

КОНФЛИКТ ИНТЕРЕСОВ

Авторы заявляют об отсутствии конфликта интересов.

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Titanium Dioxide Nanoparticles Inhibits Entosis in the Human Breast Adenocarcinoma Cell Line

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TiO₂ is widely used in industry and cosmetics and medicines production. In recent years, to achieve tumor-specific delivery of anticancer agents, TiO₂ nanoparticles have been used in chemo/photodynamic therapy, which may cause local increase of the TiO₂ concentration in tumors. The TiO₂ nanoparticles can affect various processes in tumors. One of such process is entosis. During entosis one tumor cell invades another tumor cell. The aim of this work was to study the effect of TiO₂ nanoparticles (anatase <25 nm and rutil/anatase <75 nm; 1, 10 and 100 µg/mL, 72 hours) on the entosis in the human breast adenocarcinoma cell line (MCF7). Cultivation of cells in the presence of nanoparticles lead to a slowdown in proliferation and reduced in the entosis number. These effects were dose-dependent. Elemental analysis (analytical electron microscopy) showed presence TiO₂ nanoparticles in the cell vacuoles, in the cytosol and in the extracellular space. TiO₂ nanoparticles (10 µg/mL) significantly disrupted adhesive junctions in entotic cells and in cell culture in general (immunocytochemistry staining). The anatase nanoparticles induced p53 translocation into the nucleus. Thus, the obtained data showed that the TiO₂ nanoparticles inhibited entosis in MCF-7 cells by means of disrupting the adhesive junction formation and preventing cell invasion. However, failure of adhesive contacts can facilitate tumor metastasis.

Keywords: adherens junctions, nanoparticles, titanium dioxide, p53, entosis