Effects of anticancer drug docetaxel on the structure and function of the rabbit olfactory mucosa

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Docetaxel (DCT) is an anticancer drug which acts by disrupting microtubule dynamics in the highly mitotic cancer cells. Thus, this drug has a potential to affect function and organization of tissues exhibiting high cellular turnover. We investigated, in the rabbit, the effects of a single human equivalent dose (6.26 mg/kg, i.v.) of DCT on the olfactory mucosa (OM) through light and electron microscopy, morphometry, Ki-67 immunostaining, TUNEL assay and the buried food test for olfactory sensitivity. On post-exposure days (PED) 5 and 10, there was disarrangement of the normal cell layering in the olfactory epithelium (OE), apoptotic death of cells of the OE, Bowman's glands and axon bundles, and the presence (including on PED 3) of blood vessels in the bundle cores. A decrease in bundle diameters, olfactory cell densities and cilia numbers, which was most significant on PED 10 (49.3%, 63.4% and 50%, respectively), was also evident. Surprisingly by PED 15, the OM regained normal morphology. Furthermore, olfactory sensitivity decreased progressively until PED 10 when olfaction was markedly impaired, and with recovery from the impairment by PED 15. These observations show that DCT transiently alters the structure and function of the OM suggesting a high regenerative potential for this tissue.

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