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# The effect of microgravity on cell death, cell growth and cell cycle on breast cancer patients

**Authors:**
**Azadeh Yousefi[1] and Zahra Hajebrahimi[2]**

**Institution:**
1. MSc, Genetic Biology, Department of Biology, Damghan Science and Research Branch, Islamic Azad University, Damghan, Iran.

2. PhD, Assistant Professor, Faculty Member of Iranian Space Research Center, Tehran, Iran.

**Corresponding author:**
**Azadeh Yousefi**

**ABSTRACT:**

Breast cancer is the most common cancer among women in different societies. Because life is constructed evolutionary on the gravity of 'g', removed gravity as a variable can lead to clarify many biologic questions. Today, the weightlessness is a new method to study cellular changes. Weightlessness leads to metabolic and functional changes of the human body, and studies have shown that weightlessness leads to changes in growth and gene expression in cancer cells. The aim of this study is to evaluate the effect of weightlessness on apoptosis and cellular cycle in breast cancer cells. The tests of Annexin-V, PI-flow cytometer, and MTT have been used here. Cells of the weightlessness group are cultured on Clinostat prepared by the United Nations, and in gravity of 0.001g. The cell death and apoptosis using Annexin kit, and cell cycle using the PI and flow cytometer were investigated. Also, the amount of cell damage was determined by MTT. The apoptosis results showed that weightlessness leads to a reduction of 40% in apoptosis in cell line MCF-7, and the increase in BT-20 cell line for two times. Apoptosis in cell line MDA-MB-468 was not affected, and the results showed that the cell cycle and growth in cell line ZR-75 increased at a rate of five times (35% of weightlessness group versus 7% of control). Cell growth in the other categories showed no significant difference between two groups. Also, no significant difference was observed in the amounts of cell damage in groups of weightlessness and control.

**Keywords:**

Breast cancer, Weightlessness, Apoptosis, Cell cycle.