

Biosensor

- Environmental biosensor are the analytical device composed of biological sensing elements and a physically transducer which together relate to measurable signal

Types of biosensor based on transduction signal

- Electrochemical
- Optical
- Piezoelectric
- Thermal sensor

2: Examples of Endocrine disrupter?

Endocrine disruptor is:

- An exogenous agent that interferes with synthesis, secretion, transport, binding, action, or elimination of natural hormones in the body which are responsible for the maintenance of homeostasis, reproduction, development and/or behavior

Examples of Endocrine Disruptors

- Diethylstilbesterol (DES).
- Polychlorinated biphenyls (PCBs).
- Polybrominated biphenyls (PBB).
- Chloroform.
- Dioxins and furans.
- Pesticides

3: Define endocrine disrupter?

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Mechanism of action

- Endocrine disruptors act on the endocrine system of humans and animals by mimicking, blocking and/or interfering in some manner with the natural instructions of hormones to cells.

- Binding of EDs to hormone receptors, with resultant alteration in the transcription of messenger RNA, followed by altered gene expression, appears to be one mechanism by which EDs can alter endocrine function.
- Other mechanisms involve alteration in hormone synthesis, metabolism, and transport as well as effects mediated through changes in the hypothalamic–pituitary–gonadal axis.

4: Steps of making genomic libraries?

Steps of making Genomic Libraries

- Isolation of genomic DNA

- Generation of suitable size DNA fragments
- Cloning in suitable vector system (depending on size)
- Transformation in suitable host .

Isolation of genomic DNA- Isolation of genomic DNA

has following steps: 1. Lysis of cells with detergent containing lysis buffer. 2. Incubation of cells with digestion buffer containing protease-K, SDS to release

genomic DNA from DNA-protein complex. 3.

Isolation

of genomic DNA by absolute alcohol precipitation. 4.

Purification of genomic DNA with phenol:chloroform

mixture. Chloroform : phenol mixture has two phases,

aqueous phase and organic phase. In this step, phenol

denatures the remaining proteins and keep the protein

in the organic phase. 5. Genomic DNA present in aqueous phase is again precipitated with absolute alcohol. 6. Genomic DNA is analyzed on 0.8% agarose

gel and a good preparation of genomic DNA give an intact band with no visible smear.

5. Define vector?

Cloning Vectors

- A vehicle DNA is required to carry foreign DNA to generate a recombinant construct so that it should allow easy amplification of chimeric DNA in host. Vehicle DNA used for this purpose in genetic engineering is known as ‘vector’.

Criteria of a good vector :

- **The vector DNA has a two main responsibility:**
- Ability to carry foreign DNA,
- Ability to replicate in the host

MCQs

1. Two of the important topics at the threshold of the 21st century have been the environment and biotechnology.

2. Nitrogen cycle

3. Less than 1% of the existent microorganisms have been cultivated and characterized.

4. Other extremophiles include organisms that live at extreme pH values, pressure.

5. Detoxification

6: Major petrochemicals are acetylene, benzene, ethane, ethylene, methane, propane, and hydrogen.

7. There are many classes of transposable elements which are short pieces of DNA,

8. An organism that is generated through genetic engineering is considered to be a genetically modified organism (GMO).

9. A mutagen is a chemical which increases the rate of error in DNA replication

10. Genetic engineering is the deliberate, controlled manipulation of genes in an organism in order to upgrade that organism.

Bt503 :-
xenobiotics,

XENOBIOTICS' are the foreign chemical substances found within an organism, which are not normally naturally produced by an organism or expected to be present within that organism.

- It can also cover substances which are present in much higher concentrations than are usual in any product.
- Most of the systems in the body are affected by these xenobiotic compounds

including the immune, neurological, and the endocrine systems.

- Toxicity in these systems can lead to immune dysfunction, autoimmunity, asthma, cancer, learning difficulties, mood changes, neurological illnesses, changes in sexual desire and functioning, reproductive dysfunction, and upsets in blood glucose levels, etc.

what do u mean by mobility of DNA ,

The movement of genes within and between organisms.

- Plasmids may be transferred between bacteria by conjugation, of which there are several types, but all of which require direct cell to cell contact. Not only are genes transferred between bacteria on plasmids, but bacteriophages (bacterial viruses) are

also vectors for intercellular transmission. Similarly, eukaryotic viruses are able to transfer genetic material between susceptible cells. In addition, bacterial cells may pick up DNA free in the environment under conditions where their cell wall has become 'leaky' to fragments of this macromolecule, a process called transformation.

define genetic engineering ,

Genetic Engineering

- Definition: The technology entailing all processes of altering the genetic material of a cell to make it capable of performing the desired functions, such as producing novel substances.

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In other words:

- Genetic engineering is the deliberate, controlled manipulation of genes in an organism in order to upgrade that organism.

Molecular tools and Technological breakthroughs

- Enzymes- nucleic acid cleavage, ligation,
- Vector- molecular cloning
- Polymerase chain reaction
- DNA sequencing
- Electrophoretic separation
- Detection of genes:
DNA-Southern blotting; in situ

hybridization;
FISH technique;
RNA- Northern blotting
Pr-Western blotting;
immunohistochemistry

- Purification
- Transgenic organisms

difference between extremophiles and hyperthermophiles,

Extremophiles are organisms that have evolved to survive in environments once thought to be entirely uninhabitable. These environments are inhospitable, reaching extreme conditions of heat, acidity, pressure, and cold that would be fatal to most other life forms. Because extremophiles live on extreme ends of the spectrum, they can indicate the range of conditions under which life is possible.

