Zooxanthellae Genotyping

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Abstract

The symbiotic relationship of corals and algae will be understood once we comprehend coral bleaching at the molecular and cell level. With the use of molecular techniques like Polymerase Chain Reaction (PCR) and Restriction Fragment Length Polymorphisms (RFLPs) we genotyped fifteen *Montastraea faveolata* samples. Of the fifteen samples, seven ended up being type A, one type C, five type D and two a mixture of C and A. In the long run these fragments will served for the aid in constructing cDNA libraries for sequencing and the usage of gene expression.

Introduction

Over the last several decades (Knowlton and Rohwer) Global warming has been impacting one of the worlds diverse ecosystems, which are coral reefs (Hughes *et al.* 2003). This has had a drastic effect in such ecosystem, causing disruption of a mutualistic relationship among corals and *Symbiodinium* (Zooxanthellae) algae. Such disruption is known as coral bleaching: a disease where the endosymbiotic algae are lost and the coral can no longer survive (e.g. Hoegh-Guldberg and Smith 1989). This phenomenon not only is affecting the corals, but it is affecting the biodiversity present in coral reefs and "the economies of some countries"(Vann Open and Gates 2006) as well . The reason for coral bleaching is not only due to global warming, but it is also "associated with...over fishing, eutrophication and coral disease" (Smith et al 2006). It is important that such phenomenon is understood at a molecular and cellular level to be able and comprehend the symbiotic relationship among corals and algae. Our lab tries to address this by Zooxanthellae genotyping (18S rRNA fragment), as well as

Results

Although the samples are from the same species *Montastraea faveolata* the results were different from each other. The healthy MF total sample as well as the healthy and diseased from January 06 samples resulted in clade A with exception of one healthy sample being clade C. As for the May 06 healthy and diseased samples all ended up being clade D with the exception of two white plaque diseased samples from May 06, which ended up being a mixture of two clades C and A (see Table 1 and Fig 1).

Conclusion

The results for the experiment were interesting because all the coral samples did not result with the same clade type. Instead all the healthy and January 2006 samples were clade A with the exception of one being clade C. For the May 2006 samples, four healthy ended up being type D, one diseased sample ended being type D and two diseased samples ended up being a mixture of type C and A.

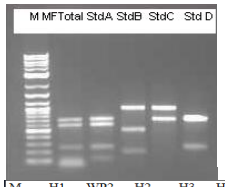
Materials and Methods

Coral samples came from the Caribbean species *Montastraea faveolata* from two different time periods (January 2006 and May 2006) and two different health conditions such as healthy coral and coral affected by white plaque disease. Afterward Zooxanthellae was scraped off from coral tissue with a razor and preserved with ethanol. DNA was then isolated from the preserved samples by graduate student, Shinichi Sunagawa. Then I proceeded with amplification of DNA more precisely the 18S rRNA gene using the technique of polymerase chain reaction (PCR). To classify if the amplification was zooxanthellae, the PCR product was digested using the technique of restriction fragment length polymorphisms(RFLPs) and analyzed with a 2% agarose gel via electrophoresis.

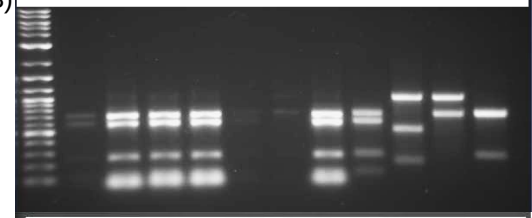
Table 1. Clade typing results for samples of *Montastraea faveolata*

MF Total	A
WP2 Jan06	A
H2 Jan06	A
H3 Jan06	A
WP5 Jan06	A
H1 Jan06	A
H5 Jan06	C
WP1 Jan06	A
H1 May06	D
H2 May06	D
H3 May06	D
H5 May06	D
WP7 May06	D
WP8 May06	C\A
WP10 May06	C\A

A)



B)



C)

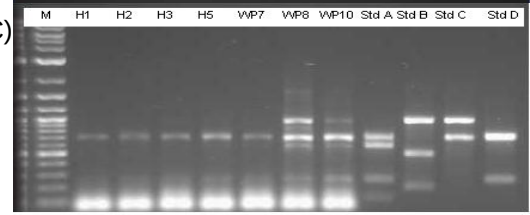


Fig.1. RFLP Pictures
A) MF Total Sample
B) Jan 06 samples
C) May 06 samples

References

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