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Effects of Bulgarian Propolis on Cd34+ Cells *In Vivo* and on Two Cell Lines *In Vitro*

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Purpose: To evaluate whether Bulgarian propolis augment the release of hematopoietic stem cells from bone marrow into the blood stream of rats and to analyze its effect on cell proliferation and surviving *in vitro.*

Methods: Twenty male Wistar rats were divided into two groups (n=10) and treated as follows:1^{-st} group (Controls) – aqua destillata, p.o.; 2nd group-Bulgarian propolis in a dose 100 mg/kg bw, i.p. Two hours after single administration of the substances blood samples were analyzed by flowcytometry for CD34+ and white blood cells differential were performed using hematology analyzer.

Peripheral blood mononuclear cell (PBMC) and Mouse lymphoma cell line L5178Y were cultivated in 96 well plate in culture medium RPMI-1640 with 100 U/mL Penicillin and 100 mg/mL Streptomycin. 10% Fetal bovine serum was added to the L5178Y cell line. The cells were grown in an incubator at 37^{o}C and 5% CO_2 for 24 hours and were treated with increasing propolis concentrations - 0, 01; 0, 1; 1, 0 and 10 mg/L. To analyze the effect of the natural product on cell viability, a cytotoxic MTT-test was used.

Results: Propolis mobilized significant amount of hematopoietic stem cells in the blood stream versus controls. It also caused a significant increase in the number of leukocytes and lymphocytes in rats in comparison to controls. In human PBMC cells treated with propolis in concentrations 0, 01; 0, 1; 1, 0 and 10 mg/L the cell vitality was higher in comparison with the control cells. The percentage of living cell was increased from 106 to 135% with increasing of the propolis concentrations. In propolis treated tumor cells L5178Y the percentage of living cells decreased with increasing of propolis concentrations. The results of 3-(4, 5-dimethylthiazolyl-2)-2, 5-diphenyltetrazolium bromide (MMT) assay showed that concentration 0, 1 mg/L leads to 73% cell survival, 1, 0 mg/L to 69%, and the highest concentration-10 mg/L decreased the percentage of surviving cells to 40% .

Conclusion: Bulgarian propolis has no effect on the stem cells maturation but mobilize the rats stem cells in peripheral blood. In human PBMC the proliferative activity after treatment with propolis suppose the ability to influence cell differentiation. From the other side the cytotoxic effect of propolis on the tumor cell line determines its potential in anti-tumor therapy.

Keywords: CD34+ cells, cell lines, proliferation, rats, Bulgarian propolis.

Biography:

Dr. Lyudmil Peychev, PhD, MHM, is Dean of the Faculty of Pharmacy at the Medical Medical University of Plovdiv, Bulgaria and Head of the Department of Pharmacology and Drug Toxicology. He is a specialist in Pharmacology, Clinical Pharmacology and Therapeutics, Master of Health Management. Professor L.Peychev is the author of scientific articles in the field of neuropharmacology, clinical pharmacology, phytotherapy and apitherapy. He is Head of research projects and author of inventions and trademarks. As a scientist he has won recognition by the academic community in Bulgaria and other countries.