

«Protoplast» Experiment

**INFLUENCE OF MICROGRAVITY ON DIVISION CAPABILITY
AND EXPANSION GROWTH OF PLANT CELLS INVITRO****Klymchuk D. A.**

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The gravisensitivity of plant cells *in vitro* will be studied. The protoplast and culture of single cells growing in altered gravity will be the objects of experiment. The main objectives are the following:

- control of the growth and behavior of protoplasts and cultured single cells;
- study of cell proliferation and cell expansion rate, microcallus formation, genetic stability and cell differentiation;
- determination of the calcium ion concentration during cell wall regeneration by protoplasts and in microcallus cells;

— study of structural and biochemical features of a regenerating cell wall;

— study of the cytoskeleton topography in protoplasts and microcallus cells.

The methods of light, fluorescence and electron microscopy, cytochemistry, immunocytochemistry and morphometry will be used.

To meet these objectives, the simplified and inexpensive approaches are proposed. The obtained data on the influence of altered gravity on basic processes of plant cell functioning will be helpful for understanding the mechanisms of cell gravisensitivity.

«Plant Tumors» Experiment

**STUDY OF MICROGRAVITY EFFECTS ON TUMOR FORMATION
IN PLANTS BY THE MODEL OF CROWN GALL INDUCTION
WITH AGROBACTERIUM TUMEFACIENS****Sarnatzkaya V. V.**

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The purpose of the experiment is to study the influence of microgravity on induction and development of crown gall tumors on explants of plant storage tissue cultivated *in vitro*. The main objective concerns the relation between the efficiency of the process of tumor induction and cell metabolism in altered gravity (namely, the effect of modification of Ca^{++} metabolism on tumor induction, enzyme activity and pathogenesis-related protein formation). This model is also applied for screening anti-tumor preparations and for study of the mode of their action. For this reason, it is important to study

the effectiveness of anti-tumor substances, which affect just the nuclei and cell membranes, under microgravity. Both normal and inoculated with *Agrobacterium tumefaciens* explants of Jerusalem artichoke and potato bulbs will be used as objects of this investigation.

The methods of tissue culture, evaluation of crown gall tumor induction and development, as well as cytological (investigation of mitotic and proliferative activity, cytofluorimetry) and biochemical (ion-exchange chromatography and gel-electrophoresis of proteins) methods will be applied.