THE TOPIC OF A COMPETITION PROMOTING STUDENT ENGAGEMENT IN SCIENTIFIC ACTIVITIES

Topic: Cytotoxic effect of cytokine induced killer cells (CIKs) on cancer cell lines

Goal: To evaluate the killing effect of CIKs on cancer cell lines of different type and determine whether there are easily identifiable cancer markers that could predict the effectiveness.

This study will evaluate the cytotoxic effects of Cytokine-Induced Killer Cells (CIKs) on various cancer cell lines, aiming to identify potential cancer markers that predict the effectiveness of CIK-based therapies. CIKs are a unique subset of immune cells, generated from peripheral blood mononuclear cells (PBMCs) through stimulation with IFN-γ, anti-CD3 antibody, IL-2 and other factors. The precise protocol will be disclosed to the student. These cells possess potent anti-tumor activity, combining the characteristics of both T cells and natural killer (NK) cells created in the cell differentiation process.

In this experimental setup, CIKs will be co-cultured with cancer cell lines derived from different tumors, including melanoma (human SK-MEL-28, murine B16), leukemia (K-562), lung (PC-9), and breast cancers (MCF-7). The primary objective is to determine the cytotoxicity by measuring cancer proliferation and possibly cell apoptosis after exposure to CIKs. This will be assessed using assays like MTT and flow cytometry to quantify the killing efficiency.

The study further investigates whether specific biomarkers expressed by cancer cells, such as MHC class I, PD-L1, MIC A/B or NKG2D ligands, correlate with the susceptibility to CIK-mediated killing. Identifying these markers could enable the prediction of therapeutic outcomes and help tailor CIK therapies to individual patients, enhancing their efficacy and reducing resistance.

Metods used: Basic cell culture protocols, advanced cell differentiation protocols, MTT assay, FACS.

The project will be conducted in collaboration with Laboratory of immunology of National Cancer Institute in Vilnius and UAB "Froceth" which are both pioneers in anti-cancer therapy development.

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