CALIFORNIA SCIENCE & ENGINEERING FAIR
2018 PROJECT SUMMARY

Name(s)

Yolanda A. Shen

Project Number

38426

Project Title

Using Penium margaritaceum to Investigate Cytokinesis Conservation

Abstract

Objectives/Goals

I chemically inhibited the cytokinesis of algae to characterize both the growth and the cell wall components of the algae.

Methods/Materials

Applied Endosidin 7 (chemical) to P. margaritaceum, then utilized monoclonal antibody JIM5 and secondary antibody Alexafluor 488 to label. Observed under confocal microscope and compared to Dimethyl sulfoxide (DMSO; control)-treated algae. Repeated process with secondary antibody TRITC.

Results

The pectin labeled by JIM5 allowed for the visualization of the isthmus zone of the algae. The isthmus zone of the ES7 treated algae was greater than that of the DMSO by 150%. JIM5 pectin specks were still found in the isthmus zone, where there should be no immunofluorescence. This experiment resulted in no correlation with algae growth and chemical treatment, despite the quantification that the DMSO treated algae grew more than the experimental group by 47%.

Conclusions/Discussion

ES7 inhibits P. margaritaceum cytokinesis, as the elongated isthmus is due to the cells# bilateral expansion before attempting to divide. The immunofluorescence in the isthmus may indicate the algae's attempt to restabilize the forming cell plate to counter ES7's effects. Cell elongation cannot be correlated to treatment due to slightly de-synchronized cell division cycles of the algae. This experiment will contribute to further understanding of the evolution of the cell wall (ES7 used in complex land plants before) as well as the development of more efficient biofuel.

Summary Statement

I chemically inhibited the cytokinesis of algae to characterize both the growth and the cell wall components of the algae.

Help Received

I performed my experiment in the Drakakaki Lab at UC Davis under the guidance of graduate student Destiny Davis.