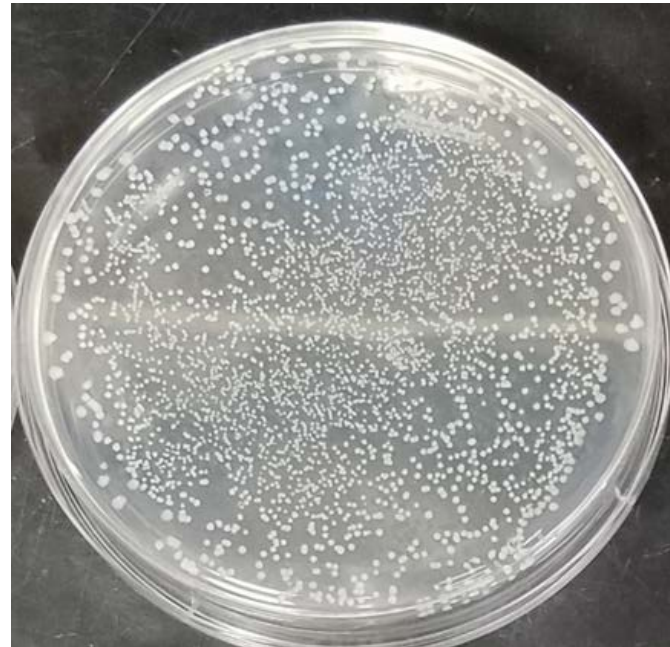
“Exit-only”
lidded pupal
cup



“Russian doll”
nested caging
system for adults

Sterility validation: culturing

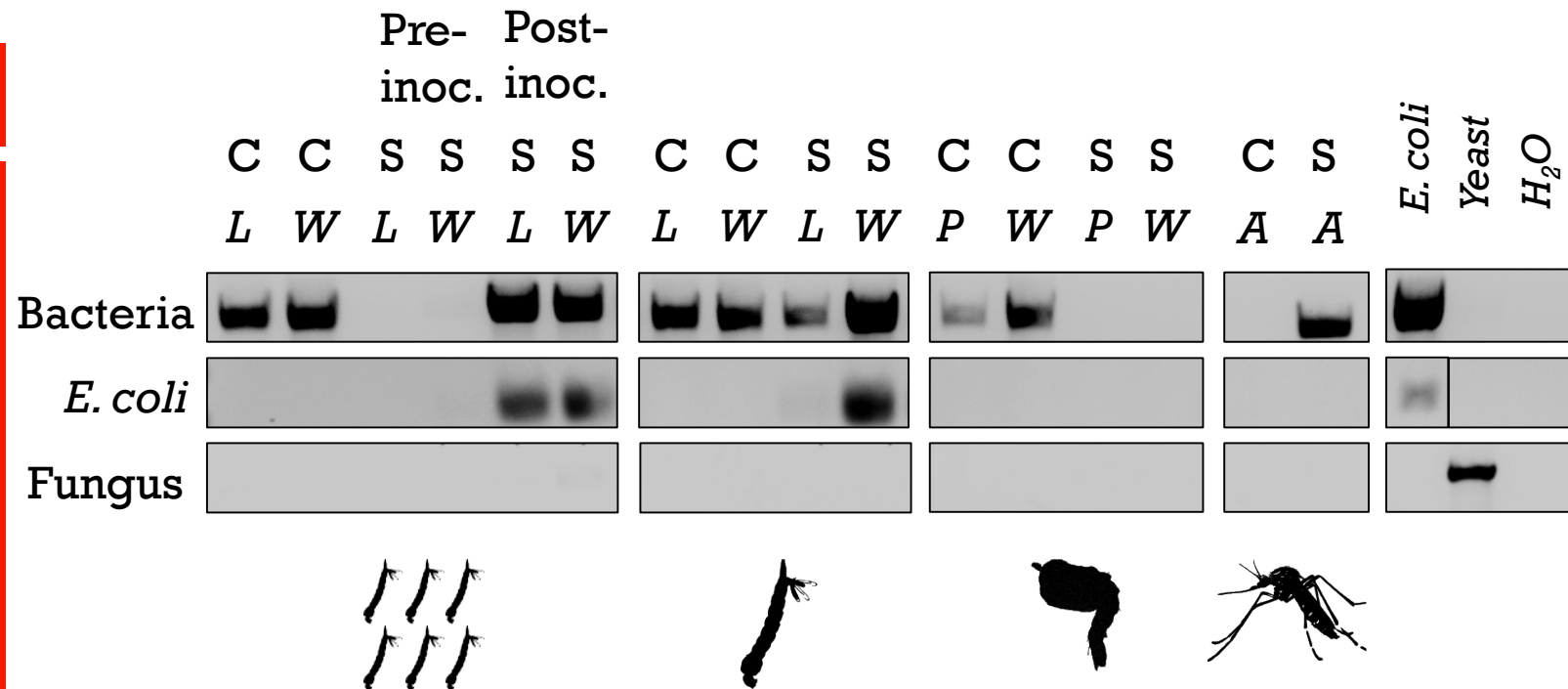
- LB agar
- YPD medium agar
- Potato dextrose agar



