

recombination question

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A question that I'm sure someone here can answer for me:

In my basic understanding of genetic recombination, two chromosomes recombine with crossings at essentially random locations in the DNA sequence. Most of the crossing points, if selected randomly, occur in long stretches of DNA that do not code for anything in particular, and may well be junk for all we know. But the tiny bands along the chromosome that contain genes are not vanishingly small and in fact sometimes a crossing point must occur within a gene. When that happens, if the two chromosomes have different alleles at that point in the DNA sequence, the resulting gene will be a mash-up of the original two, which I would guess is very unlikely to work.

My questions are:

does what I described actually happen or does something prevent crossover within certain segments – and that's why genes have such longevity?

If it does happen, what are the usual consequences? Does the individual usually die?

How likely is it that a random crossover point in the DNA sequence falls within a gene, rather than in the stuff between genes along the chromosome?

How many crossover points do there tend to be per chromosome, roughly, in human recombination?

as you can see I have only a very elementary understanding of this, I'm a musician whose wife is taking elementary biology and I was just looking at her textbook trying to understand this! Thanks for any answers.

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