

Reviewer's report

Title: Are Liver and Renal Lesions in East Greenland Polar Bears (*Ursus maritimus*) Associated with High Mercury Levels?

Version: 1 **Date:** 6 February 2007

Reviewer: Paulo Renato Dorneles

Reviewer's report:

General

Dear Authors and Editors,

The article is relevant to this particular field of knowledge and present scientific information in a correct manner. The observations made were based in a good methodological approach, and on good method validation procedures. The discussion presented by the authors is fairly supported by the references cited. Each hypothesis raised by the authors is strongly based on the available information. From the scientific point of view, thus, I think the work has plenty of merit.

In my opinion, the great scientific contribution of the article is related to the fact that age has been taken into consideration while dealing with association between pathological findings and mercury concentrations. This statement is based on the fact that pathological effects are not expected to occur, in marine mammals, as a consequence of a mercury exposure other than an extremely high one, but obviously, pathologies end up occurring as a result of ageing. This animal group has been exposed to high concentrations of this naturally occurring metal during the evolution process. As a consequence, they present certain tolerance to mercury. The quoted high exposure is generated by the biomagnification process, which is especially important for mercury due to the also natural phenomenon of methylation of this metal in aquatic environments, which in turn confers lipophilicity to mercury, a feature that is crucial for the biomagnification process. However, despite of the quoted tolerance, any detoxification process represents a cost for the cell or organism involved and, probably, there is always a threshold level, above which the detoxifying mechanism ends up being inefficient. The manuscript elegantly draws attention to the necessity of investigation on toxic effects of mercury even in marine mammals, considering not only the man-made increase in levels of the quoted metal in certain regions, but also the possibility of synergistic effect between mercury and anthropogenically generated toxic substances, like organohalogenated compounds. When all this is said, there are only a few suggestions to made, which are indicated below.

Discretionary Revisions (which the author can choose to ignore)

In the paragraph started on line 58, mercury bioaccumulation by polar bears is associated exclusively with pollution. Therefore, considering all the mentioned here (above) about mercury biomagnification, I suggest to be mentioned in the paragraph concerned that a high uptake of the quoted metal is expected for top marine predators, especially if a species that consumes other top predators is considered, which is the case for polar bear.

I believe that, with the sentence started on line 242, the authors intended to state that the preys on which polar bears start to predate by the time they are weaned are richer in retinol than milk. However, the original sentence should be reformulated, since it is transmitting the wrong idea that milk is not rich in vitamin A. In this context, it would be more appropriated if the authors quoted an investigation in which it has been demonstrated that the mentioned preys are richer in the quoted lipophilic vitamin than the fat-rich milk produced by marine mammals as *Ursus maritimus*.

The intention of the authors while using the word "exacerbated" is not clear for the reader. Does it mean, for example, that in the fifteen cases of interstitial fibrosis, glomerular sclerosis was moderate rather than mild? I suggest rewriting this passage in order to turn it clearer.

On the sentence started on line 283, doubt is elicited by the mention that the proximal convoluted tubular basement membrane hyalinization could occur as a consequence of mercury induced liver injury. The quoted doubt concerns whether or not the authors intended to state that the liver injury increases the

leakage of mercury (included in polypeptide complexes) into the plasma and hence increasing the burden of Hg filtered through the glomeruli, which in turn would generate tubular hyalinization. This would make sense considering the high inorganic mercury concentrations mentioned on line 62, especially when it is taken into account that the tubular lesion concerned has occurred on proximal convoluted tubule, which is main renal site for peptide endocytosis. If this was the intention of the authors, I believe that it should be stated in a more detailed way.

References: References are correctly cited, and I found no missing citations.

Figures and tables: Figures and tables are correct and do not require any improvement.

Review conclusion

There is no doubt that the original quality and broad interest in the present work make the manuscript valuable to be published in Environmental Health. I hope that the authors and editor can use my comments to make the manuscript of a higher scientific standard. Finally I would like to state that it has been a pleasure to conduct the present review and I really hope that the authors use my comments in a positive way.

What next?: Accept after discretionary revisions

Level of interest: An article of importance in its field

Quality of written English: Acceptable

Statistical review: No, the manuscript does not need to be seen by a statistician.