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SYNERGY BETWEEN UV AND POLLUTANTS INDUCE SKIN CELLS DISORDERS: AN IN VITRO APPROACH (2D AND 3D MODELS)

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Since low concentrations (nanomolar range) of Polycyclic Aromatic Hydrocarbons (PAH, common pollutants) were measured in the blood of people living in a polluted environment, skin could be exposed to PAH either by systemic distribution (food, breath) or topical exposure. In the same time, skin is exposed to solar radiation, especially UV wavelength (UVA represents 70% of solar wavelength). Here, we compared in vitro the biological effects of PAH on normal human keratinocytes and reconstructed skin model exposed either to daily UV (d-UV 300-400 nm) or to UVA1 (350-400nm). UVA1 was often as potent as d-UV in inducing a strong phototoxic impact. Moreover, benzo[a]pyrene (BaP) and indeno[1,2,3-cd]pyrene (IcdP) were phototoxic at very low concentrations (nanomoles per liter) and impaired keratinocytes clonogenic potential. At sub-phototoxic doses BaP and IcdP induce redox imbalance and involved a change of metabolism: glutathione-metabolism appear as a key mechanism in the cellular defence, with activation of Xc- system. PAH were well known for their carcinogenic potential at micromolar concentration, but for the first time we demonstrate the phototoxicity of some particular PAH at realistic concentration (nanomolar range). In such experimental conditions mimicking skin contamination, our results suggest that chronic exposure to photo-polluting stress might impair cutaneous homeostasis.