

Abstract: Microorganisms are prolific producers of bioactive natural products. These compounds, which are often eukaryotic cell effectors, can be a feature of symbiosis between a microbe and a eukaryotic host. The marine bryozoan, *Bugula neritina*, possesses an uncultured microbial symbiont, "*Candidatus Endobugula sertula*", that produces bryostatins, bioactive natural products that have been shown to defend the vulnerable larvae from predators. First, we are investigating the interplay between the benefit of defensive bryostatins and the cost of symbiosis on the geographic distribution of both the host and symbiont. In addition, we have found that the bryostatins may be important for reproduction in the host, and may be co-opted as primary metabolites by the host. This system is an excellent example of the importance of symbiont-produced natural products to the host.