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Q NO.1 DIFFERENIATE BATWEEN

1) POSITIVE AND NEGATIVE REGULATION

When the expression of genetic information is quantitatively increased by the person of specific regulatory element so it is called positive regulation.
So the specific regulatory element or molecule mediating positive regulation is called positive regulator.

EXAMPLE: *Lac operon*

NEGATIVE REGULATION: *When the expression of genetic information is decreased by the of the specific regulatory element is called negative regulation .*

The element or molecule mediating the negative regulation is called a negative regulator.

EXAMPLE: Tryptophen operon

QNO.1

2) GLUCOSE AND GALACTOSE

It is the primary metabolic fuel for the brain and human liver , glycogen is the storage from the glucose.
In the normal individual its concentration in blood is maintained within the narrow range of about 70 or 80 mg / dl after an overnight fast to about 150 mg/dl immediately after a glucose – rich meal.

EXAMPLE
fructose

GALACTOSE:
It is one of the products of lactose hydrolysis in the intestine. Galactose is a monosaccharide when combined the glucose through a condensation reaction, is the result of diasaccharide lactose.

EXAMPLE:
lactose

QNO.1

3)PROBIOTICS AND PREBIOTICS

They are the live microorganisms that are intended to have health benefits .products sold as probiotics include foods, dietary supplements, and products that are not used orally, such as skin creams.
Maybe killed over time probiotics fight the harmful bacteria l species present in the gut.

EXAMPLE:
Bifidobacteria is the host of good bacteria that benefit your body. pickles, miso.

PREBIOTICS:

They are a component of some food that the body cannot digest . they serves food for bacteria and other beneficial organisms in the gut .
The powder form of prebiotics can survive heat, cold and acid

EXAMPLE:
The yogurt fermented foods, such as sauerkraut and kimchi, traditional fermented butter milk, fermented cheeses, such as gouda

QNO 1.

4)IONIZING RADIATION AND NON – IONIZING RADIATION

Such as x-ray or gamma radiation carries enough energy to remove electrons from the molecule of the cell.
Free radicals can be damage most other molecule in a call and such as DNA OR RNA , by oxidizing them.

EXAMPLE:
Cosmic ray
X- rays

NON- IONIZING RADIATION
Such as ultraviolet light , exerts its mutagenic effect by exciting electron in molecules.
These dimmers often change the shape of the DNA in the cell and can cause problems during replication.

EXAMPLE:
Micro waves
Radio waves- beyond infrared

QNO1

5)CHROMOSOME REARRANGEMENT AND RECOMBINATION

Chromosome rearrangement are mutations that change the structure of individual chromosomes.
Rearrangement has one unmutated chromosome and one chromosome with the rearrangement

EXAMPLE:
It is the original white allele in drosophila which is a small deletion affecting only the white gene

***RECOMBINATION**:*
Recombination of the refers to the exchange of DNA strands and producing a new nucleotide rearrangements.
The three types are homologous recombination , and transposition.
Occurs during the preparation of gamates.

EXAMPLE:
Recombination occurs when two molecules of DNA exchange pieces of their genetic material with each other.

QNO 5. WHAT IS GENETICALLY MODIFED ORGANISM? WRITE DOWN ADVANTAGE AND DISADVANTAGES OF GENETICALLY MODIFIED FOODS?

ANS: GENETICALLY MODIFIED ORGANISAM:

These organisam whose genome has been engineered in the laboratory in order to favour the expression of desired physiological traits or the generation of desired biological products due to the genetic modification , however, recombinant genetic technologies are employed to produce organisms whose genome have been precisely altered at the molecular level, usually by the inclusion of gene from unrelated species of organism that code for traits that would not be obtained easily through conventional selective breeding.

However , while GMOS have benefited human society in many ways , some disadvantages exist; therefore the oroduction of GMOS remain a highly controversial topic in many parts of the world.

GENETICALLY MODIFIED FOOD

There are organisms that have had a new genes added to themselves from other organism that the technique used in this type of crop management has been introduced to ensure farmers and merchants are able to improve crop or food quality in a more efficient way.

