



Scientists Develop Plastic Film to Dismantle Viruses

Description

Every day, we touch many surfaces, from kitchen counters to public transport handrails. This constant contact can spread harmful viruses and germs quickly. Typically, people become infected by touching contaminated surfaces and then touching their face.

While chemical cleaners can disinfect surfaces, they often lose effectiveness, harm the environment, or contribute to antimicrobial resistance. In response, researchers have developed a novel plastic surface with tiny features that mimic insect wings. This design can physically damage such viruses as human parainfluenza virus type 3 (hPIV-3).

The new material is cost-effective and scalable, making it suitable for use on commonly handled items like mobile phones and hospital equipment. Traditional cleaning methods involve applying disinfectant, which must remain wet for a certain time to be effective. However, this can be impractical, especially in busy environments, and surfaces can become recontaminated quickly.

Previous antiviral methods have involved adding materials like graphene to protective gear. While effective, these approaches can pose health and environmental risks, as they may leach harmful chemicals and diminish in effectiveness over time.

This latest research, which took over a decade to develop, focused on creating a lightweight and flexible surface that could burst viruses. The innovative material features thousands of tiny pillars that stretch viral membranes until they rupture, effectively killing the viruses.

Laboratory tests showed that up to 94% of hPIV-3 particles were destroyed within an hour of contact with the material. The design can be readily scaled for various industries, including food packaging and healthcare. Although challenges remain in creating completely germ-free surfaces, these nanotextured materials present a promising alternative to traditional chemical methods.

Vocabulary List:

1. **contaminated** //kən'tæmə,neɪtɪd// (adjective): having dirt or germs that cause harm
2. **disinfectant** //,dɪsən'fektənt// (noun): chemical that kills germs on surfaces
3. **antimicrobial** //,æntɪmɪ'krɔʊbiəl// (adjective): stops or kills tiny living germs or bacteria
4. **scalable** //'skeɪləbəl// (adjective): able to grow or be made larger easily
5. **mimic** //'mɪmɪk// (verb): to copy the appearance or action of something
6. **nanotextured** //'nænɒs,tɛkstʃəd// (adjective): having very small raised or patterned surface details



Comprehension Questions

Multiple Choice

1. What can spread harmful viruses and germs quickly?
Option: Disinfectants
Option: Plastic surfaces
Option: Constant contact with surfaces
Option: Insect wings
2. What is one disadvantage of chemical cleaners?
Option: They are always effective
Option: They can contribute to antimicrobial resistance
Option: They are environmentally friendly
Option: They are not widely used
3. What type of virus can the new material effectively damage?
Option: Influenza A
Option: Human parainfluenza virus type 3
Option: COVID-19
Option: Ebola virus
4. What aspect is crucial for traditional cleaning methods to be effective?
Option: Applying heat
Option: Keeping surfaces dry
Option: Disinfectant must remain wet for a certain time
Option: Using natural cleaners
5. How long did the development of the latest research take?
Option: A few months
Option: Over a decade
Option: Two years
Option: Five years
6. What do the tiny pillars in the new material do?
Option: Clean surfaces



- Option: Stretch viral membranes until they rupture
- Option: Absorb liquids
- Option: Release disinfectant

True-False

- 7. The new material is not suitable for use on mobile phones.
- 8. Laboratory tests showed that 94% of hPIV-3 particles were destroyed within an hour of contact with the material.
- 9. Chemical cleaners are always effective on all surfaces.
- 10. Previous antiviral methods involved adding materials like graphene to protective gear.
- 11. Nanotextured materials provide a poor alternative to traditional chemical methods.
- 12. Surfaces can become recontaminated quickly after being cleaned.

Gap-Fill

- 13. The new material is cost-effective and _____ for use on commonly handled items.
- 14. Traditional cleaning methods require the disinfectant to remain wet for a certain _____ to be effective.
- 15. The innovative material features thousands of tiny pillars that _____ viral membranes until they rupture.
- 16. Previous antiviral methods can pose health and environmental _____ by leaching harmful chemicals.
- 17. While chemical cleaners can disinfect surfaces, they often lose _____ and harm the environment.
- 18. This research focused on creating a lightweight and _____ surface that could burst



viruses.

