Lab.1
Model organism in Genetics

Main topics

- Model Organisms
    1. Definition of Model Organism
    2. How to choose the model organism
    3. *Drosophila melanogaster*

Model Organisms

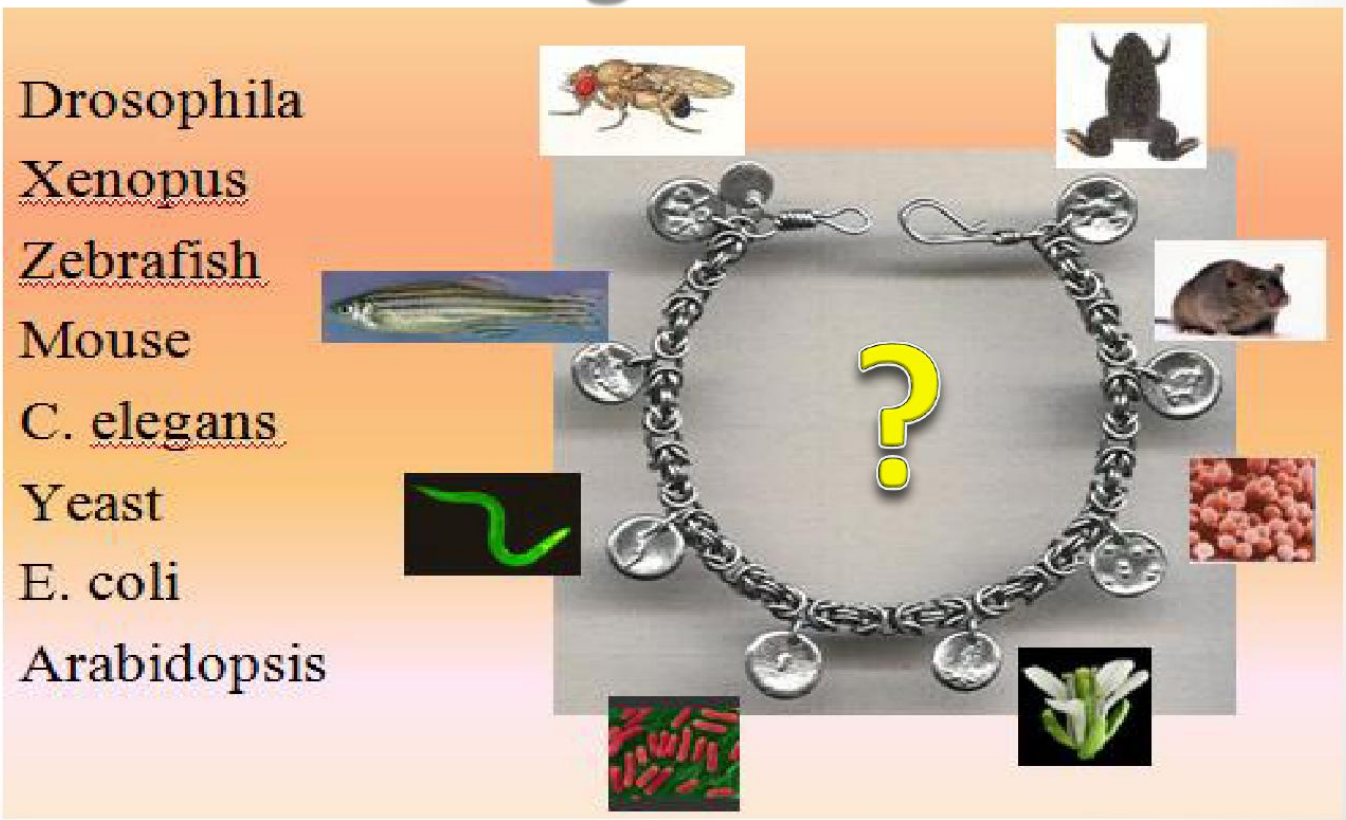
Definition of Model Organism

- Specific species or organism
- Extensively studied in research laboratories
- Advance our understanding of
    1. Cellular function
    2. Development
    3. Disease
- Ability to apply new knowledge to other organisms