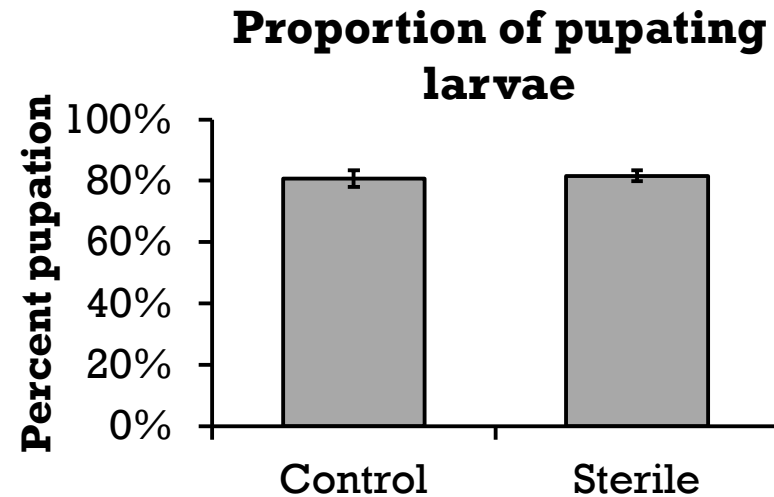
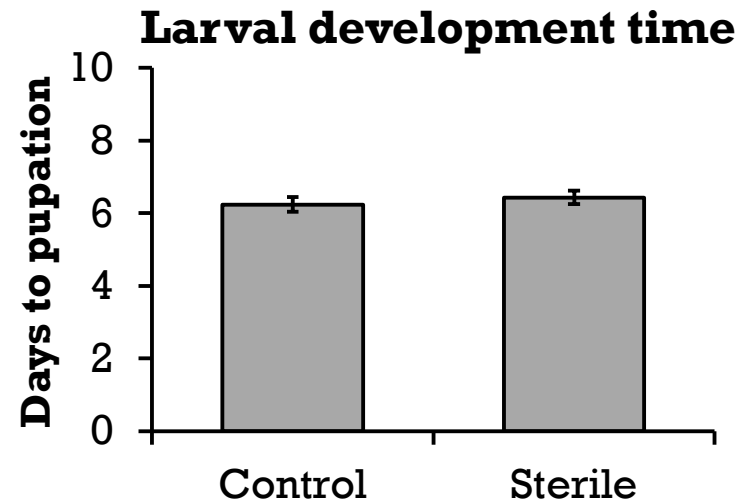
Control

