

Chapter 7: Linkage and Recombination

_____ are genes that are located on the same chromosome so they do not assort independently (and therefore do not follow Mendelian genetics). Instead, we look at the _____ between the genes to determine the frequency of phenotypes in offspring.

To test if genes are linked or not, a dihybrid cross can be performed (as a testcross, that you would expect to see a 1:1:1:1 ratio if the genes were not linked). If your chi-square falls, then your genes are not assorting independently and are therefore linked.

A geneticist discovers a new mutation in *Drosophila melanogaster* that causes the flies to shiver and jitter. She calls this mutation *spastic* (*sp*) and determines that *spastic* is due to an autosomal recessive gene. The ratio of inheritance of the *spastic* gene is linked to the recessive gene for winged wings (*wg*). The crosses with *Drosophila* for *spastic* and winged traits with a 1% recombination for the wild-type trait and then over the *D. melanogaster* in a test cross. She obtains the following F_2 flies:

$wg^+ sp^+ : 499$
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 $wg sp : 501$

Do a series of chi-square tests to determine if the genes have assorted independently or are linked.

Cloning your vectors carefully and to more likely to happen between genes that are further apart (less together) on the same chromosome.

Why can you assume that the distance between two genes is proportional to the recombination frequency between them (more distance = more recombination)?