

THE EFFECT OF MEDICINAL PLANTS ON PROLIFERATION OF HUMAN SW620 COLORECTAL CANCER CELLS

M. Zhumabekova* , M. Zhunusova , A. Issabekova , V. Ogay

Laboratory of Stem Cells, National Center for Biotechnology (Astana, Kazakhstan)

L.N. Gumilyov Eurasian National University (Astana, Kazakhstan)

marzhan.zhumabekova@nu.edu.kz

Keywords: Colorectal cancer, medicinal plants, SW620

Introduction: Colorectal cancer is currently one of the most common malignancies and the third leading cause of cancer-related deaths worldwide. Mortality is attributed to invasion and metastasis, with only 12.5% five-year survival rate for patients with distant metastasis. Chemotherapy is routinely used for cancer treatment. However, it is accompanied by a number of undesired side effects that can put the patients under further strain. Therefore, research interest is drawing its attention towards alternative treatments with less toxic side effects. Medicinal plants have a wide spectrum of pharmacological properties such as anti-carcinogenic, anti-inflammatory, anti-oxidative, anti-bacterial, etc. Medicinal plants as natural reservoirs of various secondary metabolites possess chemoprotective potential in anticancer therapies. In this study, we investigated the effect of five medicinal plant (Celandine (*Chelidonium majus*), Fenugreek (*Trigonella foenum-graecum*), *Sanguisorba officinalis*, Chaga mushroom (*Inonotus obliquus*), *Carum carvi*) extracts on viability of human metastatic colon cancer cells in comparison with two common chemotherapy drugs, 5-fluorouracil and oxaliplatin.

Methods: Human colon cancer cells from lymph node metastasis (SW620) were cultured in both high-glucose and low-glucose DMEM supplemented with 10% FBS for glucose starvation prior to administration of inhibiting agents, and grown at 37°C under 5% CO₂. The cytotoxicity of 0.5% and 1% aqueous plant extracts, 5-fluorouracil (250 Lig/ml), and oxaliplatin (250 LLM) was determined by Alamar Blue® cell viability assay.

Results: Among all plant extracts and chemotherapy drugs, SW620 cells were more sensitive to fenugreek seeds at 1% concentration, as demonstrated by 1.3 and 1.2-fold reduction in cell viability compared to the effect of oxaliplatin and 5-fluorouracil, respectively. Fenugreek inhibited cell growth in a dose-dependent manner, with less profound difference in anti-cancer activity at a concentration of 0.5%. The response of cancer cells to *Carum carvi* and to *Chelidonium majus* was similar to the response to conventional chemotherapeutic drugs. Water extracts of *Sanguisorba officinalis* and *Inonotus obliquus* did not have significant effect on proliferation of cancer cells. Glucose starvation before the experiment revealed increased resistance of SW620 cells to an inhibiting agent.

Conclusion: Our results prove the prospects of using medicinal plants as an alternative to or in combination with chemotherapy, especially in multidrug-resistant cancer types.