

CIGARETTE SMOKE ACTIVATES MONOCYTES (THP-1 CELLS) AND AFFECTS HUMAN ALVEOLAR BASAL EPITHELIAL CELL GROWTH (A-549 CELLS) IN CULTURE

A. Holownia, A. Kwolek¹, E. Rysiak¹ and P. Wielgat.

Department of Clinical Pharmacology and ¹Department of Drug Chemistry, Medical University of Białystok, Waszyngtona 15a, Poland; Holow_sinai@hotmail.com

Smoking cigarettes is one of the leading causes of cardiovascular and respiratory diseases but the nature of cigarette-induced inflammation is still not clear. In this study we have used two human cell lines - macrophages (THP1 cells) and alveolar epithelial cells (A549 cells) grown in culture medium containing chemicals of cigarette smoke and extracellular and intracellular parameters relevant to cell physiology were estimated. Cigarette smoke extract was prepared using Marlboro cigarettes with removed filters. 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 grown in modified media for 24 hours and then human leukocyte antigen (HLA-DR), integrins (CD11a and CD11b) or nuclear acetylated histone H3 level was estimated using specific monoclonal antibodies and flow cytometry detection. Moreover oxidative stress and cell proliferation were estimated using dichlorofluorescein diacetate and propidium iodide DNA staining, respectively. In cells growing in medium containing cigarette smoke significant antiproliferative effect was observed in both cell types while oxidative stress was significant only in THP1 cells.

Expression of HLA-DR and integrins on THP cells was elevated by more than five times. Less significant changes were observed in acetylated H3 level. Our data describe new aspects of cigarette smoke-induced cell activation which may be relevant to the mechanisms and therapies of smoking-related diseases.