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DEP Micro 4th Sem

Paper Bacterial genetics

 Q NO 5

 Answer

Genetically modified organism

 A genetically modified organisms is any organism whose genetic material has been altered using genetics engineering technique .

GMO , is an animal , plant or microbes whose DNA has been altered using genetics engineering . for thousand of years human , have used breeding methods to modified organisms . corn , cattle , even dogs has been selectively bred over generation to have certain desired traits .

GMOs are living beings that have had their genetics code tweaked in some way .

GM technology isn’t only for crops use on microorganisms , such as bacteria , has created medicines like insulin and vaccines

Why are GMOs used

 Bred to resist disease or damage from chemicals .

Most stable harvests with higher yield

Most common genetically modified crops , soy , corn , cottonseed , and canola .

Advantages of GM food

 Can manipulate environment ,can feed precursors .

Possible to select in culture and also possible to get all cells in a culture producing .

 Crops

. Enhanced taste and quality

. Reduce maturation time

. Increased nutrients , yields , stress tolerance .

. new products and growing techniques .

Animal

 Increased resistance , productivity , hardiness , and feed efficiency

 . better yields of meat ,eggs and milk

Disadvantages of GM foods

 . High cost

 . Contamination

 . Low intrinsic production

. Health concerns

. Allergic reaction are most common because people can react to the ingredients used .

. Egg , wheat , fish , tree , nuts , peanuts and soybeans are most common .

 Q NO 3

 Answer

Electroporation

 A method used to apply an electric current across a cell membrane resulting in temporary ‘‘pore’’ formation enabling the uptake of exogenous molecules found in the medium to either the cytoplasm or into the nucleus , there by transecting or transforming the cell .

. Electroporation is based on the principle that high voltage electric pluses can include cell plasma membrane to fuse .

Liposome-,mediated gene transfer ‘ lipofection’ are circular lipid molecules , having aqueous interior that can carry nucleic acids.

 Types of recombination

1. ; Homologous recombination

 DNA replication starts with one parental DNA template and switches to a second parental molecule , resulting in the synthesis of recombinant daughter DNAs containing sequence homologous to both parents .

Parental DNAs are broken at staggered sites, and overlapping signal-stranded region are exchange via base pairing with homologous sequence .

In breakage and rejoining , recombination occurs as a result of breakage and crosswise rejoining of parental DNA molecules .

1. . Non –homologous recombination

 The main difference between homologous and non – homologous chromosomes consist of alleles of the same type of genes in the same loci whereas non-homologous chromosome consist of alleles different types of genes .

In bacteria and the yeast integration of such DNA into the genome requires substantial sequence similarity between incoming DNA and the recipient site .

However ,cell of the other fungi ,higher plants, and animals are able to integrate foreign DNA into their chromosomes with little or no sequencing similarity .

1. ; Site specific recombination

Bacteriophages , plasmids , bacteria and unicellular eukaryotes provides many examples of differentiation through controlled and site – specific recombination of DNA segments .

Invertebrates , a controlled series of deletion leads to the generation of the great diversity of gene sequence encoding gene for immune defense against pathogens .

All these process depend upon interaction and recombination between specific DNA sequence ,generally catalyzed by site – specific recombinase enzymes .

 Q NO 4

 Answer

Importance of transformation

 Imagine that a harmless bacterium takes up DNA for a toxins gene from disease –causing species of bacterium .

When non-disease –causing species of bacterium joins the new DNA into its own chromosome it too ,many become pathogenic .

Importance of transduction

 Transduction is specially importance because it explains one mechanism by which antibiotics .drugs become ineffective

Due to the transfer of antibiotics –resistance genes between bacteria .

In addition ,hope to create medical methods of genetic modification of disease such as Duchene/Beckr muscular Dystrophy are based on these methodologies .
importance of conjugation

 Conjugation is used to share beneficial genetics material between bacteria , such as antibiotics resistance .However , manually inserting genes into the F-plasmid would allow for scientists to have bacteria transfer almost any gene to other cells , including our AMP kill switch .

Bacterial conjugation is transfer of genetic material between bacterial cell by direct cell to cell contact or by a bridge –like connection.

 Part B

 Generalized transduction

It is a process by which any bacteria gene may be transferred to another bacterium via a bacteriophage , and typically carries only bacteria DNA and no viral DNA .

This is the packaging of bacteria DNA into a viral envelope .this may occur to main ways, recombination and heedful packing .

It happens when phage is in the lytic stage ,at the moment the viral DNA is packaged into phage heads .

The DNA will ne absorbed by the cell and recycled for spare part ,this type of recombination is random and the amount recombined depends on the size of the virus being used .

Specialized transduction

It is the process by which a restricted set of bacterial genes are transferred to another bacterium .

Specialized transduction occur when the prophage excises roughly form the chromosome .

The excised DNA is then packaged into a new virus particles , which can then deliver the DNA to new bacterium , where the donor gene can inserted into the recipient chromosomes or remain in the cytoplasm , depending on the nature of the bacteriophage .

 Q NO 2

 Answer

 Importance of bacterial genetics

Microbes provide relatively simple system for studying genetics phenomenon and thus useful to other higher organism. microorganism are used to isolation and multiplication of specific genes of higher organisms which is reffere as gene cloning .

About 25 percent of bacterial genetics material constituted by a extra chromosomal DNA fragments are ,tissue tropism plays an important role in disease –for example UPEC infects .

Importance of B-galactosides

 . B-galactosidase is importance to organism as it is key provider in the production of energy and source of carbons through the break down of lactose to galactose .

It is also important for the lactose intolerant community as it is responsible for making lactose to free-milk and other dairy products .

The B – galactosidase gene function well as reporter gene for two major reason its protein products is extremely stable and resistant to proteolytic degradation is cellular lysates , and most importunately the enzyme is easily essayed .

 Q NO 1

 Answer

Differentiate between

1 ; Glucose

 Glucose is the primary metabolic fuel for the brain .

If glucose is limited example, hypoglycemia , the alternative substrate such as lactate ,pyruvate ,free fatty acid , glycerol , and certain amino acid have been show to capable of partially or wholly .

Supporting respiration of brain tissue slice .

Galactose

 Galactose is one of the products lactose ,milk sugar , hydrolysis in the intestine. Galactose is a monosaccharide when combined with glucose ,monosaccharide, through a condensation reaction the result is the disaccharide lactose.

 Probiotics

Probiotics are beneficial bacteria found in certain foods or supplements.

Probiotics are live microorganisms that are intended to have health benefits. Products sold as probiotics include foods, such as yogurt , dietary supplement , and products that are not used orally such as skin creams .

Prebiotics

 It is a types of fiber that feed the friendly bacteria in the digestive system .

 Are a component of some foods that the body cannot digest .They serve as food for bacteria and other beneficial organisms

In the gut. E.g yogurt fermental foods , such as sauerkraut and kimchi , traditional fermented buttermilk , fermented cheeses , such as gouda

1. Chromosome rearrangement

Chromosome are known as homologous chromosomes.

We have two copies of each chromosomes in over cell one from father and other from mother .

Recombination

 During genetic recombination homologous chromosome physically exchange pieces of genetic information .

1. Ionization radiation

Ionization radiation is short wave length .

. high frequency , and high energy to produce ions in matter at molecular level

Non –ionization radiation

 longer wave length

. lower frequency

. lower energy

1. ; positive regulation

In positive regulation a transcription factor is required to bind at the promoter in order to enable RNA polymerase to initiate transcription .

Negative regulation

 In negative regulation a repressor protein binds to an operator to prevent a gene from being expressed .