Sterile

Sterility validation: PCR

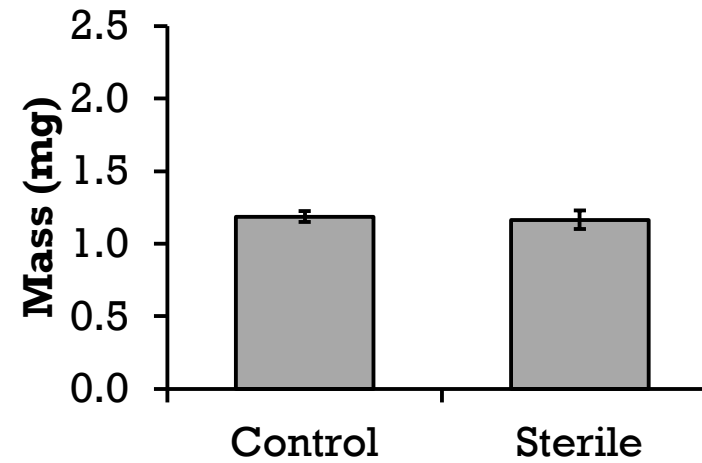


Robustness of sterile adult mosquitoes

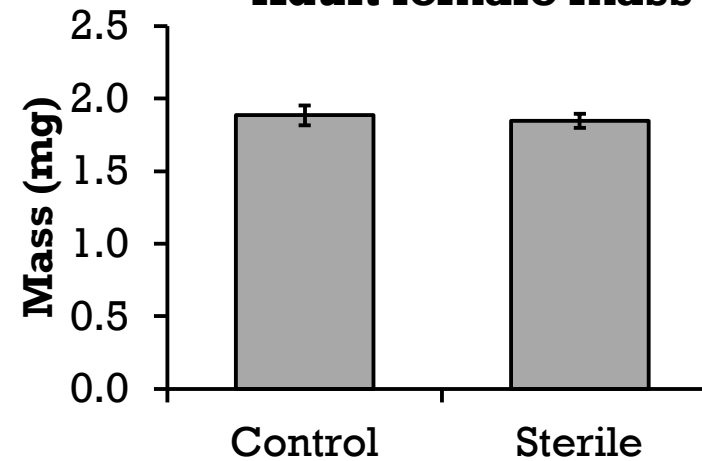


Robustness of sterile adult mosquitoes

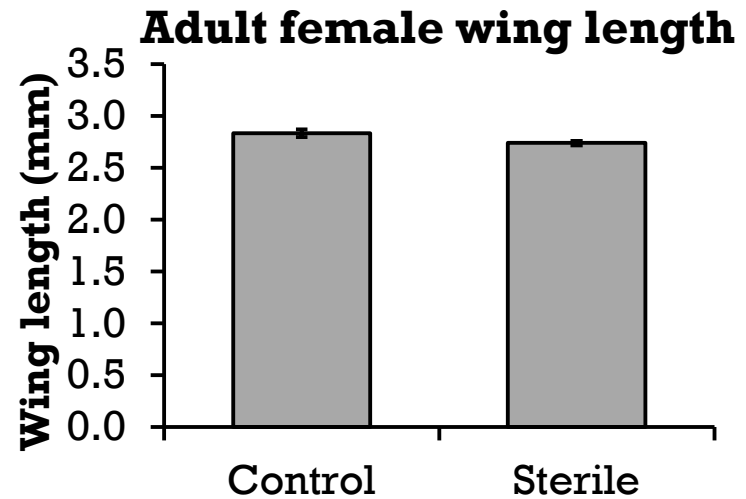
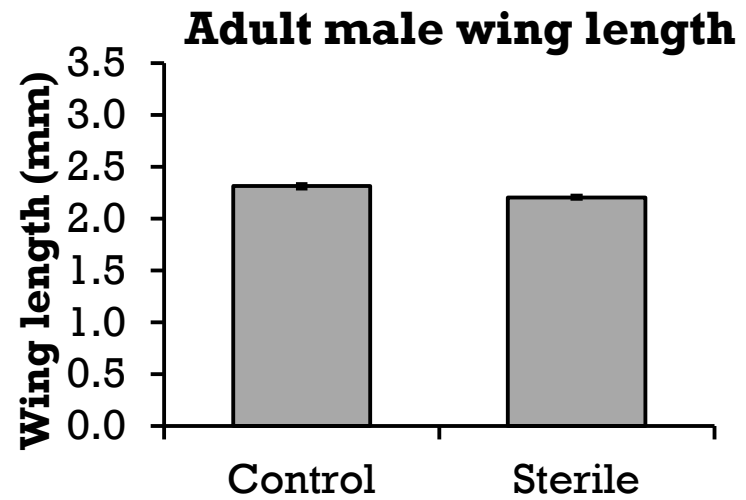
Adult male mass



