IFN-$\gamma$ AND IL-4 PLASMATIC LEVELS AND THEIR ASSOCIATION WITH METALS EXPOSED TO CHILDREN

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Abstract: The metals that are produced by mining and found in its waste (tailings) represent potential risks to ecosystems as well as human health, mainly to vulnerable populations such as children. An analytical cross-sectional study was conducted in 48 children; 52% were boys and 48% were girls. The children ranged in age from 6-11 years and lived near tailings by Taxco, Mexico. The objective of the study was to quantify the plasmatic cytokine levels IL-4 and IFN-$\gamma$ and to evaluate their association with metal concentrations in urine (Cr, Ni, Ba, Mn, Cd, Cu, As, Hg, Co, Mo, Sr, Fe, and Zn) and blood (Pb). The elements Ni, Cr, Co, Ba, Mn, Cd Pb, Cu, and As were found to be above reference values. The cytokine levels IFN-$\gamma$ and IL-4 were determined by ELISA immunoassay. We found that 68% of the IFN-$\gamma$ levels to be between 4.0±4.23 pg ml$^{-1}$, and 60% of the IL-4 levels to be between 3.74±9.27 pg ml$^{-1}$. The linear generalized models for crude and adjusted values showed a positive association between IFN-$\gamma$ levels and Cd levels and a negative association between IL-4 levels and Ni levels. These results suggest immunological alterations in Th1/Th2 cytokines in children who were exposed to metals.

Keywords: children, 4 interleukin, IFN-$\gamma$, metals, mining.