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Chromium (VI)-induced immunotoxicity and intracellular accumulation in human primary dendritic cells.

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Chromium compounds, besides being occupational carcinogens, can also induce allergic contact dermatitis (ACD) and other immunomodulatory effects. In this study we investigate cell viability, uptake and intracellular distribution of chromium in human primary dendritic cells (DCs), either immature (iDCs) or driven to differentiate by a specific maturation stimulus (LPS) (mature DCs, mDCs), when exposed for 48 h to concentrations of soluble radiolabelled Na251CrO4 ranging from 5 to 0.5 microM. The modulation of the expression of membrane markers (CD80, CD86, MHC class II) correlated with the immunological functions of DCs was also measured. After 48 h of exposure the mean IC50 values in 4 donors were 36 and 31 microM in iDCs and mDC respectively, as detected by propidium iodide incorporation. Cellular uptake of chromium was nearly linear with increasing doses. At 48 h post-exposure chromium was accumulated preferentially in the nuclear and cytosolic fractions (44.1 to 66% and 13.1 to 31% of total cellular chromium, respectively). Although a high inter-individual variability was observed, an increase in the expression of CD86 and, to a lower extent, CD80 and MHC class II membrane markers was found in mDCs of single donors. These results highlight the relevance of searching for the biodistribution of trace metals in primary cells of the immune system. Moreover, they suggest that DCs differentiation markers can help in measuring the immunotoxicity of metal compounds with sensitisation potential.

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