

Genomics

Genomics is the study of genes including the complete set of DNA and RNA in the system of organisms. It mainly deals with the structure and function of genes, as well as mapping and editing of genomes. Genes produce proteins with the help of enzymes that make the cells, organs, tissues, carry chemical reactions and signals. Genetics is the study of individual genes, their influence on the organisms and inheritance.

Genomics focuses on the processes such as gene manipulation, extraction, alteration, deletion, duplication of the genome. The study of genomics starts with the extraction of genes, to sequence and study the resultant protein structure of the genes that take part in all the biological processes in the body.

The genomics techniques include genomic DNA isolation through breaking down of DNA, separation of DNA, cutting and joining of DNA with the help of restriction enzymes and ligases, cloning and vectors with the help of plasmid (circular double stranded DNA molecule), cosmid (circular DNA molecules that can be inserted into viruses), bacteriophage (viruses infecting different bacterial strains), hybridisation for detecting genes, Recombination of DNA for cloning, Producing multiple copies of DNA with the help of polymerase chain reaction (PCR), DNA sequencing techniques such as Maxam and Gilbert method, Chain termination method, Pyrosequencing, whole-genome shotgun sequencing method, Next-generation sequencing etc, are used for Alteration of genes for producing disease resistant organisms.

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