Scientists demonstrate that environmental lithium uptake promotes longevity

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Dr. Kim Zarse from Jena University investigates how low-dose lithium exposure may affect mortality in nematodes. Credit: Photo: Jan-Peter Kasper/University Jena

Professor Dr. Michael Ristow's team along with Japanese colleagues from universities in Oita and Hiroshima have demonstrated by two independent approaches that even a low concentration of lithium leads to an increased life expectancy in humans as well as in a model organism, the roundworm *Caenorhabditis elegans*. The research team presents its results in the online edition of the scientific publication *European Journal of Nutrition* which is now online.

Lithium is one of many nutritional trace elements and is ingested mainly through vegetables and drinking water. "The scientific community doesn't know much about the physiological function of lithium", project

manager Ristow says. According to an earlier study from the US, highly concentrated lithium showed to be life-prolonging in *C. elegans*, the Professor of Nutrition in Jena continues. "The dosage that has been analyzed back then, however, is clearly beyond the physiologically relevant range and may be poisonous for human beings", explains Ristow. To find out if lithium has a life-prolonging impact at much lower concentrations, the scientists then examined the impact of lithium in a concentration that is regularly found in ordinary tap water.

In a collaborative effort with Japanese colleagues, the Jena scientists analyzed the mortality rate in 18 adjacent Japanese municipalities in relation to the amount of lithium contained in tap water from the respective regions. "We found that the mortality rate was considerably lower in those municipalities with more lithium in the drinking water", Ristow explains the key finding. In a second experiment, the Jena scientists examined exactly this range of concentration in the model organism *C. elegans*. The result was confirmed: "The average longevity of the worms is higher after they have been treated with lithium at this dosage", Ristow says.

Even though the underlying mechanisms still remain to be clarified, the scientists assume that the higher longevity they observed in humans as well as in nematodes *C. elegans* can be induced by the trace element lithium.

Moreover, the scientists speculate about using low-dose lithium as a potential dietary supplement in the future. "From previous studies we know already that a higher uptake of lithium through drinking water is associated with an improvement of psychological well-being and with decreased suicide rates", Professor Ristow explains. While low-dose lithium uptake on the basis of the new data is clearly thought to be beneficial, more studies will be necessary to thoroughly recommend such a supplementation, the scientists conclude.

More information: Zarse K., Terao T., Tian J., Iwata N., Ishii N., Ristow M. Low-dose lithium uptake promotes longevity in humans and metazoans. Eur J Nutr 2011, DOI:10.1007/s00394-011-0171-x