American Journal Of Social Sciences And Humanity Research
(ISSN – 2771-2141)
VOLUME 04 ISSUE 06 PAGES: 85-92
OCLC – 1121105677
Crossref doi Google Scholar WorldCat MENDELEY

Publisher: Oscar Publishing Services

Journal Website: https://theusajournals.com/index.php/ajsshr

Research Article

THE SCIENCE OF BIOTECHNOLOGY AND ITS CONTENT

Submission Date: June 13, 2024, Accepted Date: June 18, 2024,
Published Date: June 23, 2024
Crossref doi: https://doi.org/10.37547/ajsshr/Volume04Issue06-15

B. Nazarov
Researcher of Tashkent state Pedagogical University named after Nizami, Uzbekistan

ABSTRACT

Another branch of biotechnology that attracts the attention of many scientists in recent times is genetic engineering, which developed very quickly and revealed the wonderful secrets of nature in a short period of time. The information obtained so far has been fully confirmed that DNA is the substance that stores genes in chromosomes and carries heredity.

KEYWORDS

Biotechnology, microorganisms, DNA molecule, cell, DNA synthesis, proteins and nucleic acid molecules, protein synthesis, metabolism and problems of reproductive control.

INTRODUCTION

First of all, the understanding of the genetic role of DNA is constantly developing, based on the observation that when one type of microorganisms is treated with DNA obtained from another type, its properties are transferred to the first type of microorganisms. Experimental tests have confirmed that the genes that determine the transfer of hereditary traits from one generation to another consist of separate segments (limited parts) of the DNA molecule. These segments carry out the information in the DNA molecule by creating a specific protein in the cytoplasm of the cell through special DNA synthesis.

The specific characteristics of the cell and organism are determined by the appearance of a specific protein at

American Journal Of Social Sciences And Humanity Research
(ISSN – 2771-2141)
VOLUME 04 ISSUE 06 PAGES: 85-92
OCLC – 1121105677
Crossref doi Google Scholar WorldCat MENDELEY
Publisher: Oscar Publishing Services

a certain time, in the appropriate place, and in the required amount. Now the mechanism of specific synthesis of protein molecule and ways of controlling this process by DNA molecules located in chromosomes have been discovered, and the mechanism of transmission of genetic traits from one generation to another and its appearance has been determined.

Determining the connection between the structure of proteins and nucleic acid molecules and their biological function is one of the first but most important achievements of genetic engineering, the youngest field based primarily on the information of biotechnology.

Thus, modern biotechnology and genetic engineering are on the verge of unraveling the deepest secrets of life processes, solving the problems of protein synthesis, metabolism and reproduction. Solving these important tasks is the theoretical basis for solving such problems as increasing the yield of agricultural plants and animal productivity, overcoming cancer, viral diseases, genetic diseases and cardiovascular diseases, which are a serious disaster for humans, and extending human life. creates.

Deoxyribonucleic acid is present in all living organisms and some viruses. It stores genetic information and transmits it from generation to generation. Chromosome consists of DNA and proteins. The composition of proteins is very complex and consists of 20 different amino acids, that is, monomers. They consist of different combinations of nucleic acids. The structure of nucleic acids has been fully studied in the simplest living organisms - prokaryotes.

At the end of the twenties, scientists began to pay attention to the presence of deoxybonucleic acid in large quantities in the chromosomes of the cell nucleus.

First of all, using the histochemical Felgen reaction (red coloration of fuchsin with sulfite acid), the location of DNA in chromosomes and RNA in the cytoplasm was determined. In the same years, the facts confirming that the transmission of genetic traits from generation to generation depends on the genes located on chromosomes led to the gradual acceptance of the chromosomal theory of heredity.

The study of the chemical composition of the DNA molecule has reached a new important stage. Examination of the four different nucleotides that make up DNA in DNA molecules isolated from different organisms shows that the nitrogenous bases are adenine (A,A), guanine (G,G), cytosine (S,S) and thymine (T,T) in a certain ratio. confirms that they will. Determining these relationships makes it possible to phylogenetically characterize species based on DNA content.

