


# Cardiac response of the hydrothermal vent crab *Segonzacia mesatlantica* to variable temperature and oxygen levels

Stéphane Hourdez

PII: S0967-0637(17)30379-5
DOI: https://doi.org/10.1016/j.dsr.2018.03.004
Reference: DSRI2886

To appear in: *Deep-Sea Research Part I*

Received date: 28 November 2017
Revised date: 1 March 2018
Accepted date: 9 March 2018

Cite this article as: Stéphane Hourdez, Cardiac response of the hydrothermal vent crab *Segonzacia mesatlantica* to variable temperature and oxygen levels, *Deep-Sea Research Part I,* https://doi.org/10.1016/j.dsr.2018.03.004

# Cardiac response of the hydrothermal vent crab *Segonzacia mesatlantica* to variable temperature and oxygen levels

Stéphane Hourdez[a,b1]

[a]Centre National de la Recherche Scientifique, Adaptation and Biology of Invertebrates under Extreme Conditions, UMR7144, CNRS-UPMC, Station Biologique, 29680 Roscoff, France

[b]Sorbonne Universités, Université Pierre et Marie Curie, Adaptation and Biology of Invertebrates under Extreme Conditions, UMR7144, CNRS-UPMC, Station Biologique, 29680 Roscoff, France



## Abstract

*Segonzacia mesatlantica* inhabits different hydrothermal vent sites of the Mid-Atlantic Ridge where it experiences chronic environmental hypoxia, and highly variable temperatures. Experimental animals in aquaria at *in situ* pressure were exposed to varying oxygen concentrations and temperature, and their cardiac response was studied. *S. mesatlantica* is well adapted to these challenging conditions and capable to regulate its oxygen uptake down to very low concentrations (7.3-14.2 $\mu mol.l^{-1}$). In *S. mesatlantica*, this capacity most likely relies on an increased ventilation rate, while the heart rate remains stable down to this critical oxygen tension. When not exposed to temperature increase, hypoxia corresponds to metabolic hypoxia and the response likely only involves ventilation modulation, as in shallow-water relatives. For *S. mesatlantica* however, an environmental temperature increase is usually correlated with more pronounced hypoxia. Although the response to hypoxia is similar at 10 and 20˚C, temperature itself has a strong effect on the heart rate and EKG signal amplitude. As in shallow water species, the heart rate increases with temperature. Our study revealed that the range of thermal tolerance for *S.*

[1] Phone: +33-298-29-2340; Fax: +33-298-29-2324. E-mail: hourdez@sb-roscoff.fr