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The Evaluation of the Effectiveness of Alpha Bungarotoxin Individually and Combined with Cisplatin on A549 Lung Adenocancer Cell Line and SK-MES-1 Lung Squamous Cell Cancer Cell Line

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Objectives: Nicotine is the essential active component of the tobacco involvement. It has been demonsrated that, nicotine stimulates the proliferation of normal and cancerogenic cells, and protects these cells against the apoptosis induced by anti-cancer agents and extracellular stress acting as an agonist on the nicotinic acetylcholine receptors (nAChR) especially on alpha 7 nAChR which identified on the non-neuronal tissues including the lung airway epithelium. We used alpha bungaro-toxin (α-bgtx), antagonist of nAChR, with and without cisplatin in order to detect the differences of theraupetic results on A549 and SK-MES-1 cancer cell lines.

Methods: A549 and SK-MES-1 which had been kept as frozened form in the liquid nitrogen tank were prepared in order to use. The drug concentrations had been accounted and then the stok solution for Alpha-Bgtx., molecular weighted 7984.4 gr, 1 m M with the dissolution of 1 mg drug in 125 µl PBS, and for Cisplatin,molecular weighted 300.1 gr, 1 m M with the dis-solution of 1 mg drug in 3300 µl PBS. The XTT, MTT and RTCA-Xcelligence systems were used in order to measure the cytotoxicity, and the apoptotic effects were evaluated by comparison of m RNA level of BAX, BCL-2 and CASPASE-3 genes and secondly by counting the percentage of early apoptotic cells measured on the cell lines.

Results: We used alpha bungarotoxin (α-bgtx), with and without cisplatin on SK-MES-1 cancer cell line, the cytotoxic effects of all dosage were considered to be significant (p=0.001). When we had accepted the result of 0.1 µM of cisplatin as a new control group, the cytotoxicity of the 1nM of α-bgtx on both A549 (p=0.006) and SK-MES-1 (p<0.001) and 1 pM of α-bgtx on SK-MES-1 (p<0.001) were considered to be significant. Detecting cytotoxic of all with RTCA XCelligence system on A549 cell line were not considered to be significant, on SK-MES-1 were considered to be significant (p<0.001). When we had accepted the cytotoxic result of cisplatin as the control group, the results of α-bgtx with and without cisplatin were consid-ered to be significant (p<0.001).

Conclusion: When all the results had been evaluated thoroughly, the results of α-Bgtx usage with and without cisplatin were considered to be significant especially on SK-MES-1 squamous lung cancer line on which the tobacco using was the main responsible agent with a great percentage. We hope that, the results of our study will be an era on lung cancer treatment as an essential for in vivo studies, in future.

Keywords: Alpha-bungarotoxin, alpha-7 nAChR, A-549 cell line, SK-MES-1 cell line, nicotine, lung cancer