

Text Readability Study

Your participation is voluntary, and your responses will remain completely anonymous, as no personal information will be collected. The data will only be used for research purposes and reported in a way that ensures your privacy. By continuing, you agree to participate in this study. If you have any questions, please contact: gump@kth.se.

Don't go back to previous pages on the form!

* Indicates required question

1. Is English your native language? *

Mark only one oval.

☐ Yes

☐ No

2. I consent to participate in this study *

Mark only one oval.

☐ Yes *Skip to question 3*

☐ No *Skip to section 7 (End)*

Pre-knowledge test

Answer the questions without extra independent research. Feel free to follow your first instinct.

3. Bacteriophage-therapy is implemented mostly in the West world *

Mark only one oval.

☐ True

☐ False

4. Bacteriophages are natural predators of specific bacterial strains *

Mark only one oval.

- ☐ True
☐ False

5. Bacteriophages can develop antibiotic-resistance *

Mark only one oval.

- ☐ True
☐ False

6. Which factors contribute to a decline of global health by increasing antibiotic resistance in nature? *

Mark only one oval.

- ☐ Evolution of bacterial resistance to phages
☐ Antibiotic overuse
☐ Antimicrobial peptides and proteins
☐ Limited host range

7. What is necessary for phage therapy? *

Mark only one oval.

- ☐ Developing phage-based products in order to obtain safety approval
☐ Identification of bacterial targets, rapidly and accurately
☐ Fluorescently labeled phages and traditional plaque formation
☐ Cultivating bacteriophages to create phage cocktails

8. Choose a number *

Mark only one oval.

- ☐ 0 *Skip to question 9*
- ☐ 1 *Skip to question 10*

Text

Antibiotic-resistant germs are a growing problem worldwide. Factors like excessive antibiotic use, gene transfer, and bacterial changes make the issue worse. We urgently need new medicines to fight these germs, but there aren't many in development. So, scientists are exploring different treatments like bacteriophages, tiny proteins, and nanoparticles. Bacteriophages are viruses that attack bacteria. They were first discovered in the early 1900s. People used them as medicine before antibiotics became popular. Some companies in different countries made products using bacteriophages. However, when broad-spectrum antibiotics came along, the use of phages decreased in the Western world. Yet, in Eastern Europe and the Soviet Union, people continued using phage therapy.

Today, reintroducing phage therapy in Western medicine faces many challenges. These include doubts about past studies, strict rules, limited bacteria targets, and side effects. Some companies and researchers are focusing on using phages in food safety, agriculture, industry, and diagnostics due to long approval processes for medical use. They have created products approved by different organizations for various purposes. For instance, some phage products are used to kill harmful bacteria in food and crops. Others help detect specific bacterial infections. These innovations pave the way for better phage therapy by swiftly identifying target bacteria and finding the right phages to combat them.

9. I have read the text *

Mark only one oval.

- ☐ Yes *Skip to question 11*
- ☐ No *Skip to question 9*

Text

Antibiotic-resistant pathogens constitute a worsening global health problem exacerbated by interconnected travel, antibiotic overuse, horizontal gene transfer, and bacterial evolution. New classes of antimicrobials are needed to treat these pathogens but the drug development pipeline is dry. As a result, there has been a renewed interest in alternative antimicrobial treatments, including bacteriophages, antimicrobial peptides and proteins, and nanoparticles. The discovery of bacteriophage particles that seemed to 'eat bacteria' is generally attributed to Twort and d'Herelle in the early 20th century. The therapeutic potential of 'phages' – members of the kingdom of viruses and obligate predators of bacteria – was recognized soon thereafter and applied for several decades before the discovery and widespread adoption of antibiotics. A range of commercial products were distributed by companies in France, Germany, the UK, and the US. However, mixed therapeutic results, poor understanding of phage biology, and the advent of broad-spectrum antibiotics led to the decline of phage therapy in the Western world. In the meantime, phage therapy continued to be studied and used in Eastern Europe and the Soviet Union.

The reintroduction of bacteriophage therapy into modern-day Western medicine faces numerous hurdles. These challenges include skepticism about the rigor of prior phage therapy studies, strict regulatory constraints placed on new clinical therapeutics such as phages, limited phage host ranges, the evolution of bacterial resistance to phages, manufacturing challenges, systemic side effects of phage therapy, and delivery.

Non-therapeutic applications of bacteriophages.

