Functional properties of haemocyanin oxygen-binding were investigated with a diffusion chamber using the step by step procedure. Oxygen affinity was moderately high, with P50 = 5.2 Torr at 15°C and pH 7.6, slightly above values obtained with *B. thermydron* Hc (Sanders *et al*, 1988). However the Bohr effect was surprisingly intense (Δlog P50/ΔpH < -2) especially for a brachyuran species (Truchot, 1992). Conversely, oxygenation was apparently endothermic with ΔH=15.5 kJ.mo^{l-1} between 4 and 35°C at pH 7.6.

Considering that, as a crab gets closer to a vent, the increase in temperature is probably accompanied by a decrease in pH, the affinity for oxygen by *Cyanagraea* Hc would actually decrease, but in a limited extent due to a compensation of this high Bohr effect by a positive intrinsic heat of oxygenation.

References

Markl J. & Decker H. 1992. Structure of arthropod hemocyanins. In: *Blood and Tissues Oxygen Carriers,* (C.P. Mangum ed), pp. 325-376. Springer Verlag: Berlin Heidelberg.

Sanders N.K., Arp A.J. & Childress J.J. 1988. Oxygen binding characteristics of the hemocyanins of two deep-sea hydrothermal vent crustaceans. *Respiration Physiology,* **71** : 57-68.

Truchot J.-P. 1992. Respiratory function of arthropod hemocyanins. In: *Blood and Tissues Oxygen Carriers,* (C.P. Mangum ed), pp. 377-410. Springer Verlag: Berlin Heidelberg.

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Phylogenetic relationships between deep-sea hydrothermal vent and cold seep polychaetes of the genus *Branchipolynoe* (Polychaeta: Polynoidae) inferred from sequences of mitochondrial genes (16S rRNA and COI).

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Polynoid polychaetes are a diverse family, particularly well represented at deep-sea hydrothermal vents and cold seeps. Many of the vent and seep species are free-living, however the genus *Branchipolynoe* Pettibone, 1984 occurs exclusively as a commensal in the mantle cavity of *Bathymodiolus*-like mytilid bivalves. Three species of *Branchipolynoe* have been described: *B. symmytilida* from the Galapagos Rift and northern East Pacific Rise (EPR) hydrothermal vent sites; *B. pettibonneae* from several vent areas in the western Pacific; and *B. seepensis* from cold seepage areas of the Gulf of Mexico. Commensal polynoids occurring in mytilids at hydrothermal vents of the Mid-Atlantic Ridge (MAR) are also assigned to *B. seepensis* based on morphological criteria. Specialized species, however, rarely occur at both vents and seeps, and there has been a growing suspicion that cryptic speciation has occurred between MAR commensals and Gulf of Mexico *B. seepensis*.

We have attempted to resolve the pattern of phylogenetic relationships within this genus, by analyzing DNA sequences. Specimens of *Branchipolynoe* were collected from several different localities on the Galapagos Rift, the East Pacific Rise, the Mid-Atlantic Ridge and the Louisiana Slope in the Gulf of Mexico. Following DNA extraction from frozen specimens, 500-600 bp fragments of the mitochondrial large subunit (16S) ribosomal RNA (rRNA) and the mitochondrial cytochrome oxidase subunit I (COI) genes were PCR amplified using "universal" primers. Purified PCR products were sequenced, nucleotide sequences were aligned, and maximum likelihood and neighbor-joining trees were calculated.

The divergence between *B. seepensis* from the Gulf of Mexico seeps and the commensal from the MAR was assessed in detail with the two genes, and suggests that the two forms might have been isolated long enough to become different species. Along a ridge axis, the level of differentiation within hydrothermal species of *Branchipolynoe* is much lower, and the effects of fast-vs. slow-spreading were compared.