‘Fishing Out’ Polyketide Synthesis Genes from a ‘Red Tide’-Forming Dinoflagellate

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Dinoflagellates are single-celled, eukaryotic, planktonic species. Most dinoflagellates are completely harmless, but a few species have detrimental environmental effects such as the Red Tide-forming Karenia brevis. These tides are a result of a brevetoxin produced by Karenia brevis, which deplete the water of oxygen and other nutrients, as well as poison marine life, which can then harm humans. Brevetoxins are synthesized by Polyketide Synthesis genes, which have been sequenced in other dinoflagellates – but not in the genome of Karenia brevis. It is hypothesized that multiple versions and domains of the PKS gene will be isolated inside the genome. By creating sequenced probes from homologous PKS genes, targeted genes will be able to be ‘fished out’ of a sample of Karenia brevis RNA. These genes will then be put through a Reverse Transcription reaction, followed by a Polymerase Chain Reaction, and finally ran on an agarose gel to determine size of bands. It has been seen that streaks appear on gels, proving that multiple genes are present for the coding of proteins necessary for brevetoxin construction (specifically Acyl Transferase). With procedural modifications, all eight of the targeted probes will produce similar results. By understanding the genetic make-up behind the toxin, science will be better able to understand what triggers such mass releases that result in the dead zones of red tides.

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