CBSE Test Paper 02

Ch-12 Biotechnology and its Applications

1. Gene encoding hirudin is synthesized to
   a. to decrease stress
   b. to increase sugar level in blood
   c. Prevent blood clotting
   d. to prevent high blood pressure
2. Plasmid used to produce humulin is
   a. BAC
   b. YAC
   c. Pbr322
   d. phage
3. Dolly sheep is made by implanting oocyte at what stage
   a. secondary oocyte
   b. primary oocyte
   c. Morula
   d. blastocyst
4. Gene for controlling production of insulin is b-galactosidase. It can be used for
   a. PCR
   b. Ladder
   c. Blue white screening
   d. Gel electrophoresis
5. Most industrialized nations are rich financially but poor in
   a. Population
   b. Biodiversity and traditional knowledge
   c. Traditional knowledge and land requirement
   d. Health and manpower
6. ADA deficiency leads to
   a. Enzyme isolation
   b. Immune disfunction
   c. Immune response
   d. DNA hybridization

7. Cry genes introduced in a plant will not be affective against
    a. coleoptera
    b. hymenoptera
    c. lepidoptera
    d. rodents
8. Name the vector used for transferring ADA-DNA into the recipient cells in humans. Name the recipients cells.
9. Which transgenic animal is used for testing the safety of polio vaccine?
10. what is golden rice?
11. Explain why children eating golden rice are unlikely to suffer from 'night blindness'?
12. What was the specialty of the milk produced by the transgenic cow Rosie?
13. Arvind's mother has developed Diabetes. Doctor suggests her to take Insulin injections. But his mother declines as she presumes injections are prepared by slaughtering of animals. How will you solve his mother's problem with your knowledge of biotechnology?
14. Inspector Dubey could find only few hair strands from crime scene. He wants to proceed for DNA fingerprinting but the amount of DNA is very less. In your opinion what could be the solution to this problem? Write the basic steps of this technique?
15. Diagrammatically represent the experimental steps in cloning and expressing a human gene into a bacterium like E. coli?

CBSE Test Paper 02

Ch-12 Biotechnology and its Applications

Answer

1. c. Prevent blood clotting, **Explanation:** Hirudin is an anticlotting agent that prevents blood clotting. It is obtained from secretion of leeches. The gene encoding hirudin is synthesized to prevent blood clotting during surgery.
2. c. Pbr322, **Explanation:** Plasmid are extra nuclear genetic materials present in bacterial humulin is produced by using plasmid Pbr322. It is an E.coli plasmid vector containing the origin of replication.
3. d. blastocyst, **Explanation:** Dolly (5 July 1996 – 14 February 2003) was a female domestic sheep, and the first mammal cloned from an adult somatic cell, using the process of nuclear transfer. Dolly had three mothers (one provided the egg, another the DNA and a third carried the cloned embryo to term). She was created using the technique of somatic cell nuclear transfer, where the cell nucleus from an adult cell is transferred into an unfertilized oocyte (developing egg cell) that has had its cell nucleus removed. The hybrid cell is then stimulated to divide by an electric shock, and when it develops into a blastocyst it is implanted in a surrogate mother. Dolly was the first clone produced from a cell taken from an adult mammal.
4. c. Blue white screening, **Explanation:** The blue-white screen is a screening technique that allows for the rapid and convenient detection of recombinant bacteria in vector-based molecular cloning experiments. DNA of interest is ligated into a vector. The method is based on the principle of α-complementation of the β-galactosidase gene. This phenomenon of α-complementation was first demonstrated in work done by Agnes Ullmann in the laboratory of François Jacob and Jacques Monod, where the function of an inactive mutant β-galactosidase with deleted sequence was shown to be rescued by a fragment of β-galactosidase in which that same sequence, the α-donor peptide, is still intact.
5. b. Biodiversity and traditional knowledge, **Explanation:** Most industrialized nations are rich financially but poor in biodiversity and traditional knowledge.