Examples of Model Organisms Popular in Laboratory

organism	
	Prokaryotes
	Eukaryotes

How to choose the model organism

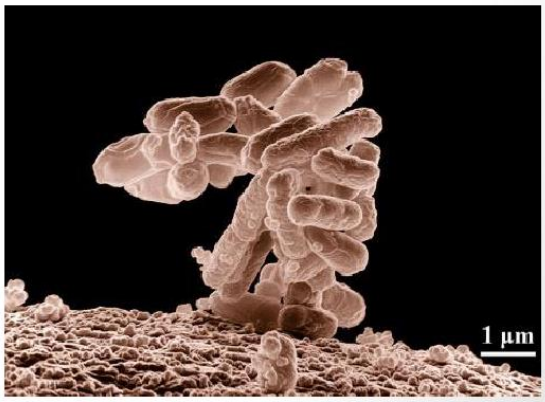


Model Organism

- Conditions needed for choosing the model organism:
  - Prokaryote or eukaryote
  - Life cycle
  - Unicellular or multi-cellular
  - Genetic content
  - References
  - Similarity

Prokaryotes:
Escherichia coli: "E.coli"

- *E. coli reproduces* rapidly (under optimal situation 0.5 hr/generation).
- it a popular model for studies using recombinant DNA.



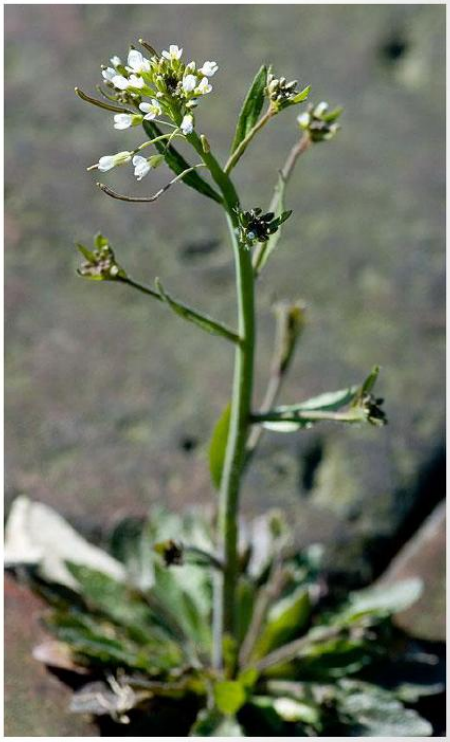
Eukaryotes
1. Nematode *"Caenorhabditis elegans"*

- It has a short life cycle (3 days)
- Hermaphrodites can self-fertilize or mate with males to produce offspring.
- It illustrate central biological concepts, such as cell division. because it is transparent, thus cells of interest can be observed using a dissecting microscope

Eukaryotes

2. Plants *"Arabidopsis thaliana"*

- Arabidopsis is a member of the mustard (Brassicaceae) family.
- It has a fast life cycle.
- It can be manipulated through genetic engineering more easily and rapidly than any other plant genome.

