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Snake venomomics and antivenomics of the nose-horned viper, *Vipera ammodytes ammodytes*

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Snake venoms are a deep well of natural compounds with high specificity for various biological targets, from which we draw new pharmacological leads. The nose-horned viper, *Vipera a. ammodytes*, is the most venomous European snake inhabiting a large part of the south-eastern Europe and Asia Minor. Hemorrhage and coagulopathies are the most pronounced effects of envenomation in humans. We used snake venomomics approach, combining proteomics and transcriptomics, to survey the protein composition of the venom with the aim of discovering new pharmacologically active substances. Proteins were separated by two-dimensional polyacrylamide gel electrophoresis into 208 spots and identified by mass spectrometry using the venom gland cDNA library sequence data. In an activity-guided fractionation, hemostatically active components, effecting blood coagulation and platelet aggregation, were detected and isolated: procoagulants metalloproteases - factor IX, X and prothrombin activators, anticoagulant fibrinogenolytic serine proteinases with kallikrein-like and angiotensin I-degrading activity, C-type lectin-like proteins inhibiting vWF-dependant platelet aggregation, dimeric disintegrins inhibiting vWF-, collagen- and ADP-dependant platelet aggregation and phospholipases A2 with anticoagulant and platelet anti-aggregation activities. The only adequate and efficient treatment of snakebite envenoming is serotherapy. The term “antivenomics” describes proteomic procedure of identification of those polypeptides in the venom which possess epitopes that are weakly or not at all recognized by the standard homologous antivenom. Using antivenomics approach we aimed to deepen and broaden our efforts towards formulation of the optimal antigenic composition of the sample for immunization of animals to prepare highly effective antiserum for immunotherapy after envenomation with the nose-horned viper venom.

Biography

Adrijana Leonardi is a researcher at the Department of molecular and biomedical sciences at the Jozef Stefan Institute. She is a biochemist with a deep research interest in toxicology, protein structure and structure–function relationships. She has been studying hemostatically active components of snake venoms and other medically interesting compounds from animal venoms. Recently she started collaborations with research groups studying the interactions of nanoparticles with plasma proteins. She is mentoring graduate and undergraduate students. Her work was published in 36 papers in reputed journals.

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