**Linkage disequilibrium**

*Linkage Disequilibrium (LD):* the non-random association of alleles at two or more loci, that may or may not be on the same chromosome.

Linkage disequilibrium is the non-random association of alleles at different loci. More explicitly, it’s a trait of SNPs on a contiguous stretch of genomic sequence and it’s used to describe how much an allele of a specific SNP is inherited or correlated with an allele of another SNP in the population.

Here is a picture that might help. Within a family, linkage occurs when two genetic markers remain linked on a chromosome rather than being broken apart by recombination events during meiosis. (red lines) Within a population, contiguous stretches of founder chromosomes will decrease in size due to the recombination events. As time goes on, recombination events gradually occur between every possible point on the chromosome, a pair of markers of a chromosome in the population changes from linkage disequilibrium to linkage equilibrium.

**Recombination rate ~ 1% for 1 million base pairs**
Linkage Within A Family

Recombination Point

Initial Generation

Generation 1

Generation 2

Generation 3

Linkage between two points/markers

Decay of Linkage over successive generations

Linkage Disequilibrium Within A Population

Initial Generation

100 Generations

1000 Generations

Population moves from Linkage Disequilibrium to Linkage Equilibrium over time