

**BIOTECHNOLOGY
DEFINITION AND SCOPE OF
BIOTECHNOLOGY**

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DEFINITION

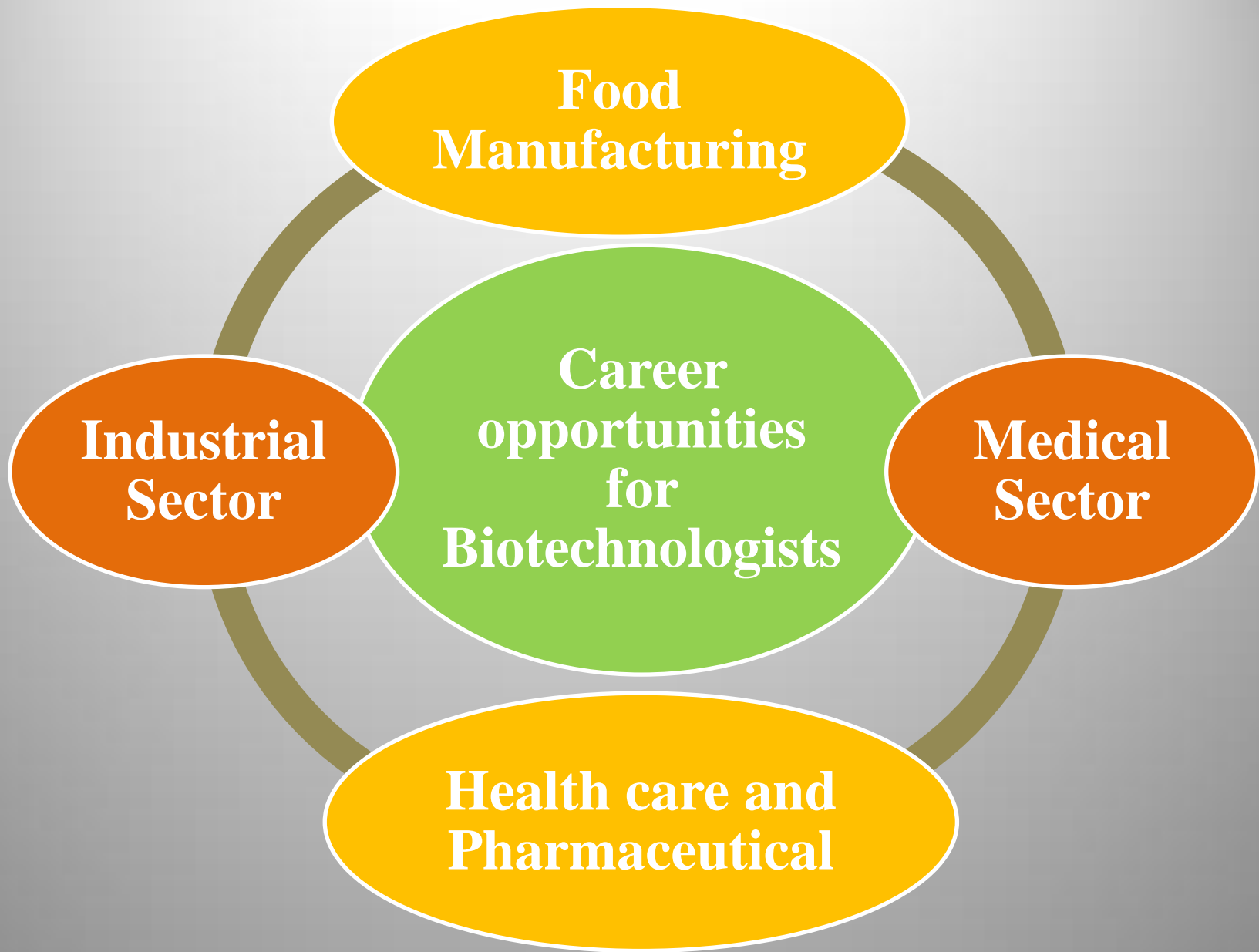
- In 1919, a Hungarian engineer called Karl Ereky coined the word BIOTECHNOLOGY.
- Biotechnology is simply the use of living organisms for production and service to humanity.
- Any technological application that uses biological systems, living entities or its derivatives to make or modify processes for specific use.
- Biotechnology is a combination science of biology and technology and used to make a products useful to mankind

