

Chemosymbiosis: animal – microbe – environment interactions

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Most of the biomass at hydrothermal vents is in invertebrate species that host symbiotic sulfide- and methane-oxidizing bacteria. This high symbiotic productivity is mainly driven by the geofuels emanating from the hydrothermal fluids, with oxygen from the surrounding seawater as the primary electron acceptor. Thus, the dilution of vent effluents with ambient seawater leads to gradients in electron donors and acceptors, which can vary starkly over time and space. These gradients play a major role in determining the distribution, biomass and productivity of symbiotic organisms at hydrothermal vents. While the importance of these interactions between hydrothermal and biological processes has long been recognized, our understanding of them still remains fragmentary. Major challenges in the field include identifying these gradients, the collection of animals along these gradients, and the biogeochemical analysis of these gradients at scales relevant to the symbiotic associations. In the laboratory, challenges include characterizing symbiont diversity and abundance, and a statistically relevant analysis of symbiotic biomass and productivity. The goal of this talk is to provide a basis for discussing how these challenges can be met through interdisciplinary exchange and collaboration.

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