American Journal Of Social Sciences And Humanity Research
(ISSN – 2771-2141)
VOLUME 04 ISSUE 06 PAGES: 85-92
OCLC – 1121105677
Crossref doi Google Scholar WorldCat MENDELEY
Publisher: Oscar Publishing Services

The ratio of nucleotides in the DNA molecule was discovered in 1905 by the American biochemist Erwin Chargaff. In 1938, William Astbury and his colleague Florian Bellam took an X-ray view of DNA and found that the nitrogen-based double strands are opposite each other. Despite these discoveries, until 1950, little information was collected about the composition of DNA, and its structure remained completely unknown. The collected data made it possible to express the concept that the genetic gene formation in the polymer chain of DNA is written in the sequence of four monomer links. By this time, the first X-rays of the DNA molecule were taken by British scientists M. Wilkins and R. Franklin. Intensive research ended with the creation of the DNA double helix model by J. Watson and Francis Crick in 1953.

The idea of a self-replicating DNA molecule naturally arose from the double-helix model of the DNA molecule. This process is called "replication", that is, "copying", and it is convenient to observe its simple execution in natural conditions in viruses. The enzyme that performs replication is DNA polymerase. Arthur Karnburg (1957) was the first in the world to artificially synthesize a living organism that stores a DNA molecule - a virus.

In the 50s, protein synthesis was confirmed in ribosomes. But the concept that there is an intermediary (informational RNA) that transfers information from DNA to ribosomes was announced only in 1961 by F. Jakob and J. Mano.

James Watson describes in detail how the structure of DNA was discovered in his book “The Double spiral”.

The "authors" of the spiral, physicist Francis Crick and biochemist Dr. Watson, met in the fall of 1951 in the Cavendish laboratory at Cambridge University. Margiell Wilkins, a physicist and radiologist who worked at King's College London, joined them as the third "author". Wilkins, who determined the crystal structure of DNA, was the first to start work.

The idea of the location of the foundations in the model was put forward by F. Crick. Thus, in 1953, it was discovered that DNA is structured in the form of a double helix model.

The model representing the spatial structure of DNA is one of the greatest discoveries in biology of the 20th century. For the creation of the double helix model, Watson, Crick and Wilkins were awarded the Nobel Prize in Physiology and Medicine in 1962, and 1953, when their research in this field was published as a separate scientific work, is considered the birth year of molecular biology. Hybridized DNA has a circular shape and consists of a gene and a vector. Development of DNA fragments ensures their addition, plays a key role in the synthesis of proteins from genetic systems.

American Journal Of Social Sciences And Humanity Research
(ISSN – 2771-2141)
VOLUME 04 ISSUE 06 PAGES: 85-92
OCLC – 1121105677
Crossref doi Google Scholar WorldCat MENDELEY
Publisher: Oscar Publishing Services

Most of the vector is derived from phage lambia ((), plasmid, SV 40 virus, yeast and many other bacteria. The process of protein synthesis takes place in the mother cell. Many bacteria, yeast, and animal cells are used, and the selection of the vector depends on its specificity and the purpose of the experiment. The main importance of hybrid DNA is that it consists of 2 enzymes.

1) In the DNA molecule, restrictase spreads the fragment to key sites.

2) DNA ligases, DNA joining enzymes. Such experiments have become one of the main tasks of medical genetics.

History of the development of biotechnology. Biotechnology is currently a new direction of technology and science, which developed widely in the 60s and 70s. In particular, it accelerated after the opportunities provided by the experience of genetic engineering in the 1970s. Although there was a short time for its development, the science of biotechnology was able to attract the attention of many scientists.

Biotechnology is a controlled method of obtaining products intended for the national economy and medicine. Biological agents and cell components are used for this.

Biotechnology has established the use of bacterial cell culture, production of yeasts, production of plant and animal biosynthesis products. Biotechnology was able to fully demonstrate its potential in the field of exemplary knowledge and biochemical methods, technical chemistry and genetics. The purpose of creating biotechnology was mainly to solve global problems. For example, the production of various gases, the preparation of medicines, and human health in meeting human needs require that each innovation be solved in its own way. At this time, physico-chemical biology, genetics, molecular biology and microbiology together recommend a new technology, as if this technology can solve problems. Because the new experiments of biotechnology did not give bad results, therefore, it was found useful for the future.

The development of biotechnology can be divided into four main stages:

1. Biotechnology of food products.

2. Biotechnology of organic acids, solvents, biomass in non-sterile conditions, biotechnology of vaccines.

3. Biotechnological processes in sterile conditions (era of antibiotics).

4. Modern stage:

a) Use of enzymes and immobilized cells;

b) Using the achievements of molecular biology and genetic engineering (recombinant DNA, monoclonal antibodies, etc.);

American Journal Of Social Sciences And Humanity Research
(ISSN – 2771-2141)
VOLUME 04 ISSUE 06 PAGES: 85-92
OCLC – 1121105677
Crossref doi Google Scholar WorldCat MENDELEY
Publisher: Oscar Publishing Services

c) Development of new technical means – sensors, bioreactors, control and management systems, purification and concentration.