Read more on Brainly.in - <https://brainly.in/question/2276069#readmore>

A hyperthermophile is an organism that thrives in extremely hot environments—from 60 °C (140 °F) upwards. An optimal temperature for the existence of hyperthermophiles is above 80 °C (176 °F).[1]Hyperthermophiles are often within the domain Archaea, although some bacteria are able to tolerate temperatures of around 100 °C (212 °F), as well. Some bacteria can live at temperatures higher than 100 °C at large depths in sea where water does not boil because of high pressure. Many hyperthermophiles are also able to withstand other environmental extremes such as high acidity or high radiation levels. Hyperthermophiles are a subset of extremophiles

contaminants releases in the environment.

Contaminants released into the environment

- Solvents
- Pesticides
- Herbicides
- Fungicides
- Insecticides
- Petrochemicals
- Explosives
- Heavy metals

Environment biotechnology

deals with

- Decontamination of environmental components
 - Production of chemicals
- biosensors

- Pollution prevention
- Waste minimization

Bt503

Differ ques

what do you mean by mobility of DNA? annealing steps in pcr?

Annealing: This is the annealing step where at lower temperature (usually 50-65°C) primers are allowed to bind to template DNA, annealing time is 15-30 secs and it depends on the length and bases of the primers. Generally annealing temperature is about 3-5°C below the melting temperature (T_m) of the pair of the primers is used.

contaminants released from the environment?

1- RNAi technology? 3 marks

RNAi technology

- In addition to the traditional strategies for vector construction and genetic modification strategies described,

RNAi (interference) technology is now becoming a new way to improve the contents and fight the diseases of crop plants.

- Furthermore, plant virus vectors for transfer and expression of transgenes in crop

plants are coming into use.

2- pUC8 plasmid? 3 marks

pUC8 Plasmid

- The **pUC8** plasmid was designed by scientists and contains the **lac z gene**. To produce the plasmid, the pBR322 plasmid was cut in half with EcoR I and the section containing the **ampicillin resistance gene** was

combined with a DNA fragment containing the lac z gene.

- As a result, the plasmid provides a transformed cell with both ampicillin resistance and the ability to utilize lactose as a food source, since the lac z gene produces β galactosidase (degrades lactose)

2- **Bt503**

3- **What are xenobiotics (2)**

4-

What are vectors (2)

Define biotechnology (3)

5- Biotechnology is the use of biological processes, organisms, or systems to manufacture products intended to improve the quality of human life. The earliest biotechnologists were farmers who developed improved species of plants and animals by cross pollenization or cross breeding. In recent years, biotechnology has expanded in sophistication, scope, and applicability.

6- The science of biotechnology can be broken down into subdisciplines called red, white, green, and blue. Red biotechnology involves medical processes such as getting organisms to produce new drugs, or using stem cells to regenerate damaged human tissues and perhaps re-grow entire organs. White (also called gray)

biotechnology involves industrial processes such as the production of new chemicals or the development of new fuels for vehicles. Green biotechnology applies to agriculture and involves such processes as the development of pest-resistant grains or the accelerated evolution of disease-resistant animals. Blue biotechnology, rarely mentioned, encompasses processes in marine and aquatic environments, such as controlling the proliferation of noxious water-borne organisms

7-

What are cosmid vectors (3)

8- **Cosmids vector**

- Combine parts of the lambda chromosome with parts of plasmids.
- An origin of replication (ori).
- A cos site(a sequence yield cohesive end) .
- An ampicillin resistance gene (amp),
- Restriction sites for cloning
- Cosmids can carry up to 50 kb of inserted DNA.

Write tge examples of endocrine disruptor (5)

Applications of plasmid vectors (5)

A **plasmid** is a small [DNA](#) molecule within a cell that is physically separated from a [chromosomal DNA](#) and can replicate independently. They are most commonly found as small circular, double-stranded DNA molecules in [bacteria](#); however, plasmids are sometimes present in [archaea](#) and [eukaryotic organisms](#). In nature, plasmids often carry genes that may benefit the survival of the organism, for example [antibiotic resistance](#). While the chromosomes are big and contain all the essential genetic information for living under normal conditions, plasmids usually are very small and contain only additional genes that may be useful to the organism under certain

situations or particular conditions. Artificial plasmids are widely used as [vectors](#) in [molecular cloning](#), serving to drive the replication of [recombinant DNA](#) sequences within host organisms. In the laboratory, plasmids may be introduced into a cell via [transformation](#).

Plasmids are considered [replicons](#), units of DNA capable of replicating autonomously within a suitable host. However, plasmids, like [viruses](#), are not generally classified as [life](#).^[1] Plasmids are transmitted from one bacterium to another (even of another species) mostly through [conjugation](#).^[2] This host-to-host transfer of genetic material is one mechanism of [horizontal gene transfer](#), and plasmids are considered part of the [mobilome](#). Unlike viruses (which encase their genetic material in a protective protein coat called a [capsid](#)), plasmids are "naked" DNA and do not encode genes necessary to encase the genetic material for transfer to a new host. However, some classes of plasmids encode the [conjugative "sex" pilus](#) necessary for their own transfer. The size of the plasmid varies from 1 to over 200 [kbp](#),^[3] and the number of identical plasmids in a single [cell](#) can range anywhere from one to thousands under some circumstances.

The relationship between microbes and plasmid DNA is neither parasitic nor mutualistic, because each implies the presence of an independent species living in a detrimental or commensal state with the host organism. Rather, plasmids provide a mechanism for horizontal gene transfer within a population of microbes and typically provide a selective advantage under a given environmental state. Plasmids may carry genes that provide [resistance](#) to naturally occurring [antibiotics](#) in a competitive [environmental niche](#), or the proteins produced may act as [toxins](#) under similar circumstances, or allow the organism to utilize particular organic compounds that would be advantageous when nutrients are scarce