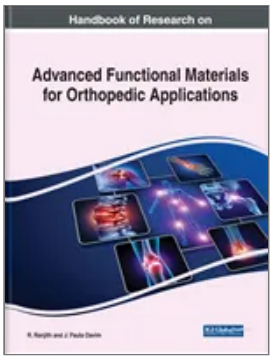

The Role of Bioengineering in Healthcare

S. Dhivya, Franklin Ore Areche, B. R. Senthil Kumar, M. Hariprabhu, Swati Mutha (/affiliate/swati-mutha/451222/)

Source Title: Handbook of Research on Advanced Functional Materials for Orthopedic Applications (/book/handbook-research-advanced-functional-materials/307910)

Pages: 20
DOI: 10.4018/978-1-6684-7412-9.ch016

Abstract

Bioengineering, also known as biological engineering, is a discipline that explores the application of mathematics, chemistry, physics, and computer science to analyze and design new processes or tools to bridge gaps in the life sciences. It is a field that encompasses a wide range of sub-disciplines, including food and biological process engineering, agricultural engineering, technical resource engineering, and biomedical engineering. Bioengineering uses so-called biotechnology, which the United Nations defines in the Convention on Biological Diversity as technology that uses the biological systems of living organisms or their derived biological systems to produce or modify products or processes for specific uses. This chapter deals with the area of bioengineering that currently benefits or will benefit in the future from the possibilities of artificial intelligence.

Chapter Preview

Top

2. The Role Of Bioengineering In Healthcare

Bioengineering, also known as biological engineering is a discipline that explores the application of mathematics, chemistry, physics, and computer science to analyze and design new processes or tools to bridge gaps in the life sciences. It is a field that encompasses a wide range of sub-disciplines, including food and biological process engineering, agricultural engineering, technical resource engineering and biomedical engineering.

Bioengineering uses so-called biotechnology, which the United Nations Organization defines in the Convention on Biological Diversity as technology that uses the biological systems of living organisms or their derived biological systems to produce or modify products or processes for specific use (White et al., 2020).

2.1. History of Bioengineering

Today, biotechnology refers to molecular and cellular technologies that began to appear in the 1960s and 1970s, mainly in connection with the company Genentech, but humans have been using biological processes to improve the quality of their lives for about 10,000 years, starting the emergence of agriculture. About 6,000 years ago, humans began to use the biological processes of microorganisms to make bread, alcoholic beverages and cheese, and to preserve dairy products. In medicine, thanks to biotechnology, the invention of vaccination in the 18th century, the 20th century brought a discovery in the form of antibiotics.

Bioengineering was initially dominated by the biotechnology industry, recombinant DNA technology or genetic engineering that brought insulin, for example.

When the US Supreme Court ruled in 1980 that a living man-made microorganism was patentable subject matter, dozens of genetically engineered protein drugs were commercialized worldwide, including recombinant versions of growth hormone, proteins to stimulate the production of red and white blood cells, interferons, and substances dissolving the precipitate.

In its beginnings, the main goal of bioengineering was primarily to produce larger quantities of already existing substances. Today, the trend in bioengineering is primarily to understand and reveal the molecular causes of diseases and to intervene at the level of the possible occurrence of the disease - that is, to prevent the disease. At the end of the 20th century, monoclonal antibodies were discovered that stop the spread of the disease. Such advances have been made possible by the study of genes (genomics) and the proteins they encode (Khoury & Holt, 2021).