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DEPARTMENT: MLT4TH

Q1: Fill in the blanks.

1. Denaturation, annealing and extension.
2. VARIOLAE Vaccine
3. Yeast
4. Molecular scissors
5. Restriction map
6. DNA finger printing
7. Restriction endonuclease and METHYLASE enzyme

Q2: Write short notes on the following.

1. Vaccines and types:

VACCINE:

 Vaccine is a type of biological preparation that provide production of antibodies and provide immunity and help strength the immunity and help the body to fight against one or several diseases prepared from the causative agent.

TYPES:

* LIVE
* DEAD
* SUBUNIT
* GENTICALLY ENGINEERED
1. Biotechnology and its scope:

BIOTECHNOLOGY:

 It is a type of technology which use living organisms to create products for a particular purpose.

SCOPE OF BIOTECHNOLOGY:

* Agriculture
* Nanotechnology
* Chemicals
* Information technology
* Medical devices and equipment
* pharmaceuticals
* infrastructure management

Q3: Explain in detail the restriction modification system.

ANS:

* It is a defensive mechanism of prokaryotic against invading genomes.
* It occurs in bacteria and ARCHAEA and also occurs in a wide variety of unicellular organisms.
* This compromise of two contrasting enzymatic activities:
* Restriction endonuclease
* METHYLTRANSFERASE
* Viruses invade all types of cells.
* Bacteria are one of favorite target.
* Bacteria had developed defensive mechanism against these types of invasion.
* The defensive mechanism that bacteria have is called restriction modification system.

. System composed of

* RESTRICTION ENDONUCLEASE
* METHYLASE ENZYME
* Each bacteria and strain has their own type of METHYLATING ENZYME AND RESTRICTION ENZYME.

RESTRICTION:

 It is a type of enzyme that cuts DNA at internal PHOSPHODIESTER bonds. Different types exist and the most useful one is type II which cleave at a specific DNA sequence.

TYPE II:

* These are the most common available used restriction enzyme.
* They composed one subunit.
* 4 to 8 nucleotide.
* Recognize and cleave DNA at same site.
* Do not use ATP for their activity.
* RECQUIRE mg2+ as a cofactor.

METHYLASE:

 This enzyme add methyl group to a molecule in restriction modification of bacteria.

Q4: What are different types of retraction enzymes? Recombinant DNA, recombinant DNA technology and its application

ANS:

Types of enzymes:

1. OXIDOREDUCTASE:

 Transfer O and H atoms between substances involved.

1. TRANSFERASE:

 Transfer of a chemical group from one substrate to another.

1. ISOMERASE:

 Rearrangement of group within a molecule

1. LIGASE:

 Formation of bonds between two molecules

1. LYASE ENZYMES:

 Addition or removal of a chemical group other than by hydrolysis to form a double bond

1. HYDROLASE:

 This is the breaking of chemicals bonds with the addition water.

RECOMBINANT DNA:

 DNA molecules formed by laboratory methods of genetic recombination to bring together genetic material from multiple sources

RECOMBINANT DNA TECHNOLOGY:

With this technology we can isolate and clone single copy of a gene into an indefinite number of copies, all identical.

APPLICATION OF RECOMBINANT DNA TECHNOLOGY:

* DNA sequencing
* Mutation studies
* Genetic engineering
* Transformation
* Polymerase chain reaction
* Restriction enzymes site analysis

Q5: As a student of MLT how will you use restriction endonuclease in lab?

ANS:

FOR EACH LAB GROUP:

* Four MICROTUBES
* MICROTUBE rack
* 20 micro liter micropipette and sterile tips
* Waterproof pen
* Beakers or foam cup with crushed ice for the following

. 20 micro liters of 0.4 micro g/ micro liter lambda DNA

. 2.5 micro liters BAMHI restriction enzyme

. 2.5 micro liters ECORI restriction enzyme

. 2.5 micro liters HINDIII restriction enzymes

. 10 micro liters distilled water

. Gloves

. 500 Ml beaker day 2

. Electrophoresis chamber day 2

. Power supply day 2

. 20 micro liters 10 cross loading dye day 2

. 1.0% AGAROSE day 2

COMMON MATERIALS:

* Container with TBE solution
* 37 c water bath with floating rack
* 60 c water bath on a hot plate day 2
* Cooler with crushed ice
* Freezer
* Camera if desired
* Distilled water
* 0.002% methylene blue stain