Effects of simulated weightlessness on cellular morphology and biological characteristics of cell lines SGC-7901 and HFE-145

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ABSTRACT. We investigated the effects of simulated weightlessness on cellular morphology, proliferation, cell cycle, and apoptosis of the human gastric carcinoma cell line SGC-7901 and the human gastric normal cell line HFE-145. A rotating clinostat was used to simulate weightlessness. The Image-Pro4.5 image analysis system was used for morphometric analysis. Proliferating cell nuclear antigen expression was examined by immunohistochemical staining. Changes in the cell cycle were examined using a cytometer. Apoptosis was measured using the terminal dUTP nick-end labeling (TUNEL) method. When subjected to simulated weightlessness, the cellular morphology of SGC-7901 cells was changed at 12, 24, 48, and 72 h, cell conversion from the G₁ to S phase was blocked, proliferation was inhibited at 48 and 72 h, and the apoptosis index was increased at 72 h. The same changes were observed for HFE-145 cells at 12 h when subjected to simulated weightlessness, but no significant changes were found.
afterward compared with controls. SGC-7901 cells change their cellular morphology and biological characteristics during clinostat-simulated weightlessness at 72 h, but HFE-145 cells only change at 12 h and adapt to simulated weightlessness after that point.

**Key words:** Simulated weightlessness; Gastric cancer cells; Gastric normal cells; Cell morphology; Biological characteristics