Induction of Apoptosis by Particulate Matter Derived From Diesel Exhausts on Alveolar Type II Cells in Culture

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Air pollution is a serious health problem in large cities being responsible for numerous respiratory infections, worsening allergic and cardiovascular diseases, besides being associated to lung cancer. Despite the efforts of environmental agencies in establishing regulations for pollutant emissions by vehicles through PROCONVE (Programa de Controle de Poluição do Ar por Veículos Automotores), which contributed to lowering vehicular emissions, the increasing number of vehicles in cities as São Paulo is still responsible for high levels of air pollution. Among the air pollutants, particulate matter is of particular interest due to its major contribution to the health effects abovementioned. The objective of this study was to evaluate the effects of particulate matter (PM) derived from diesel exhausts (collected from São Paulo buses) on apoptosis in immortalized human alveolar type II cells (A549). PM induced dose and time-dependent apoptosis, as measured by FACS, using quantification of sub-diploid nuclei (sub-G_1 events) after cell cycle analysis of propidium iodide stained cells. Cells treated with diesel-derived PM apparently did not phosphorylate or activate p53 at the times tested, as shown by Western Blot. UV irradiation of A549 cells was used as a positive control for p53 activation. We are currently studying other apoptotic pathways that may be involved on MP-induced apoptosis.

Keywords: Air pollution, apoptosis, cell signaling, p53.