

HAIR AS A NON-INVASIVE SAMPLE FOR TRACE ELEMENT AND HEAVY METAL ANALYSIS IN THE LEOPARD AND WEDDELL SEAL

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Leopard and Weddell seals occupy an upper trophic level within the Antarctic ecosystem and are useful "indicator" species of trace element and heavy metal concentrations in this ecosystem. Opportunities for obtaining tissue samples, the ideal sample for trace element and heavy metal analysis, from leopard and Weddell seals are extremely limited; whilst hair can be easily collected and can be obtained non-invasively, particularly when collected off the ice from moulting seals. The present study investigated the relative advantages of serum, tissue and hair for trace element and heavy metal analysis in the leopard and Weddell seal.

Blood, tissue and fur samples were collected from leopard and Weddell seals in Prydz Bay, Antarctica and from leopard seals hauled out along the NSW coast, Australia between 1999-2003 and analysed for 19 elements using inductively coupled plasma mass spectroscopy.

Notable accumulations of elements were detected in the liver, kidney and hair, with minor concentrations in the remainder of the tissues. Significant regression relationships for concentrations of trace elements in serum and hair were not seen (except for Al and Se in the leopard seal), reflecting the different time scales of element accumulation in serum and hair. Significant differences were seen in the concentration of trace elements with hair type (moult and new hair) in seven out of 15 of the trace elements compared, with higher concentrations in moult hair.

The finding in this study of comparatively high concentrations of certain elements in the hair of leopard and Weddell seals indicates that hair may be useful as a non-invasive sample for trace element and heavy metal analysis in these species. The finding of differences in element concentrations in moult and new hair also has practical implications for sample collection. Repeated sampling of moult hair over successive seasons could be used to monitor annual fluctuations in trace element and heavy metal concentrations in seals.