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**Department BS MLT 4th semester**

**Fill in the blanks**

1. The three main steps of PCR are **Denaturation, Annealing, and Extension.**
2. The world 'vaccine' originates from the Latin word **Variolae vaccine.**
3. **Yeast** is the oldest microbes exploited by humans for their benefit.
4. **Restriction map** is a diagram or map of DNA molecule of an organism that shows specific site of cleavage restriction site.
5. A forensic technique used to identify individuals based on the variation in their DNA sequence is known as **DNA finger prints .**
6. Restriction endonucleases are also called as **molecular seissor.**
7. Restriction modification system is mainly composed of **Endonucles** and **Methylase.**

**Ans:-No 2:-**

1. **Biotechnology:-**

The use of living organism or their processes and product for the welfare of mainkind.

**Scope of biotechnology:-**

* This is one of the fastest and growing field in reaserch and development it is called technology of future or technology of tomorrow. some daily based importance are given below.
* Communication media.
* Bioformaticals web site.
* Bio-engineering- Instrument developments .
* Pharmacistical componies
* Diagnose laboratories.
* Waste manegment.
* In medicine such gene therapy , medical genetics, and use of biological tools.
* Agriculture and animals husbandry.
* With the help of DNA fingerprinting we can find out the suspected and criminal person.
* Great work on agriculture.

**2 . Vaccine:-**

It is a substance used to stimulate the production of Antibodies and provide a good immunity against one or more Diseases.

**Types of vaccine**

**1 . Live attenuated vaccine:-**

These vaccine contain a live version of microbe which is weaken in lab.these vaccine are called good teacher of immunity system.

**Example:-** vaccine for mumps, measle etc.

**2 . Inactivated vaccine:-**

These vaccine are More stable and safe .

**Example,:-** vaccine against influenza,polio hepatitis A and Rabies.

**3 . Subunit vaccine:-**

These vaccine only include the antigen that stimulate the immunity system.

* + Sometime only specific part of antigen is used because T-cell recognize to bind to it.

**Example:-** plague immunization.

**4 . Toxoid vaccines:-**

These are used mainly against the toxin of bacteria other chemical such as formalin can add to this vaccine for safety.

**Example:-** crotalus Artrox toxid etc.

**5 . Conjugate vaccine:-**

It is used against the capsulated bacteria.

**Example:-** Hemophilus influenza type B vaccine.

**6 . Recombinant vactor vaccine:-**

Similar to DNA vaccine.

**Example:-** DPT.

**7 .DNA vaccine:-**

In experimental stage still but several tested in human. These vaccine with both whole organism and its part get down to essential.

**Example:-** influenza vaccine.

**Ans No:- 4**

**Different types of restriction enzymes:-**

* **Type 1**  This enzyme cleave the random site of DNA from recognition site.
* **Type 2** There function and cleaves of DNA is at right/ defined position close or even with in recognition sequence.
* **Type 2 G:-** It can cut DNA out side of the recognition site
* **Type 2 P:-** It can cleave the symmetric targets and cleavage site of. DNA.
* **Type 2 S:**-It recognize the asymmetric sequence.
* **Type 3:-** Cleavage/ cut DNA out of recognition site.
* **Type 4:**-This enzyme can cut the modified methylated DNA.

**\***\***Recombinant DNA :-**

The DNA that is formed by the laboratory method of genetic recombinant. The recombinant DNA is formed artificially by combining part ( constitutes) of different organism.

**\*\*Recombinant DNA technology:-**

The recombinant DNA can prepared by the following steps.

1. **Formation of recombinant DNA:-**

The DNA or gene of choice is isolated by restriction enzyme and inserted into plasmid restriction enzyme can done the cleavage. The DNA ligase join the two DNA and by developing phosphodiester bond between 3 – OH and 5 - PO4 this called new recombinant DNA.

**2 . Transformation of expression system:-**

Most for expression system we use bacteria 1st bacteria cell is treated by calcium- chloride to make them more permeable.

**3 . Identification of clone cell:-**

The transferred clone got resistance to gene found in medium.

**Application with the help of recombinant DNA technology:-**

**We can find out:-**

* DNA sequence.
* Mutation studies.
* Also transformation.
* Also used in genetic engineering.
* In recombinant DNA library.
* Also used in restriction enzyme site analysis used in polymerase chain Reaction.

**Ans No :-3**

**Restriction modification system:-**

This is in important component of prokaryotic defense mechanism against the invading genome.

**.occrance:**-they occurred in great variety of the unicellular organism including bacteria and arches.

They are consist of two different enzymatic activity.

* Restriction Endonucles
* Methyltransferase

The phage or viruses invaded all types of cells.

The bacteria is one of favorite target.the defense mechanism is devolped by bacteria for defense themselves from there invsion.

The system which work for defense is restriction modification system which is composed of

Restriction Endonucles and methylase enzymes.

Each bacterial species and strain has their own combination of restriction and methylating enzyme.

**Restriction enzyme:-**

This is enzyme which cut in internal phosphodiester bond . Different types are present but in molecular biology most useful is type 2 are those enzyme which cut specific DNA sequence.

**Methylase:**-this is an enzyme which add a methyl group to a molecule in the restriction modification system of bacteria .the methyl can add to a specific site to protect from restriction Endonucles cleavage.

**Ans No:- 5**

**We can use restriction Endonucles in lab with following**

**Technique.**

* In the laboratory restriction Endonucles enzyme are used to cut DNA into smaller fragments .
* The cut are always made at specific nucleotide sequence.
* Different restriction enzyme recognize and cut different DNA sequence.
* These restriction enzyme are found in bacteria.
* Bacteria use restriction Endonucles enzyme to kill viruses these enzymes attach the viral DNA and break it useless fragments.

**End off**