Answer

Multiple Choice: 1. Constant contact with surfaces 2. They can contribute to antimicrobial resistance
3. Human parainfluenza virus type 3 4. Disinfectant must remain wet for a certain time 5. Over a decade
6. Stretch viral membranes until they rupture

True-False: 7. False 8. True 9. False 10. True 11. False 12. True

Gap-Fill: 13. scalable 14. time 15. stretch 16. risks 17. effectiveness 18. flexible

Vocabulary quizzes

Multiple Choice (Select the Correct answer for each question.)

1. What term is used to describe something that has been made dirty or unclean?

Option: Contaminated

Option: Processed

Option: Purified

Option: Sterilized

2. Which of the following is commonly used to kill bacteria and viruses on surfaces?

Option: Disinfectant

Option: Moisturizer

Option: Antibiotic

Option: Astringent

3. What type of agent helps to prevent the growth of microorganisms?

Option: Antimicrobial

Option: Analgesic

Option: Antipyretic

Option: Antiseptic

4. What term describes a system that can grow in size or capacity?

Option: Scalable

Option: Static

Option: Limited

Option: Fixed

5. What verb means to imitate or replicate the behavior or appearance of something?



- Option: Mimic
- Option: Modify
- Option: Create
- Option: Inhibit

6. What term refers to surface structures at the nano-scale used to enhance material properties?

- Option: Nanotextured
- Option: Textured
- Option: Smooth
- Option: Polished

7. What is the professional title of a doctor who specializes in skin conditions?

- Option: Dermatologist
- Option: Pediatrician
- Option: Oncologist
- Option: Cardiologist

8. What is the term for a type of cancer that starts in the skin or tissues that line organs?

- Option: Carcinoma
- Option: Sarcoma
- Option: Leukemia
- Option: Melanoma

9. Which type of skin cancer arises from melanocytes, the cells that produce pigment?

- Option: Basal Cell Carcinoma
- Option: Squamous Cell Carcinoma
- Option: Melanoma
- Option: Melanocyte

10. What is the process of discovering or identifying something called?

- Option: Detection
- Option: Prevention
- Option: Isolation
- Option: Amplification

Gap-Fill (Fill in the blanks with the correct word from the vocabulary list.)

11. Adequate sleep is crucial for maintaining overall health and well-being.

12. The evidence will warrant further investigation into the matter.



13. Insulin is a hormone that regulates blood sugar levels in the body.
14. Scientists are working to reverse the effects of aging through various studies.
15. The endocrine system regulates various body functions through hormone secretion.
16. Exercise plays a key role in boosting a person's metabolism.
17. The brain has complex neural pathways that govern behavior and thought.
18. The hindbrain controls many vital functions such as heartbeat and breathing.
19. Certain legumes contain lectin, which can affect nutrient absorption.
20. Mucus serves as a protective barrier in the respiratory and digestive systems.

Matching Sentences (Match each definition to the correct word from the vocabulary list.)

21. The skin serves as a barrier between the internal body and external environment.
22. The security system was breached, exposing sensitive information.
23. Galactose is a simple sugar that is part of lactose, found in milk.
24. Some bacteria have become resistant to commonly used antibiotics.
25. The results were consistent across multiple trials, confirming the hypothesis.
26. Teachers aim to engage students through interactive learning methods.
27. A balanced diet consists of nutritious foods that provide essential vitamins.
28. Stabilizing the mixture requires careful control of temperature and pressure.
29. Hormonal changes during puberty significantly affect growth and mood.
30. The distribution of resources can impact economic equality.

Answer

Multiple Choice: 1. Contaminated 2. Disinfectant 3. Antimicrobial 4. Scalable 5. Mimic 6. Nanotextured
7. Dermatologist



8. Carcinoma 9. Melanoma 10. Detection

Gap-Fill: 11. 12. 13. 14. 15. 16. 17. 18. 19. 20.

Matching sentence: 1. barrier 2. breached 3. galactose 4. resistant 5. consistent 6. engage 7. nutritious
8. stabilize 9. hormonal 10. distribution

CATEGORY

1. Health - LEVEL5

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