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Snake venom proteins affecting platelet receptor function

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Platelets are a major target for snake venom proteins in snake bite. Because platelets are critically important in preventing bleeding they would repair damage to the endothelial cells and subendothelium caused by other venom components, such as metalloproteases, and prevent neurotoxic and myelotoxic components from reaching their targets rapidly, essential for immobilizing the prey. Hence, platelets need to be neutralized. Platelet targets for venom are mainly critical receptors, involved in platelet activation, adhesion and aggregation. In Elapid snakes the main mechanism involves metalloprotease removal of receptors. Viperidae and Crotalidae have several mechanisms using disintegrins to prevent adhesion and aggregation and snaclecs to block receptors. However, the more advanced snakes use activation of platelets, via clustering of receptors, mimicking physiological pathways, to prevent platelet repair mechanisms. Snaclecs are the main class of proteins involved in platelet receptor clustering and they use a variety of mechanisms to do this. For the snake this approach has the advantage of using very small amounts of protein compared to inhibition of platelet receptors, which enhances evolutionary fitness. Several snaclecs played major roles in the isolation and characterisation of novel platelet receptors and are still used as convenient ligands for the study of platelet function.