

AI Is A Major Tool In Medical Biotechnology

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Abstract:

Artificial Intelligence is an area of Computer Science where we deal with ability of any Computer System to imagine, learn and respond accordingly as human brain does. It is practically the ability to perform tasks as per human being by the machine without human interventions. It has an huge impact on various segments of human civilization today, especially in the field of **Medical Biotechnology**. AI applications in Med BT are a huge one. It includes various testing processes, targeted medical evidences, imaging, gathering clinical information etc. Throughout this article there is an endeavor to explain elaborately how AI can put a deep impact on various areas of Medical Biotechnology.

Keywords: Artificial intelligence, Medical biotechnology, Clinical information.

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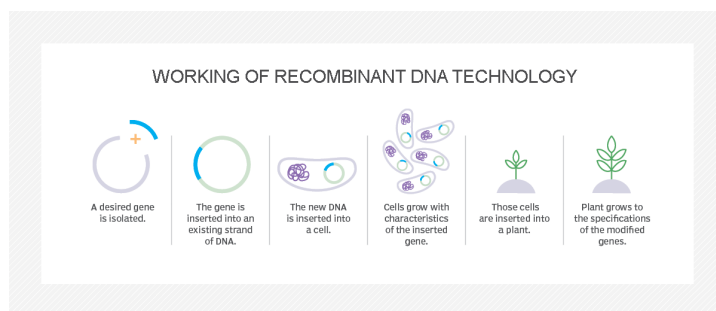
I. Introduction:

To develop new products, methods, applications and organisms by the use of Biology to improve human health and society is known as Biotechnology. It is often referred to as biotech which has existed since the beginning of human civilization with the domestication of living beings and the discovery of fermentation. The discipline has evolved significantly over the last century by manipulating the genetic structures and biomolecular processes of living organisms. The modern areas of biotechnology draws from various disciplines of science and technology, including the following:

- Chemistry
- Molecular biology
- Genetic Engineering
- Bionics
- Nanotechnology
- Genomics
- Informatics
- Proteomics

The major outcomes are the innovations and breakthroughs in the following areas:

- **Drugs and therapeutics** that prevent and treat disease.
- **Diagnostics or Medical Tests** such as pregnancy tests.
- **biofuels** (sustainable), reducing waste and pollution.
- **genetically modified organisms (GMOs)** recent major application area is Agriculture (Efficient & Cost-effective Agriculture).



Artificial Intelligence is the theory and development of computer systems capable of performing tasks that resemblances human intelligence such as identifying patterns & recognizing speech, making decisions. Current types are mainly of four in numbers –

Reactive b) Limited Memory c) Theory of Mind d) Self-aware.

Artificial Intelligence can have a transformative impact on biotechnology. There are many areas where biotech companies can get benefitted with AI to enrich their processes, drive innovation and explore new ideas and models can be easily implemented. The pace for innovation is accelerating in the biotechnology industry and Biotechnology companies also are now realizing the value of Artificial Intelligence which can bring to their entire business, in the form of –

- Accelerated Research & Development
- Effective decision-making
- Analysis of very large databases
- Cost-effectiveness

Trendsetting Discoveries in Biotechnology:

Over the last 100 hundred years or so, biotechnologies emerged with the following discoveries and advancements and complete a path to start with a new Era of Innovations:

1919. Hungarian scientist Karl Ereky coins the term *biotechnology*.

1928. Alexander Fleming discovers penicillin, the first true antibiotic.

1943. Oswald Avery proves DNA carries genetic information.

1953. James Watson and Francis Crick discover the double helix structure of DNA.

1960s. Insulin is synthesized to fight diabetes, and vaccines for measles, mumps and rubella are developed.

1969. The first synthesis of an enzyme in vitro, or outside the body, is conducted.

1973. Herbert Boyer and Stanley Cohen develop genetic engineering with the first insertion of DNA from one bacterium into another.

1980s. The first biotech drugs to treat cancer are developed.

1890. The United States Supreme Court rules that a "live human-made microorganism is patentable subject matter," meaning GMOs can be intellectual property.

1982. A biotech-developed form of insulin becomes the first genetically engineered product approved by the U.S. Food and Drug Administration (FDA).

1983. The first genetically modified plant is introduced.

1993. GMOs are introduced into agriculture with the FDA approval of growth hormones that produce more milk in cows.

1997. The first mammal is cloned.

1998. The first draft of the Human Genome Project is created, giving scientists access to over 30,000 human genes and facilitating research on treatment of diseases such as cancer and Alzheimer's.

2010. The first synthetic cell is created.

2013. The first bionic eye is created.

2020. MRNA vaccine and monoclonal antibody technology is used to treat the SARS-CoV-2 virus.

Segments of Biotechnology

The biotechnology is broken down into some sub disciplines those may be color-coded based on common uses and applications.

- **Red biotechnology** deals with medical processes, E.g. Using organisms to produce new drugs and stem cells to regenerate damaged human tissues and grow and regrow entire organs.
- **White or gray** refers to industrial processes, E.g. the formation of new chemicals or new biofuels for vehicles.
- **Green** covers different agricultural processes, E.g. Producing pest-resistant crops, disease-resistant animals and Eco-friendly agricultural practices.
- **Gold**, also known as bioinformatics, is a cross between biological processes and informatics. It refers to the methods of biological data which healthcare workers use to gather, store and analyze to treat patients.
- **Blue** works for processes in marine and aquatic environments, such as converting aquatic biomass into fuels and pharmaceutical products.
- **Yellow** refers to processes that used in food production, the most popular application being the fermentation of alcohol and cheese.
- **Violet** is the practice of biotechnology is in conformity with laws and ethical standards governing each field.