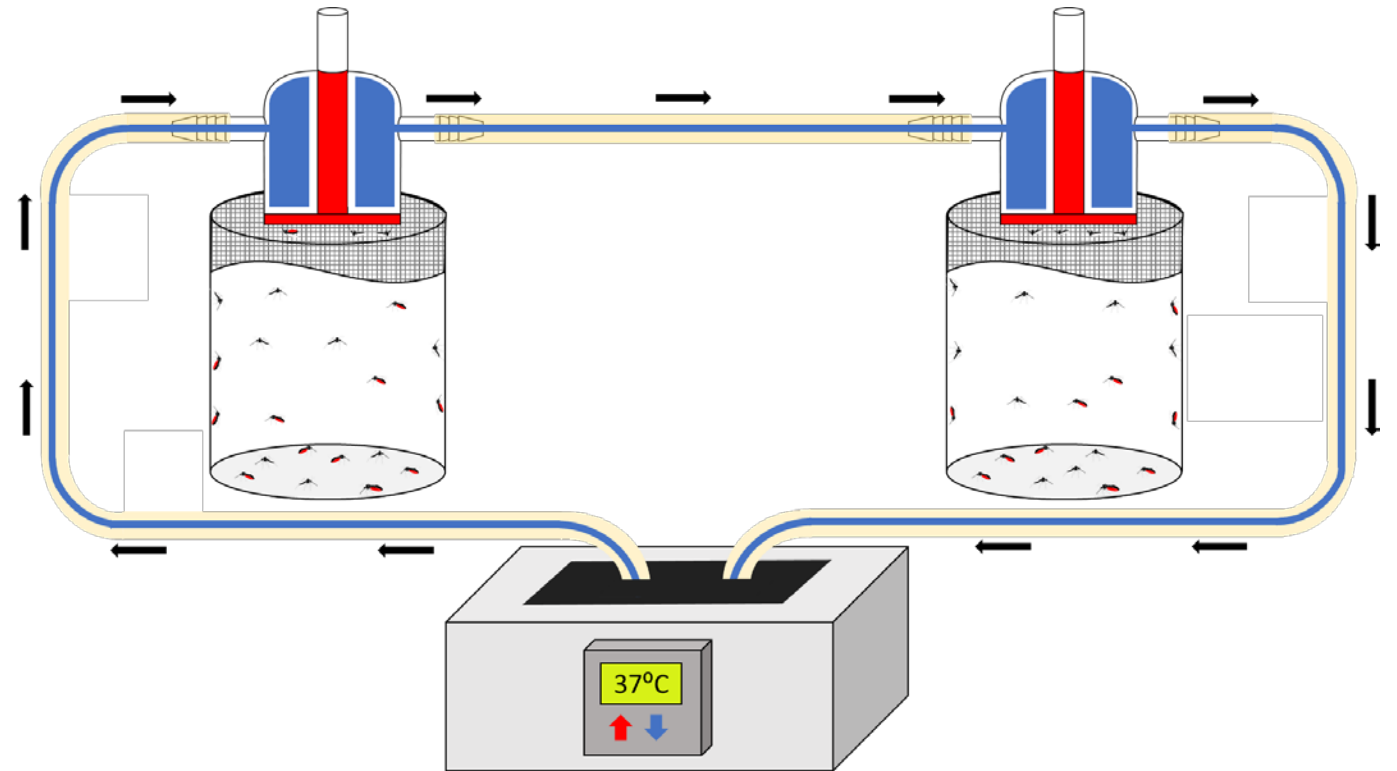
Adult female mass



Robustness of sterile adult mosquitoes

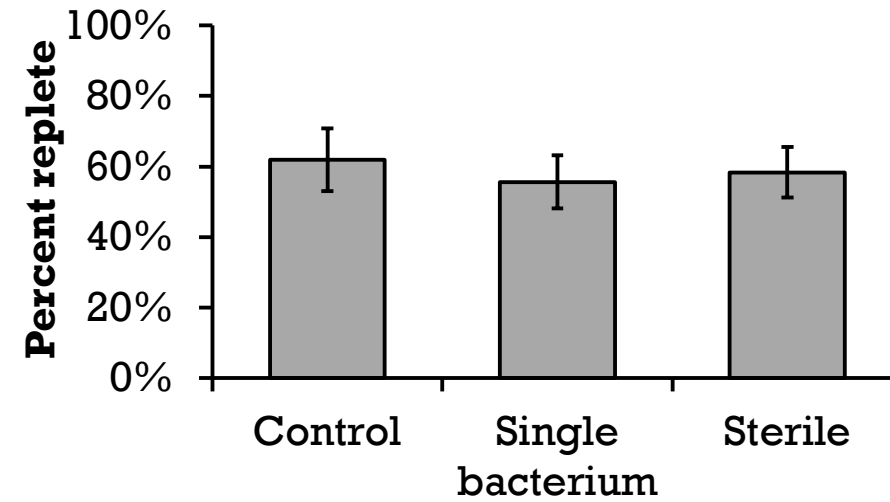


Robustness of
sterile adult
mosquitoes

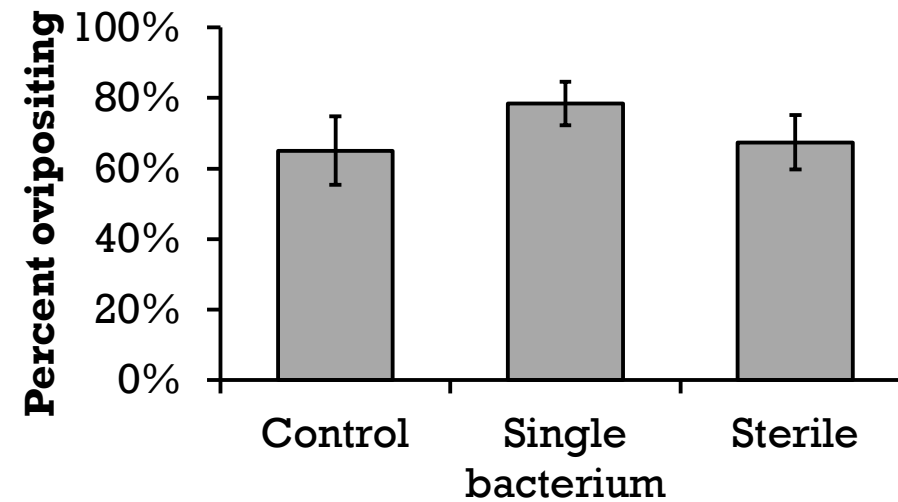


