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OBTAINING CALCIUM PHOSPHATE PATTERNS WITH ANTI-CANCER EFFECT

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Annotation. In this research, we have studied the anti-cancer properties of quercetin. The effect of quercetin loaded in hydroxyapatite has been tested on cancer cells *in vitro.*

Introduction. Development of bacterial resistance to drugs initiated the search for alternative drugs. Recently, much attention has been paid to the quercetin. In vitro experiments show that quercetin has a pronounced activity against tumor cells. The anti-cancer effect is realized through various mechanisms that provide its antiproliferative, antioxidant, proapoptotic effect, suppression of tumor growth factor, as well as its synergy with some chemotherapeutic agents. The quercetin anti-cancer effect relies on its ability to reduce proliferation, induce apoptosis, and cause cell cycle arrest. The quercetin also inhibits mitotic processes by modulating cyclins, pro-apototic, PI3K/Akt and mitogen-activated protein kinase (MAPK) molecular pathways.

Main part. The research aims are to obtain calcium-phosphate patterns loaded with quercetin, which have an anti-cancer effect. The scientific group of ITMO University has developed a model system that includes hydroxyapatite, quercetin in various concentrations. The HEK 293 was used as a model cancer cell line. The biocompatibility of the hydroxyapatite patterns has been tested. Hydroxyapatite patterns are found to absorb different concentrations of the quercetin to form a drug gradient. It was found that the addition of quercetin to hydroxyapatite at concentrations of 10-6, 10-5, 10-4, 10-3, 10-2 mol/L leads to the death of cancer cells. Moreover, studies have been conducted (MTT-test, release), showing the degree of release of quercetin over time, which allows us to evaluate its effect on cells.

Conclusion. The quercetin loaded in hydroxyapatite patterns has demonstrated strong anti-cancer properties, particularly at minimal concentrations. These materials could be used for bone cancer curing.

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