

Escherichia coli changes phenotype when cultured in symbiosis with
Dictyostelium discoideum

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SUMMARY

We established an experimental symbiotic system composed of *Escherichia coli* and *Dictyostelium discoideum* to examine how symbiosis occurs. Even though the relationship of *E. coli* and *D. discoideum* is a prey-predator relationship, these two species achieved a state of stable coexistence within mucoidal colonies after several weeks of co-cultivation (we named this the “symbiotic colony”). We then investigated the population dynamics of *E. coli* after cells were isolated from the symbiotic colony. To do these experiments we observed the morphological changes of the *E. coli* cells and the shape of the *E. coli* colonies and also tested if *E. coli* could be cultured again with *D. discoideum*. To do these experiments, we used a glutamine-auxotrophic mutant *E. coli*. The amino acid was then supplied with the medium (for the *E. coli* colonies), or available through the products of *D. discoideum* (in the co-cultivation experiments). We observed the *E. coli* response to the glutamine through its growth curve. We found that there were two types of *E. coli* present in this system. One type formed normal colonies by itself and mucoidal colonies with *D. discoideum*, while the other type formed mucoidal colonies in both cases. The mucoidal colony developed faster than the original symbiotic mucoidal colony, even though its growth curve differed according to the glutamine quantity provided in the liquid medium. This phenotypic change of *E. coli*, induced through an interaction with *D. discoideum* cells, seems important. We aim to gain a better understanding of how *E. coli* changes its relationship by looking at intracellular aspects such as gene expression in the future.