- **Dark** is the sector of biotechnology for weapons or warfare.

Role of AI in Medical Biotechnology:

Medical biotechnology utilizes living cells for the advancement of human wellbeing by delivering medications and anti-toxins. It additionally includes the investigation of DNA and hereditarily controls the cells to build the creation of significant and gainful qualities. AI helps in finding little particles that could give remedial advantages. AI is generally utilized in diagnosis it is to reach the genuine outcome to improve the analytic tests i.e., the more indicative tests that are run, the more exact outcomes can be reached. Artificial Intelligence is likewise helping in reducing the radiation treatment arranging process bringing about sparing time and improving patient consideration, another region where Artificial Intelligence and Machine Learning are being very much promising to incorporate and improve the EHRs with proof based drugs and clinical choice except the previously mentioned applications, these innovations are broadly utilized in quality altering, radiology, customized medication, medicine the executives, and so forth.

Medical biotechnology, also known as BIOPHARMA which aims to fight and prevent disease and improve healthcare. Biotechnology and biomedical research are the basis of the modern pharmaceutical industry. Uses include the following:

- STEM CELL RESEARCH (replace or repair dead or defective cells).
- DEVELOPMENT OF ANTIBIOTICS;
- GENE THERAPIES (For the treatment of congenital diseases);
- SPECIFIC RESEARCH IN DEADLY PATHOGENS & THEIR ANTIBODIES.
- 3D printing USED IN GROWING OF ORGANS & BONES IN LAB.
- mRNA VACCINES (monoclonal antibody treatments and research).

Various uses of AI in Medical Biotechnology:

New medicine & their required clinical trials:

Medication revelation has been the most energizing utilization of Artificial Intelligence (AI) and Machine Learning (ML). Associations are embracing a structure-based methodology for searching relief, using Machine learning (ML) to find little particles that could give remedial advantages for a particular disease. Larger part of AI use-cases and rising innovations for clinical preliminary appear to spin around three basic applications: tolerant enlistment, clinical preliminary plan and its advancement.

Test reports for proper diagnosis:

Artificial Intelligence is used in the conclusion of malignant growths. Artificial Intelligence to make malignant growth distinguishing proof more exact. The other ML applications incorporate pathology and in uncommon sickness conclusion. An ongoing report has indicated ML being more exact than cardiologists in distinguishing heart illnesses.

Controlled use of Radiotherapy and Radiology:

Artificial Intelligence has proven to be useful in decreasing the radiation treatment arranging procedure to only a few minutes, subsequently sparing radiologists a few days and improving patient consideration.

New era of medicine (customized medicine):

Till this very day, the medicines we usually consume in order to cure diseases are more or less common for the mass. The idea of customized medicine essentially deals with the concept that, just like every human being is genetically somewhat different, the medicines must also be specific for every individual. There is a lot of exploration proceeding with respect to the use of AI and insightful assessment in retrying treatment to a person's exceptional prosperity history. If productive, this can bring about smoothed out discoveries and treatment shows. Starting at now, the accentuation is on coordinated acknowledging where experts can use innate information and reactions to constrain investigative other options or make an educated guess about a patient's peril. Such an approach can help to prevent side-effects or anaphylactic reactions with respect to the unique condition that a patient might specifically be having.

Role in quality control:

Quality control is one of the most important aspects of downstream processing and it plays a vital role in the production as well as the supply of unadulterated and proper medicines. Their quality altering stage runs the whole procedure from RNA determination to information investigation and in this whole process AI is taking a major role.

Generation of Electronic Health record:

An EHR framework is more impressive and will help specialists in settling on educated clinical choices explicit to a patient's inclinations and clinical history. The tremendous measure of information can be productively put away and arranged for better patient consideration. Along with this, the maintenance of EHR libraries may even be useful in minimizing the risk during emergencies and in such cases, a person's entire medical history could be easily fetched from such EHR libraries with respect to a unique identification system.

Medication management & Resource Management:

Different applications are being created to screen the medicine program of patients. The cell phone webcam is associated with AI to oversee solutions of patients. These can be helpful for patients with incessant sickness and clinical preliminary members. AI will explore the entire information passage and give a remote helper to organize medicate stores—all through an agent's PDA. Along with the incorporation of EHR assets with this system, with respect to a person's medical history, the recommended medicines and their present inventory with respect to stores near the person may be notified. Artificial intelligence can likewise help organizations and delegates in client division that could help in viably focusing on expected doctors.

II. Conclusion:

Based on the above analysis, it is concluded that Artificial Intelligence has been quite successful in creating a direct impact in the sphere of biotechnology. With respect to clinical preliminaries, there have been numerous applications to extract and gather various information from different sources to clinical preliminary agents, who might then have the option to rapidly and efficiently decipher the information comprehensively. Artificial intelligence can coordinate that data, break it into easily processable bits and produce defined patient gatherings. That capacity to deal with mind blowing, multivariate information is changing the structure and execution of clinical preliminaries. Through this paper we've seen the various opportunities and applications that computing has bestowed specifically within the field of biotechnology. It's safe to say that computing is evolving at an exponential rate, and also the applications for an equivalent square measure endless. The introduction of Artificial Neural Networks that enables AI to mimic the human nervous system to an extent, increasing the boundaries of computing, and reducing the gap with respect to the applications of Artificial Intelligence. Based on the aforementioned analysis, it's over that computing has been created an on-the-spot impact on the biotechnology.

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