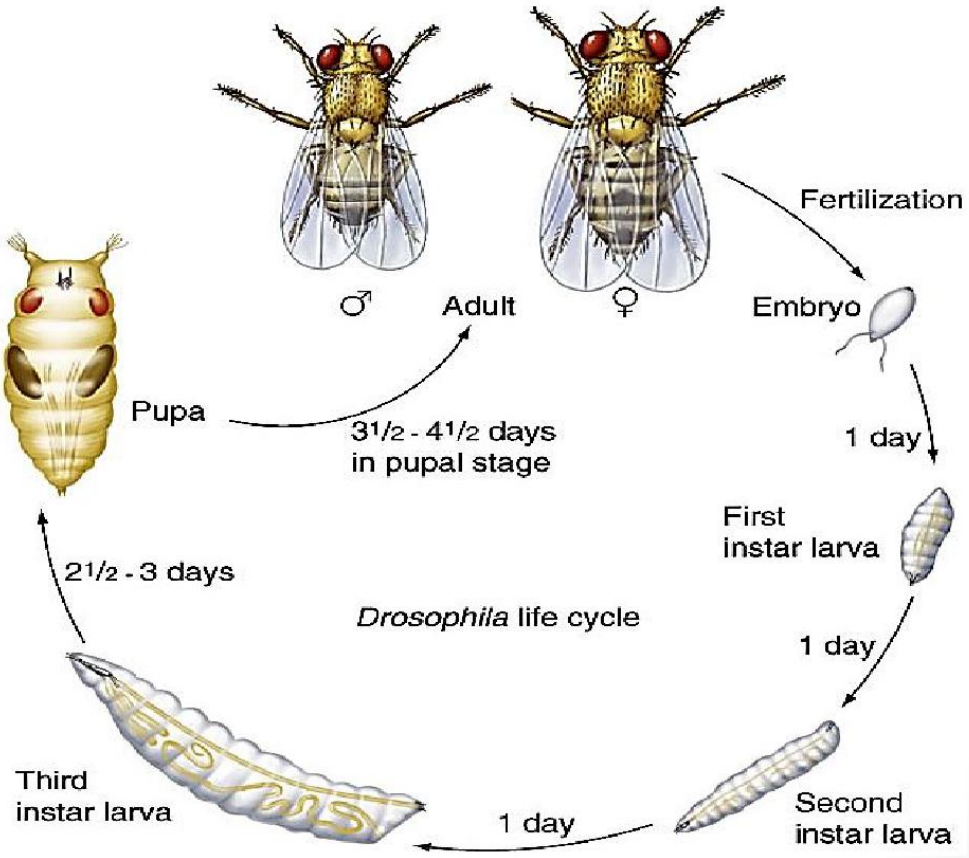


Eukaryotes
3. Insect
"Drosophila melanogaster"

Drosophila melanogaster

- it has short life cycle of two weeks.
- It is easy to culture and inexpensive to house large numbers.
- it is large enough that many attributes can be seen with eye or under low-power magnification.

Life cycle


Fertilization
♂
Adult
♀
Embryo
Pupa
3½ - 4½ days
in pupal stage
1 day
First
instar larva
2½ - 3 days
Drosophila life cycle
1 day
Third
instar larva
1 day
Second
instar larva

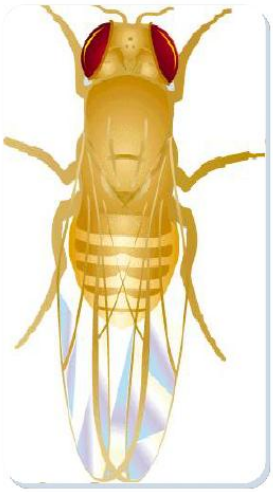
Different between male and female

Some mutations in *Drosophila*

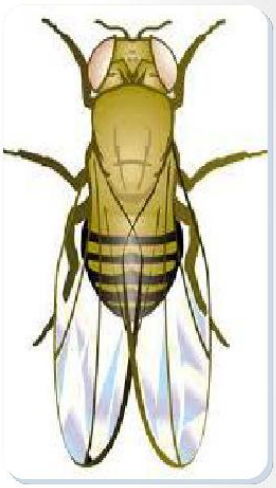
vestigial wing
vg

Dumpy wing
dp

ebony body
e



Yellow body
y



white eyes
w

References

- http://www.google.com/imgres?imgurl=http://www.senescence.info/models_aging.jpg&imgrefurl=http://www.senescence.info/aging_models.html&h=228&w=277&tbnid=vKifBL1zJA
- http://www.senescence.info/aging_models.html
- http://www.biologycorner.com/fruitflygenetics/
- http://www.horton.ednet.ns.ca/staff/jfuller/selig/snydersupport.htm
- www.biologie.uni-halle.de/entwicklungsgenetik/lehre/studenten/drosophila/mutanten/?lang=en
- http://www.exploratorium.edu/exhibits/mutant_flies/mutant_flies.html