

Intro to *C. elegans*

- A small soil nematode

Kingdom: Animalia

Phylum: Nematoda

Class: Secernentea

Order: Rhabditida

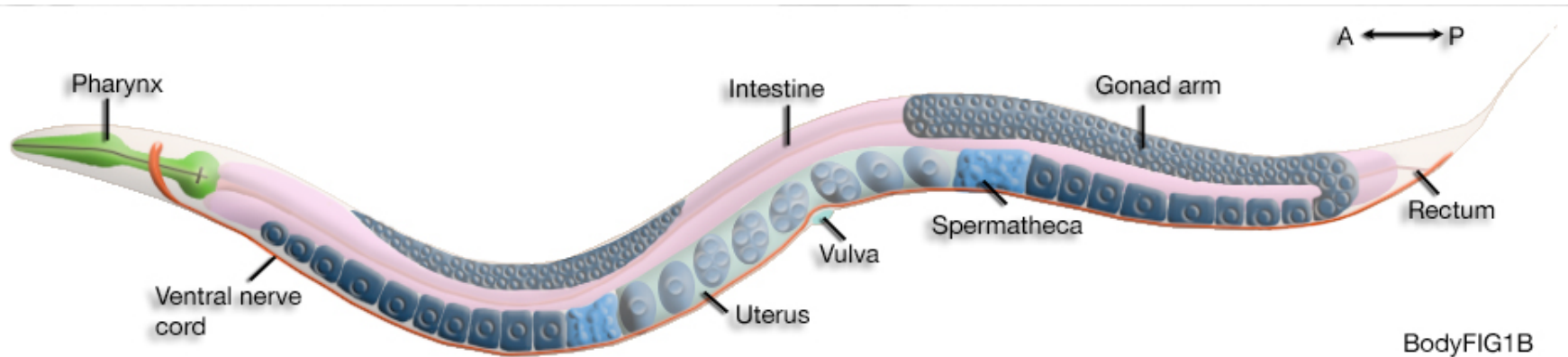
Family: Rhabditidae

Genus: Caenorhabditis

Species: *C. elegans*



Why use a worm??



Easy to grow in lab--eats *E. coli* and lives on agar plates

**Short life cycle with many offspring
-Self-fertilizing hermaphrodites**

Translucent body with visible organs

Many gene homologs in mammals (like humans)

We can easily manipulate its genes

C. elegans life cycle

Early development

Reproductive adult

egg

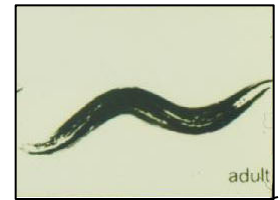
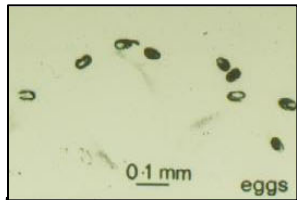
L1

