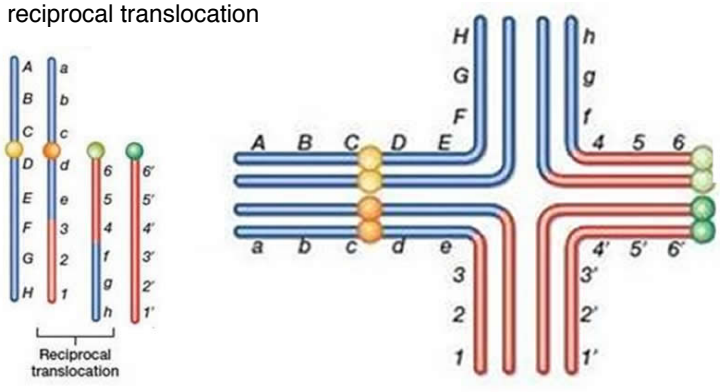
coreBio II - genetics: Wed. 14 Feb 2018

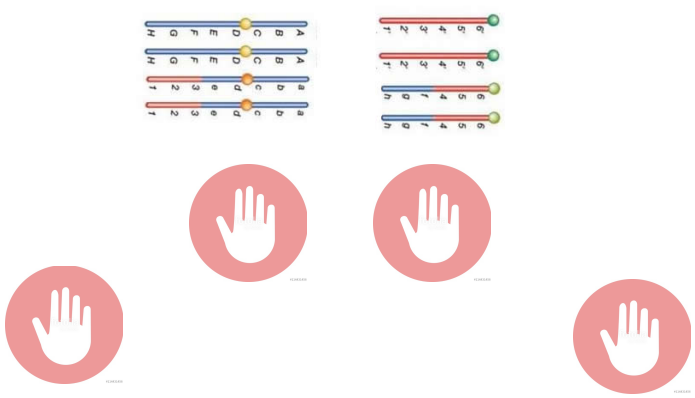
hand in questions!

Aidan: top questions from last time

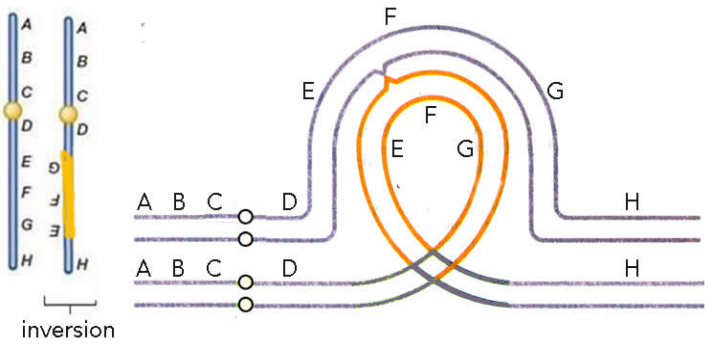
reciprocal translocation



activity - which are the lethal (non-viable) gametes?

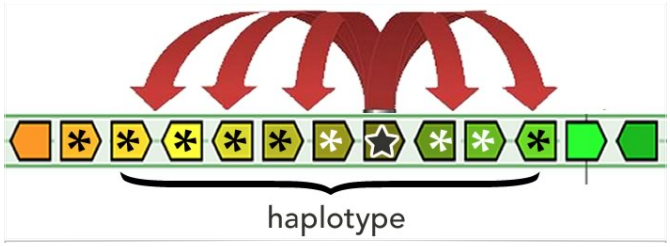


inversion



draw outcomes of cross overs

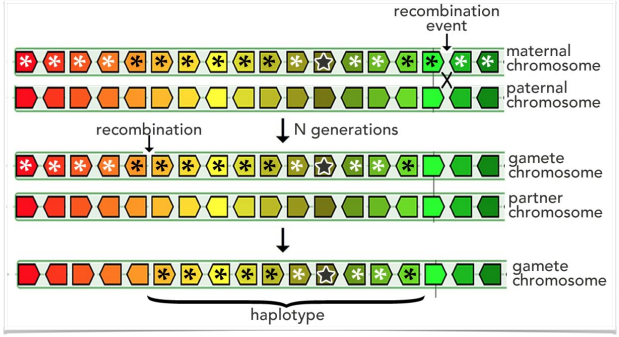
evolutionary effects: disconnecting alleles



What happens if their is strong positive / negative selection on

☆ how does it effect neighboring alleles?

evolutionary effects: disconnect alleles



we can estimate time that region was inherited by looking at the combination of alleles interited together.

Now consider mutation rate

Article | OPEN

Differences between germline and somatic mutation rates in humans and mice

Brandon Milholland, Xiao Dong, Lei Zhang, Xiaoxiao Hao, Yousin Suh & Jan Vijg

Nature Communications 8,
Article number: 15183 (2017)
doi:10.1038/ncomms15183
Download Citation
Ageing Genomics Mutation

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Published online: 09 May 2017

in human: germline mutation rate (males) ~3 x 10^{-11} per bp
Somatic mutation rate ~3 x 10^{-9} per bp
haploid human genome ~3 x 10^{9} bps

both mutation rates are higher in mouse

Genetics

Fathers pass on four times as many new genetic mutations as mothers – study

The figures mean that a child born to 30-year-old parents would, on average, inherit 11 new mutations from the mother, but 45 from the father.

why, exactly?

Questions (you should be able) to answer:

212. Graph, as a function of distance, the likelihood that recombination will disconnect a selected (whether positively of negatively) allele from alleles in surrounding genes.
213. Why might a crossing over event inhibit nearby crossing over events?
214. How can you use the size of a conserved genomic region to estimate time of isolation of a population?
215. What are the benefits of recombination in terms of environmental adaptation?

Questions to ponder:

-How does the size of haplotype regions reflect the reproductive history of a population?
-How does the presence of a deleterious allele influence the selective pressures on an organism? How might it open up (over generational) time, new evolutionary possibilities?