Surprising results in the first genome sequencing of a crustacean

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This is a picture of *Daphnia pulex*. Credit: Joachim Mergeay, Belgium

There are many different kinds of crustaceans, ranging from the shellfish Swedish people eat at traditional crayfish parties every August to tiny relatives found in their millions in both freshwater and saltwater. One of the latter, *Daphnia pulex*, is the first crustacean to have its genome sequenced. A researcher from the University of Gothenburg has made a surprising discovery.

The sequencing has been done in an international research network

known as the Daphnia Genomics Consortium. The Swedish contribution – the discovery that the genome of Daphnia contains neurotrophins – surprisingly shows that the nervous system of crustaceans is more complex than previously believed.

"In mammals, neurotrophins play a role in learning, memory and development of the nervous system. For a long time researchers considered neurotrophins and their receptors to be characteristic of vertebrates, but that is not the case," says Karen Wilson at the Department of Marine Ecology, University of Gothenburg, who is a member of the consortium.

The neurotrophins and their receptors in mammals are known to be sensitive to oxygen deficiency, environmental degradation and toxins. This may mean that the neurotrophins in crustacea are equally exposed.

"This is an important finding, as climate change, acidification and pollution may affect behaviour in crustaceans in both freshwater and marine environments."

Daphnia pulex is a crustacean species half a centimetre in size found in several parts of the world. In Sweden it lives both in lakes, ponds and coastal waters.

Crustaceans represent a highly variable group of animals found in both freshwater and marine environments. Because of their diversity and worldwide distribution, they play an important ecological role. They are also of great economic significance. Some crustacean species are directly consumed by humans (prawns, crayfish, lobster), while others serve as an indirect source of food when crustaceans in the larval stage are eaten by others. Other crustaceans are the cause of costs, such as the salmon louse, a fish parasite that attacks salmonids, and the barnacle, which causes fouling of man-made structures in the sea.