

Tardigrade Protein: A Breakthrough in Radiation Protection for Cancer Patients

Description

Tardigrades are tiny animals that can survive a lot of radiation. They can take doses that would kill most other living things. Scientists are studying how tardigrades can help protect healthy cells during cancer treatment.

A team led by researchers from Harvard Medical School and the University of Iowa found that a special type of messenger RNA can help protect cells from radiation. This RNA tells cells to make a protein called Dsup, which helps keep DNA safe.

Cancer treatment can hurt healthy cells, not just the tumor. This can cause mouth sores and other painful problems. Dr. James Byrne from the University of Iowa said that treatment can make it hard for people to eat.

The researchers injected Dsup mRNA into mice and then exposed them to radiation. The mice that received the mRNA had fewer DNA breaks than those that did not receive it. This study shows promise for protecting healthy cells during cancer treatment.

In the future, Dsup RNA could help protect cells from damage caused by radiation from space or nuclear sources.

This research was published in the journal *Nature Biomedical Engineering*.

Vocabulary List:

- 1. **Tardigrades** /'tardɪ,greɪdz/ (noun): Tiny animals known for their ability to survive extreme conditions including high radiation.
- 2. Radiation /,reɪdi'eɪʃən/ (noun): Energy emitted in the form of waves or particles.
- 3. **Messenger** /'mɛs.ɪn.dʒər/ (noun): A molecule that carries a message in this context referring to RNA that conveys genetic information.
- 4. **Protect** /prəˈtɛkt/ (verb): To keep safe from harm or injury.
- 5. DNA /di:'ɛn.eɪ/ (noun): Deoxyribonucleic acid the molecule that carries genetic information in living organisms.
- 6. Tumor /'tu:.mər/ (noun): An abnormal growth of tissue which can be benign or malignant (cancerous).

Comprehension Questions



Multiple Choice

1. What are tardigrades?

Option: Tiny animals that can survive a lot of radiation

Option: Large mammals found in the Arctic Option: Marine creatures living in deep oceans

Option: Insects resistant to chemicals

2. What is the name of the protein that helps keep DNA safe in cells?

Option: Dsup Option: DnaRep Option: RnaProt Option: CellGuard

3. What did researchers inject into mice to protect them from DNA damage by radiation?

Option: DnaRep protein Option: CellGuard RNA Option: Dsup RNA

Option: RnaProt messenger

4. Where could Dsup RNA potentially help protect cells from damage in the future?

Option: From excessive heat Option: From dehydration

Option: From radiation in space or nuclear sources

Option: From microbial infections

5. What can cancer treatment do to healthy cells?

Option: Enhance their growth

Option: Cause mouth sores and painful problems

Option: Induce resistance to treatment

Option: Promote cell division

6. In which journal was this research published?

Option: Nature Biomedicine Option: Journal of Cell Biology Option: Medical Science Reports

Option: Nature Biomedical Engineering



True-False

- 7. Tardigrades are large mammals that can survive radiation.
- 8. The messenger RNA injected into mice was found to have no effect on DNA breaks caused by radiation.
- 9. Dr. James Byrne is affiliated with Harvard Medical School.
- 10. Dsup RNA may potentially protect cells from radiation damage in space.
- 11. Cancer treatment can make it difficult for people to eat.
- 12. The research team was from the University of Iowa and Stanford University.

Gap-Fill

13. Tardigrades are tiny animals that can survive a lot of	
14. Dr. James Byrne is associated with the University of	
15. Dsup RNA has the potential to protect cells from radiation damage in	or
nuclear sources.	
16. The special type of messenger RNA produced a protein called which	helps
protect DNA.	
17. Researchers found that the mice injected with Dsup mRNA had fewer DNA breaks than those the	nat did
not receive	
18. The study conducted by the research team showed promise for protecting healthy cells during	
treatment.	

Answer

Multiple Choice: 1. Tiny animals that can survive a lot of radiation 2. Dsup 3. Dsup RNA 4. From radiation in space or nuclear sources



5. Cause mouth sores and painful problems 6. Nature Biomedical Engineering

True-False: 7. False 8. False 9. False 10. True 11. True 12. False Gap-Fill: 13. radiation 14. lowa 15. space 16. Dsup 17. it 18. cancer

Vocabulary quizzes

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

1. What are known to be the most resilient animals on Earth?

Option: Tardigrades Option: Radiation Option: DNA

Option: Hormones

2. What drives animals to perform certain behaviors without prior experience?

Option: Behavior Option: Automatic **Option: Instinct** Option: Responsive

NEWS.COM 3. What can lead to harmful effects when one is in contact with chemicals or radiation?

Option: Exposure Option: Preference

Option: Leak Option: Tumor

4. Which field of physics deals with the behavior of subatomic particles?

Option: Mechanics Option: Quantum Option: Chemicals Option: Research

5. What state is characterized by illness or poor health?

Option: Response Option: Recovery Option: Oxygen Option: Sick

6. Which term describes items designed to be thrown away after use?

Option: Hormones Option: Disposable



Option: Microwaving

Option: DNA		
Option: Tumor Option: HypoxyStat	xygen levels in tissues to maintain homeostasis?	
Option: Chemicals Option: Messenger		
8. What activity involves the	e systematic investigation to discover new knowledge?	
Option: Tissues Option: Research Option: Expand		
Option: Messenger		
9. What do certain mechanis	sms in the body do to ensure the safety of cells?	
Option: Protect		
Option: Expand		
Option: Container Option: Chemicals		
Option. Chemicais	NEWS.COM	
10. What term describes the	e ability to react quickly and positively to something?	
Option: Sick		
Option: Responsive		
Option: Recovery		
Option: Radiation		
Gap-Fill (Fill in the blan	ks with the correct word from the vocabulary list.)	
11. The process of breathing	g is mostly controlled by the nervou	ıs system.
12. A	is an abnormal growth of cells that serves no purpose.	
13. Humans need	to survive as it is vital for cellular respiration.	
14. The study of how	react with each other is important in chen	nistry.
15. Hormones act as	molecules in the body to signal various re	sponses.
16. Cells	in size as they absorb nutrients and grow.	
17. The cell membrane acts	s as a holding the cell together and k	ceeping its



Answer

Multiple Choice: 1. Tardigrades 2. Instinct 3. Exposure 4. Quantum 5. Sick 6. Disposable 7. HypoxyStat 8. Research 9. Protect 10. Responsive

Gap-Fill: 11. Automatic 12. Tumor 13. Oxygen 14. Chemicals 15. Messenger 16. Expand 17. Container 18. Leak 19. Preference 20. Harmful

Matching sentence: 1. DNA 2. Behavior 3. Unconscious 4. Researchers 5. Sick 6. Recovery 7. Microwaving 8. Responsive 9. Chemicals 10. Preference

CATEGORY

1. Health - LEVEL1



Date Created 2025/02/26 **Author** aimeeyoung99

ESL-NEWS.COM