Попова Наталья Сергеевна
Тюменский государственный университет
Институт Биологии
Кафедра иностранных языков и межкультурной профессиональной коммуникации
Студент специалитета
Группа 26БиБс185
Stud0000207011@study.utmn.ru
Гаркуша Надежда Анатольевна
Тюменский государственный университет
Институт социально-гуманитарных наук
Кафедра иностранных языков и межкультурной профессиональной коммуникации
Доцент, канд. пед. наук
n.a.garkusha@utmn.ru

АНТИБИОТИК ИЗ НЕМАТОД

Popova Natalia Sergeyevna
University of Tyumen
Institute of Biology
Foreign Languages and Intercultural Professional Communication Department
Student of 26BiBs185 gr.
Stud0000207011@study.utmn.ru
Garkusha Nadezhda Anatolievna
University of Tyumen
Institute of Social and Human Sciences
Foreign Languages and Intercultural Professional Communication Department
Associate Professor, Candidate of Pedagogic Sciences
n.a.garkusha@utmn.ru

NEMATODE ANTIBIOTIC

Аннотация. Данная статья посвящена новому антибиотику, который используется для борьбы с лекарственно-устойчивыми бактериями. В статье представлена информация о медицине и антибиотиках в целом, основные аспекты того, как действуют антибиотики. Основная цель статьи – выявить его особенности.

Ключевые слова. Медицина, антибиотики, биоинженерия, Даробактин.

Abstract. This article is devoted to a new antibiotic that is used to fight drug-resistant bacteria. The article presents information about medicine and antibiotics in general, the main aspects of how antibiotics work. The main purpose of the article is to reveal its features.

Key words. Medicine, antibiotics, bioengineering, Darobaktin.

Alexander Fleming told about the first antibiotic penicillin on September 13, 1929 at a meeting of the Medical Research Club at the University of London, but since then, a lot of time has passed, the bacteria have become more resistant to various types of antibiotics, and therefore medicine has to look for new ways to combat it.

Scientists are now working to find new antibiotics and have to look for them in a variety of places. For example, a new antibiotic was recently discovered in bacteria living in nematodes!

Big discoveries in the field of medicine can be hidden even in the smallest objects of wildlife.

Development of antibiotics

According to historical sources, our ancestors, faced with diseases caused by pathogens, fought them in an accessible way. But progress is not worthwhile, and people have now learned how to understand why some of the earlier medicines used can affect disease, and then how to invent new medicines themselves. Bacteria continue to mutate and nowadays most antibiotics are useless. But it should also be noted that if a strain gets resistance to a strong and modern drug, it does not mean

that older drugs will be useless for it, as the bacteria rarely have absolute protection against drugs.

It is difficult to predict how the situation will change in a few years' time, but long-term predictions look bleak.

Knowledge and tools to control pathogens have now reached enormous proportions, but still require further improvement as new human-resistant microbial species begin to emerge over time.

Why are we looking for new antibiotics?

Antibiotics have long been a universal way of getting rid of various infections, but the development is not in place and the bacteria are becoming increasingly resistant to most drugs against them. Over time, this turns into a battle between science and medicine against bacteria.

By the middle of the 1990s, scientists had discovered all the antibiotics that were easy to find, after which no new classes were found for several years. There are a lot of problems in finding antibiotics, but there is also a great chance to find them, for example, if you just study your desk or the soil in the park carefully.

The incurable diseases that medicine has warned us about are gradually entering the life of modern man. Antibiotics are one of the main means of treating various diseases in human life, but over time they become obsolete because bacterial strains develop full or partial resistance to their effects.

They mutate quickly and become resistant to drugs. Bacteria is a biological constructor that creates itself from the various strains of bacteria from which it takes on the qualities and abilities it needs. Therefore, scientists constantly need to find new ways to influence them in order to continue to fight against hard-to-recover diseases.

New peptide

Bacteria such as Escherichia coli and Klebsiella pneumoniae have become resistant to most currently available antibiotics. This is because their additional outer membrane makes it difficult for these bacteria to attack, making them virtually

invulnerable. And now, for the treatment of diseases that cause these gram-negative bacteria, there is a lack of new, more active substances.

An international team of researchers and scientists from the University of Justus Liebich at Giessen (JLU) discovered a new peptide that can attack such Gram-negative bacteria at an unknown early point of action.

Since the 1960s, no one has been able to develop a new class of antibiotics that would be effective against such gram-negative bacteria, but now it is possible with this peptide.

Also, when working with this peptide was isolated another one, it was called Darobactin.

Getting

Recently, it was discovered that the Heterorhabditidae worm symbiotic bacteria, which feed on insects, were able to produce an unknown early class of antibiotic. The nematode penetrates the insect's larvae and then releases the Photorhabdus bacteria into the victim's body cavity, which destroys it. But also in addition to toxins against the larvae themselves, Photorhabdus has learned to synthesize antibiotics that kill other insect microflora bacteria. This antibiotic is called Darobaktin. Perhaps this antibiotic will make a great contribution to the development of medicine, as it is currently one of the most promising drugs.

The action of Darobaktin

Darobaktin – a peptide consisting of seven amino acids with structural characteristics. It has a very important feature that is key in its use as an antibiotic - it does not show toxicity to cells.

Scientists have also been able to find the location of this peptide. It binds to the BamA protein, which is in the outer membrane of the Gram-negative bacteria. As a result, the creation of the outer membrane is disturbed and the bacterium dies.

Darobaktin demonstrates excellent effect in the case of antibiotic-resistant strains of Pseudomonas aeruginosa, Escherichia coli and Klebsiella pneumoniae. Therefore, it is a very promising substance for further development of the new antibiotic. Developments in this area are critical, as the World Health Organization

(WHO) has identified scientific developments in relation to antibiotic-resistant pathogens to the highest priority for human health.

We would like to believe that the development of science in this area will only go in a positive direction and we will be open only to new and useful knowledge about antibiotics.

Let's hope that the advances in medicine and bioengineering will help us to find even more new classes of antibiotics and to solve the problem of their resistance to medications in the near future.

REFERENCES

1. Antibiotics and antibiotic resistance: from antiquity to the present [Electronic resource] – Access mode: https://www.popmech.ru/science/news-325242-ustoychivost-k-antibiotikam-pochemu-bakterii-stanovyatsya-vse-bolee-zhivuchimi/

2. A new antibiotic to combat drug-resistant bacteria is in sight [Electronic resource] – Access mode: https://www.dzif.de/en/new-antibiotic-combat-drug-resistant-bacteria-sight

3. "Looks like bacteria are beating science." [Electronic resource] – Access mode: https://meduza.io/feature/2019/06/13/kazhetsya-bakterii-pobezhdayut-nauku/

4. A strong antibiotic was isolated from the roundworms [Electronic resource] – Access mode: http://www.meddaily.ru/article/22nov2019/darobaktin

5. Scientists have learned how to defeat bacteria that aren't sensitive to antibiotics [Electronic resource] – Access mode: https://www.ridus.ru/news/313462

6. A new antibiotic was found in the stomach of the nematode worms [Electronic resource] – Access mode: https://tass.ru/nauka/7166293/amp