

Evaluating cytotoxic effects of biosynthetic nanoparticles on human esophageal carcinoma cells

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Introduction: Esophageal cancer is a serious malignancy with respect to rate of incidence and mortality, specifically in developing nations. Esophageal squamous cell carcinoma (ESCC) is the most common histological type of esophageal cancer arising from the stratified squamous epithelial lining of the organ. Beside surgery, chemotherapy and radiotherapy, alone or in combination, are routine therapeutic modalities, although acquired resistance of cancer cells reduces their efficacy. The aim of present study was to evaluate cytotoxic effects of biosynthetic nanoparticles derived from a cold-tolerant bacterium on human ESCC cells.

Methods: Copper and zinc oxide nanoparticles (CuONPs and ZnONPs) were extracted from *Stentrophomonas sp* by centrifugation. KYSE30 cells were seeded at a density of 8000 cell/well in 96-well plates and treated with 12.5, 25, 50 and 100 µg/ml of CuONPs and ZnONPs for 24 h. The thiazolyl blue assay was used to determine viability of cells in each treatment.

Results and conclusion: Quantitative assessment of cell viability indicated that 80%, 72%, 60% and 45% of KYSE30 cells were alive upon administration of 12.5, 25, 50 and 100 µg/ml CuONPs, respectively. In addition, percentage of viable cells after treatment with 12.5, 25, 50 and 100 µg/ml ZnONPs were as 80%, 78%, 70% and 70%, respectively. According to observed effects, it seems that CuONPs could serve as a toxic agent against ESCC cells, although more research is required to define its mechanism of action.

Key word: Esophageal cancer, Biosynthetic nanoparticles, Copper oxide nanoparticles, Cytotoxicity, Viability assessment

