Hemolytic activity of venoms of the water shrew *Neomys fodiens* and the common shrew *Sorex araneus*

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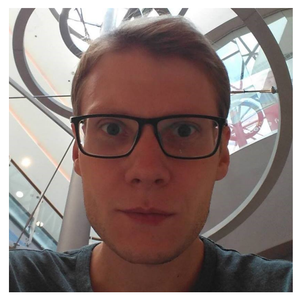


Toxicity of venom of *Neomys fodiens*

* potent paralytic activity (paralysis, convulsions, irregular respiration) [1,2]
* lower cardioinhibitory effects coupled with a reversible cardiac arrest [2]
* phospholipase A2, lysozyme C and hyaluronidase identified in the venom [2,3]

Neomys fodiens eating a frog

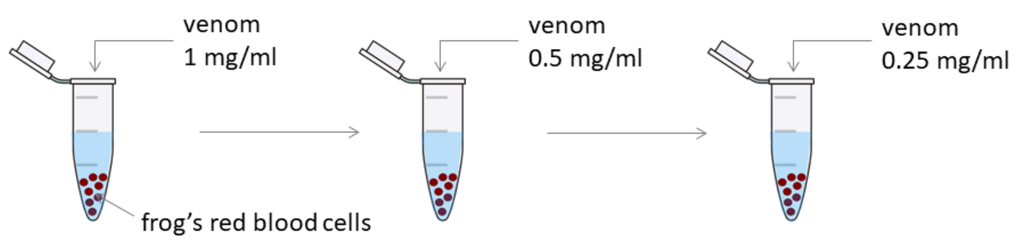
Research objectives

* determination of the hemolytic activity of venom of *N. fodiens* (NF) and saliva of *Sorex araneus* (SA)
* toxin identification in saliva of *N. fodiens* and *S. araneus*

Sorex araneus eating an earthworm

Methods

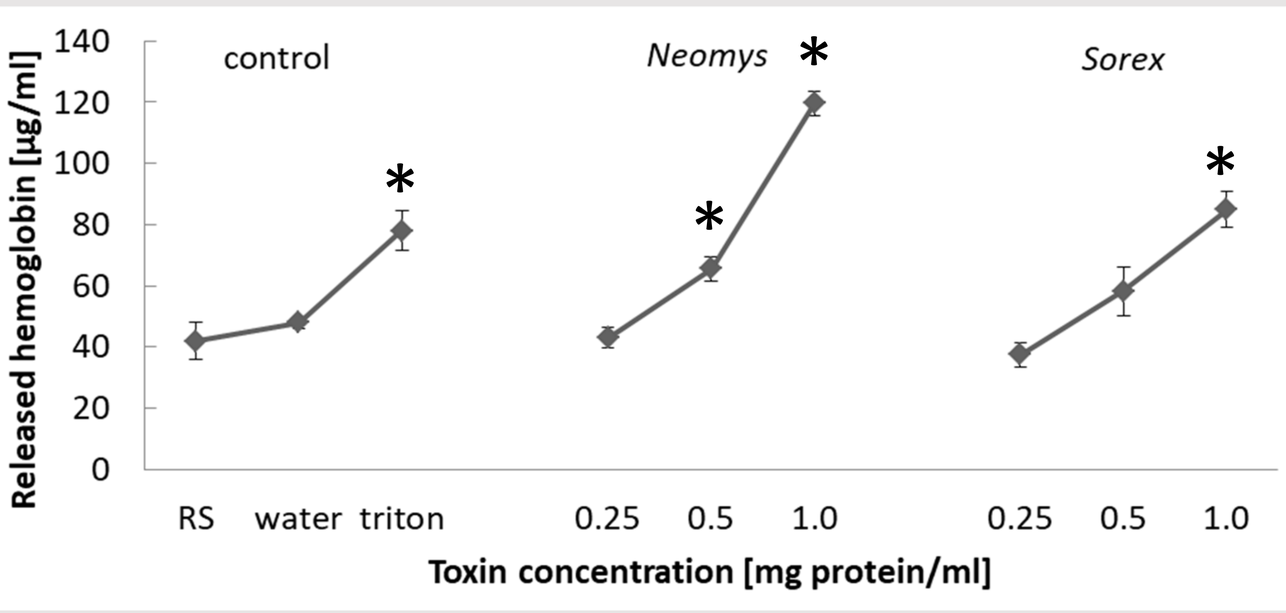
* extraction of submandibular glands of shrews (n=12 for both shrew species)
* hemolytic assay: treatment of frog erythrocytes with venom of NF and SA at concentrations of 1.0, 0.5 and 0.25 mg/ml



* control tests: water & Ringer's solution (negative controls), Triton X-100 (positive control)
* protein identification: chromatographic separation and proteomics

