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Slime Mold Lab Report

Abstract

The *Dictyostelium purpureum* was plated on different media containing (1) *Escherichia coli* (2) bread (3) potato (4) banana (5) sugar and glucose and (6)water. Fruiting body formation was observed or all colonies with die-off at water alone. There was observable migration or selective chemotaxis for diet preferences for E. coli and simpler sugars.

I. Introduction.

The *Dictyostelium purpureum* (Domain: Eukarya; Phylum: Amoebozoa; Class Mycetozoa, Order Dictysliida) belongs to a group of dictyostelids commonly known as cellular slime moulds. Their life involves two stages — the amoeba and slug phase. At favorable environment conditions and food supply they accede to their amoebic form otherwise at food scarcity, they aggregate to form a slug. The mechanism for cell aggregation for the slime mold proceed by cAMP response, whereby the amoeba, releases cAMP signals as stress response from food scarcity. Others would migrate to cAMP concentrations.The slug is one big migratory aggregate bearing an anterior and posterior, with chemotactic, phototactic, thermotactic response. Given proper environmental conditions, the fruiting body (a maturation/development of slug) thatcontains spores, will become the new amoeba.

In the performed lab exercise on *Dictyostelium purpureum* is plated on different meadia bearing different “food”. The response of *Dictyostelium* sp. and the life cycle was observed on the different nutrient media.

II.Methods:

Using aseptic techniques, same amount of fresh, young culture of *Dictyostelium purpureum* was plated on different media containing the subsequent nutrition: Petri plate (1) *Escherichia coli* (2) bread (3) potato (4) banana (5) sugar and glucose and (6)water. The *Dictyostelium* was incubated under room temperature conditions, 32^0C, for a duration of one week. For each day of the week, the Petri plates were observed for the formation of cell aggregates and fruiting structures. Growth was also measured using a paper with 1 cm circle on it. Possible contamination is also noted. All observations were recorded on Table 1.

III. Results and Discussion:

The life cycle of *Dictyostelium purpureum* and its response to different nutrient media were observed and recorded in Table1.

Table 1 shows that during there was no formation of fruiting body on Day 1 and Day 2. This indicates that the amoeba was still prevalent in the different media and that there was no scarcity of food yet. Upon culture plating of the organisms, the individual or the single-celled amoeba adapts to the environmental conditions of the various media, starts to grow and develop as there are abundance of food. Amoeba cannot be discerned by the naked eye. It is only the fruiting body structure which would be visible. At Day 2, there are possible food depreciation to near scarcity hence fruiting bodies may have started to grow for the culture on bread and water. For the culture on bread and banana, the start of fruiting body formation may have been because the amoeboid on the medium has difficulty breaking down the complex nutrient of the bread and which is consist mainly of complex carbohydrate starch and cellulose, for the banana. For the culture on water, this is not surprising, because there are only traces of nutrients available for the amoeba. The start of fruiting body formation and its migration to the sixth circle may probably

be attributed to the buoyancy of water and also to the need of the *Dictyostelium* to search for food. This is possible since the cell aggregate formation can react both to chemotaxis, in this case for the presence of food.

Day three signals the start of fruit formation for the dictyostelid. The food starts to run out. Asexual stage stage begins. During food depletion, cell division stops for the amoeba nad cell division starts. The asexual stage involves the aggregation of starving amoeba to one central point through cAMP response. The muticellular structure becomes the fruiting body bearing spores.

From Day 4 to Day 6, there was continuous increase in the number of fruiting bodies. Migration towards different paths, an indication of chemotaxis or chemotactic response was evident for cell cultures. As time goes by, the migration becomes more raucous even reaching to the approaching the ends of the plate or far from the inner circle. In Day 7, there was a lag in fruiting body formation, an indication of cell death for the culture. Contamination of the cultures were observed for bread and water. This is unsurprising since the media used are unsterile. For the bread fungal contamination is common. The observed colonies are of red and yellow types. In this case, an assessment for the organism/contaminant is lacking if the basis is on color morphology alone.

Chemotaxis is exhibited by *Dictyosteleum purpureum*. *E.coli* is a common diet for the dictyostelid and it was shown to be observed in the media (Plate 6 Day 7 migration observable). Depending on the nutrient available and its complexity, the organism may prefer for simpler sugars instead of cellulose (banana) or starch (bread) and will “search” for this in the media. Water is a requirement for growth but on water alone, the dictyostelid will cease to live.

Table1. Number of Fruiting Bodies and Observation of *Dictyostelium purpureum* Grown on Different Nutrient Media

Plate	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
1 *E.coli*	0	0	11	100*******	300-400*********	500**********	600**********
2 Potato	0	0	17*	20****	30******	40********	40******
3 Bread	0	Start**	30*******	80********	150*********	200**********	200C
4 Banana	0	1	43******	60*******	100********	150**********	150
5 Sugar, Glucose	0	0	40	60********** *	80s	100**********	100
6 Water	0	Start*****	80***	150********** **	200s	300**********	SC

*Circle Number Migration where the number of * corresponds to circle no.
S=spreader
C=possible contaminants/ presence of other fungi or bubble

IV. Conclusion

Dictyostelium purpureum exhibit fruiting formation during asexual stage as response to food scarcity. Migration at different parts of the plate are indicative of chemotactic response and the organism is partial to *E. coli* and simpler sugars.

Work Cited

Booth, C. . “Fungal Culture Media” in *Methods in Microbiology*. London: Academic Press, 1971.