

Visualization of mechanisms of kidney cancer A498 cell death under the influence of combined therapy of *Gratiola officinalis* extract and cyclophosphamide using the effect of fluorescence of ultrastructural cell components

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Objective of the study

To evaluate the effectiveness of combined antitumor therapy with *Gratiola officinalis* extract in combination with synthetic cytostatic drug (cyclophosphamide).

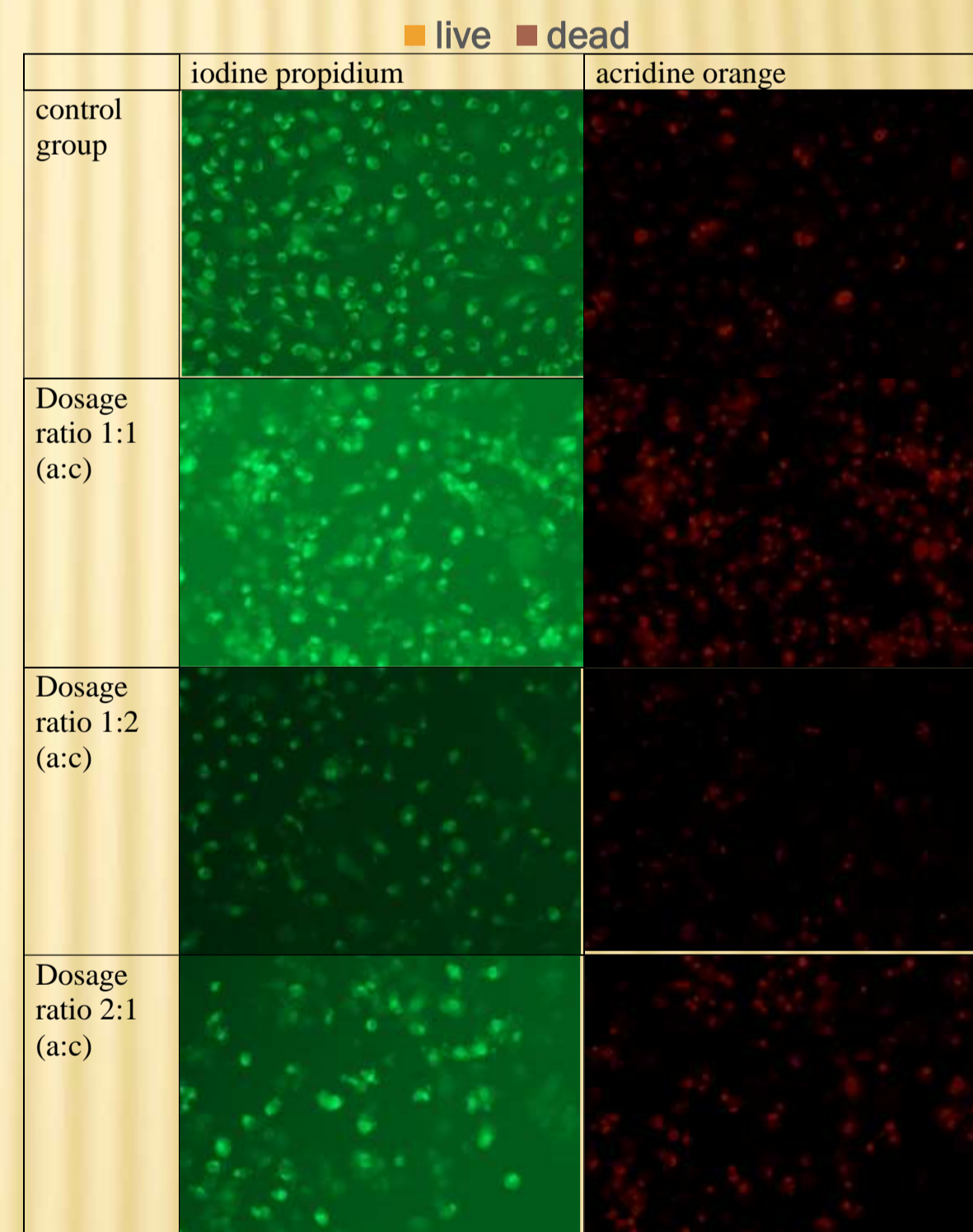
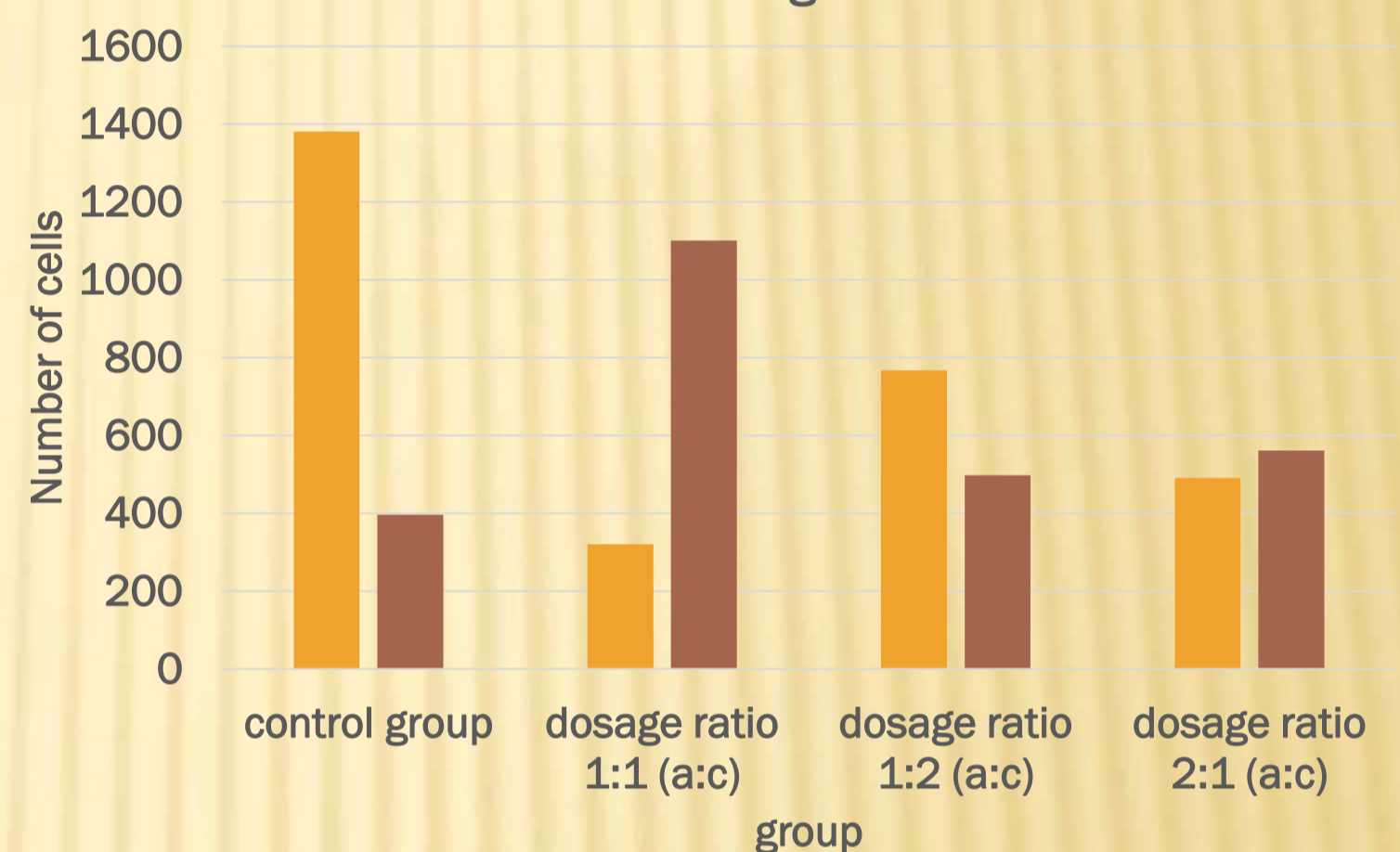
Materials and methods

Fluorescent dyes: iodine propidium and acridine orange. The “living and dead” test was used for visualization, which revealed the total number of cells, died by necrosis and apoptosis, the number of cells with apoptotic cells or nucleus pycnosis. The study was carried out within 24 hours, the dosage of drugs: *Gratiola officinalis* extract of 100 mcg/ml, cyclophosphamide 300 mcg/ml. The studied substances were used in 3 dosage ratios of *Gratiola officinalis* extract and cyclophosphamide (1:1; 1:2; 2:1), the comparison was made with the control group (without substances).



Results

Results «living and dead test»



Conclusions

The use of fluorescent dyes as a way to diagnose the mechanisms of cell death allowed studying the effect of combined antitumor therapy on cells of human kidney carcinoma A498. The most effective of the studied ratios of dosages of *Gratiola officinalis* extract and cyclophosphamide was found to be a ratio of 1:1, which combines a high level of cytostatic, cytotoxic, apoptotic activity.