Robustness of sterile adult mosquitoes

**Proportion of bloodfeeding
females**



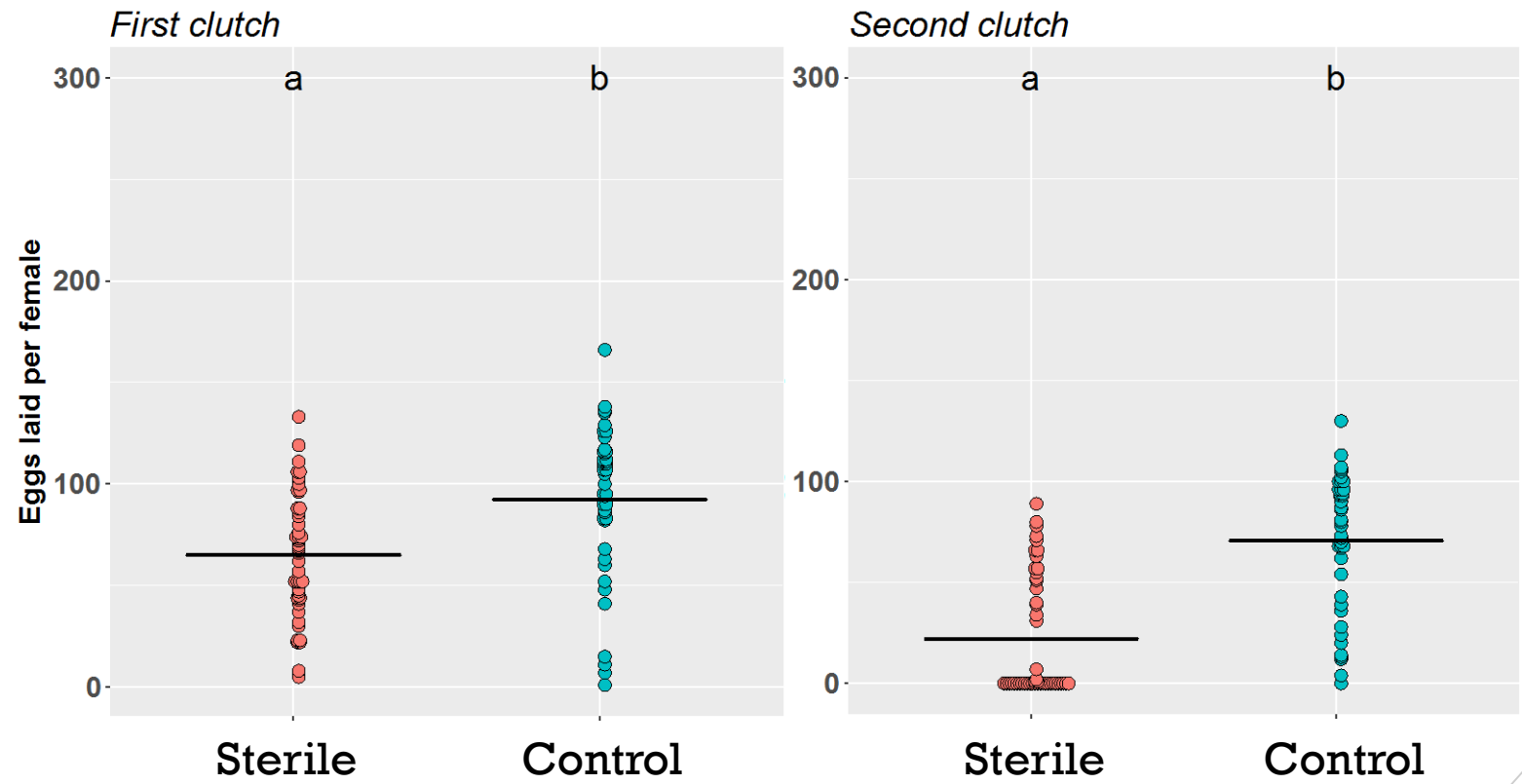
**Proportion of ovipositing
females**



So, what have I
found so far?

