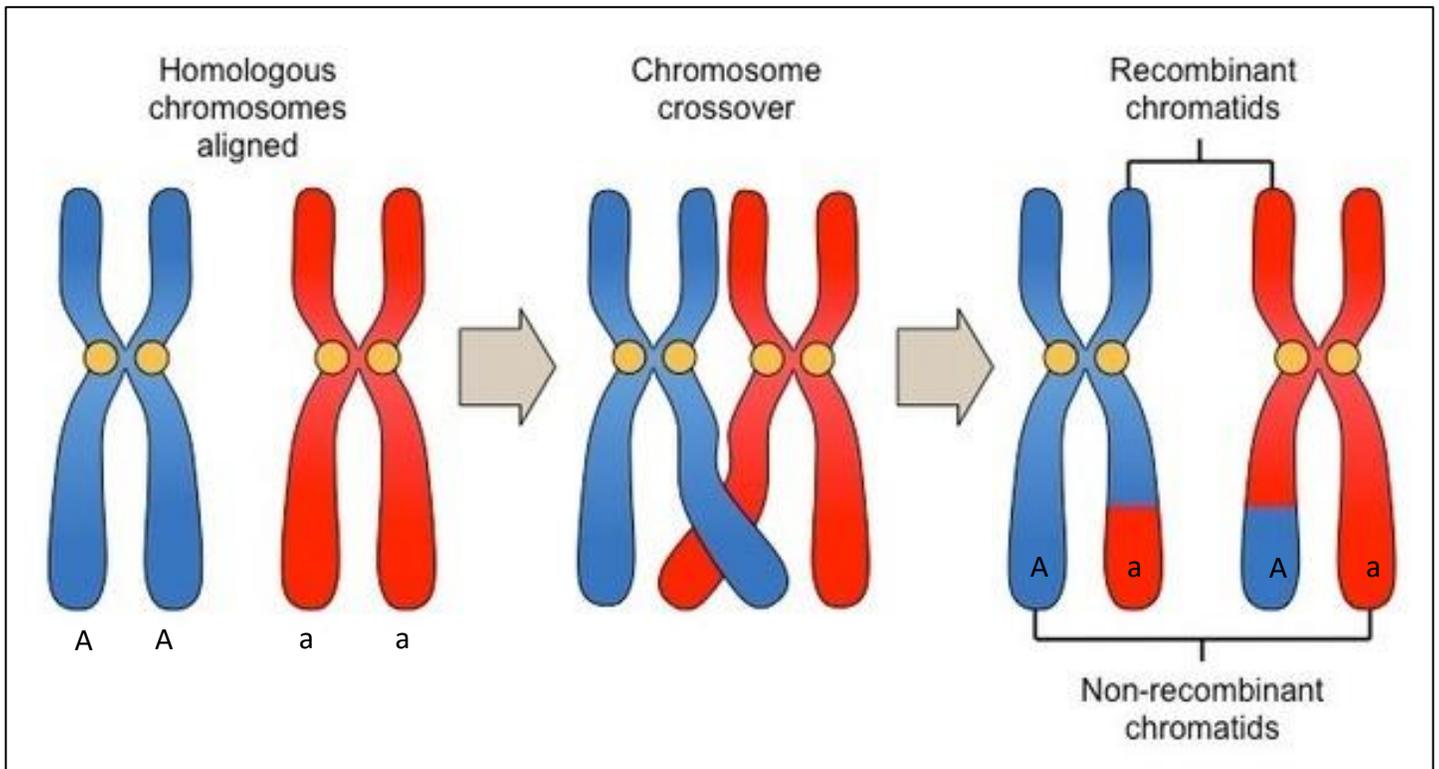


What happens during Chromosome Crossing Over in Meiosis I?



