

Re: recombination question

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I'll add a bit of additional comment on top of Perplexed in Peoria's very excellent reply.

I suspect that, in the great majority of cases, no problem occurs during crossover for the following reasons:

1. Many crossovers occur outside of of genes.
2. Oftentimes, as Perplexed pointed out, the difference between two alleles is a difference of a single nucleotide base pair. A crossover in the middle of such a gene is simply equivalent to inheriting the allele containing the copied difference.
3. (This is more speculation on my part) Even when the crossover produces an allele that is not found in either parent, the result is not likely to result in a non-viable zygote. The allele is composed of base pairs that do, in fact, work in different forms in one or the other of the parents. The new version is novel, but probably not deadly.

Whether it confers an evolutionary advantage, a disadvantage, or neither one, is a matter of chance. This is part of the stuff of variation that natural selection works on.

There are documented cases of more serious crossover errors that still result in viable and even advantages outcomes. I'm thinking of cases where the "chiasma", i.e., the point where the crossover occurs, is different on each chromosome so that a whole gene can be added (i.e., one copy from the mother and one from the father) to one chromosome and both copies deleted from the homologous chromosome. I know this has been found in some plants.

Alan

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