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Dprmt BS (MLT)^{4th}

Paper Molecular Biology

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Q¹ Filling the blanks Answer.

(i) Denaturation, Annealing and Extension

(ii) Vaccine

(iii) Yeast

(iv) Molecular Scissors

(v) Restriction Map

(vi) DNA Finger Printing.

(vii) Restriction Endonuclease,
Methylase Enzyme.

Th

Q2: Vaccines :-

1 Ans
⇒

The word vaccines is

derived from a latin word
"vaccinae"

which means cowpox and

⇒ In 1798 the Edward Jenner
was demonstrated this vaccine.

⇒ In human the smallpox
could prevent which is
demonstrated by Edward Jenner.

⇒ Nowaday this vaccine which is
produced from living that
applies to all biological preparation

⇒ It prevent the immune system
from the disease and also
either prevent (prophylatic vaccines)

or in some cases, which is

P - T - O

treated by therapeutic vaccines.
and so on.

Types of Vaccines:-

Here we have some types of vaccines which are as under.

1: Live attenuated vaccine:-

⇒ It is the type of vaccine.

⇒ Composed of live attenuated microorganism in which in the host, they cause limited infection sufficiently which induce the response of immune system.

⇒ But also insufficiently they cause a disease.

and so on.

2: Killed Vaccines :-

It also a type of vaccine in which we prepare the vaccine for using live microorganism, when they are unsafe. \Rightarrow we are prepare these vaccines for normal as (wild type) infectious pathogenic microorganism, and so on.

\Rightarrow we have oral poliomyelitis ^{vaccine} which growth in monkey's culture and the poliomyelitis vaccine which consist of virus as poliomyelitis.

3: Subunit vaccine :-

It is the third type of vaccine which used for trigger an immune response.

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e.g. pathogen fragment, proteins

surface typically

⇒ Also from which it is derived they stimulate the acquired immunity against the diseases or pathogens.

4: Recombinant vaccines

⇒ These type of vaccines which are using recombinant DNA technology and or genetic engineering.

⇒ These are those vaccines in ~~the~~ which genes for desired antigens of a microbes which are inter into a vector.

and so on

5: DNA Vaccines:-

These type of

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vaccines which are injected in animal muscle which are being vaccinated.

⇒ The humoral and cellular immunity which are induced by this vaccines. and so on.

6: Cocktail vaccines:-

These type of vaccine that it is the mixture of different vaccines.

⇒ They are more effective against more than one disease.

⇒ MMR is a vaccine which effective against mumps, Rubella and measles is the example of this. and so on.

Q2:- Biotechnology's

2 Ans →

They are the manipulation of living organism.

⇒ They also as organic material which serve the human needs.

⇒ For the human benefit and also their surrounding the science of using living or the products of living organism.

For example's

⇒ Plants and animals cloning.

⇒ Using bacteria as penicillin to kill the harmful organisms, etc.

P-T-O

Scope of biotechnology:-

The activity ~~with~~ and research between the different agricultural area or place with common goals and techniques of research which has been increased. are as under:-

⇒ Plant Science.

⇒ Productivity.

⇒ Nutrition improvement.

⇒ Biofactories.

⇒ Biofuels.

⇒ Phytoremediation.

etc.

⇒ Animal science.

⇒ Transgenic.

P.T.O

9.

⇒ Animal have been cloned as cats, sheep, goats etc.

⇒ The sheep named Dolly which first in the beginning is cloned in 1996.

⇒ Environmental Science

⇒ Bioremediation.

⇒ Immunoassay Test

⇒ The tire wash channels is the example of Installation of biological barriers.
etc.

and so on.

Q 3: Restriction modification
System

Ans: ⇒ The R-M system which is very important component of prokaryotic defense mechanism against the invading genomes.

⇒ Archaea and bacteria which are included in the occurring in a wide variety of unicellular organisms.

⇒ The two contrasting enzymatic activities which are comprises by this.

→ Restriction endonuclease (REase)

→ Methyltransferase (MTase)

⇒ All types of cells which invade the viruses as phage.

⇒ It's favorite target is bacteria.

⇒ Bacteria developed the defense mechanism which they defend from these invasions themselves.

⇒ It's system as the restriction-modification system which poses this defense.

⇒ ii Restriction endonuclease

iii methylase enzyme.

⇒ ii Restriction enzyme is an enzyme which cuts DNA at internal phosphodiester bonds.

⇒ iii Methylase is an enzyme that add a methyl group to a molecule.

and so on.

Q 41: Different types of restriction
enzymes //

Ans: Ans is the restriction enzymes is also known as "Restriction Endonucleases".

⇒ This enzymes was discovered in 1968.

So there are ~~four~~ ^{three} types of restriction enzymes ^{which are} recognized and also designated as I, II, III and ~~IV~~ which having primarily different structure are as under.

⇒ The type I, II and III and ~~IV~~.

⇒ Each type is characterized action on DNA by slightly

different mode.

⇒ So the I and III restriction endonucleases having both enzymes as methylase and endonuclease activity on single protein.

⇒ The type I REs which break the DNA randomly site which is located at 1000 base pair from the recognition site.

⇒ The type III REs which are also the same cut 24 to 24 bp away from the recognition site.

⇒ Type II RE:-

They break the DNA within the recognition sequence

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at specific site.

So in molecular biology
the most important tool
type • IRE which is
made by this property.
and so on.

Recombinant DNA:

⇒ The Stanley N. Cohen and Herbert Boyer was first produced the recombinant DNA in 1973.

⇒ So they combine two plasmids in their experiment.

e.g. the PSC-101 and PSC-102.

So E. coli is created by the new recombined DNA.

⇒ The PSC-101 contain the gene for

P - F :

tetracycline resistance.

⇒ De pSC-102 which contain the gene for Kanamycin resistance, and so on

Recombinant DNA Technology :-

⇒ In recombinant DNA technology many diverse techniques are now available.

There is the steps in the recombinant DNA technology are as under.

⇒ The first step is the spreading of the total DNA of the organism which contain the desired gene of interest.

⇒ Next step is the fragment

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generation of the upper DNA
with suitable restriction enzyme.

⇒ Then the DNA pieces containing
the gene of interest is inserted
to cloning vector which create
or produce recombinant or chimeric
DNA.

⇒ Plasmid, bacteriophage and
viruses etc are the cloning vectors
such as YAS and BAC.

⇒ So after the cloning introduce
the recombinated vector into the
cell of host such as E. coli
bacteria

⇒ In cloning vector which having
a sequence to allow them to replicate

P F-c

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autonomously within the competent host cell.

⇒ After that it induce the expression gene of interest in the host cell to produce ^{desired} product.

So the product which can be extracted from the medium using the suitable downstream processing techniques.

Applications or uses:-

⇒ Treatment of harmful virus infection.

⇒ Treatment of insulin which is dependent on diabetes.

⇒ Prevent of infectious disease.

⇒ Enhance of action of immune system.

etc.

Q54 Using of Restriction endonuclease in lab.

Ans: we can use in the laboratory restriction enzyme which is also called restriction endonuclease are used to cut DNA

P F O

into smaller pieces.

So the cuts are always made at specific nucleotide sequences.

⇒ So restriction enzyme or endonuclease are basic tool for biotechnology research.

So they are used for both the fingerprinting of DNA and also for DNA cloning.

⇒ In the laboratory to use the restriction endonuclease to cut the DNA sample yourself and determine the size of it.
and so on.