L2

L3

L4

adult



2.5

8

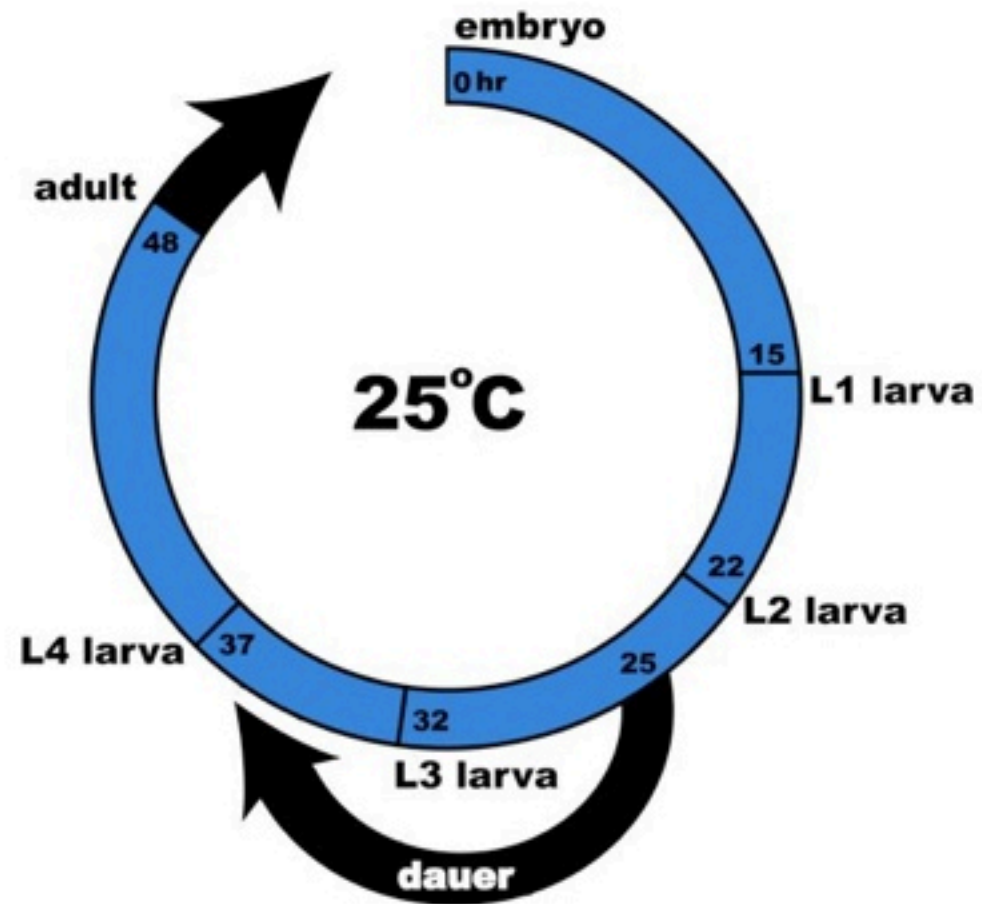
12-20 days

Larval
period

Reproductive
period

Progressive
decline

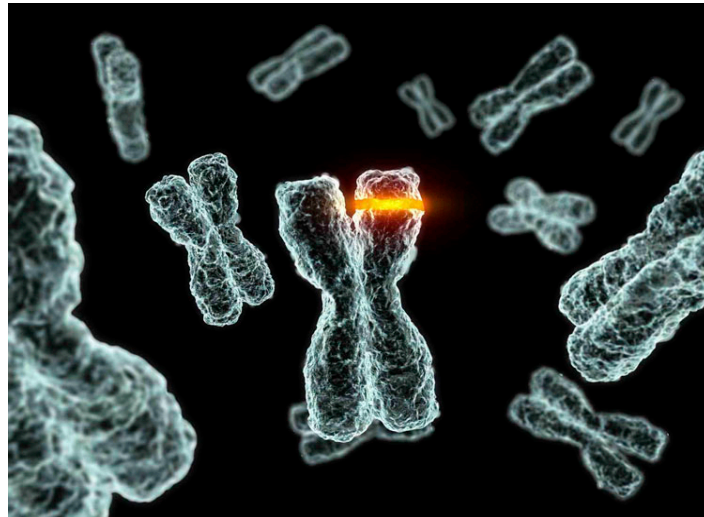
from *Integrated Genomics*, Caldwell et al.



