

Not Quite a Solid, Not Quite a Liquid: Meet Hydrogels

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EPISODE 1

VOCABULARY

A. Choose the correct words in the box to match their meaning.

unpredictable irrigation mimic prototype sustainable biocompatible retain


- | | |
|----|---------------------------------------------------|
| 1. | to copy or imitate something closely. |
| 2. | to keep or hold something. |
| 3. | able to exist in the body without causing harm. |
| 4. | the artificial watering of land or crops. |
| 5. | not able to be foreseen or expected. |
| 6. | an early model of a product used for testing. |
| 7. | able to continue without harming the environment. |




VOCABULARY

B. Read the summary and fill in the blanks using the words in the box.

irrigation unpredictable mimic prototypes sustainable biocompatible retain



Hydrogels are water-rich materials that can (1)___ living tissue properties and (2)___ extraordinary amounts of water. In healthcare, these (3)___ materials are being used in wound dressings and implants that reduce the formation of scar tissue. In agriculture, hydrogels improve water retention in dry soils, reducing the need for (4)___ and helping crops survive in increasingly (5)___ climates. Researchers are currently working on (6)___ in the lab, with the goal of scaling these materials to create (7)___ solutions for water harvesting, carbon capture, and environmental applications.



COMPREHENSION QUESTIONS

C. Choose the correct answers.

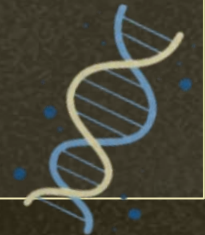
1. What percentage of their weight can hydrogels absorb in water?

- A) Up to 50%
- B) Up to 75%
- C) Up to 99%



2. What is one advantage of hydrogel implants compared to traditional metal implants?

- A) They are cheaper to produce
- B) They eliminate scar tissue formation
- C) They last longer in the body



COMPREHENSION QUESTIONS

C. Choose the correct answers.

3. How do hydrogel-based water harvesting systems work?
- A) They use electricity to extract water from air
 - B) They absorb water at night and release it during the day using sunlight
 - C) They filter water from underground sources
4. What can hydrogel sensors detect in plants?
- A) The plant's age
 - B) Problems like insufficient watering or bacteria within minutes
 - C) The type of soil the plant is growing in



COMPREHENSION EXERCISE

D. Choose T if the underlined word is correct, or replace the word if it is incorrect.

1. Hydrogels are networks of polymer chains that behave more like living plastic than traditional materials.
2. Traditional implantable materials such as metals always form scar tissues on the interface.
3. Hydrogel sensors can give farmers information about crop health within hours.
4. Hydrogels can absorb water vapor in very humid climates.
5. Researchers at MIT are exploring hydrogels that could capture atmospheric oxygen and methane.



DISCUSSION QUESTIONS

E. Answer the questions

1. How could hydrogel technology change healthcare in developing countries where access to advanced medical treatments is limited?
2. Do you think using hydrogels in agriculture is a better solution than traditional irrigation methods? Why or why not?
3. What are the potential environmental benefits and risks of using hydrogels to harvest water from the air in desert regions?



DISCUSSION QUESTIONS

E. Answer the questions

4. If you could design a hydrogel application to solve a problem in your community, what would it be and why?
5. How might the development of self-repairing materials using hydrogels change the way we manufacture products in the future?
6. What ethical considerations should scientists think about when developing materials that can interface directly with plants or living tissue?