The clinical use of phage therapy is faced with long product development and approval timelines in Western regulatory frameworks. As a result, many companies and researchers have pursued food safety, agricultural, industrial, and clinical diagnostic applications instead. Several companies have successfully developed phage-based products with EPA, USDA, and FDA approval. Such products have established a favorable regulatory precedent in which individual components of phage cocktails can be tailored towards bacterial targets. Products targeted at *Listeria monocytogenes* represent one of the first examples of phage cocktails to obtain Generally Recognized As Safe status from the FDA. These products are designed to be used as sterilizing agents for processed foods. Another approved product treats crop pathogens such as *Xanthomonas campestris* pv. *vesicatoria* and *Pseudomonas syringae* pv. *tomato*. Further products are in development against other bacterial pathogens, including *Escherichia coli* strains and *Salmonella enterica*.

In addition to being used to kill bacteria, phages have defined host specificities that can be exploited for detecting and typing bacterial infections. For example, Microphage, Inc. recently received FDA approval for a blood culture test that uses phage infection to detect methicillin-resistant *S. aureus*. Phage typing methods can involve the expression of luciferase genes delivered by modified phages, fluorescently labeled phages, and traditional plaque formation. In addition to being useful as general diagnostics, these products can help lay the groundwork for effective phage therapy, which requires the rapid and accurate identification of bacterial targets and the determination of their susceptibility to specific phages.

10. I have read the text *

Mark only one oval.

- ☐ Yes *Skip to question 11*
- ☐ No *Skip to question 10*

Post-knowledge test

Answer the questions based on what you read in the text. Feel free to follow your first instinct.

11. Bacteriophage-therapy is implemented mostly in the West world *

Mark only one oval.

- ☐ True
- ☐ False

12. Bacteriophages can develop antibiotic-resistance *

Mark only one oval.

- ☐ True
- ☐ False

13. Bacteriophages are natural predators of specific bacterial strains *

Mark only one oval.

- ☐ True
- ☐ False

14. Which health problem is this article going to tackle and engineer a solution for? *

Mark only one oval.

- ☐ Bacteriophage particles
- ☐ Pathogens with developed antibiotic-resistance
- ☐ "phages" with the ability to target specific bacteria

15. What is a reason to phage therapy being left unstudied for a while in a big part of the world? *

Mark only one oval.

- ☐ bacterial evolution
- ☐ poor understanding of phage biology
- ☐ alternative treatments to antibiotics

16. Which is one of the controversial aspects of the engineered solution that will be tackled by this study? *

Mark only one oval.

- ☐ alternative treatments to antibiotics
- ☐ mixed therapeutic results
- ☐ bacteriophages
- ☐ systemic side effects of phage therapy
- ☐ the advent of broad-spectrum antibiotics

17. Why have some researchers pursued food safety and other areas instead of exploring the clinical use of phages? *

Mark only one oval.

- ☐ because individual components of phage cocktails can target specific bacteria, if tailored
- ☐ since phages cannot be used to eliminate bacteria
- ☐ due to the challenges faced being long approval timelines and product development
- ☐ as a cause of the safety concerns of bacteriophage hosts/targets

18. Which factors contribute to a decline of global health by increasing antibiotic resistance in nature? *

Mark only one oval.

- ☐ Evolution of bacterial resistance to phages
- ☐ Antibiotic overuse
- ☐ Antimicrobial peptides and proteins
- ☐ Limited host range

19. What is necessary for phage therapy? *

Mark only one oval.

- ☐ Developing phage-based products in order to obtain safety approval
- ☐ Identification of bacterial targets, rapidly and accurately
- ☐ Fluorescently labeled phages and traditional plaque formation
- ☐ Cultivating bacteriophages to create phage cocktails

20. What are the alleged possible solutions to this global health problem? *

Mark only one oval.

- ☐ bacterial evolution
- ☐ bacteriophages
- ☐ the evolution of bacterial resistance to phages

Opinions

Share your opinions on the readability of the text you read!

21. How understandable was the content of text? *

Mark only one oval.

1 2 3 4 5

I did ☐ ☐ ☐ ☐ ☐ I understood it perfectly

22. How was the readability of the text? *

Mark only one oval.

1 2 3 4 5

It was ☐ ☐ ☐ ☐ ☐ It was easy to read

23. Did you feel the some content was missing? *

Mark only one oval.

- ☐ Yes
- ☐ No
- ☐ Maybe

End

Thank you for helping us in our study!

This content is neither created nor endorsed by Google.

Google Forms