



## “Medical Biotechnology: New Advancement and Ethics”

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### ABSTRACT-

Biotechnology is the discipline of technology that uses the data and methods of engineering and technology to study and solve problems related to organisms and living systems. It is considered related in chemical engineering, chemistry or biology. Biotechnology is the integration of natural science and engineering science to achieve the application of organisms, cells, their parts and molecular homologues to products and services. The most prominent area of biotechnology is the production of therapeutic proteins and other drugs through genetic engineering. Bio means living system and technology means technology. According to this, biotechnology means using technology on living beings. Biotechnology is the use of living systems and organisms to develop or create specific products or substances. Biotechnology is called 'Jaivprodhyogiki' in Hindi. Biotechnology is often associated with the fields of bioengineering, biomedical engineering, molecular engineering, etc. For thousands of years, mankind has used biotechnology in agriculture, food production, and medicine.

**KEYWORDS:** -Nature Biotechnology, Medical Biotechnology, Advancement

Received 06 Mar., 2023; Revised 17 Mar., 2023; Accepted 19 Mar., 2023 © The author(s) 2023.  
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### I. INTRODUCTION-

Medical biotechnology is the use of living cells and other cell material to improve human health. It is mainly used to find cures as well as to get rid of and prevent diseases. Biotechnology is generally a process in which biological material is converted into useful products using technology. The word biotechnology is made up of biology and technology - Biotechnology = Biology Technology, it means using biology and technology together. So, biotechnology is one such branch in which technology and biological elements are used together to prepare such products which are helpful in the welfare of mankind. The term biotechnology was first given by Karl Ereky in 1919. Karl Ereky was a Hungarian agricultural engineer. Karl Ereky is also called the father of biotechnology. Biotechnology plays an important role in preserving biodiversity, it protects their genetic material. Human Genome Project is a huge success of Biotechnology. Identification, mapping, sequencing etc. of the entire human genome (DNA, genes) are included under this project.

Medical biotechnology is also called red biotechnology. This is the branch of biotechnology which is used in the medical field. Using this, efforts are made to improve human health and human life. Example- Vaccine making, antibiotics, drugs therapy etc. come under Red Biotechnology. We humans use this technique a lot in life. As we all know that for humans to maintain health, we have to use living cells and other cell materials. It is mainly used to get rid of sick people from diseases or to prevent diseases along with getting treatment of humans.

**There are four types of Biotechnology. Which is described in detail below.**

- Red Biotechnology → Red Biotechnology is used in research in the field of medicine and in researching new drugs. These regenerate damaged human tissue through stem cells.
- Green Biotechnology → Use of Green Biotechnology “For Research and Development of Insect-Resistant Solutions” This technology is used in the field of agriculture. As part of this, research activities are also carried out for disease resistant animals.
- Blue Biotechnology → Blue Biotechnology is used in the field of marine and aquatic environment. It is used because this technology is used for research or development to control living beings and new water.
- White Biotechnology → This technology is used in the field of industry for the development of new fuel for vehicles and for the research or development of new chemicals.

**Scope And Importance of Biotechnology**

- **Medical Biotechnology:** - We use this technology a lot in human life. As we all know that for humans to maintain health, we have to use living cells and other cell materials.

It is mainly used to get rid of sick people from diseases or to prevent diseases along with getting treatment of humans.

- **Industrial Biotechnology:** - It is used in the industrial sector to apply biotechnology for its purposes, it also includes industrial purposes. By applying techniques of biology to it,
  - ✓ it improves your efficiency
  - ✓ paper and pulp
  - ✓ including chemical manufacturing and textile
- **Agricultural Biotechnology:** - Use of this technology to increase crop yield That is, to develop genetically modified plants in agricultural biotechnology. focused to show/tell the characteristics of these plants.

**Medical and Ethical Issues of Biotechnology**

While there are great advancements and positives to medical biotechnology, anything this fast-growing and powerful is bound to come with some concerns and issues. Medical biotechnology is a controversial medical topic, with medical ethical issues associated.

**Risk to Human Life in Clinical Trials**

A huge risk of medical biotechnology is its impact during clinical trials. Because it’s such new tech, people can and have gotten hurt—and even died—during trials of the technology. Because of these risks, extensive research should be performed before even thinking of introducing tech to human subjects, and those who are participating in a trial should be extremely aware of any and all possibilities. Unfortunately, the paradox is that many times people who are sick are willing to try new things for the chance to get cured. This means researchers and doctors have a huge ethical responsibility to truly outline for a patient what the costs may be and respect their ultimate decision.

