

JOINT EVENT

9th International Conference and Expo on

Proteomics and Molecular Medicine

9th International Conference on

Bioinformatics

November 13-15, 2017 Paris, France

Proteomics analysis of antitumor activity of Helix and Rapana hemocyanins

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Hemocyanins (Hcs) are copper-containing glycoproteins that act as oxygen transporting proteins in many arthropods and mollusk species. Hemocyanins from the molluscs *Helix aspersa* (HaH), *Helix lucorum* (HLH) and *Rapana venosa* (RvH) exhibiting different oligosaccharide structures have been investigated for potential use in therapy of bladder cancer permanent cells. *In vitro* studies on the antitumor activities of these proteins were performed in T-24 cells and compared to doxorubicin and mitomycin-C. Control experiments were performed using normal urothelial HL 10/29 cells.

The obtained results show that the human tumor T24 cell lines are sensitive to the action of the tested hemocyanins and their isoforms. The inhibition of the tumor cell growth was dose and time dependent and was observed after incubation with native HaH and HLH and FUs β c-HLH-h and RvH-c. Cells treated with both FUs, β c-HLH-h and RvH-e, showed apoptotic and necrotic cells and this inhibition was stronger than the effect measured for doxorubicin treated cells. No growth inhibition of the normal urothelial cell line HL 10/29 was observed after treatment with HLH, HaH, RvH and their isoforms. The impact of hemocyanins on tumor cells was investigated by 2D-gel PAGE and several proteins showed indeed altered abundancies. The most effective inhibition of tumor cells is probably caused by a specific novel and unusual N-glycan oligosaccharide structure on HLH with methylated hexoses, an internal fucose residue connecting one GalNAc(β 1-2) and one hexuronic acid.

Biography

Radostina Velikova is currently working in the Institute for Organic Chemistry with Center for Phytochemistry, Bulgarian Academy of Sciences.

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