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CYTOTOXICITY AND ACCUMULATION OF BORON AND LITHIUM IN MELANOMA CELLS: A COMPARATIVE STUDY *IN VITRO*.

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Boron neutron capture therapy is a perspective selective technology for the destruction of cancer cells, while the use of lithium instead of boron may represent a new and promising vector for the development of neutron capture therapy (NCT), however, data on the possibilities of lithium accumulation in tumor cells are limited to single studies [1, 2].

The aim of this work was to compare the cytotoxicity of boron-containing drugs and various lithium salts, as well as the accumulation of boron and lithium in tumor cells *in vitro.*

Cell cultures BJ-5ta (human fibroblasts), SK-Mel-28 (human skin melanoma) and B16 (mouse skin melanoma) were used in the experiment. Boronophenylalanine (BPA) and sodium borocaptate (BSH) are boron delivery agents, which are certified and used in clinical studies, were tested in subsequent investigation as well as lithium salts: lithium carbonate, lithium citrate and lithium chloride. The cytotoxicity of the drugs was determined using MTT-test. The colony-forming assay was used to evaluate the effect of lithium salts on proliferation capacity of cell cultures. The boron and lithium concentration was measured by inductively coupled plasma atomic emission spectrometry (ICP AES).

Cytotoxic effect was observed when incubated with boron-containing drugs in concentrations of boron higher than 160 μg/ml what correlates with literature data. The cytotoxicity of lithium salts was ob-

served in lithium concentrations of 160 μg/ml and more, thus lithium salts can be safety used in lithium concentrations minimally required for successful NCT.

The maximum boron concentration was 0.29 μg/10^6 cells when SK-Mel-28 and B16 cells were incubated with boronophenylalanine. The highest concentration of lithium was found when the B16 culture was incubated with lithium carbonate and was 0.79 μg/10^6 cells, which is more than 2 times higher than the boron concentration.

The investigation revealed that non-toxic doses of boron and lithium-containing drugs lead to significantly higher uptake of lithium by tumor cells compared to boron, what indicates the possibility to use the lithium in neutron capture therapy.

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