

### PROBLEM SET 3

Bi 410/510 Model Organisms

Due 5/13/14 at class time

These questions concern the paper referenced below. Please be concise in your answers but provide sufficient detail to demonstrate that you understand the issues under discussion:

“*Caenorhabditis elegans* gene *ced-9* protects cells from programmed cell death”

Hengartner et al.

Nature 356:494 – 499 (1992)

1. Describe the evidence that *ced-9(n1950)* is a dominant, gain-of-function mutation. Do you think it is possible for a mutation to be dominant but not gain-of-function?
2. What is the evidence that the *ced-9* loss-of-function mutations are indeed in the *ced-9* gene, not in some other gene?
3. What is the evidence that the ectopic cell deaths seen in *ced-9* loss-of-function mutants are the result of activation of the programmed cell death pathway (as opposed for example to death by some other means)?
4. Based on the *ced-9*(loss-of-function) *ced-3*(loss-of-function) double mutant phenotype, the authors propose that the two gene products act sequentially in a pathway. Can you propose another explanation for the double mutant phenotype, an explanation that doesn't have the gene products functioning in a linear pathway?