**High Cost May Exclude the Poor**

While medical biotechnology has huge potential to make medicine more efficient and easier, what’s the cost? This technology is often hugely expensive compared to traditional treatments. There is an ongoing give and take about finding new medical advancements and the cost it takes to do research and then market the findings for purchase. There is also the concern that high costs of tech treatments can exclude an entire class of people from being able to utilize them. This is also a huge give and take, with science and medicine having a responsibility to help all patients—not just those who are wealthy enough to buy the best care.

**Privacy Concerns**

Privacy is an ongoing issue in our technology world, but reading someone’s DNA seems to be a giant privacy breach. Imagine a doctor looks at a young child’s DNA and finds out they are likely to develop a heart disease or terminal issue. Does their employer have the right to know that? Should this information impact their ability to get a house or insurance? HIPAA offers some protection, but as medical biotechnology continues to advance the ability to read genes, insurance companies, doctors, and governments will have to come up with new programs and privacy tactics to match all the new needs that will arise.

**Some Groups Oppose Stem Cell Research**

Medical biotechnology is kind of a hot-button political issue, with presidential candidates even being asked about their position. The idea of working with foetal tissue, or other tissue, to learn about regrowth conjures images of Frankenstein’s monster. Scientists and researchers have been cautioned multiple times to be ethical and moral when doing this research. For example, using human tissue for research can be seen as ethical, while

using an embryo’s tissue can be seen as unethical because it can damage the embryo. It is still early in the stem-cell research process, but as technology and research continue to advance in that area, scientists will have to consider moral and ethical lines even more.

### **Bioterrorism is a National Concern**

Medical biotechnology has been used for security measures to help prevent a large number of people from possible bioterrorism. But the development of these projects takes away funding and time from curing known diseases. It becomes a real question of how to divide resources among projects and knowing where the resources are most needed. It’s difficult because we don’t know if people will die from bioterrorism but with so many people being concerned, it seems like a worthwhile place to spend time and money.

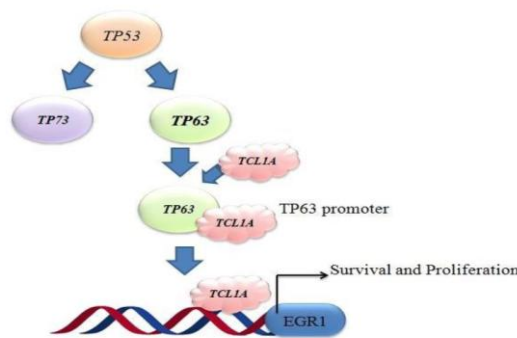
### **Role of Nurses in the Biotechnology Industry**

Nurses have an ongoing role in medical biotechnology because of their direct experience with patient care. Nurses are able to use their knowledge and experience in hospitals and clinics to understand and demonstrate how medicines and drugs would impact large populations. Beyond knowing the science, they have the human element that researchers sometimes lack. They are able to understand how a patient would respond to a potential treatment and can help researchers consider new approaches to technology and adoption practices.

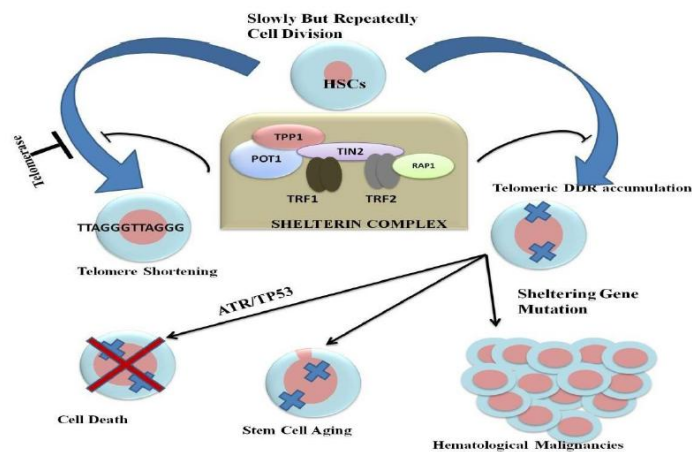
Nurses who have leadership and management experience can also help support researchers by keeping them on track with goals and checkpoints, ensuring that projects are moving along smoothly and key information is being conveyed to management. In instances where patients are part of the research, nurses can gain deeper insights from patients about their experiences in trials and how they’ve been affected. By being fluent in medical terminology and having the ability to effectively connect with patients, nurses can help bridge the gap between the two worlds and share valuable information between patients and researchers.