The main components of biotechnological processes include biological agent, substrate, target product, apparatus and process control methods. Today, there are two main reasons for the rapid development of biotechnology. These are the accumulation of masses and wastes that are not used due to the increase in the need for certain products and energy, and the emergence of new and effective methods of fundamental research.

Importance of biotechnology in the field of science and production. Biotechnology is the technology of development knowledge. Instead of spending 76% on biotechnological processes, the US company "Genetic" spends 12% on remanufacturing, much less than other companies. 35% of the employees of this company are doctors of science. In this way, the new biotechnology, in search of more innovations than science biotechnology, is looking for the easy side of production. He is actively involved in the production of only science and technology. Of course, the step taken in this area can give the desired effect only if it is based on a deep foundation.

Recognizing the uniqueness of the new technology, the integration of agricultural and local biotechnological opportunities will be the same term. If this process, in turn, affects living nature and microorganisms, it is possible to have an impact on nature to the extent of destroying it. Biotechnology seeks to solve such an existing problem. In the near future, biotechnology will be able to fully solve the problems that arise with its capabilities and planned work. It is emphasized that this proposal will contribute to the solution of global problems arising mainly as a result of ecology. In addition, ecology, biology, which is important today, is not only the reconstruction of all production and farms by man, but also the ability to create those necessary for agriculture. Biotechnology, together with biological science, microbiology, genetics, physico-chemistry, is becoming a unified force in modern production. Of course, the development of science plays an important role in solving these problems.

Albert Sasson stated that the development of biotechnology is focused on biological research with its complex problems related to evolution. This idea seems to be true. But solving such problems on demand has not been proven in biotechnology experience. Biotechnology is a unique technology that solves important issues related to tissue, organism, biocenosis, biosphere and man. It can cover the whole planet. For now, this is only a hypothesis, and a dream that will be difficult to achieve. Currently, biotechnology is mostly used on the basis of a living fragment of chemical technology. Currently, as a result

American Journal Of Social Sciences And Humanity Research
(ISSN – 2771-2141)
VOLUME 04 ISSUE 06 PAGES: 85-92
OCLC – 1121105677
Crossref doi Google Scholar WorldCat MENDELEY
Publisher: Oscar Publishing Services

of these dreams and hypotheses, many works related to ecological and biological issues are being carried out.

From the beginning of our century, the French chemist P. Bertlot proposed ideal nutrition, that is, sending ready-made food to the stomach and intestines and blood. This hypothesis was supported until the 70s, but it is no longer effective to eat this way. Academician A.M. Ugolev (1960) was the first to solve this problem based on many studies and introduced the concept of membrane digestion to science.

He said that a lot of innovations have been created in the field of nutrition recently. In particular, new types of nutrition inside the cell, in the lysosome, distant nutrition outside the cell, digestion in the membrane were found. Thanks to nutrition, a person restores not only his body, but also the activity of microorganisms such as Escherichia coli present in the body. Recent research and interest has led to the fact that in human evolution and many multicellular organisms have evolved along with the organism in their evolution.

Our imaginations that appear in some of our dreams in nature are turning into reality with the help of technology.

Departments of biotechnology. The life of all living organisms, including microorganisms, plants, animals, and humans, depends on meeting the demand for energy. It follows that bioenergy is one of the branches of biotechnology and should be considered one of its main directions.

Bioenergy in a broad sense is a factor that provides energy to the earth's biosphere. The energy of all organisms that are part of the biosphere is inextricably linked with the energy of microorganisms, plants and animals. Organic compounds in the biological line are filled with chemical energy. In particular, the process of photosynthesis is connected with many complex chemical reactions.

232.5 billion tons of dry organic products are produced on our planet during the year. They consume approximately 6000.102 kdj of energy for nature. The demand for energy increases during life. Therefore, the demand of people for the biosphere can lead to a violation of the balance in nature.