ADVANTAGES AND DISADVANTAGESOF GMOS

ADVANTAGES: *Some people arrogate that is technology will help those in the agricultural industry decrease the amount of wasted crops and foods .*

INSECT RESISTANCE

Some GMOS food have been modified make them more resistance to insect and other pest. This means the amount of pesticide chemical used to the plant are reduced , so their exposure to dangerous pesticides are also reduced.

STORNGER CROPS

Another benefit that GM technology is believed to make them bring about is that crops can be engineered to withstand weather extremes and fluctuations which means that there will be good quality and sufficient yield even under a poor or severe weather condition.

LARGER PRODUCTION

It has been easier to raise crops that are classified as genetically modified because all of their example have the stronger ability to resist pest . this producing greater amount of crops or foods.

DISADVANTAGES OF GENETICALLY MODIFIED FOOODS

ALLERGIC REACTION

According to research by the Brown university , resent genetically modified food can pose significant allergy risk to people. It states that genetic modification often adds or mixes proteins that were not indigenous to the original animal or plant, which might cause new allergic reactions in our body.

LOWER LEVEL OF BIODIVERSITY

One big potential drawback of this technology is that some organism in the ecosystem could be harmed, which in turn could lead to a lower level of biodiversity.

CROSS POLLINATION

Cross pollution – can cover quite large quite distance , where new genes can be include in the offspring of organic , traditional plants or crops that are miles away.

HUMAN HEALTH

GMO plants may create encourage farmers to increase their use of herbicides and pesticides, which will raise human consumption of dangerous toxins .

GENE SPILLING

It is unclear that effects , if there are any genetic pollution resulting from inadequate sequestering of genetically modified cross pollution would have on the wild varieties surrounding them.

QNO 2: WHAT ARE THE IMPORTANCE OF BACTERIAL GENETICS, B-GALACTOSIDASE ASSAY, GENE REGULATION, RECOMBINATION AND MUTATION?

B-galactosidase:

The B-galactosidase is also called the beta-gal or B-gal, or lactase which is a hydrolysis enzyme that catalyzes hydrolysis of B-galactosides.

The lactase enzyme are needed to break lactose down into the glucose and galactose, which can then be absorbed into bloodstream and used for the energy.

IMPORTANCE OF B-GALACTOSIDASE:

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

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

So in the recent years, beta-galatosidase has been researched as a potential treatment for the lactose intolerance through the gene replacement therapy where it could be placed into the human DNA so in the individuals can break down lactose on their own .

And B-Glactosidase is required for lactose utilization, so the intensity of the color produced can be used as a measure of enzymatic rate.

GENE REGULATION:

Gene regulation is a process in which a cell determines with gene it will express and when every cell in the human body contains a completely copy of that person's DNA, with tens of thousands of the potentially viable genes.

All of these genes cannot be expressed at once, so the must decide which genes to tern on and which genes to turn off.

For example, the skin cell turn on the genes that make it a skin cell, while for a bone cell would leave these genes turned off.

RECOMBINTION:

The exchange of the corresponding DNA segments between adjacent chromosomes during the special type of the cell division that results in the production of new genetic make up , that is with out crossing over the 4 daughter cells below would have no genetic recombination.

We have two copies of each chromosome in our cell, one from our father cell and one from our mother. These chromosomes are known as homologous chromosomes.

During genetic recombination, homologous chromosomes physically exchange pieces of genetic information.

MUTATION:

Mutation plays an important role in evolution and the ultimate source of all the genetic variation is mutation. Thus mutation is important as the first step of evolution because it creates a new DNA sequence for a

particular gene, creating a new allele.DNA mutation are generally of the most interest to breeders. However, mutation that alter chromosome structure to increase the number of recombination events and break undesirable linkage are also extremely valuable.

QNO.3; WHAT IS ELECTROPORATION? BRIEFLY EXPLAIN THE TYPES OF RECOMBINATION?