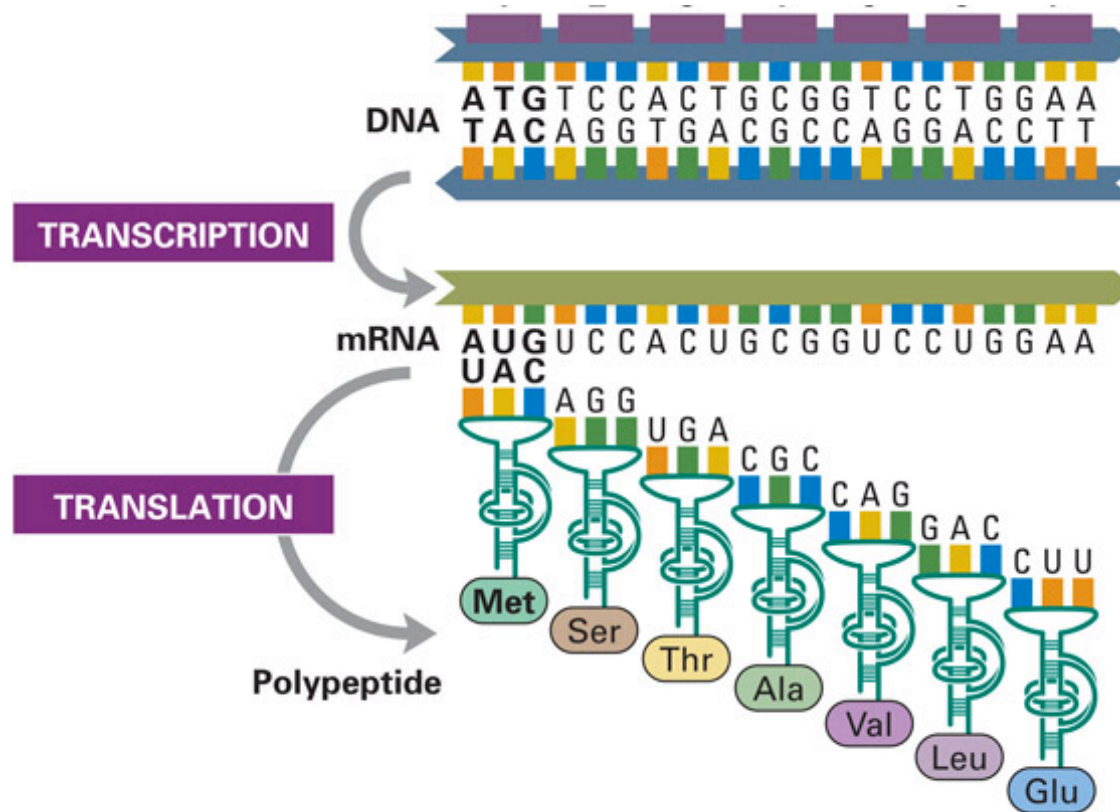
Using Molecular Genetics to Answer Scientific Questions

When geneticists want to know what a gene does, they get rid of it and see what goes wrong.

