

Answer on Question#50980 – Biology – Other

1. Explain what is a crossover.
2. Explain why the crossover process that occurs in meiosis ensures genetic diversity among individuals generation to generation.
3. The crossover process is also critical to another phenomenon that occurs during meiosis. Explains.
4. Explain what would happen if it did not produce crossover during meiosis I.

Answer:

1. Crossover (crossing over) is the process where homologous chromosomes pair up with each other and interchange different sections of their genetic material to form recombinant chromosomes.
2. During the meiosis the chromosomes duplicate and homologous chromosomes exchange genetic information before a first division (meiosis I). During the meiosis II separate daughter cells receive daughter chromosomes with recombined alleles. The daughter chromosomes are not identical and have a different set of alleles and genes than their parents do. The crossover process ensures genetic diversity among generations because due to the crossover different generations have different set of alleles and genes in the homologous chromosomes.
3. During the meiosis location of bivalents (metaphase I) and chromosomes (metaphase II) is randomly determined. Chromosome segregation at anaphase leads to the formation of new combinations of alleles in gametes. This process is also one of the mechanisms that ensures genetic diversity between the parent cell and daughter cells.
4. Crossover together with sexual reproduction and mutations are the main instruments of genetic variability. Sexual reproduction ensures combinations between genes situated in different chromosomes and crossover process provides recombination of alleles located in a same chromosome. Without the crossover all genetic variability would be limited to only sexual reproduction and random mutations.

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