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# Machines and Molds: An Exploration of Brainless Cognition

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## Abstract

Cognition as a grouping of mental processes has always been fundamentally linked to that of the brain. Yet more recently, the acellular slime mold known as *P. polycephalum* has been observed to complete various tasks associated with cognition without the need for a brain. The most notable feat of *P. polycephalum* has been repeatedly solving mazes with greater efficiency on each subsequent run. This has led to the speculation that *P. polycephalum* may possess the ability to learn. Comparatively, various developments in computation have led to algorithms and robotic systems that also appear to have the capacity to “learn.” Utilizing the same maze structure to test both *P. polycephalum* and various computational methods, we quantitatively map and compare the effectiveness and means by which each solves the problem. With this, we hope to provide greater insight into brainless problem-solving in both biological organisms and machines.