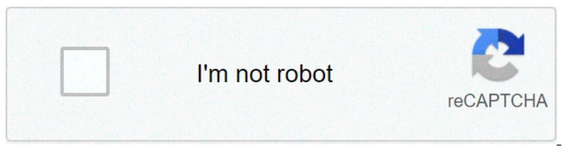

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Describe the process of crossing over

Understanding: Ã ¢ Â ¢ Ã The early stages of meiosis involves coupling of homologous chromosomes and crossing OVERA Ã Ã Ã Ã Ã condensation followed BYA In prophase I, homologous chromosomes undergo a process called synapses, for which you mate to form a bivalent (or tetrad) the homologous chromosomes are held together in dots called chiasms (singular: chiasma) Crossing over of genetic material between chromatids not sister can occur in these chiasmataAs result of this exchange of genetic material, new combinations of genes are formed on the chromatids (recombination) once chiasms formats, homologous chromosomes condense as divalent and then are separated into meiosisIf crossing over occurs then all four haploid daughter cells will be distinguished geneticallyÃ (sister chromatid are no longer identical) Genetic diversity through a © occurs because certain physical characteristics, such as eye color, are variable; this variability is the result of alternative DNA sequences that encode for the same physical characteristic. These sequences are commonly referred to as alleles. The various alleles associated with a specific trait are slightly different from each other, and are always in the same position (or locus) within an organism's DNA. For example, it does not matter if a person has blue eyes, brown eyes or green eyes, the alleles for eye color are in the same area of the same chromosome in all human beings. The unique combination of alleles that all organisms that reproduce sexually receive from their parents is the direct result of recombination during meiosis. What happens during the recombination? Genetic recombination is a complex process that involves alignment of the two homologous DNA strands, accurate breaking of each sector, equal exchange of DNA segments between the two wires, and sealing of the resulting recombined DNA molecules through the action of enzymes called ligases . Despite the complexity of this process, occurring recombination events with remarkable accuracy and precision in most cases. When recombination occurs during meiosis, homologous chromosomes of the cell line extremely close to one another. Then, the DNA strand within each chromosome breakage in the exact same location, leaving two free ends. Each ends then cross another chromosome and forms a link called chiasm. During this process, it is common for large sections of DNA containing many different genes to pass from one chromosome. Finally, as prophase I comes to an end and metaphase I begins, the crossing-over process concludes, and homologous chromosomes prepare to separate. When the chromosomes are subsequently removed during anaphase I, each chromosome brings new unique combinations of alleles that are the direct result of recombination. He recombination occurs in several cells of gametes? Beyond its role in meiosis, recombination is important for somatic cells in eukaryotes, because © can be used to aid the DNA repair broken, even when the failure involves both strands of the double helix. These interruptions are known as double-strand breaks, or DSB. When DSB happen, a homologous chromosomes can serve as a template for the synthesis of any portion of the genetic material was lost after the collapse. Then, once synthesized, this new DNA can be incorporated into the broken DNA strand, the repair so. In fact, this is a form of recombination, © because the broken area is replaced with new material from a homologous chromosome. Recombination can also be used in a similar manner for repairing small, single-strand breaks. In general, recombination can No timed time chromosomes couples, whether they freely floating in tandem or lined up on the metaphase plate during meiosis. The recombination is not limited to eukaryotes, though. A particular type of recombination called conjugation takes place in many prokaries, and has been particularly well studied and characterized E. coli bacteria. During conjugation, genetic material from a bacterium is transferred to another bacterium, and is then recombined in the receiving cell. Recombination also plays an important role in the repair of DNA in the prokaryoti bodies, as well as the eukaryotic bodies takes place. What helps ensure the survival of a kind? Genetic variation. It is this variation that is the essence of evolution. Without genetic differences between individuals, "the survival of the FitTest" would not be likely. Or everyone survives, or you will all perish. Figure (pageIndex {1}: Profile sexual photo reproduction results in infinite possibilities of genetic variation. In other words, the results of sexual reproduction in progeny that are genetically unique. They differ from both parents and even from each other. This occurs for a number of reasons. When homologous chromosomes form couples during Prophase I of Meiosi I, Crossing-Over can occur. Crossing-over is the exchange of genetic material between homologous chromosomes. It translates into new combinations of genes on each chromosome. When cells are divided during meiosis, homologous chromosomes are randomly distributed to daughter cells, and different chromosomes segregate regardless of each other. This call is called independent assortment. It translates into gametes that have unique combinations of chromosomes. In sexual reproduction, two gametes come together to produce a progeny. But which of the two million possible gameters will be? This is likely to be a matter of luck. It is obviously another source of genetic variation in offspring. This is known as random fertilization. All these mechanisms that work together resulted in an impressive quantity of potential changes. Every human couple, for example, has the potential to produce more than 64 trillion of genetically unique children. There is no surprise we are all different! Crossing-over occurs during the ephase I, and is the exchange of genetic material between non-brothers chromatis of homologous chromosomes. Recall during pro phase i, the homologous chromosomes align in pairs, gene-gene down all their length, forming a configuration with four chromatis, known as tetrade. At this point, the chromatis are very close to each other and two chromatis material to pass chromosomes, ie the material interruptions turns off and hang up at the same position on the homologous chromosome (figure (pageIndex {2}). This exchange of genetic material can happen many times within the same pair of homologous chromosomes, creating unique combinations of genes. This process is also known as recombination. Figure (PageIndex {2}): Ã, Ã, Ã, Ã, Ã, Ã, Ã, Crossing-over. A nursery of DNA is shown in red. A paternal wire of DNA is shown in blue. Crossing produces two chromosomes who have never existed. The recombination process involves the rupture and rejected parental chromosomes (M, F). The result is the generation of new chromosomes (C1, C2) the share of DNA from both parents. During the ephase I, the chromosomes condens and become visible within the nucleus. Because the nuclear envelope begins to break down, the homologous chromosomes approach together. The Synapttonemal complex, a grid of protein â €

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