INTRODUCTION

Algae, like many other organisms, were once single celled and evolved multicellularity. Volvaceae algae is the most recently evolved family, dating back to approximately 200 million years ago, making it the best candidate for experimenting with its evolution because fewer changes were likely to occur from its inception to now in comparison to the other families. The specific volvacean algae that we used were chlamydomonas which is unicellular and gonium which is colonial multicellular. Below are the members of the Volvaceae family and even though these algae look very different, their genome is very similar.

Hypothesis

We believe that transforming the gonium cell wall modification gene into the chlamydomonas algae will produce a gain of function, making the chlamydomonas multicellular.

METHODS

After a long process of selecting a putative multicellular gene, it was transferred into Chlamydomonas using the following steps: 1) Amplified the gene by PCR, 2) ran a gel extraction to isolate the specific base pair, 3) ligated that gene to a plasmid vector so that it can more easily be transformed, 4) transformed the gene to E. coli to make more copies of the gene for further experimentation, 5) ran a colony PCR to ensure that the gene was still present, 6) grew more plasmids for further experimentation by culturing, 7) ran a restriction enzyme digest to ensure that the gene was in the correct orientation, 8) electroporation.

RESULTS

The Cell Wall Modification gene Gp13.g826 was successfully cloned and transformed into Chlamydomonas resulting in a gain of function.

DISCUSSION

The experiment supported my hypothesis, as the once spread unicellular algae became multicellular and punctated when modified, which proves that a cell wall modification may have occurred during the evolution of algae. The next step would be to use the gene in reverse orientation to knock out the cell wall modification gene to ensure that no outside variable impacted the experiment. After all of that, the transformants should be backcrossed with the RB pathway in hopes that they are somehow linked. This will allow us to theorize natural multicellular evolution.

CONCLUSIONS

When the Gonium cell wall modification gene GP.13g826 is transformed into Chlamydomonas, a gain of function occurred producing multicellular transformants. Further research, including back crossing the transformants with the RB pathway, has to be done to verify if the gene is linked to the pathway and the natural evolution of multicellularity.

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