The use of bioenergy in large quantities causes many negative consequences, such as not only the death of plants and animals, the destruction of their systems, the destruction of the biogeocenosis, the destruction of the structure of the biosphere, and the weakening of self-defense. But the planned use of air helps the biosphere consciously. All this makes it possible to protect the environment and maintain bioenergy at the same level. The unity of the following 2 noospheres can maintain this system:

1) Energy (sorting and system maintenance, most of the energy);

American Journal Of Social Sciences And Humanity Research
(ISSN – 2771-2141)
VOLUME 04 ISSUE 06 PAGES: 85-92
OCLC – 1121105677
Crossref doi Google Scholar WorldCat MENDELEY
Publisher: Oscar Publishing Services

2) Informational (very complex sorting system). Both of these actively participate in the formation of new bioenergy.

Biologization and ecologization. We are now more aware of the interconnectedness of nature and humans. Therefore, now the concept of greening is gaining great importance. The most important of these is the biologization process, which is widely used in production farms. Getting rid of the unnecessary waste that surrounds us (for example, water and various gaseous wastes in hydrocarbons). It appears under ecologization, just like at the beginning of biologization.

It is desirable to work under the laws of biology in the biosphere. This is especially evident in cases related to the activity of plants that need help. The problem is that at the same time there is nothing in the world that does not have a negative effect on the plant.

In addition, laws are currently being developed to protect the world of plants. In 1917, the fight against insects based on chemical preparations appeared, and in 1980, the number of such control methods reached 432. But the use of such chemical preparations is harmful not only for plants, but also for humans. Biotechnology is a field that helps us to overcome such a risk. We can use the same words in relation to biologization. We see here not savings, but rather a solution to the problem of improving human life and preserving the biosphere.

In addition, the amount of bioenergy is widely distributed on the earth. It is known that the reserves of oil, coal, and natural gas on earth are limited. Currently, humanity is trying to get energy based on natural sources, abandoning nuclear energy. Of course, we don't mean that there is enough uranium on earth. But more than 10,000 tons of uranium-containing products produced so far have the power to destroy all living beings. As far as we know, the problem of buried radioactive material has not yet been solved. Also, catastrophic situations caused by NPP accidents are condemned as a serious danger to people and nature.

CONCLUSION

It is known that currently biotechnology is widely used in the preparation of various products for health care, as well as in agriculture and the chemical industry. Most of the products needed for these industries cannot be prepared without the participation of biotechnology.

In particular, the use of microorganisms and cell culture leads to less pollution of the environment. This, in turn, shows how important biotechnology is in our lives.

REFERENCES

American Journal Of Social Sciences And Humanity Research
(ISSN – 2771-2141)
VOLUME 04 ISSUE 06 PAGES: 85-92
OCLC – 1121105677
Crossref doi Google Scholar WorldCat MENDELEY
Publisher: Oscar Publishing Services

1. Биотехнология. Принципы и применение. – М: «Мир», 1988.
2. Грачева И.М. Технология ферментных препаратов. – М: «Наука», 2000.
3. Маурер Г. Диск электрофорез. – М: «Мир», 1971.
4. Детерман Г. Гель хроматография. – М: «Мир», 1982.
5. U. Khuzhanazarov, Bulleting of Agrarian Sciences 1-2 (47-48), 111-114 (2012)
6. U. Khujanazarov, H. Shomurodov, E. Afonina, The Asian International Journal of Life Sciences 21 (1), 1-11 (2019)
7. Khujanazarov U.E., Islomov I.N. 2020. Monitoring of foothill and mountain pasture plants of Kashkadarya basin. Journal of critical reviews. Vol. 7, Issue 13. – Pp.741-743.
8. Khujanazarov U. 2015. About the protection of some rare and endemic plant species in the upper part of the Kashkadarya basin. – Tashkent: News of the National University of Uzbekistan. № 3/2. – Pp.135-137.
9. Khujanazarov U.E. 2017. Ecological condition of some endemic plants in the foothills of the Kashkadarya basin. – Tashkent: News of the National University of Uzbekistan. №3 / 2. – Pp.210-213.
10. Khujanazarov U.E, Mirkhamidova P., Valikhanova A.K. 2017. Determination of flavonoids in medicinal plants in the Kashkadarya basin of the southwestern Zarafshan ridge. Karshi State University News, No.4. – Pp.44-48.
11. Khujanazarov U.E., Mirkhamidova P., Mamatkulov D., Ziyamukhamedova S., Mukhamedov G.I. 2018. A determination of the amount of vitamin C in some medical plants growing in the southwestern Zarafshan Mountain ranges. European Science Review. Vienna. № 3-4, Mart-April. – Pp.32-34.