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Using the Slime Mold *Physarum polycephalum* in Independent Student Research

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Abstract

This mini-workshop will introduce the acellular slime mold *Physarum polycephalum* as an ideal organism for use in independent research for first-year biology students. There are many challenges to incorporating independent research in introductory biology courses: students don't yet have sufficient conceptual understanding to conduct the research, the experimental organisms pose maintenance problems, necessary equipment is expensive, and there is not enough room to accommodate numerous experimental setups. *Physarum polycephalum* addresses all of these problems. First, students do not need detailed background information to understand the organism. Its life cycle includes several distinct stages that can easily be distinguished. The slime mold can be induced to move from one stage to another by manipulation of the nutrition source and light. Second, *Physarum* is easily grown on 2% non-nutrient agar, fed oatmeal flakes, and kept at room temperature. Third, students can often design their own experimental apparatus from PVC pipe and plastic storage containers. Fourth, the entire experiment of a research team can be stored in a single laboratory drawer or medium-sized box. At College of Notre Dame of Maryland, first-semester biology students conduct semester-long research projects involving *Physarum*. At the end of the semester, students present their results in a formal symposium presentation and in a written report. Because this same organism has been used by first-semester students for many years, its use has become a "rite of passage" for students in the department, linking students within the major. Over the semesters, especially innovative or well-written reports have been collected and "published" in the department's *Journal of Physarum Research.* As students read these articles and others accessed through the library's database, they are introduced to the importance of studying the literature. In the spring semester, first-year students are invited to continue their project as independent research. Students have taken the results of this extended research to various undergraduate research symposiums.