

2:30-4:25 Wednesday Biology 1103 Lab

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C.elegans have been organisms in science known to uncover the many secrets of some of the most basic cellular processes in animals. Some of the uses of *C.elegans* in science include research on embryonic development, sex development, sex determination, aging, and alcoholism (laboratory manual, sixth ed.). Some reasoning behind the effectiveness of *C.elegans* in this research is their versatility. The species *C.elegans* are usually hermaphrodites meaning they make both eggs and sperm. Another unique aspect is their ability to reproduce by either self-fertilization or mating with a male.

C.elegans are harmless round worms, but they can often be mistaken for vicious, bloodsucking parasites. When viewing *C.elegans*, some telltale characteristics one can look for is their long, slim physique with females differing in their feathered off wispy tail compared to the fat bulb of the male. The females, other known as hermaphrodites with their androgynous characteristics, often move slower than the males who speed swiftly under the lens of a high-powered microscope. There can be several types of *C.elegans* varying from mutant females, coupled with the wild-type males and females. The male species is often seemingly outnumbered by the amount of females resulting from the female's ability to self produce and mutate with various species.

When establishing a cross between organisms, one must first consider many things. The projected outcome of the cross must be taken into account as well as the status of the organism, for example, whether it is mutated or normal. If mutated, it is also important to evaluate the source of the mutation assessing its dominance or recessiveness and deciphering whether the disease is sex-linked, resulting from the female chromosome, or from one of the other twenty-two autosomal chromosomes.

When approaching our scientific cross, my lab partner and I aimed especially to further investigate mutations in *C. elegans*. Our first inquiry was to find out if the mutation in the hermaphrodite of question was sex-linked or autosomal. Sex-linked genes are the phenotypic

expression of an allele that is related to the chromosomal sex of the individual. The most telltale sign in concluding if the gene is x-linked recessive or not is if the son has the defective gene resulting in a mutation. Because the gene is recessive, it is usually up to the son to detect the gene because he will pick up a defective x from the mother and a y from the father. Girls have the beneficial circumstance of having a backup “x” from the mother that often results in them not receiving the mutation.

Autosomal recessive on the other hand depends on the genotype of both parents. Because of this, both parents must be carrier’s for the gene in order for the mutation to be expressed in the offspring. A carrier simply means that each parent contains the recessive allele for the mutation. This usually does not mean that they have the mutation, only the fact that they have a strong chance of transferring the mutation to their offspring.

XhX [Sex-linked] x XY

XhX x XhY [Autosomal]

Xh	X	Y
	XhX	XhY
X	XX	XY

Vs

Xh	Xh	Y
	Xh Xh	XhY
X	XhX	XY

For our mutation, our group decided to pick a *C-elegan* known as dpy-5. Its characteristics differing from normal wild type worms are largely due to dpy-5’s short and fat physique. Initially, we projected that the mutation in question would be autosomal, and that the mutated dpy 5 contained the dominant allele. If this were to be the case, our cross of the mutated dpy 5 with a normal wild-type