MEDICAL THERAPIES AND PHARMACOLOGY

EFFECTS OF HYDROXYAPATITE NANOPARTICLES ON PROLIFERATION AND APOPTOSIS OF HUMAN SQUAMOUS CELL CARCINOMA CELL LINE A431 IN VITRO AND IN VIVO

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Background: Cutaneous squamous cell carcinoma (SCC) is a common cutaneous malignancy and has a potential for local recurrence and regional or distant metastases. Exploring new materials for treatment and investigating the mechanism are important. With the development of nanometer technology, hydroxyapatite (HAP) nanoparticle, a novel inorganic material, was found to be able to inhibit tumor cell proliferation.

Objective: To study the effect of hydroxyapatite nanoparticles on human SCC cell line A431 in vitro and in vivo.

Materials and Methods: The human SCC cell line A431 was cultured and treated with HAP nanoparticles at various concentrations. Growth suppression was detected with cell counting kit-8 assay and cell cycle assay. Cell apoptotic alterations were evaluated by flow cytometry (Annexin V-FITC/PI). The skin tumor model was established from balb/c nude female mice. The mice were divided into experimental group and control group, and received a subdermal injection of 1.5 million cells into the subaxillary skin with or without HAP nanoparticles.

Results: HAP nanoparticles, detected with cell counting kit-8 assay, inhibited the growth of SCC cell in a dose-dependent manner form 60 μg/ml to 480 μg/ml. cell cycle assay showed no significant difference between experimental and control group. Flow cytometry analysis showed the apoptotic rates at the concentrations of 60, 120, 240 and 480 μg/ml of HAP nanoparticles were 21.43±1.25%, 37.32±5.45%, 30.34±3.04% and 27.91±1.17%, respectively, which were all higher than that of control group 9.48±1.34%. The tumor volume in mice 18 days following injection of the cancer cells was 346.43±227.17 mm3 in experimental group, which was significant higher than that of control group 85.41±90.75 mm3.

Conclusions: HAP nanoparticles not only inhibit proliferation but also induce apoptosis of human SCC cell line A431 in vitro and in vivo.