

# Octopus' blue blood allows them to rule the waves

July 4 2013

---



The Antarctic octopod *Pareledone charcoti* photographed during the Polarstern cruise 2011 ANTXXVII/3. Credit: Armin Rose

Worldwide colonization by octopods is in their blood! They manage to survive temperature habitats ranging from as low as  $-1.8^{\circ}\text{C}$  to more than  $30^{\circ}\text{C}$  due to their ability to keep supplying oxygen to their body tissues. A new study, to be presented at the Society for Experimental Biology meeting on July 5, shows that a blue colored pigment, hemocyanin, in

their blood, responsible for oxygen transport, crucially allows octopods to live in freezing temperatures.

Research by Michael Oellermann, Hans Pörtner and Felix Mark at the Alfred Wegener Institute for Polar and Marine Research in Germany, looked at how octopods are able to supply oxygen to tissues in freezing temperatures. The researchers compared the properties of blood pigment haemocyanin, responsible for [oxygen transport](#), of Antarctic, Temperate and Warm-Adapted octopods.

The researchers found that the forms of haemocyanin of the Antarctic octopod *Pareledone charcoti*, are genetically and functionally different from the temperate and warmer climate octopods, facilitating [oxygen release](#) at sub-zero temperatures.

Michael Oellermann said: "Octopods are mainly local non-migratory species that move by crawling and have only short life stages in which they inhabit the water column. They are therefore mostly unable to migrate away from or escape "bad" environmental conditions, which exposes them to higher adaptive pressure to deal with these conditions. Our finding shows a crucial physiological adaptation in [cold environments](#) that allows [octopods](#) to sustain an aerobic life."

Octopods pump their blue blood (the colour is due to the copper containing blood pigment haemocyanin) within a closed circulatory system by means of one powerful systemic heart and two additional hearts located before the gills. Octopods inhabit virtually any marine habitat, from [tropical reefs](#) at more than 30°C to temperate rocky or sandy grounds and in both the Southern and the Arctic oceans at -1.9°C. They not only inhabit the shallow sea grounds but also the deep sea, where they can be even found around hydrothermal vents.

**More information:** This work will be presented at 16:10 on Friday 5th

July 2013.

Provided by Society for Experimental Biology

Citation: Octopus' blue blood allows them to rule the waves (2013, July 4) retrieved 25 April 2024 from <https://phys.org/news/2013-07-octopus-blue-blood.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.