Name(s)

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Project Number

S1503

Project Title

Mindless Mold: Physarum polycephalum Intelligence

Abstract

Objectives/Goals

Physarum polycephalum are a unique slime mold protist species that contain a primitive intelligence when it comes to navigation and response to stimuli. Since the species P. polycephalum has been known to navigate the most efficient route to its food source and also has been known to distinguish its most nutritional diet, will the Physarum still chose the most efficient food source even if it is not the most nutritional? Or will the P. polycephalum choose the most nutritious diet even if it must navigate through an inefficient pathway?

Methods/Materials

Physarum polycephalum was ordered from online Carolina Biological Supply company along with petri dishes, 2% (non-nutrient) agar, sterilized scalpels, and oat flakes for slime mold#s diet. Jellyroll sheet was sterilized and acted as giant petri dish for P. polycephalum. After pre-trials were conducted, P. polycephalum was placed on the jellyroll pan in agar maze created using plastic strips. Oat flakes were placed at farthest, most difficult part of maze while other, less nutritional diets place closer to starting point of P. polycephalum. Slime mold growth and behavior was then measured and recorded.

Results

Pre-trials demonstrated how long the slime mold can continue streaming and searching for its food source. At its fastest Physarum has been observed to grow at 1.35 mm per second so it was unsurprising that the Physarum traveled a total of 140.4 cm. The nutrient choice experiment was also recreated however the main experiment is still currently being conducted.

Conclusions/Discussion

P. polycephalum#s complex cytoplasmic steaming behaviors are considered a possible method to help plan future roadway or other transportation construction. An experiment that determines what choices the slime mold will make when confronted with more complex decisions will refine the knowledge about Physarum. Knowing more about P. polycephalum#s behavior, is necessary if slime mold is ever going to be a viable option for modeling transportation systems.

Summary Statement

Mindless Mold tested whether nutrient content versus efficiency was more important in Physarum polycephalum navigation.

Help Received

Permission from AP Biology teacher, Beth Dixon, to use equipment from school and parents helped order materials.