- **GENENTECH:** Biotechnology is the process of harnessing 'nature's own' biochemical tools to make possible new products and processes and provide solutions to society's ills (G. Kirk Raab, Former President and CEO of Genentech)
- Biotechnology is the application of genetic engineering and DNA technology to produce therapeutic and medical diagnostic products and processes. Biotech companies have one thing in common - the use of genetic engineering and manipulation of organisms at a molecular level.

- The aspect of technology concerned with the application of living organisms to meet the needs and ends of man.
- Biotechnology is controlled use of biological agents for beneficial use. It is integrated use of biochemistry, molecular biology, microbiology to achieve technological application of the capabilities of biological agents. Therefore, biotechnology has emerged as a science with immense potential for human welfare ranging from food processing, human health to environment protection.

SCOPE OF BIOTECHNOLOGY

- Biotechnology is a multidisciplinary in nature, involving input from
- Engineering
- Health
- Agriculture
- Seed Technology
- Computer Science
- Cell and Molecular Biology
- Microbiology
- Genetics
- Physiology
- Biochemistry
- Immunology
- Virology
- Recombinant DNA Technology : Genetic manipulation of bacteria, viruses, fungi, plants and animals, often for the development of specific products



**Food
Manufacturing**

**Industrial
Sector**

**Career
opportunities
for
Biotechnologists**

**Medical
Sector**

**Health care and
Pharmaceutical**

Genomics

**Specialise in
one or more
subfields**

Proteomics

Bioinformatics

**Medical
scientists**

**Biochemist &
Biophysicists**

**Biological
technicians**

Biomanufacturing Specialists

Microbiologists

**Job
Profiles**

Epidemiologist

Bioproduction Operators

**Biomedical
Engineers**

**Medical &
Clinical lab
Technologist
& Technicians**

**R&D Process
Development
Scientists**

- Biotechnology has its application in various fields such as in
- Medicine
- Industry
- Agriculture
- Environment

DNA fingerprinting is utilized for identification of parents and criminals

Development of recombinant vaccines like human hepatitis B etc by genetically engineered microbes

Valuable drugs like insulin and interferon have been synthesized by bacteria for treatment of human diseases

DNA, RNA probes for diagnosis of various diseases

Production of monoclonal antibody

Biotechnology in medicine

For large scale production of alcohol and antibiotics by microorganisms

Even today, a variety of pharmaceutical drugs and chemicals like lactic acid, glycerine etc.

Genetic engineering for better quality and quantity

provided us with a very efficient and economic technique for production of variety of biochemical i.e. immobilized enzymes

Biotechnology in Industry

Protein engineering where existing proteins and enzymes are remodelled for a specific function or for increasing efficiency of their function

Manufacture of beer and wine

Manufacture of washing detergents and personal care products

Production of yoghurt, bread and vinegar using microorganisms

Plant cell, tissue and organ culture is used for rapid and economic clonal multiplication of fruit and forest trees

for production of virus free genetic stocks and planting material as well as in the creation of novel genetic variations through soma-clonal variation

Genetic engineering techniques are utilized to produce transgenic plants with desirable genes like disease resistance, herbicide resistance, increased shelf life of fruits etc

Molecular breeding has hastened the process of crop improvement for e.g. molecular markers like RFLP, SSRs provide powerful tools for indirect selection of both qualitative and quantitative traits

For studying genotypic diversity

**Biotechnology
in Agriculture**

Biotechnology in the environment

- Environmental problems like pollution control, depletion of natural resources for non renewable energy, conservation of biodiversity etc. are being dealt with using biotechnology. For e.g. bacteria are being utilized for detoxification of industrial effluents, in combating oil spills for treatment of sewage and for biogas production. Bio-pesticides give environmentally safer alternative to chemical pesticides for control of insect pests and diseases.

Thank you for listening..

Any questions?

