Dictyostelia

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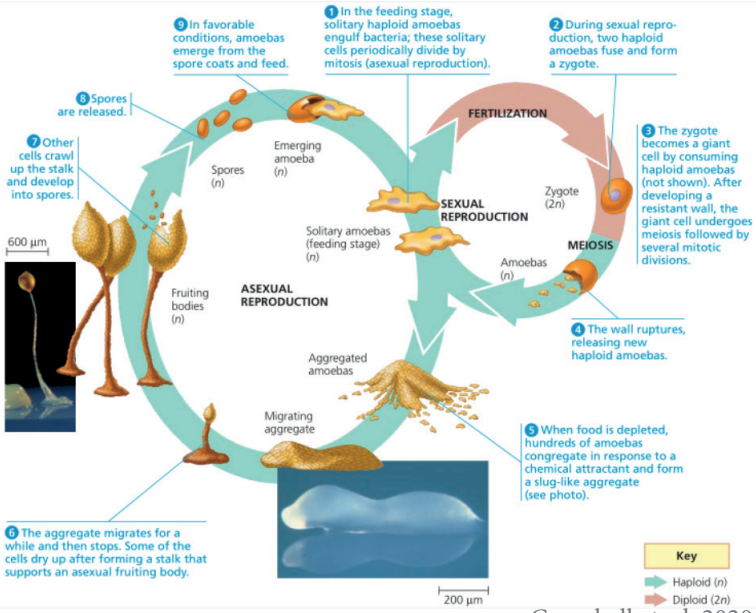
Dictyostelids, a class in the phylom Amoebozoa, spend most of their lives as free-living, unicellular amoeba found in forest soil. However, when conditions get harsh, they aggregate in large numbers. In the sexual cycle, aggregates can form zygotes within thick macrocysts. In the argueably more famous asexual cycle, the aggregated amoebae form large multicellular fruiting bodies called sorocarps. In most species, the sorocarps undergo cell differentiation, where around 20% of the cells die to form the "stalk" of the sorocarp. The function of the stalk is to support the spore- forming part of the sorocarp (sorus) and get it as elevated as possible: the stalk-forming cells thus die without forming any spores themselves.



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When aggregating, dictyostelids prefer to agregate with their own clones, using membrane proteins with polymorphic extracellular domains to recognize their own kin. However, in order to get a large enough sorocarp, they might sometimes have to aggregate with different lineages (or even a different species!). However, these other lineages might be "cheaters", meaning that a disproportionally large amount of them gather in the sorus rather than contributing to the stalk. The interplay between cheaters and non-cheaters can be complex: successful cheaters get to create more spores, but other lineages might refuse to aggregate with them at all, leaving them unable to gather large numbers. Cheating can be predetermined by genotype ("fixed" cheating) or depend on the interactions with the other lineages in the slug ("facultative" cheating). Because of this complexity, Dictyostelia, and in particular the species Dictyostelium discoideum, can be used as a model system for studying social cooperation, altruism, and cheating.

Further fun dictyostelid facts:

Some cheater lineages even lose the ability to form sorocarps by themselves, and thus become "obligate social parasites".

Dictyostelids mostly eat bacteria, and some even display a "farming" behaviour, carrying their preferred bacteria with them to new locations. They can even incorporate the bacteria in their spores, as a food source for the progeny.

Different species often form morphologically different sorocarps. If two different species combine to form a sorocarp together, it never seems to form an intermediate morphology. Instead, it usually forms a sorocarp with the same morphology as the most numerous species in the aggregate.

Some "loner" cells might not aggregate at all, and instead continue living as single amoeba. When the majority of their peers aggregate, this might lead to less competition and more food left for these loners.

References:

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