CROSSING OVER

Morgan and Castle (1912) gave the term crossing over for the exchange of genetic material and define the crossing over as the tendency of genes to enter the gamete in new combination which are quite different from those of the parents or in simple term we can say that exchange of homologous chromosomal segments between components of a pair of chromosome.

According to them the crossing over takes place in the same homologous chromosome, if the chromosome remain interact inheritance then the genes will also remain intact but during mitotic cell division exchange of segment and recombination of linked gene takes place, which was called crossing over by Morgan.

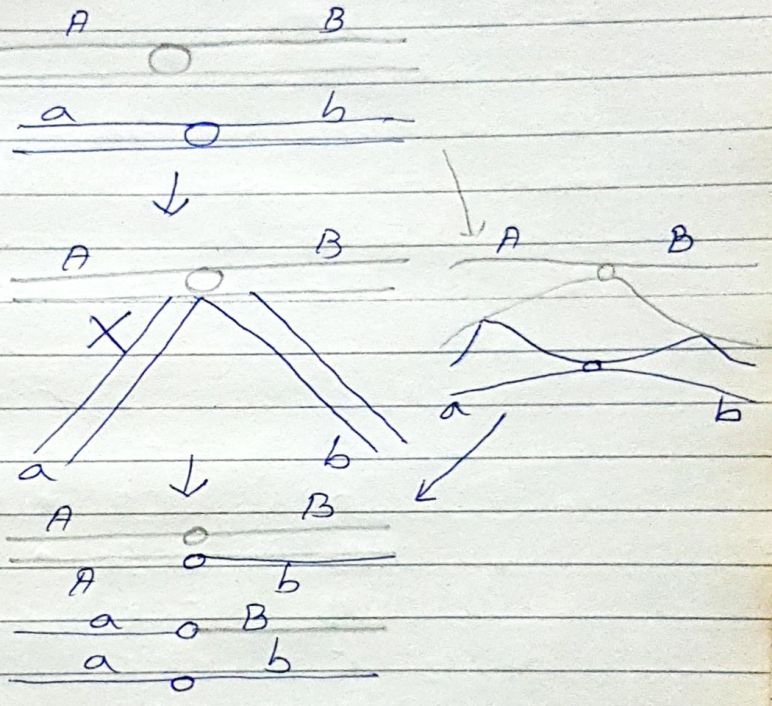
Crossing over can be easily understood by meiosis where in zygotene stage of prophase I these occurs synapsis between two dissimilar chromosome lie side by side. In pachytene stage each homologus chromosome divides longitudinally into two chromatids but remain attached in centromere. Thus the pair of homologus chromosome appears as tetrad.

In this process the chromatids remai attached at certain points, that poi are known as chiasmata. When the chiasmata form the breakage and reunion or recombination of opposite chromatids takes place which are kno as crossing over where in chromosom new genes are formed but during crossing over or chaismata formation the two outermost chromosome remai untouched when crossing over takes place only two inner chromatids exchange their gene.

When centromeres are longer the crossing over may occurs at two or more points in the same pair of chromosome and when the crossing over occurs at two points than it is called double crossing ove and when crossing over occurs at more than two points then it is known as multiple crossing over, but it is known that crossing over always takes place between two homologous chromatids.

SITE OF CROSSING OVER → Crossing over can be observed during meotic phophase. Here, two homologous chromo-somes pairing during zygotene. They separate at diplotene stage and

appear linked at some points. These points appear like 'X'. These are called chiasmata. Crossing over takes place at chiasmata points.



SIGNIFICANCE OF CROSSING OVER →

Crossing over mostly occurs in all the higher plants and animals as well as some bacteria and viruses. The important significance of crossing over are as follows—

① New varieties are produced by eliminating the undesirable genes through the plant breeding.

② It is helpful to maping the gene on chromosome.

③ It also helps to hold the paren-tal and maternal character together

④ The new recombination are produced due to exchange of genes which is only found in homologus chromosome with the help of crossing over.