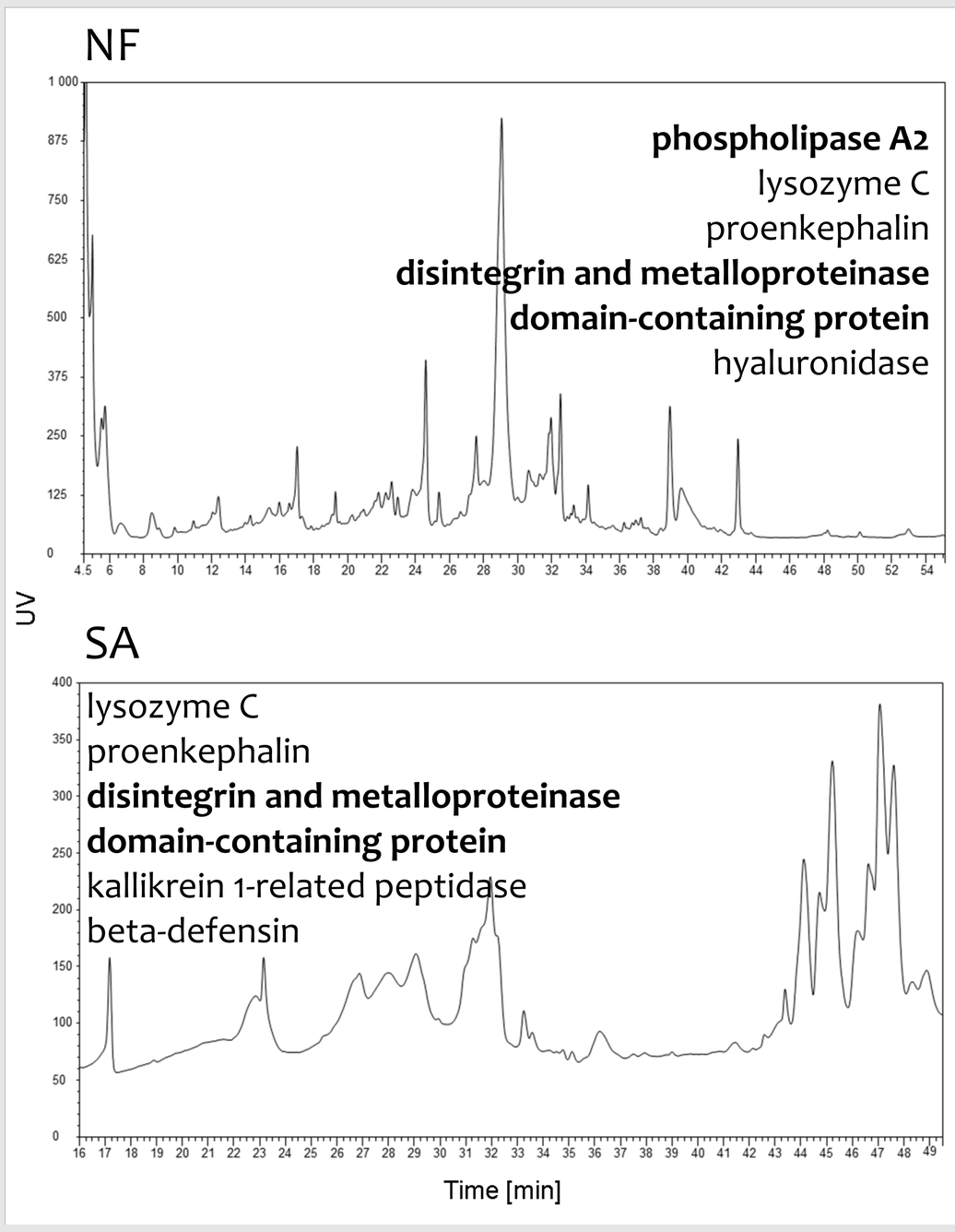
Results

Hemolytic activity



* significant concentration-dependent effects of gland extracts of both shrews on hemolysis in frog erythrocytes
* venom of NF produced hemolysis at concentrations of **0.5** ($p<0.01$) and **1.0 mg/ml** ($p<0.001$)
* saliva of SA produced hemolysis at concentration of **1.0 mg/ml** ($p<0.001$)
* hemolytic effects of NF venom were stronger than those produced by SA ($p<0.0001$)

Toxin identification



Conclusions

* shrew venoms possess hemolytic activity that may allow them to hunt larger prey as frogs
* due to toxic activity of its saliva, SA may be considered venomous mammal

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References

1. Pucek 1959. *Acta Theriol.* 3, 93-108. **2**. Kowalski et al. 2017. *Front. Zool.* 14, 46. **3**. Dufton 1992. *Pharmacol. Ther.* 53, 199-215.