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Survey of the Effect of the Probiotic Bacterium Lactobacillus plantarum and Streptococcus mutans on Casp3, AKT/PTEN, and MAPK Signaling Pathways at Co-Culture with KB Oral Cancer Cell Line and HUVEC Cells

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Abstract : Probiotic bacteria have been employed as a novel and less side-effect strategy for anticancer therapy. Since the oral cavity is a host for probiotic and pathogen bacteria to colonize, more investigation is needed to evaluate the effectiveness of this novel adjunctive treatment for oral cancer. We considered Lactobacillus plantarum as a probiotic and Streptococcus mutans as a pathogen bacterium in our study. The aim of this study is to examine the effect of Lactobacillus plantarum and Streptococcus mutans on Casp3, AKT / PTEN, and MAPK signaling pathway, which is involved in apoptosis or survival of oral cancer KB cells. On the other hand, to study the effects of these bacteria on normal cells, we used HUVEC cells. The KB and HUVEC cell lines were co-cultured with Lactobacillus plantarum and Streptococcus mutans isolated from traditional Iranian dairy and dental plaque, respectively. The growth-inhibitory effects of these two bacteria on KB and HUVEC cells were determined by (3-(4, 5-dimethylthiazolyl-2)-2,5diphenyltetrazolium bromide) MTT assay. MTT results demonstrated that the proliferation of KB cells was affected in a time, dose, and strain-dependent manner. In the following, the examination of induced apoptosis or necrosis in co-cultured KB cells with the best IC50 concentration of the Lactobacillus plantarum and Streptococcus mutans will be analyzed by FACS flow cytometry, and the changes in gene expression of Casp3, AKT / PTEN, MAPK genes will be evaluated using real-time polymerase chain reaction.

Keywords : cancer therapy, induced apoptosis, oral cancer, probiotics
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