

MORE GENETICS TERMS

Phase- Phase identifies the combination of alleles across multiple genes that an individual received from one parent as separate from the combination of alleles an individual got from the other parent. So, if an "AAbb" dad has kids with a "aaBB" mom, the phase of alleles in the kids is

Ab // aB

"a" and "B" are said to be in the same phase, while "a" and "b" are said to be in different phases

Disequilibrium- (as in linkage disequilibrium)- occurrence of an association of alleles more frequently than expected from random chance or independent assortment. Linkage disequilibrium is often caused by **linkage** (close proximity of genes and the absence of free recombination between them)

Test cross- A test cross is a cross between an individual heterozygous for alleles at multiple genetic markers to an individual homozygous for one allele at each of the same markers. When conducted using visible marker mutations, the individual that is homozygous in the cross specifically has the *recessive* allele at each marker. Test crosses are used to assess recombination occurring within one parent. For example, imagine two genes in fruit flies, cinnabar (affects eye color) and vestigial (affects wing shape). Let's say the recessive mutant allele is "cn" and the dominant wildtype allele is "cn+". For the other gene, the recessive mutant allele is "vg" and the dominant wildtype allele is "vg+".

Male: (cn vg)//(cn vg) Female: (cn+ vg+)//(cn vg)

In this example, the male is homozygous for the recessive mutations while the female is heterozygous. The offspring will be phenotypically:

cinnabar eyes, vestigial wings (cn vg)//(cn vg) -- nonrecombinant
normal eyes, normal wings (cn+ vg+)//(cn vg) -- nonrecombinant
cinnabar eyes, normal wings (cn vg+)//(cn vg) -- recombinant
normal eyes, vestigial wings (cn+ vg)//(cn vg) -- recombinant

Because the male is homozygous for the recessive mutations, the progeny from this cross can be scored manually and used to calculate the recombination rate in the female between the two markers. If the male had a dominant allele, all the offspring would have the associated phenotype, and recombination could not be scored.

Single nucleotide polymorphism (SNP)- a position in a genome's DNA sequence wherein a single nucleotide -- A, C, G, or T -- differs among members of a species. Specifically, two DNA fragments derived from the same position in the genome from different individuals (e.g., ATGCGTA vs. ATGCATA) contain a difference in a single nucleotide. SNPs are very often used as markers for genetic mapping.