



Physicists Uncover Slime Mold's Decision-Making Process

Description

Slime molds, particularly the well-studied *Physarum polycephalum*, exhibit intriguing behaviours that mimic intelligence despite lacking brains or nervous systems. Recent research indicates that a decentralized decision-making process governs their collective movement, challenging assumptions about central control in living organisms.

This vibrant yellow slime mold, primarily composed of a mass of cell nuclei, displays remarkable adaptability. When it exhausts available food sources, it can navigate to new locations, a feature that distinguishes it from traditional fungi. The study highlights how slime molds not only seek food but also demonstrate problem-solving abilities, such as navigating mazes to locate sustenance.

Researchers from Germany and the United States explored the mechanics behind these behaviours. They noted that *P. polycephalum* reacts to blue light with a strong aversion, using light traps to study its escape response. These traps consist of regions illuminated by 470 nm blue light, shaping the environment in which the molds find themselves.

During experimentation, starved slime molds began to explore these traps within an hour. They used a process known as cytoplasmic streaming, where cellular fluid flows through their bodies, enabling them to extend small structures into the illuminated regions, searching for escape routes. Most attempts were retracted, but some successful extensions allowed for liberation.

The research revealed that the longest escape routes were preferred, as the mold's rhythmic contractions helped build pressure along these paths. This mechanical advantage enables efficient movement, suggesting that decision-making in slime molds relies more on fluid dynamics than cognitive processes.

The findings, which uncover the adaptive behaviours of non-neuronal organisms, have been published in *PRX Life*. Future studies may further elucidate how these fascinating creatures process their environments to survive.

Vocabulary List:

1. **decentralized** //di:'sentrə,ləɪzd// (adjective): not controlled by a single person or group
2. **collective** //kə'lektɪv// (adjective): done by or shared by a whole group
3. **adaptability** //ə,dæptə'bɪlɪti// (noun): ability to change and work well in new situations
4. **navigate** //ˈnævɪ,geɪt// (verb): to find a way to move through a place
5. **aversion** //ə'vɜːʒən// (noun): a strong dislike or wish to avoid something
6. **cytoplasmic** //ˌsaɪtə'plæzmɪk// (adjective): relating to the fluid inside a cell



Comprehension Questions

Multiple Choice

1. What is the scientific name of the well-studied slime mold mentioned?

- Option: Amoeba proteus
- Option: Physarum polycephalum
- Option: Aspergillus niger
- Option: Penicillium chrysogenum

2. What do slime molds lack despite their ability to mimic intelligence?

- Option: Cell nuclei
- Option: Brains or nervous systems
- Option: Decentralized decision-making
- Option: Collective movement

3. How do slime molds react to blue light?

- Option: They are attracted to it
- Option: They have no response
- Option: They exhibit strong aversion
- Option: They glow

4. What mechanism do slime molds use to explore light traps?

- Option: Cytoplasmic streaming
- Option: Mitosis
- Option: Photosynthesis
- Option: Binary fission

5. What is the preferred type of escape routes for slime molds?

- Option: Shortest paths
- Option: Simplest routes
- Option: Longest escape routes
- Option: Circular paths

6. Where were the findings about slime molds published?

- Option: Nature



- Option: Science
- Option: PRX Life
- Option: Cell

True-False

7. Slime molds are classified as traditional fungi.
8. The behavior of slime molds challenges assumptions about central control in living organisms.
9. Slime molds possess a nervous system for decision making.
10. Researchers discovered that slime molds can navigate mazes to find food.
11. Cytoplasmic streaming refers to the rigid movement of slime molds.
12. The study indicates that decision-making in slime molds is based on cognitive processes.

Gap-Fill

13. Slime molds exhibit behaviors that mimic intelligence despite lacking _____.
14. When they run out of food, slime molds can navigate to _____ locations.
15. The slime mold reacts to blue light by exhibiting _____ aversion.
16. The exploration of light traps by starved slime molds occurs within _____ hour.
17. Slime molds prefer the longest escape routes due to their rhythmic _____ contractions.
18. Research findings about slime molds were published in _____ Life.

Answer

Multiple Choice: 1. Physarum polycephalum 2. Brains or nervous systems 3. They exhibit strong aversion 4. Cytoplasmic streaming 5. Longest escape routes 6. PRX Life

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

Gap-Fill: 13. brains or nervous systems



14. new 15. strong 16. an 17. mechanical 18. PRX

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