Tissue-specific expression of different carbonic anhydrases in the chemoautotrophic symbiosis *Riftia pachyptila*

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The vestimentiferan tubeworm *Riftia pachyptila* is probably the most extensively studied deep-sea chemoautotrophic symbiosis. This symbiotic interaction relies on the host's ability to assimilate inorganic molecules from the environment through the gill. The branchial plume plays a central role in oxygen, carbon dioxide and sulfide acquisition from the environment. The symbiotic sulfide-oxidizing bacteria are located inside specialized cells (bateriocytes), in an internal organ called trophosome (a specific feature of siboglinid tubeworms). Carbon dioxide diffuses through the branchial plume epithelial cells (Goffredi et al. 1997) where it is immediately converted into bicarbonate by a carbonic anhydrase (CA). Once near the bacteriocytes, bicarbonate is converted back into carbon dioxide because it is the only species which can be incorporated during the Calvin-Benson cycle of the bacteria. CA activity and protein presence have already been documented in both tissues in *Riftia pachyptila* (Kochevar et al., 1993; De Cian et al., 2003). In an attempt to identify yet unknown host proteins involved in branchial and trophosome symbiosis-specific functions, we produced subtracted gill-specific and trophosome-specific cDNA libraries. Sequencing revealed the presence of a novel CA transcript in the gill-specific library. This new CA shows only 66.8 % identity in amino acids with the one previously sequenced by De Cian et al. (2003) which was also found in our trophosome-specific cDNA library. Quantification by PCR also revealed differential expression of these two CAs, one being more specifically expressed in branchial plume tissue and the other one in the trophosome. We are currently trying to localize the two CAs messenger RNAs through fluorescent *in situ* hybridization on histological sections.

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