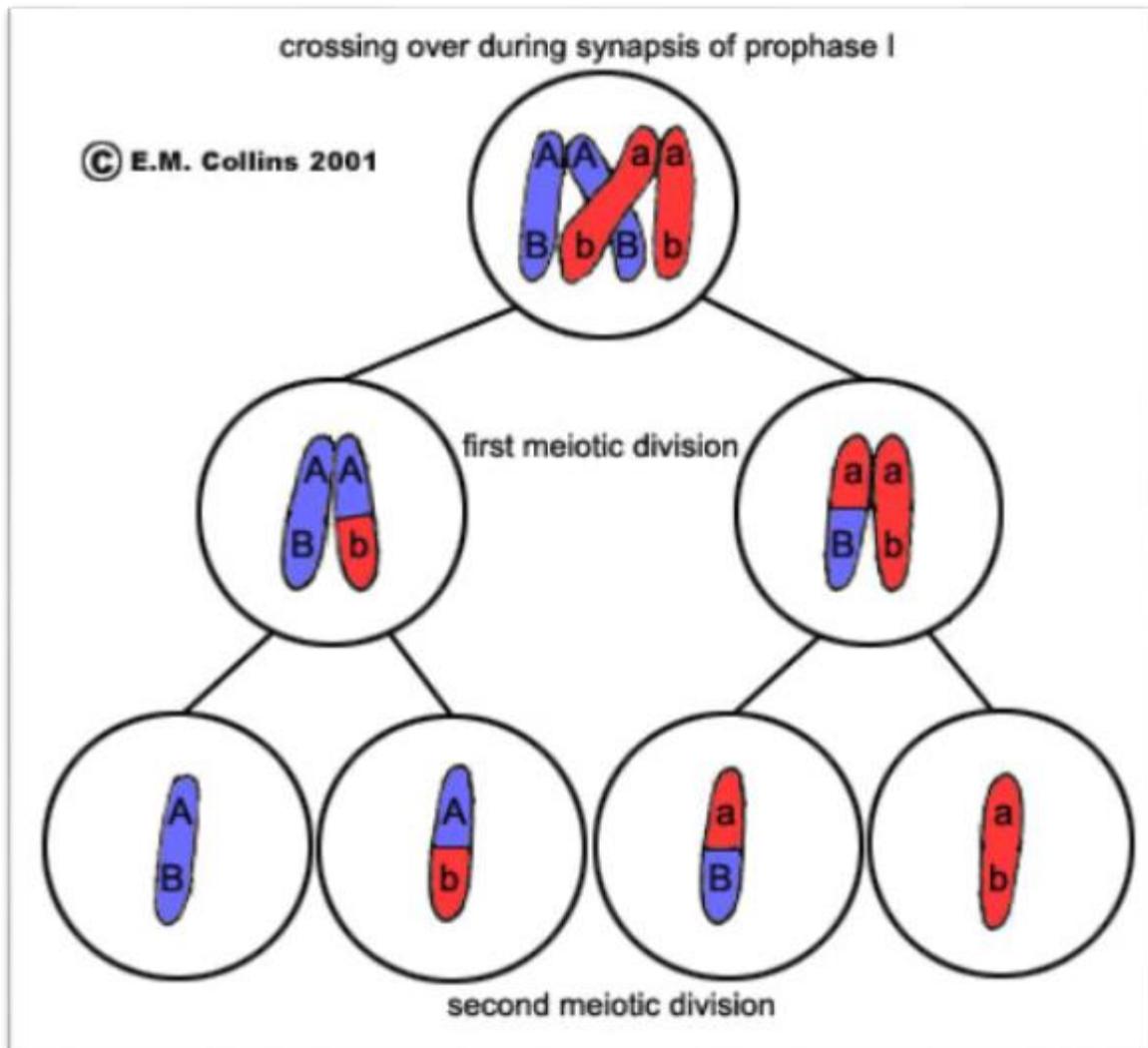
“A” represents the dominant version of a gene such as Brown hair

“a” represents the recessive version of a gene such as Red hair

Before meiosis, each chromosome will duplicate to make 2 versions of each gene type. During meiosis I, the Crossing Over will allow the gene types to switch from 1 chromosome to the next. This will cause the chromosomes to have the chance to carry various gene versions on the chromosomes. At the end of meiosis, each chromatid will separate into 4 different cells (sperm / egg) with 1 of the 2 gene types based on chance (Like flipping a coin)

As a result, each sperm or egg cell can get a copy from each gene type causing more variation. But remember, this is just for 1 trait, imagine this is happening for ALL the traits in your body! That’s a lot of shuffling and mixing of traits! Gives a new meaning to “Every day I am shuffling”.

Another diagram showing the Crossing over of chromosomes during Meiosis I



In this diagram, the chromosomes each contain 2 traits; A and B (or a and b). During Crossing Over in Meiosis I, you can see that the traits are exchanged from 1 chromosome to the next. As a result, the original chromosome with A and B gene variations now has A and b while the other that has "a" and "b" to start has "a" and "B".

The 4 circles represent the 4 sex cells that are created at the end of meiosis. In males, it creates 4 sperm cells, while in females, it creates 1 egg with 3 degenerated eggs (will not form).

Overview of Meiosis

Meiosis starts with a cell in the gonads. The cell is diploid ($2N$), meaning that it contains both sets of the genes (both a and A). How do you have both sets you might ask? You get one set from your dad, and one set from your mom!

As the cell undergoes meiosis, the chromosomes will go through 2 rounds of reduction. In the 1st round of meiosis, the chromosomes first duplicate, and then crosses over to exchange variations of the genes (See the next page on Crossing over).

The 2nd round of meiosis is simply to reduce the number of chromosomes from $2N$ to $1N$. At the end of meiosis, each cell now only has 1 set of the chromosomes called *haploid* ($1n$).