ANS:

ELECTROPORATION:

Foreign DNA has been introduced into the plant cells by the novel technique called the Electroporation. This technique involves the use of the electric pulses to make plant plasma membrane permeable to plasmid DNA molecules and plasmid DNA taken up this way has been shown to be stably inherited and expressed.

This technique has also been used for the recombination of animal cells and carefully controlled electric field pulses are introduced to animal cells and this cause the pores to open in the cell membrane allowing genes to gain access to the cell's interior.

TYPES OF RECOMBINATION:

The types of recombination are as follows,

*1.**HOMOLOGOUS RECOMBINATION:***

DNA replication starts with one parental DNA template and then switches to a second parental molecule, resulting in the synthesis of recombinant daughter DNAs containing sequences homologous to both parents. Thus the result is a heteroduplex region, in which the two DNA stands are derived from different parental molecules. Parental DNAs are broken at staggered sites, and overlapping single-stranded region are exchanged via base pairing with homologous sequence.

2. NON-HOMOLOGOUS RECOMBINATION:

It is also known as illegitimate recombination. It is the process by which two unrelated double stranded segments of DNA are joined. And this insertion of genetic material which is not meant to be adjacent tends to lead to genes being broken causing the protein which they encode to not be properly expressed. However cells of the other fungi, higher plants, and animals are able to integrate foreign DNA into their chromosomes with little or no sequence similarity.

3. SITE-SPECIFIC RECOMBINATION:

Bacteriophages, plasmids, bacteria, and unicellular eukaryotes provide many examples of differentiation through controlled and site-specific recombination of DNA segments. All these processes depend upon interaction and recombination between specific DNA sequences, generally catalyzed by site-specific recombinase enzymes.

Invertebrates, a controlled series of deletions leads to the generation of the great diversity of gene sequences encoding gene for immune defense against pathogens. Site-specific recombination alters gene order, which would not happen during general recombination.

QNO.4

A)WHAT ARE IMPORTANCE OF TRANSFORMATION, TRANSDUCTION AND CONJUGATION?

B)DISCUSS THE PROCESS OF GENERALIZED AND SPECIALIZED TRANSDUCTION?

ANS:

IMPORTANCE OF TRANSFORMATION:

Transformation of cells is widely used and versatile tool in genetic engineering and is of critical importance in the development of molecular biology.

Imagine that a harmless bacterium takes up DNA for a toxin gene from disease-causing species of bacterium. When non-disease-causing species of bacterium joins the new DNA into its own chromosomes it too may become pathogenic.

IMPORTANCE OF TRANSDUCTION:

Transduction is especially important because it explains one mechanism by which antibiotic drugs become ineffective due to the transfer of antibiotic-resistance genes between bacteria. In addition, hopes to create medical methods of genetic modification of diseases such as Duchenne/Becker Muscular Dystrophy are based on these methodologies.

IMPORTANCE OF CONJUGATION:

In most of Gram negative bacteria, conjugation is the major way of bacterial genes transfer, which frequently result in multiple antibiotic resistance.

In some of Gram positive bacteria, conjugation is also an active way of bacterial gene transfer. Multiple antibiotic resistance genes in a Gram positive bacterium can be obtained by conjugation or by transduction.

GENERALIZED TRANSDUCTION:

It is the process by which any bacterial gene may be transferred to another bacterium via a bacteriophage, and typically carries only bacterial DNA and no viral DNA. It happens when phage in the lytic stage, at the moment the viral DNA is packaged to the phage heads.

The DNA will be absorbed by the cell and by recycled for spare parts; This type of recombination depends on the size of the virus being used.

SPECIALIZED TRANSDUCTION:

The gene that get transferred depends on where the phage genome is located on the chromosome. Specialized transduction occurs when the prophage excises roughly from the chromosome.

The excised DNA is then packaged into a new virus particle, which can then deliver the DNA to a new bactetriam, where the donor genes can be inserted into the recipient chromosome or remain in the cytoplasm, depending on the nature of the bacteriophage.