### **Biotechnology and molecular analysis**

Recurrent unregulated proliferation of cells results in the fundamental abnormality known as cancer. Rather than responding appropriately to the signals that control normal cell behaviour, cancer cells grow and divide in an uncontrolled manner, invading normal tissues and organs and eventually spreading throughout the body.



Showing Role of *tp63* with leukemia (Zhang et al., 2014)



Showing role of *TERT* with hematological malignancies.

Biotechnology is a science that exploits organisms, cells and cellular components to develop new technologies through various biological processes. Biotechnology gained popularity in the 1970s. Biotechnology is proving to be very useful in the fields of agriculture, medicine, industry and environmental studies. Biotechnology is being used in almost every field. We definitely get to see biotechnology somewhere in the purification of our environment and the necessary medicines to fight new diseases and in many new discoveries. It is believed that in the coming times, biotechnology can save us from the terrible epidemic, now how true this thing is and how wrong we will know in the coming time.

### References

- [1]. Biotechnology Archived November 7, 2012, at the Wayback Machine. Portal.acs.org. Retrieved on March 20, 2013.
- [2]. "BIOTECHNOLOGY-PRINCIPLES & PROCESSES" (PDF). Archived from the original (PDF) on August 7, 2015. Retrieved December 29, 2014.
- [3]. What is biotechnology?. Europabio. Retrieved on March 20, 2013.
- [4]. Key Biotechnology Indicators (December 2011). oecd.org
- [5]. Biotechnology policies – Organization for Economic Co-operation and Development. Oecd.org. Retrieved on March 20, 2013.
- [6]. Goli, Divakar; Bhatia, Saurabh (2018). History, scope and development of biotechnology. iopscience.iop.org. doi:10.1088/978-0-7503-1299-8ch1. ISBN 978-0-7503-1299-8. Retrieved October 30, 2018.
- [7]. What Is Bioengineering? Archived January 23, 2013, at the Wayback Machine. Bionewsonline.com. Retrieved on March 20, 2013.
- [8]. See Arnold JP (2005). Origin and History of Beer and Brewing: From Prehistoric Times to the Beginning of Brewing Science and Technology. Cleveland, Ohio: BeerBooks. p. 34. ISBN 978-0-9662084-1-2. OCLC 71834130..
- [9]. Cole-Turner R (2003). "Biotechnology". Encyclopedia of Science and Religion. Retrieved December 7, 2014.
- [10]. Thieman WJ, Palladino MA (2008). Introduction to Biotechnology. Pearson/Benjamin Cummings. ISBN 978-0-321-49145-9.
- [11]. Springham D, Springham G, Moses V, Cape RE (1999). Biotechnology: The Science and the Business. CRC Press. p. 1. ISBN 978-90-5702-407-8.
- [12]. "Diamond v. Chakrabarty, 447 U.S. 303 (1980). No. 79-139." United States Supreme Court. June 16, 1980. Retrieved on May 4, 2007.
- [13]. "1960: Metal Oxide Semiconductor (MOS) Transistor Demonstrated". The Silicon Engine: A Timeline of Semiconductors in Computers. Computer History Museum. Retrieved August 31, 2019.
- [14]. Park, Jeho; Nguyen, Hoang Hiep; Woubit, Abdela; Kim, Moonil (2014). "Applications of Field-Effect Transistor (FET)–Type Biosensors". Applied Science and Convergence Technology. 23 (2): 61–71. doi:10.5757/ASCT.2014.23.2.61. ISSN 2288-6559. S2CID 55557610.
- [15]. Clark, Leland C.; Lyons, Champ (1962). "Electrode Systems for Continuous Monitoring in Cardiovascular Surgery". Annals of the New York Academy of Sciences. 102 (1): 29–45. Bibcode:1962NYASA.102...29C. doi:10.1111/j.1749-6632.1962.tb13623.x. ISSN 1749-6632. PMID 14021529. S2CID 33342483.
- [16]. Bergveld, Piet (October 1985). "The impact of MOSFET-based sensors" (PDF). Sensors and Actuators. 8 (2): 109–127. Bibcode:1985SeAc....8..109B. doi:10.1016/0250-6874(85)87009-8. ISSN 0250-6874. Archived (PDF) from the original on October 9, 2022.
- [17]. Chris Toumazou; Pantelis Georgiou (December 2011). "40 years of ISFET technology:From neuronal sensing to DNA sequencing". Electronics Letters. Retrieved May 13, 2016.
- [18]. Bergveld, P. (January 1970). "Development of an Ion-Sensitive Solid-State Device for Neurophysiological Measurements". IEEE Transactions on Biomedical Engineering. BME-17 (1): 70–71. doi:10.1109/TBME.1970.4502688. PMID 5441220.