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## **Metals in cerebrospinal fluid - a diagnostic tool**

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Background: Environmental toxicants accumulate in food chains. Metal exposure from marine sources contributes to the toxic burden of the developing foetus. Previous studies have shown alterations in the function of the nervous system correlating to mercury exposure. Other toxic metals, such as lead and cadmium, may have similar effects. Samples of urine, hair and blood are commonly used media in this type of studies.

Hypothesis: Metals in cerebrospinal fluid (CSF) are potential biomarkers of exposure and toxic effects.

Method: Aliquots of CSF were taken by spinal tap into rinsed polypropylene tubes and frozen. Metals were analyzed by Inductive Coupled Plasma Mass Spectrometry (ICP-MS).

Discussion: Sampling of urine, hair, nails and umbilical cord blood have limitations as metal concentrations in these fluids reflect the situation far away from the neuronal activity of interest. Cerebrospinal fluid is produced in the choroid plexus and surrounds the brain and spinal cord. Samples from inside the blood-liquor barriers can be anticipated to reflect the true metal accumulations affecting cerebral cortex. Synergistic effects from multiple metal exposure in children can be evaluated. These techniques may also be relevant in studies of the recently noted doubling in Parkinson disease incidence in the Faroe Islands.

Implications: Direct measurements of CSF levels of toxicants reflect exposure at the target organs bypassing barrier effects. Metal concentrations in CSF correlated with outcome from neurophysiologic and neuropsychological tests may provide a suitable tool for further studies of children's health and the environment.