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Poster abstracts

Experimental cancer prevention

P1
Possible prognostic value of xanthine oxidoreductase in tumor progression

V. Mikhailenko* , A. Glavin, P. Mykhailenko, L. Ieleiko.
R.E. Kavetsky Institute of Experimental Pathology, Ecology, Kyiv, Ukraine

Xanthine oxidoreductase (XOR) exists in two interconvertible forms – xanthine dehydrogenase (XDH, EC 1.1.1.204) and xanthine oxidase (XO, EC 1.1.3.22), involved in metabolism of many xenobiotics and drugs. Important outcome of XOR activity related to its ability to generate reactive oxygen species (ROS) and catalyze the reduction of nitrates and nitrites to nitric oxide (NO), acting as a source of both NO and peroxynitrite. Generation of free radical species determine genotoxic effects of this enzyme and its role in cell apoptosis and anticancer activity. Linder N. et al (2005, 2006) detected feedback between XOR expression in breast and gastric tumors and tumors size, unfavorable prognosis of diseases and consider that level of XOR expression may be a new marker for these diseases. Sawa T. et al (2000) showed that accumulation of the modified XOR in mice tumors had resulted in the considerable decrease of its growth. The purpose of this study was to evaluate relationship between growth of model tumor Guerin's carcinoma (GC) and XOR activity in tumor tissue. The XOR activity and rate of GC growth were evaluated in untreated rats with GC, treated with antitumor drag doxorubicin (DR), and rats inhaled with the exogenic nitrogen oxides (NOx). Reverse correlation ($\rho = -0.89$, $P < 0.05$) was observed between the considerable increase of XOR activity in tumors and decline of GC nodes sizes. The high activity of enzyme in tumor tissues (500–1100 nM of uric acid/hour/mg) was accompanied by a 3.8-fold decrease in a final size of GC nodes as compared to tumors with lower activity of XOR. It is necessary to emphasize that the low rate of GC growth not always was accompanied by high activity of enzyme. DR administration resulted in inhibition of tumors growth to 36% without a change in a total XOR activity, but activity of XO, which is responsible for free-radical production, was elevated in 2.6 times. A reverse effect was observed after exposure to NOx. Despite the fact that total activity of XOR in tumors was increased (1.6-fold), there was a sharp decline of XO activity (2.4-fold) and acceleration of GC growth. Obtained results demonstrated correlation between the XOR activity, proportion of its forms in tumor and rate of GC growth and suggest use of enzyme as a marker for assessment of tumor progression.

P2
Antitumor and antitoxic activity of plant biocomposites

S. Zaletok[1]* , O. Orlovskiy[1], S. Gogol[1], O. Samoylenko[1], O. Klenov[1], I. Malitska[1], L. Gulua[2], G. Kvesitadze[2].
[1]*R.E. Kavetsky Institute of Experimental Pathology, Oncology and Radiobiology NA, Department of Tumor Biochemistry, Kiyv, Ukraine,* [2]*S. Durmishidze Institute of Biochemistry and Biotechnology of NAS of Georgia, Department of Biotechnology, Tbilisi, Georgia*

The objective of the present study was to investigate the effects of plant biocomposites (extracts of green tea (GTE) and biocomposite derived from green tea extract and red wine lee (GTE+W)) on the growth of experimental grafted mammary (Walker W-256 carcinosarcoma) and uterine (Guerin's carcinoma, GC) rat tumors. Methods. The biocomposites were applied to the animals as solutions in drinking water. Methods of experimental oncology were used in experiments on the animals; methods of Western-blotting and Surface Plasmon Resonance were used to determine transcription factor proteins NF-κB, as well as protein such as ODC (ornithine decarboxylase, the key enzyme of polyamines biosynthesis), and proteins of NF-κB-dependent oncogenes (bcl-XL, c-myc, inos, cox-2).
Results: Consumption of GTE substantially inhibited the W-256 growth and as a trend – growth of GC. GTE+W alone did not retard W-256 growth and some (as a trend) retarded growth of GC. However, in combination with cisplatine GTE+W in concentration 1 mg/ml strengthened the effect of cisplatin on GC 1.7-fold and effect on W-256 – 1.4-fold; in concentration 2 mg/ml magnified effect on GC almost 4-fold. GTE+W sharply diminished the basic side effect of cisplatin – its nephrotoxicity (on the indices of urea and creatinine in blood serum). GTE and GTE+W have antiinflammatory and antioxidant properties. Tumor growth suppression was accompanied by the inhibition of the NF-κB transcription factor activity and the reduction of the level of ODC and proteins of NF-κB-dependent oncogenes (bcl-XL, c-myc, inos, cox-2). Thus, these data show that antitumor effect of plant bioconcentrates may be mediated by polyamines- and NF-κB-dependent signal pathways and indicated their available using in treatment and prevention of oncologic disease: GTE may be applied as a component of complex prevention and therapy of oncologic deseases; GTE+W-biocomposite may be applied in clinical oncology to magnify therapeutic effect of Cisplatin and to diminish its side effects in great number of patients who obtain this drug.

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