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Responses to Differential Light Wavelengths in the Cellular Slime Mold *Dictyostelium Purpureum*

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Poster Presentation 30

RESPONSES TO DIFFERENTIAL LIGHT WAVELENGTHS IN THE CELLULAR SLIME MOLD DICTYOSTELIUM PURPUREUM

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Cellular slime molds are detritus and soil inhabitants found predominately in dark, moist, forested regions. The unique life cycle of these organisms begins with spore germination with each spore releasing a single amoeboid cell called a myxamoeba. Myxamoeba feed by phagocytosis, then grow and divide to produce large populations of cells. Given proper chemical cues involving cAMP, myxamoeba aggregate into one or more large, motile pseudoplasmodium. After a variable period of migration, each pseudoplasmodium will stop and form a stalked fruiting body called a sorocarp. The sorocarp functions to disperse the spores that will release myxamoeba. Beginning in the multicellular pseudoplasmodial stage and culminating in the sorocarp stage, only two types of cells differentiate, stalk and spore cells, in the lifecycle of these organisms.

Due to the morphological simplicity of cellular slime molds, research scientists are using these organisms as model for scientific study. Research has been conducted studying processes of cell-cell communication, cell differentiation in the two cell type system, and behavioral processes such as myxamoeba aggregation, pseudoplasmodial migration, and sorocarp formation. A major focus of the work on behavioral processes has focused on when pseudoplasmodia stop movement and differentiate into the fruiting body. The results of this research have thus far determined that increased humidity, increased temperature, and light play significant roles in eliciting sorocarp formation. Light is known to signal more rapid induction of differentiation into the sorocarp. Previous work done on a sister group to cellular slime molds, the Myxomycota or plasmodial slime molds, revealed that certain frequencies of visible light, specifically blue and green, were the most effective in inducing sorocarp formation. There is no published research indicating that a similar sensitivity to portions of the visible spectrum exists in cellular slime molds despite exhibiting similar responses to light. In an effort to study cellular slime mold responsiveness, I have isolated the cellular slime mold Dictyostelium purpureum from soil samples in Bloomington, Illinois. I have determined positive phototaxis in this species, as well as, higher numbers of sorocarps formed when exposed to a 12:12 light to dark period over all light or all dark. The objective of the research presented here is to examine potential effects of wavelengths of visible light on myxamoeba aggregation, migration of pseudoplasmodia, and sites of sorocarp formation.