CADMIUM CYTOXICITY IN *PODARCIS SICULA* LIVER

Palma SIMONIELLO, Stefania TAMMARO, Chiara Maria MOTTA,
Vincenzo FREZZA & Silvana FILOSA

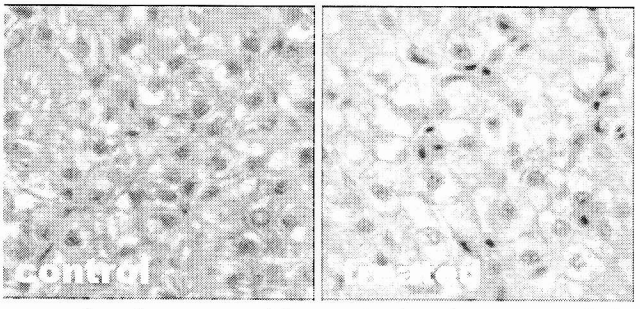
Department of the Biological Sciences, University of Naples Federico II, Naples

Cadmium (Cd) is a highly toxic metal, whose hazard to the cells is due to a high penetration and a low clearance rate (Schilderman et al 1997, Env Health Perspect 105:234-8). This metal enters through the respiratory and/or alimentary tracts, is distributed to the various organs via the blood stream (Leroyer et al 2001, Environ Res 87:147-59) and is accumulated by the detoxifying organs such as liver and kidney (Olsson et al 1996, Mar Environ Res 42:41-4).

In the present work we report the effects of cadmium in the liver of adult *Podarcis sicula* lizards exposed to three different experimental treatments. a) occasional: a single dosage of $CdCl_2$ (1 mg/kg BW) has been administered by food; b) chronic: several dosages of $CdCl_2$ (1 mg/kg BW) have been administered every other day, by food; c) acute: a single dosage of $CdCl_2$ (2 mg/Kg BW) has been administered intraperitoneally. Tissue samples, collected at regular time intervals up to a maximum of 120 days, have been processed for light microscopy and biochemical investigations. Sections have been stained for morphological investigations, and with PAS and lectins (DBA, LEA and WGA) to analyse glucid content; protein extracts have been electrophoresed, blotted and stained with PAS and lectins to investigate the presence of glycoconjugates and their nature.

Observations reveal that cadmium has induced significant alterations in hepatocytes, in the surrounding extracellular matrix and in the vascularization and that these effects apparently do not depend on the experimental treatment. At the cytological level, morphometric analyses demonstrate a clear swelling of cells and a decrease in their cytoplasm density (see figure). These effects could depend on a dilation of organelles (mitochondria, endoplasmic reticulum) (Thophon et al 2004, Env Toxicol 19:11-9) or on specific interferences of Cd with cell enzymatic activities (Carrettino et al 2004, Ecotox Env Saf 57:311-8).

Following Cd exposure significant molecular variations in glucid composition have also been observed. These are particularly evident at the level of the extracellular matrix and/or of the hepatic sinusoids. Staining with PAS reveals a significant increase in glycoconjugates, and in particular in those positive to the lectins WGA and DBA. This event is probably related to the appearance, in blots, in all treated samples, of a protein of 116 kDa, also positive to the two lectins. This observation agrees with literature reporting that following different toxicant, including Cd (Kaji et al 1995, Microvasc Res 49:268-76), glycosaminoglycans, and in particular dermatan sulphate (Aenson et al 1988, Gastroent 95:441-7), significantly increase in the extracellular matrix. These molecules condition the molecular organization of the hepatic extracellular matrix (Gressner 1994, Eur J Chem Clin Biochem 32:225-37) and also play an important role in the interaction occurring between cell surface receptors and growth factors (Pinzani et al 2001, Semin Liver Dis 21:397-416).



Finally, in liver of chronically exposed animals, from day 10 onward, a significant increase in vascularization is observed. This alteration is present until day 60; later the liver return to a condition that closely resembles that observed in untreated controls.

This work is supported by MIUR, PRIN project entitled 'Risposte molecolari di cellule embrionali, differenziate e tumorali ad intossicazione da cadmio'.

Key words: *cadmium, liver, glycoconjugates.*