Biodiversity and traditional knowledge related to bio-resources are can be exploited to develop modern applications.

6. b. Immune disfunction, **Explanation:** Adenosine deaminase deficiency is an inherited condition that affects the immune system and typically leads to severe combined immunodeficiency (SCID). People with SCID have a reduced or absent immune response which leaves them vulnerable to frequent bacterial, viral, and fungal infections. Most people affected by ADA develop symptoms of the condition before 6 months of age.
7. d. rodents, **Explanation:** Cry gene produce toxin protein that chocks the gut of insects in presence of alkaline pH to cause death of insects. It is not effective against rodents.
8. - Retroviral vector (ADA cDNA)
   - Lymphocytes
9. Transgenic mice are being used to test the safety of the polio vaccine before they are used on humans.
10. Golden rice is a variety of rice (Oryza sativa) produced through genetic engineering to biosynthesize beta-carotene, a precursor of vitamin A, in the edible parts of rice.It is intended to produce a fortified food to be grown and consumed in areas with a shortage of dietary vitamin A. Golden rice differs from its parental strain by the addition of three beta-carotene biosynthesis genes. The rice plant can naturally produce beta-carotene in its leaves, where it is involved in photosynthesis.
11. mainly children, become blind every year, 50% of whom die within a year of becoming blind. Nearly nine million children die of malnutrion every year. Vitamin A deficiency (VAD) severely affects their immune system. Golden Rice has been engineered to contain the genes necessary to make up the biochemical pathway for pro-vitamin A production. Moreover, the genetic construct was designed to be expressed exclusively in the rice endosperm, ie in the edible part of the seed. The intensity of the golden colour is an indicator of the concentration of beta-carotene in the grain.
12. The first transgenic cow Rosie produced human protein enriched milk (2.4 grams per litre). The milk contained the human alpha-lactalbumin and was nutritionally a more balanced product for human babies than natural cow milk.
13. Insulin can also be synthesized in laboratory with r DNA

Values

• Empathy.

• Awareness

• Concern.

14. He can amplify DNA with the help of PCR technique Basic steps of PCR ----

I) Denaturation

II) Annealing

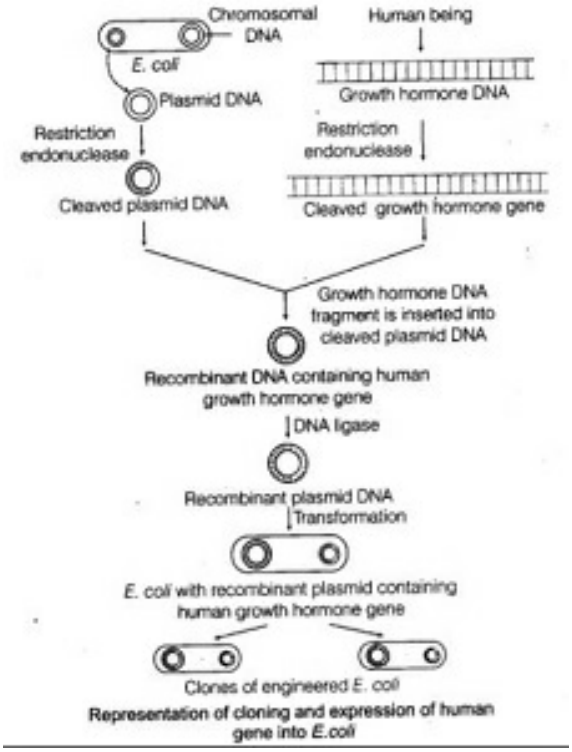
III) Extension

Values

• Critical thinking

• Awareness.

15. DNA cloning is a method of producing multiple identical copies of specific template DNA. It involves the use of a vector to carry the specific foreign DNA fragment into the host cell. The mechanism of cloning and transfer of the gene for growth hormone into E.coli is represented below.



Representation of cloning and expression of human gene into *E.coli*