ANTICANCER EFFECT OF PROBIOTIC SACCHAROMYCES BOULARDII SUPERNATANT ON HUMAN CACO-2 CELLS; AN IN VITRO STUDY

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ABSTRACT
Colon cancer is an important worldwide cause of death in human which is treated commonly by chemotherapy, radiotherapy and surgery methods with different side effects. Natural treatment such as microbial cell wall extract is suggested to be used as an effective alternative of chemical drugs for treatment of colon cancers without any side effect. Saccharomyces boulardii is used in probiotic foods and supplement capsules in viable and yeast cell wall extract forms. At the present study, we in vitro investigate the anticancer properties of S. boulardii supernatant (SBS) on colon cancer cells. We found that, SBS without dilution after 72 hours successfully killed the colon cancer cells. Also, this treatment induced apoptosis and downregulated the expression of survivin gene significantly. However, effects of SBS without dilution after 24 and 48 hours were considerable. Downregulation of survivin gene expression by functional compounds in SBS induced apoptosis and killed the colon cancer cells successfully. However, future in vivo and in vitro investigation of anticancer effects of SBS on other cancer cells are suggested to be implemented.

Keywords: Probiotic Saccharomyces boulardii; Caco-2 cell; Apoptosis; Survivin gene expression; Anticancer treatment.

1. Introduction
Cancer is the worldwide public health challenge and the second disease leading to death. In the year 2019, 1,762,450 new cases and 606,880 deaths because of cancer diseases were reported just in the United States. Colon cancer also is known as one of the most probable cancer disease and cause of death in human recently around the world. In the United States, 101,420 new cases and 51,020 deaths because of this cancer was reported last year (Siegel, Miller, & Jemal, 2019). Radiotherapy, chemotherapy and surgery are methods commonly used for treatment of cancer cells and promotion of health status of the cancer patients (Garrett, 2019). Oxaliplatin, leucovorin, and 5-fluorouracil are commonly used as chemotherapy regimen for colon cancer treatment; however, hand numbness, tingling, dizziness, weakness and loss of muscle tone are the prominent side effects of these chemical drugs (Grothey et al., 2018). Researchers have always been studying to find efficient alternatives of strategies of cancer disease treatments because of different side effects of these drugs and methods. There are many anticancer herbal and natural drugs developed in