

1. Crystals of Bt toxin produced by some bacteria do not kill the bacteria themselves because:
- bacteria are resistant to the toxin
  - toxin is immature
  - toxin is inactive
  - bacteria encloses toxin in a special sac.

**Ans.** Toxin is inactive.

2. What are transgenic bacteria? Illustrate using any one example.

**Ans.** Bacteria carrying foreign gene. *E. coli* having human growth hormone gene is transgenic.

3. Compare and contrast the advantages and disadvantages of production of genetically modified crops.

**Ans.**

<i>Advantages of GM crops</i>	<i>Disadvantages</i>
Replenishment of soil	Danger of generating superweeds
Tolerance to stress harmful genetic	Introduction of undesirable variety with combination
Great productivity	High danger of non-reproduction/inviability.
Less reliances on pesticide and in human body	Chemical produced may cause rejection insecticide

4. What are Cry proteins? Name an organism that produce it. How has man exploited this protein to his benefit?

**Ans.** Proteins responsible for killing lepidopteran insect and their larvae also called Bt toxin secreted by *Bacillus thuringensis*, man exploited gene encoding this toxin, by transferring it into cotton genome with the help of *Agrobacterium* **TDNA** as vector.

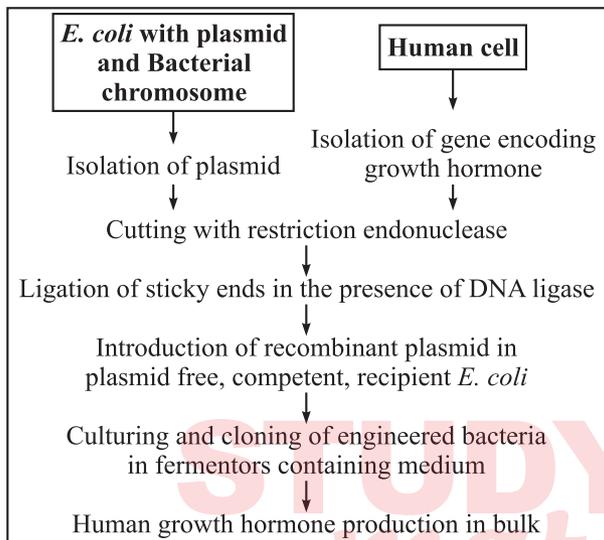
5. What is gene therapy? Illustrate using the example of adenosine deaminase (ADA) deficiency.

**Ans.**

- Gene therapy is correction of malfunctioning/absent gene by repairing or adding correct copy.
- ADA gene deficiency causes immune responses. This gene is transfected into early embryonic cells of bone marrow for permanent use.

6. Digrammatically represent the experimental steps in cloning and expressing an human gene (say the gene for growth hormone) into a bacterium like *E. coli*?

Ans.



7. Can you suggest a method to remove oil (hydrocarbon) from seeds based on your understanding of rDNA technology and chemistry of oil?

Ans. Hydrocarbons can be removed by using recombinant *Pseudomonas species* which can hydrolyse hydrocarbons.

8. Find out from internet what is golden rice.

Ans. Golden rice is transgenic rice having gene coding for vitamin A synthesis enzyme. Golden rice was developed by Swiss Federal Institute of Technology rich in vitamin A (Beta Carotene). The rice grains are golden yellow in colour.

9. Does our blood have proteases and nucleases?

Ans. No, blood does not have protease and nuclease. If it would have been there, blood and cell would have been digested. Some protease do exist in inactive form.

10. Consult internet and find out how to make orally active protein pharmaceutical. What is the major problem to be encountered?

Ans. Orally active protein product that is successfully manufactured is vaccines for preventions of infections diseases such as hepatitis B, herpes influenza, etc. Gene for antigen are isolated from bacteria and grown along with cut leaf portions of potato plant in antibiotic medium – followed by callus formation and recombinant/transgenic potato are obtained which contain those vaccines.