

CIGARETTE SMOKE TOXICITY IN HUMAN ALVEOLAR EPITHELIAL CELLS

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Cigarette smoke toxicity is involved in airway inflammation, alveolar epithelium damage, and the pathogenesis of pulmonary diseases. In this study, we examined the effect of cigarette smoke on cultured alveolar epithelial cells (A549 cell line). Cigarette smoke extract (CSE) was prepared using Marlboro cigarettes. The cigarette smoke was passed through culture media using low-pressure vacuum pump, the medium was then sterilized and used immediately to cell culture. Cells were incubated in modified media for 24 hours, and then cell viability (trypan blue exclusion, LDA release, DNA fragmentation), oxidative stress markers (DCF, MDA, GSH), apoptosis (Annexin V), and proinflammatory cytokine (IL1, IL6, IL8) release was estimated using specific monoclonal antibodies and flow cytometry detection. Our results show, that cigarette smoke has a significant antiproliferative effect, induces oxidative stress, and cytotoxicity. It depleted glutathione, increased malondialdehyde levels, and produced necrosis. Moreover, elevated TNF α and IL1 levels were detected in the culture medium. In conclusion, our data show that CSE causes cytotoxicity, oxidative stress and activate immune response. Considering pro-carcinogenic effects of nicotine, the role of nicotine and nicotinic acetylcholine receptors (nAChRs) in acute cytotoxicity of cigarette smoke remains to be established.