Use of Metallothionein-Transgenic and Null Mice to Determine the Role of Metallothionein in Cadmium Toxicity

Curtis D. Klaassen

University of Kansas Medical Center, USA

Acute Cd exposure produces hepatotoxicity, whereas chronic Cd exposure produces nephrotoxicity, hematotoxicity, immunotoxicity and bone damage. Previous experiments suggest that the low-molecular-weight, metal-binding protein metallothionein (MT) in liver protects against liver injury, but is responsible for the kidney injury observed after chronic Cd exposure. Thus, prior to the development of MT-transgenic and MT-knock-out mice models, MT's role was always assumed to be a toxicological paradox, hepatoprotection but nephrotoxicity. The development of MT-transgenic and MT-knockout mice models has reconfirmed MT's protective role against Cd-induced hepatotoxicity, but it has challenged MT's suggested role in Cd-induced nephrotoxicity. The recent data using these genetically altered mice models indicate that MT protects against not only the Cd-induced hepatotoxicity, but also nephrotoxicity, hematotoxicity, immunotoxicity, and bone damage.