

Cadmium-Induced Reproductive Toxicity in Rats

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Abstract

Cadmium (Cd) is one of the major vocational and environmental toxicants. Cadmium is a heavy metal present in soil, air and water and is listed as a priority pollutant by the United States Environmental Protection Agency. The toxicity of cadmium continues to be a significant public health concern as cadmium enters the food chain and it is taken up by tobacco smokers. Several previous studies demonstrated that cadmium toxicity can lead to testicular tissue injury, decreased testicular weights, compromised testicular function and reduced androgen secretion (I Ognjanović et al. 2010). Several evidences suggested that Cd-induced testicular toxicity is probably the result of complex interacting mechanisms associated with its capacity to induce oxidative stress and apoptosis of the germ cells of humans and animals (Ates et al. 2004; Kim and Soh 2009). Hence, Cd has been shown to increase the expression of proapoptotic proteins p53 and Bax while reducing the expression of antiapoptotic protein Bcl-2 (Zhou et al. 1999). Environmental exposure to Cd is associated with male infertility and poor semen quality in humans (Pant et al. 2003; Ji et al. 2011). Also, interstitial edema, hemorrhage and necrosis were shown in Cd-induced testicular damage (Ji et al. 2012). Naringin, a flavanone glycoside that is formed from the flavanononaringenin and the disaccharide neohesperidose, is one of the main active components of Chinese herbal medicines, such as *Drynaria fortunei* (Kunze) J. Sm. (DF), *Citrus aurantium* L. (CA) and *Citrus medica* L. (CM) (Zhang et al. 2014). The antioxidant activity is the most recognized effect of flavonoids, which depends, for instance, on hydrogen donation and electron stabilization in the phenolic rings (Verri et al. 2012). Previous studies demonstrated that naringenin significantly ameliorated oxidative and inflammatory tissue injuries in different experimental models (Arul and Subramanian 2013; Mershiba et al. 2013; Esmaeili and Alilou 2014). Vanillin (VLN), 4-hydroxy-3-methoxybenzaldehyde, is one of the most popularly used flavoring components extracted from the seedpods of *Vanilla planifolia* and is widely used in foods, beverages, cosmetics and drugs. VLN exhibits many biological activities including anti-oxidative, anti-inflammatory, anticarcinogenic and antimutagenic properties (Bezerra et al. 2016).

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