

## **BIOMONITORING AND BIOMARKERS OF LEAD EXPOSURE: EXPERIENCE IN URUGUAY**

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Medical Geology among other Environmental Health disciplines, requires the use of biomarkers to assess human and other sensitive environmental exposure to trace elements and toxic chemical pollutants. This is also applied to sensitive living species in the ecosystems. The need for human biomonitoring data in public health risk assessment can play an important role in establishing relationships between a specific human health effect and a specific chemical exposure. Animals can also suffer from diseases owing to element deficiency or toxicity, and may be even develop early serious health problems before they occur in humans.

Lead (Pb) is an example of a well known bioavailable toxic chemical pollutant in the environment, thus it can be absorbed and cause adverse health effects on susceptible living organisms. In Uruguay, this environmental problem became of public concern on 2001, and it is being multidisciplinary approached since then.

The biomonitoring for lead human exposure reflects an individual's current body burden, which is a function of recent and/or past exposure activities. Lead in whole blood (BLL, B-Pb) is mainly used for assessment of lead exposure, both for screening, biomonitoring and diagnostic purposes. B-Pb is still the most reliable indicator as it has been fully interpreted and validated in the scientific literature to be routinely used to assess lead exposure. Several alternative biomarkers that may aid diagnosis of the extent of Pb exposure include Pb determinations in plasma/serum, saliva, bone, teeth, feces, and urine. However, none of these matrices has gained convincing acceptance as an alternative to lead in whole blood owing to many confounding variables.

This work highlights the importance of lead biomonitoring of human and animal populations illustrated by the Uruguayan experience. The applications of alternative environmental lead exposure biomarkers and the main aspects of B-Pb as the predominant biological biomarker to environmental lead exposure are explained. Uruguayan studies in human populations (infants, children, adults, workers) and animals (dogs) lead studies are reviewed to show the incidence of different variables on human B-Pb, and the fact that animals can be "sentinels" of environmental lead health hazards in human is also demonstrated.

Keywords: biomarkers and biomonitoring, blood lead levels, Uruguay