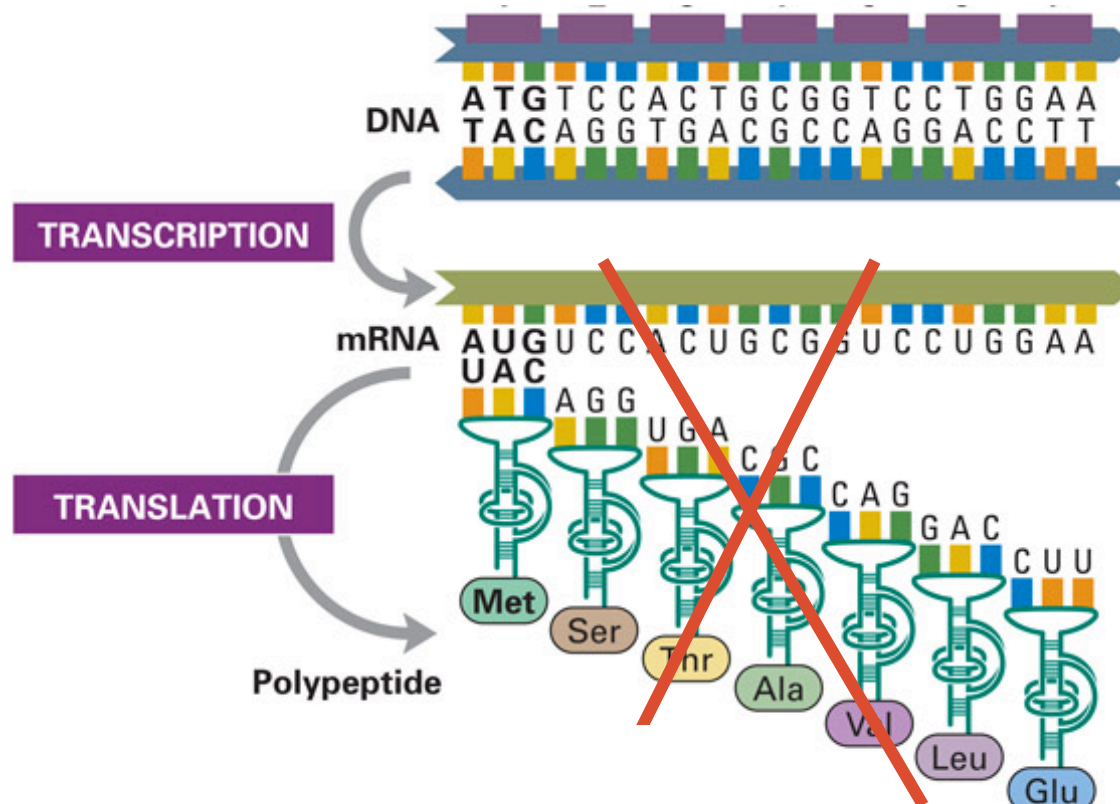
1. Mutations
2. RNAi



Protein Synthesis:

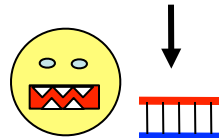


RNAi destroys mRNAs, so no new proteins get made



How does RNAi work?

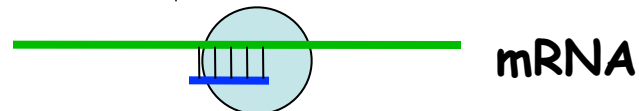
1. dsRNA from *E. coli* is eaten by the worms



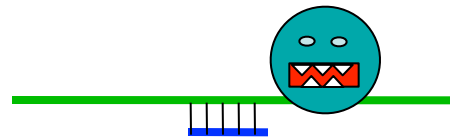
2. Cells see the dsRNA and think it is an invading virus! DICER chops up the dsRNA into little pieces



3. These small RNAs search out matching RNAs inside the worm cells

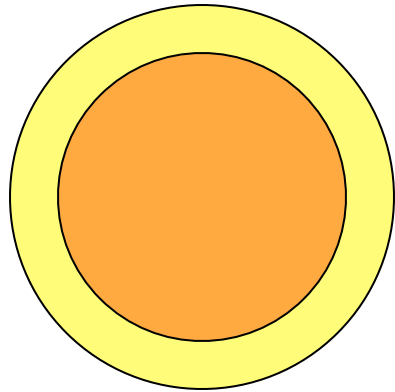


4. RNA that matches the small RNA gets destroyed!

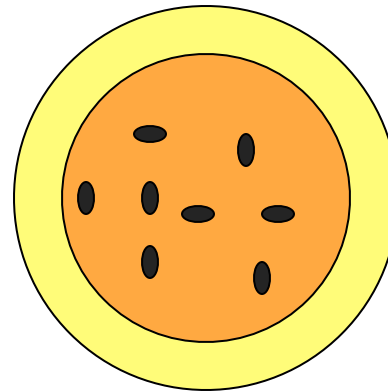


4. When the RNA is destroyed, that protein can't be made

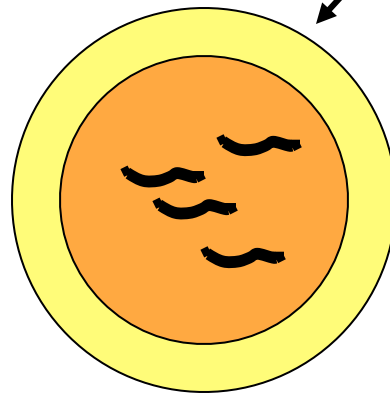
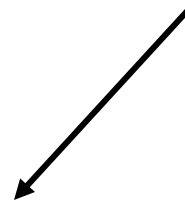
Experimental design for removing genes by RNAi



Bacteria
make the
dsRNA



Eggs hatch and
worms start to
grow.



Check adults for screwy
cell migration

Genes get
knocked down
as the worms
eat!

Other Examples:

- Dumpy:
<http://www.wormclassroom.org/movies/dpyHalf.mov>
- Uncoordinated:
<http://www.wormclassroom.org/movies/uncHalf.mov>
- Roller:
<http://www.wormclassroom.org/movies/RolHalf.mov>