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Prevention of drug nephrotoxicity with antioxidant co-therapies

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Worldwide, nephrotoxicity poses a considerable health and economic burden. Nearly 25% of the top 100, most used drugs in intensive care units are potentially nephrotoxic. Moreover, nephrotoxicity causes 10-20% of the acute renal failure cases (ARF). ARF is a very serious condition with high incidence and mortality rate, which is estimated at approximately 50% of the cases despite dialysis application, especially within critically ill patients. Mortality increases to 80% when ARF courses with multi-organ damage. The clinical handling of renal injury and ARF is difficult and expensive because, other than dialysis, there are no available treatments. For this reason the search for strategies to prevent nephrotoxicity constitute an active area of investigation. In addition to drug targeting and medical chemistry for new and safer molecules, a line of interest is the identification of renoprotective adjuvants for co-administration along with potentially nephrotoxic drugs.

At the preclinical level, many chemically unrelated antioxidants have been shown to protect the kidneys from drug nephrotoxicity, especially in experimental animal models. Although promising, antioxidants have not yet demonstrated a clear benefit in the clinical research conducted so far, which requires further investigation. One of the main problems identified in the translation of antioxidants to the clinical practice is their very low bioavailability derived from a very low absorption upon oral administration. Our research line has been focused on the effect of the natural antioxidants resveratrol and quercetin, and the antidiabetic metformin, at preventing drug nephrotoxicity. Our studies clearly show their renoprotective effect at the preclinical level. These molecules are being tested in the clinical setting and new nanoformulations being developed, which will enhance their solubility and hence their bioavailability to prospectively achieve clinical utility.

Biography

Ana Isabel Morales Martín, PhD is Professor of Toxicology in the Faculty of Pharmacy. She is director of Unit of Toxicology of University of Salamanca, in Salamanca (Spain). She has published more than 35 international publications and more than 100 congress abstracts. She is reviewer for 25 international journals and expert/project reviewer for national and international agencies. The aim of her research in recent years has been focused on improving the clinical management and prognosis of patients with acute renal failure due to nephrotoxicity of drugs and environmental pollutants.

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