Scientists Develop Virus-Destroying Plastic Film

Description

Every day, people touch many surfaces, like kitchen counters, handrails, desks, and phone screens. These surfaces can spread viruses and germs.

Typically, infection spreads when someone touches a contaminated surface and then touches their eyes, nose, or mouth. While chemical cleaners can disinfect, they may harm the environment and contribute to antimicrobial resistance, where germs stop responding to treatments.

A new study in "Advanced Science" introduces a plastic surface with nanoscale features, tiny structures a billionth of a metre in size. These mimic insect wings, which naturally kill bacteria by rupturing them. This surface can physically break apart viruses, like human parainfluenza virus type 3 (hPIV-3).

This innovation offers an affordable solution for making surfaces like phone screens and hospital equipment less likely to spread disease. Traditional methods involve cleaning, which requires chemicals and can quickly recontaminate surfaces.

Scientists previously explored antiviral surface coatings using materials like graphene. While effective, they can pose health risks and harm the environment as their potency decreases.

The initial aim was to design a smooth surface to repel germs, but research found bacteria adhered more to smooth surfaces. Inspired by insect wings, a surface covered in tiny pillars was developed to kill bacteria by stretching their membranes.

The researchers created a flexible, lightweight, and cost-effective material covered with nanopillars, which physically tear viruses apart. Lab tests showed up to 94% of hPIV-3 particles were destroyed within an hour.

This material, adaptable for various industries, could replace traditional methods. However, like all materials, it may degrade over time. Further research aims to improve germ-free surfaces and combat viruses without relying on chemicals.

Vocabulary List:

1. **contaminated** /kənˈtæməˌneɪtɪd/ (adjective): dirty because of germs or harmful substances
2. **antimicrobial** /ˌæntimaɪˈkroʊbiəl/ (adjective): stops or fights growth of harmful germs
3. **nanoscale** /ˈnænoʊskeɪl/ (adjective): extremely small; measured in billionths of meters
4. **mimic** /ˈmɪmɪk/ (verb): copy how something looks or works
5. **nanopillars** /ˈnænoʊˌpɪlərz/ (noun): very small upright structures on a surface
6. **rupturing** /ˈrʌptʃərɪŋ/ (verb): breaking or tearing something into pieces

Comprehension Questions

Multiple Choice

1. What is the main concern with traditional chemical cleaners?

   Option: They are expensive
   Option: They may harm the environment
   Option: They are ineffective
   Option: They are difficult to use

2. What does the new plastic surface introduced in 'Advanced Science' mimic?

   Option: Human skin
   Option: Animal fur
   Option: Insect wings
   Option: Plant leaves

3. What type of virus was specifically mentioned as being affected by the new surface?

   Option: Influenza virus
   Option: hPIV-3
   Option: COVID-19
   Option: Ebola virus

4. How effective was the new material in destroying hPIV-3 particles in lab tests?

   Option: 50%
   Option: 70%
   Option: 94%
   Option: 100%

5. What inspired the design of the new surface with nanopillars?

   Option: Human hands
   Option: Insect wings
   Option: The structure of viruses
   Option: Chemical compounds

6. What problem was found with smooth surfaces in relation to germs?

   Option: They are easier to clean

Option: Bacteria adhered more to them
Option: They do not attract dirt
Option: They are more expensive

True-False

7. The new study suggests that traditionally smooth surfaces repel bacteria effectively.

8. Chemical cleaners do not contribute to antimicrobial resistance.

9. Nanoscale features on the new plastic surface can physically break apart viruses.

10. The material developed was not designed to be cost-effective.

11. The initial aim of the researchers was to create a rough surface to kill bacteria.

12. Further research is being conducted to improve germ-free surfaces without chemicals.

Gap-Fill

13. Typically, infection spreads when someone touches a contaminated surface and then touches their eyes, nose, or _____.

14. The new surface can physically break apart viruses, like human parainfluenza virus type _____ (hPIV-3).

15. Lab tests showed up to _____ of hPIV-3 particles were destroyed within an hour.

16. The material is covered with tiny pillars that _____ bacteria by stretching their membranes.

17. Scientists explored antiviral surface coatings using materials like _____ and found they can pose health risks.

18. The researchers aimed to create a _____ surface that would repel germs but

discovered it was ineffective.

Answer

Multiple Choice: 1. They may harm the environment 2. Insect wings 3. hPIV-3 4. 94% 6. Bacteria adhered more to them
True-False: 7. False 8. False 9. True 10. False 11. False 12. True
Gap-Fill: 13. mouth 14. 3 15. 94% 16. kill 17. graphene 18. smooth

CATEGORY

1. Health - LEVEL4

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