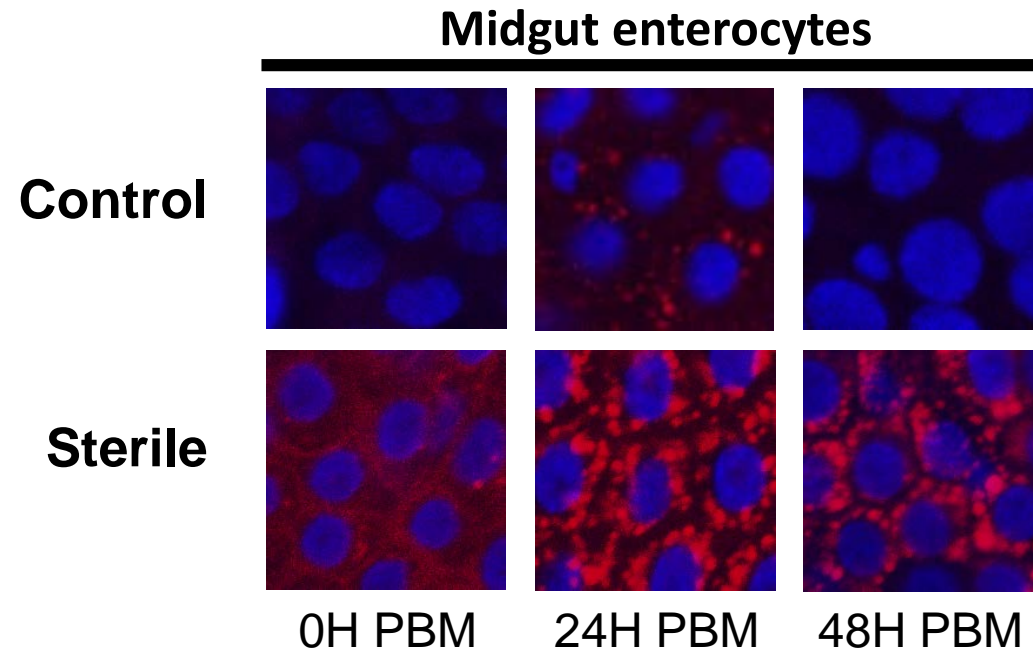


Defects in sterile adults: egg formation



Defects in sterile adults: lipid trafficking

Hoescht: nuclei
Nile Red: lipid droplets

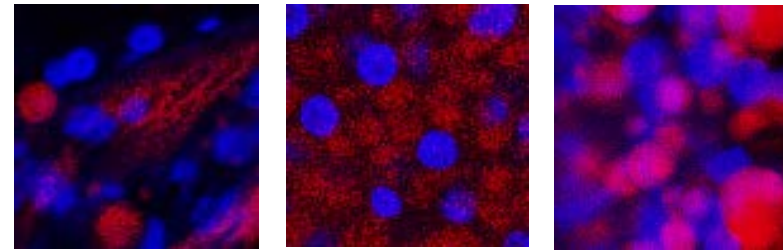


Defects in sterile adults: lipid trafficking

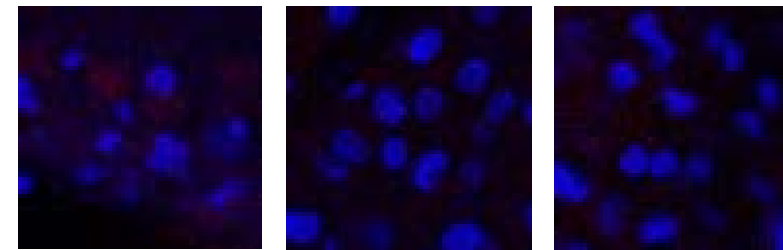
Hoescht: nuclei
Nile Red: lipid droplets

Fat body adipocytes

Control



Sterile



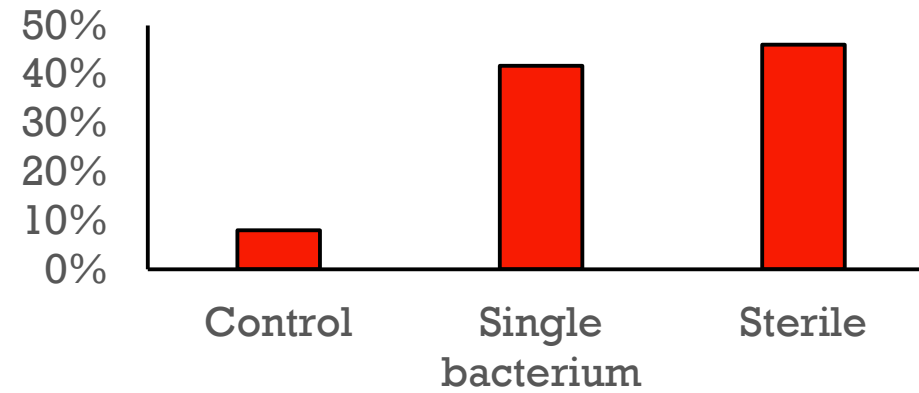
0H PBM

24H PBM

48H PBM

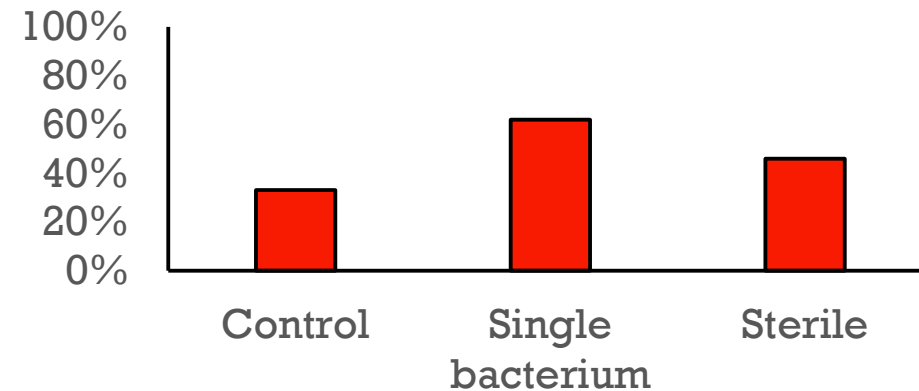
Defects in sterile
adults:
susceptibility to
dengue virus

Percent infected with dengue
virus 2



$p < 0.0001$

Percent with disseminated
virus



$p = 0.74$

Thanks for your
attention!

- Georgia Mosquito Control Association
- Mike Strand
- Mark Brown
- Bret Boyd
- Kerri Coon
- Luca Valzania
- Jena Johnson
- UGA Department of Entomology
- UGA CTEGD
- National Institutes of Health



**UNIVERSITY OF
GEORGIA**
Center for Tropical &
Emerging Global Diseases

