



product. The processes include separation and purification, which are collectively referred to as downstream processing. The product has to be formulated with suitable preservatives. Such formulation has to undergo thorough clinical trials as in case of drugs. Strict quality control testing for each product is also required. The downstream processing and quality control testing vary from product to product.

SUMMARY

Biotechnology deals with large scale production and marketing of products and processes using live organisms, cells or enzymes. Modern biotechnology using genetically modified organisms was made possible only when man learnt to alter the chemistry of DNA and construct recombinant DNA. This key process is called recombinant DNA technology or genetic engineering. This process involves the use of restriction endonucleases, DNA ligase, appropriate plasmid or viral vectors to isolate and ferry the foreign DNA into host organisms, expression of the foreign gene, purification of the gene product, i.e., the functional protein and finally making a suitable formulation for marketing. Large scale production involves use of bioreactors.



EXERCISES

1. Can you list 10 recombinant proteins which are used in medical practice? Find out where they are used as therapeutics (use the internet).
2. Make a chart (with diagrammatic representation) showing a restriction enzyme, the substrate DNA on which it acts, the site at which it cuts DNA and the product it produces.
3. From what you have learnt, can you tell whether enzymes are bigger or DNA is bigger in molecular size? How did you know?
4. What would be the molar concentration of human DNA in a human cell? Consult your teacher.
5. Do eukaryotic cells have restriction endonucleases? Justify your answer.
6. Besides better aeration and mixing properties, what other advantages do stirred tank bioreactors have over shake flasks?
7. Collect 5 examples of palindromic DNA sequences by consulting your teacher. Better try to create a palindromic sequence by following base-pair rules.
8. Can you recall meiosis and indicate at what stage a recombinant DNA is made?
9. Can you think and answer how a reporter enzyme can be used to monitor transformation of host cells by foreign DNA in addition to a selectable marker?