



Toxic mercury could be produced within seawater

New research has shed light on the source of highly toxic monomethylmercury (MMHg) in Arctic marine waters. A study of polar seawater suggests that relatively harmless inorganic mercury is being transformed into the toxic MMHg within the water itself.

MMHg is a neurotoxin that accumulates in marine organisms, meaning that its toxic impacts increase as it progresses up the food chain. This has serious implications for human health, particularly for those whose diet mainly consists of marine mammals and fish, such as the northern Inuit people. The source of MMHg has remained uncertain although many theories have been proposed to explain its presence in seawater, such as export from coastal and deep-sea sediments and major rivers.

The study investigated the theory that MMHg is produced from the transformation, or 'methylation', of inorganic mercury in the water. Inorganic mercury can be released from human activities, such as industry and coal burning. Seawater samples were collected at five locations across the Canadian Arctic Archipelago and from two different depths of water. Mercury and MMHg were added to the samples to observe any transformation processes over time and the rates of these processes. Production of MMHg from the transformation of mercury was observed for all samples and depths.

This demonstrated for the first time that mercury easily transforms into MMHg in Arctic marine waters. In addition, the transformation was observed to continue over time, although the net production did slow down after 12 hours. Through their observations, the researchers estimated that the conversion of inorganic mercury to MMHg within seawater accounts for around 47 per cent of the MMHg present in polar marine waters. This in turn could account for a significant amount of mercury found in Arctic marine waters and possibly other oceans.

Concentrations of inorganic mercury increase in marine waters with human activities, such as industry and coal burning, which could lead to increasing MMHg concentrations and possible increased risks to human health.

Source: Lehnherr, I., St. Louis, V.L., Hintelmann, H. & Kirk, J.L. (2011) Methylation of inorganic mercury in polar marine waters. *Nature Geoscience*. 4:298-302.

Contact: lehnherr@ualberta.ca

Theme(s): Chemicals, Marine ecosystems