

Effect of Total Proteoglycans on Cell Proliferation and Tumor Formation in Mice

Valentina I. Rykova¹, Galina M. Ronichevskaya¹ and Elvira V. Grigorieva²

¹ *Department of Genome Structure, Institute of Cytology and Genetics SD RAS, Novosibirsk, 630090, Russia;* ² *Laboratory of Molecular Mechanisms of Carcinogenesis, Institute of Molecular Biology and Biophysics SD RAMS, Novosibirsk, 630117, Russia*

KEYWORDS Proteoglycan. Tumor. Heparan Sulfate. Dermatan Sulfate. Cell Proliferation

ABSTRACT Proteoglycans (PGs) are heterogeneous macromolecules that can both suppress and induce mitotic activity and cell growth depending on their structure and experimental conditions. Possibly, their combination is necessary for the proper regulatory effect to the certain tissue. In the present study, an influence of bovine liver total proteoglycans on the mitotic activity of different mouse embryonic tissues and mouse adenocarcinoma cells was investigated. Bovine liver proteoglycans suppressed cell proliferation in the mouse liver (1.8% mitotic cells versus 10.6 % in the control animals) but not in the other tissues. The antimitotic effect of the PGs was tissue-specific as it was shown by experiments with bovine spleen and lung PG preparations. An influence of the total proteoglycan preparation on tumor cell proliferation was studied by treatment of primary breast adenocarcinoma cells with bovine liver PGs before injection into experimental animals. The treatment suppressed tumor formation in mice – only 20% animals developed tumors on 26th day and 55% ones on 43rd day (versus 75% and 100% in a control group, respectively). Intraperitoneal injection of the proteoglycans into mice with induced Ehrlich ascite carcinoma decreased tumor weight and tumor volume by 50%. These results indicate that bovine liver total proteoglycans are able to suppress cell proliferation in both fetal mouse tissues and orthotopic mammary carcinoma model *in vivo*. The effect is tissue-specific and species non-specific with optimal concentration 0.3-0.4 mg/g animal weight. The data suggest that total bovine proteoglycan preparations may be potential antimitotic compound to cell proliferation disorders for another animal species.