Chapter-6 : Molecular Basis of Inheritance

Revision Notes

TOPIC-3

Rice Genome Project

Rice is one of the most largely consumed foods in India. Also, the population is increasing with a rapid pace, so, to meet this requirement, Rice genome project has been launched to increase the production of rice. Rice has the smallest genome of 430Mb nucleotides located on chromosome 12

Rice Genome: It is a joint project of National Institute of Aerobiological Sciences (NIAS), forestry and fisheries (STAFF), Ministry of Agriculture, Forestry and Fisheries (NAFF), Society for Techno-innovation of Agriculture genome research program.

Arabidopsis is an experiment plant of rice genome because it has fast life cycle and can be easily grown. It has smaller genome and high diversity and helps in enhancing the molecular products

Need for sequencing rice genome:

- To know the functioning of genes by accurate gene sequencing
- It is important for agronomic traits which requires mapping of genomic sequences
- Improvement of other cereals will become easier

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Chapter-7 : Evolution

Revision Notes

TOPIC-2

The Modern Synthetic Theory

The modern synthetic theory is also known as Neo-Darwinian theory which merges the theory of Darwinian evolution with Mendelian genetics given by many evolutionary biologists such as such as T. Dobzhansky, Sewall Wright, G.L. Stebbins, Ernst Mayr. This theory provided a new definition of evolution as "the changes occurring in the allele frequencies within the populations" which emphasizes the genetic basis of evolution.

Factors of modern synthetic theory:

- Mutation
- Genetic recombination
- Genetic drift
- Natural selection
- Isolation

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Chapter-12 : Biotechnology and Its Applications

Revision Notes

TOPIC-1

Vaccine Production & Stem Cell Technology

➢ **Vaccine Production:**

Vaccines are the substances which protect the human body from various diseases by recognizing and destroying the harmful foreign pathogens. A dead or weakened microbe is used to produce the vaccine.

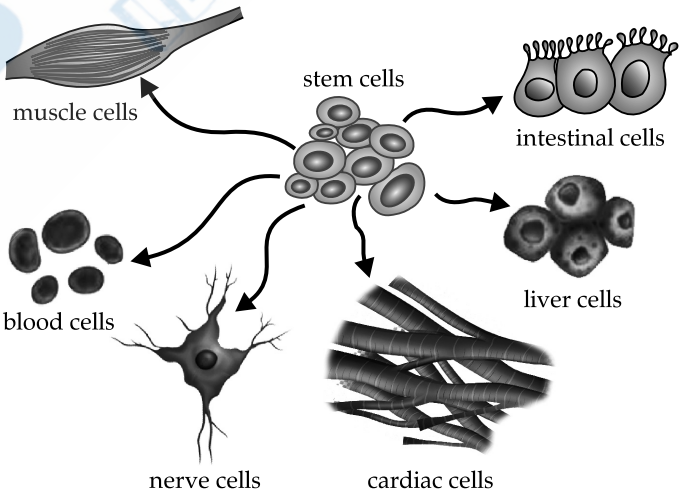
Generally, there are four types of vaccines which include:

1. **Live attenuated vaccine:** This type of vaccine contains weakened form of viruses.
   e.g., Rubella, Measles, Mumps etc.
2. **Inactivated vaccines:** These vaccines are made from small pieces of virus or bacteria or from their proteins.
   e.g., The whooping cough vaccine
3. **Toxoid vaccines:** These vaccines contain the toxin produced by the bacteria or virus.
   e.g., Tetanus and diphtheria vaccine
4. **Biosynthetic vaccines:** These are the man-made vaccines which are produced from the substances or chemicals similar to the pieces of virus or bacteria.
   e.g., Hepatitis-B

➢ **Stem Cell Technology:**

Stem cells are totipotent, undifferentiated and self-renewing cells which originate from the different parts of the body. Stem cells are broadly classified into two types, namely Embryonic stem cells (embryos formed during the blastocyst phase of embryological development) and Adult stem cells (regenerate the damaged tissues)

- Stem cells technology is a rapidly growing field wherein efforts are made by cell biologist and geneticists in order to develop effective treatment for various malignant and non-malignant diseases.
- In this technology, stem cells are grown in lab by researchers. These are later manipulated to differentiate into specific types of cells such as nerve cells, muscle cells etc.
- The specialized cells, then can be implanted into a person's target organ to treat the disease
- In many people, heart tissue is repaired by manipulation of these stem cells under invitro conditions.
- Cancer and blood related diseases like leukemia, lymphoma, myeloma has been cured by using adult stem cells



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