

DIVERSITY AND BIOGEOGRAPHY OF THE UNIQUE.
TROPICAL PHYLUM PLACOZOA

A THESIS SUBMITTED TO THE GRADUATE DIVISION OF THE
UNIVERSITY OF HAWAII IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF SCIENCE

IN

OCEANOGRAPHY

AUGUST 2008

By
Jillian Ward

Thesis Committee:
Eric Gaidos, Chairperson
Grieg Steward
Guangyi Wang

Abstract

Phylum Placozoa consists of only a single described species, *Trichoplax adhaerens*. Although organisms within the phylum are morphologically indistinct, recent molecular evidence indicates cryptic diversity. To date there are 8 described placozoan haplotypes found in tropical regions world wide. Presented below is a community analysis of 30 placozoan isolates obtained from Hawai'i, as well as 14 samples collected from Puerto Rico. It was found that at least 5 of the 11 described haplotypes are found in Hawai'i, while only 2 different haplotypes were obtained from the Puerto Rican samples. Two separate genetic loci were analyzed using DNA from the Hawai'ian isolates, the mitochondrial 16S rDNA and a more variable location on the mitochondrial genome that encompasses the *cox2* gene as well as an intergenic spacer region. It was found that both loci exhibited low levels of intra-haplotype variation and moderate levels of inter-haplotype variation, however the 16S locus was better able to capture diversity because the average single nucleotide polymorphism per base pair rate (SNP/bp) is 0.188 compared to the *cox* SNP/bp rate of 0.095 on average. Preliminary work was also done to explore the placozoan life cycle. Samples of near-shore water (between five and 11 liters) were taken during each of two field collections from 2 locations on Oahu and filtered. DNA was extracted from the filter and placozoan 16S rDNA primers were used to amplify product from the extract. Possible product was detected by gel electrophoresis, but more work must be done to conclude whether or not placozoans inhabit the water column and at what concentration. Placozoans are tractable, easily cultured organisms making them ideal for ecological, speciation, and evolution studies.