

A Comparison of Sulfur Mustard Cytotoxic Effects on the Two Human Lung Origin Cell Lines

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Abstract : Sulfur mustard (bis(2-chlorethyl) sulfide) is highly toxic, chemical warfare agent that has been used in the past in several armed conflicts. Except for the skin, respiratory tract is one of the important routes of exposure. The elucidation and understanding of the mechanism of toxicity of SM have been effort intensive research. The multiple targets character of SM caused cellular damage resulted in activation of many different mechanisms which contribute to cellular response and participate in the final cytopathology effect. In our present work, we compared time-dependent changes in sulfur mustard exposed adult human lung fibroblasts NHLF and lung epithelial alveolar cell line A-549. Cell viability (MTT assay, Calcein-AM assay, and xCELLigence - real-time cell analysis), apoptosis (flow cytometry), mitochondrial membrane potential ($\Delta\psi_m$, flow cytometry), reactive oxygen species induction (DC and cell cycle distribution (flow cytometry) were studied. We observed significantly decreased mitochondrial membrane potential and subsequent induction of apoptosis correlating with decreased cellular viability in the sulfur mustard exposed cells. In low concentrations, sulfur mustard-induced S-phase cell cycle arrest, on the other hand, high concentrations, cell cycle phase distribution of sulfur mustard exposed cells resembled cell cycle phase distribution of control group, which implies nonspecific cell cycle inhibition. Epithelial cells A-549 was found as more sensible to sulfur mustard toxicity. Acknowledgements: This work was supported by a long-term organization development plan Medical Aspects of Weapons of Mass Destruction of the Faculty of Military Health Sciences, University of Defence.

Keywords : apoptosis, cell cycle, cytotoxicity, sulfur mustard

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