

through inducing apoptosis on the cells. The results of the study revealed that the AK8b is a promising potent anti-proliferative agent for cancer cell lines by inducing apoptosis.

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N-glycoprofiling analysis in a simple glycoprotein model: Glycosylated human prolactin



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Human prolactin (hPRL) is a polypeptide hormone occurring in the non-glycosylated (NG-hPRL) and glycosylated (G-hPRL) forms, with molecular weights of approximately 23 and 25 kDa, respectively. It has a single, partially occupied N-glycosylation site located at Asn-31: the physiological function of G-hPRL is, however, not clear. Carbohydrate moieties generally play an important role in the biosynthesis, secretion, biological activity, and plasma survival of glycohormones and can vary depending on the host cell. The main objective of this study was to determine the N-glycan structures present in native, pituitary G-hPRL and compare them with those present in the recombinant hormone. CHO cell-derived G-hPRL was then compared to pituitary G-hPRL especially with regard to N-glycoprofiling. Among the main differences found in the pituitary sample were an extremely low presence of sialylated (1.7%) and a high percentage of sulfated (74.0%) and of fucosylated (90.5%) glycans. A ~4-fold lower bioactivity and a higher clearance rate in mice were also found for pituitary G-hPRL. N-glycan profiling, moreover, proved to be a useful and accurate methodology for molecular mass and carbohydrate content determination for the two G-hPRL preparations, in good agreement with the values obtained directly via MALDI-TOF-MS.

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Cytotoxic and antiproliferative effects of evernic acid on HeLa cell lines: A candidate anticancer drug



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Major research studies and innovations have not been able to prevent the spread of cancer, which is currently known as the second most deadly disease after heart attack. There are several treatment methods for cancers of different origins, but the effects of some anti-cancer agents are still unknown in cancer cells. Lichens are obligate symbiotic organisms between a fungal partner and algal or cyanobacterial cells and they have been used for different purposes, such as treatment of diseases in folk medicines, as perfumes and dyes. *Evernia prunastri* and *Pseudoevernia furfuracea* contain fatty acids, depsides, depsidones, atranorin, evernic acid. In this study, the cytotoxic and antiproliferative effect of the evernic acid was evaluated by LDH (lactate dehydrogenase leakage) and WST-1 (water soluble tetrazolium salts) assays on HeLa (human cervical cancer) cell lines. According to our results, evernic acid showed

strong cytotoxic and antiproliferative effects and the most effective doses were observed in 25 and 50 µg/mL concentrations. Finally, we can assert that evernic acid may be an effective anti-cancer agent and has potential to become a fundamental compound for anticancer pharmaceuticals. In the future, we will focus on animal experiments to demonstrate and confirm the protective role of evernic acid.

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Plant Biotechnology

Identification of wheat germplasm resistant to leaf and stripe rust using molecular markers



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Resistance to stripe and leaf rusts are the major factor that adversely affects wheat yield and quality and causes considerable economic damage in Kazakhstan. The aim of the present study was to screen 85 wheat accessions, including cultivars and advanced lines, with markers linked to effective rust genes. For the identification of Lr-gene sources, STS J91/2 and SCAR Lr29R18 markers (<http://maswheat.usdavis.edu>) associated with known effective genes (Lr24 and Lr29) were used in screening the accessions. Using STS marker J91/2, five carriers of Lr24 (Sabina, Zhetisu, Umanka and Zhamin) were identified. 33 genotypes with SCAR Lr29R18 generated the DNA fragment associated with Lr29. Among them two breeding lines (SP-2-1026, 1207) showed high yield potential combined with resistance to *P. tritici* races predominant in Kazakhstan. For the identification of Yr-gene sources, SSR markers XBARC8.2 (Bai Yu-Lu et al., 2010) and psp3000F/R (Wang LF et al., 2002), tightly linked to effective genes (Yr15 and Yr10) were used. The XBARC8.2 marker was present in 17 lines Yuzhnaya12/Dippes Triumph and in 4 lines, including KS-19-241 *T. monococcum*/G-292, KS7 Saratovskaya 29/*T. maha*, KS-3 Zhenis/*T. dicoccum* and KS-1 Zhenis/PPG as well as. The results are being used in MAS in wheat breeding programs targeting leaf and stripe rust resistance.

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Production of rapeseed mutant lines by microspore-derived embryo culture



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In order to obtain rapeseed mutant lines of cultivar “Kris” used isolated microspore culture. Isolation of microspores was defined according to E. Swanson (2002) with our modifications. Density of microspores in NLN medium was adjusted to 20,000–25,000 microspores/ml. The protocol allows obtain 2% embryogenesis in the cultured microspores and 90% regeneration of the cultured embryos. Upon reaching sizes of 1.5–2.5 mm embryos transferred