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biotechnology the use of biology to solve problems and make useful products the most prominent area of biotechnology is the production of therapeutic proteins and other drugs through genetic engineering learn more about the development and applications of biotechnology in this article biotechnology has numerous applications particularly in medicine and agriculture examples include the use of biotechnology in merging biological information with computer technology bioinformatics exploring the use of microscopic equipment that can enter the human body nanotechnology and possibly applying techniques of stem cell the applications of biotechnology are diverse and have led to the development of essential products like life saving drugs biofuels genetically modified crops and innovative materials 4 this chapter covers the basic principles of enzymology such as classification structure kinetics and inhibition and also provides an overview of industrial applications in addition techniques for the purification of enzymes are discussed in this chapter the readers will understand the potential applications of biotechnology in several fields like production of medicines diagnostics therapeutics like monoclonal antibodies stem cells and gene therapy agricultural biotechnology pollution control bioremediation industrial and marine biotechnology and biomaterials as well the science of biotechnology is broken down into subdisciplines that are color coded based on common uses and applications red biotechnology involves medical processes such as using organisms to produce new drugs and stem cells to regenerate damaged human tissues and grow and regrow entire organs the practical applications of biotechnology have merged to have helpful and safe production of sustained food more research is recommended in the said field for better and safe production and processing technologies and techniques biotechnological techniques have led to the production of synthetic insulin monoclonal antibodies for cancer treatment and vaccines for various diseases biotechnology also contributes to regenerative medicine including stem cell therapies and tissue engineering biotechnology is a broad discipline in which biological processes organisms cells or cellular components are exploited to develop new technologies new tools and products developed by enzymes are biological catalysts also known as biocatalysts that speed up biochemical reactions in living organisms and which can be extracted from cells and then used to catalyse a wide range applications in medicine in addition to gene therapy for genetic disorders biotechnology can be used to transform bacteria so they are able to make human proteins figure below shows how this is done to produce a cytokine which is a small protein that helps fight infections biotechnology is not a new discipline but it is advancing by leaps and bounds and it has more and more applications in our day to day lives from pharmaceutical development to food production and the treatment of polluting waste we explore this exciting field below and try to determine how far it might go in the future in the present chapter we aim to review our current knowledge regarding genetic modifications and tools for modifying e coli to generate plasmid vectors single and multiple gene knockouts whole genome editing biosensor generation and applications and synthetic gene circuits and genomes keywords molecular biology tools synthetic biology the applications of biotechnology encompass a wide range of breakthroughs these include the development of novel pharmaceuticals using recombinant dna technology targeted genetic modifications using gene editing techniques like crispr cas9 and so on we summarize and discuss the most recent knowledge and biotechnological implications of various rna metabolism processes in plant chloroplasts and mitochondria with a focus on the nucleus encoded factors supporting them to gain a deeper understanding of the function and evolution of these two organelles in plant cells some of the biotechnology applications in medicine include the following recombinant insulin insulin is required by diabetic patients to remove excess sugar from the blood diabetic patients have a very low level of insulin or no insulin produced by the body therefore they need external insulin to control blood glucose levels biotechnological applications cryptophytes are cells with unique

biochemistry for example it has a high and balanced content of pufa ala sda epa dha 21 22 phytosterols carbohydrates 21 and fluorescent pigments pbps the inhibitors of these enzymes are found great clinical applications against various diseases such as cancer diabetes and viral infections aminopeptidases are widely used for the synthesis of biopeptides and amino acids and found to be efficient than chemical synthesis we provide a comprehensive overview of recently reported knowledge on aromatic transporter systems in bacteria point gaps in our understanding of the underlying translocation mechanisms highlight existing limitations in harnessing transporter systems in synthetic biology applications and suggest future research directions abstract organic acids are traditional products of food and bio technology however at the same time organic acids are among the most promising future products of industrial microbiology owing to their possible use as building block chemicals

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