***In Vitro Effects of Water Pipe Smoke Condensate On the Endocytosis Activity of Type II Alveolar Epithelial Cells (A549)***

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**Background**: Tuberculosis (TB) is a major global health problem and poses immense healthcare threats in many populations which is enhanced by tobacco smoking. Water-pipe smoking has become an increasing problem not only in Middle Eastern countries but also globally as it is considered by users as safer than cigarettes. The presence of high levels of toxic substances in water-pipe smoke may predispose towards the enhanced incidence of pulmonary disorders in water-pipe smokers. For example, uncontrolled macropinocytosis in alveolar epithelial cells following exposure to water-pipe smoke may predispose subjects to pulmonary infection. Here, we studied the effects of water-pipe condense (WPC) on the internalization of mycobacterium Bovis (BCG) by macropinocytosis in type II alveolar epithelial cells (A549).

**Methods**: A549 cells were treated by WPC (4mg/ml) for 24, 48, 72 and 96 hours. Cell viability was studied using the methyl thiazolyldiphenyl-tetrazolium bromide (MTT) assay. Cells were exposed to FITC-Dextran (1mg/ml) (as a control) and FITC-BCG (MOI=10) for 20 min at 37*°*C before cells were collected and the uptake of BCG-FITC determined by flow cytometry. Similar experiments were performed at 4°C as a control.

**Results**: WPC (4mg/ml) induced a time-dependent increase in the uptake of BCG-FITC which reached significance after 72 (1.4±0.2 fold, p<0.05) and 96 (1.6±0.2 fold, p<0.05) hours. WPC also significantly increased the uptake of FITC-Dextran (2.9±0.3 fold, p<0.05) after 96 hours. WPC significantly decreased cell viability after 24 (84± 2%, p<0.05), 48 (78±, 3%, p<0.05), 72 (64± 2%, p<0.05) and 96 hours (45±2%, p<0.05).

**Conclusion**: Our in vitro data suggests possible harmful effects of WPC on the ability of lung epithelial cells to survive and to phagocytose mycobacterium. Further studies will be conducted to understanding of mechanism action of WPC.