

# Discovery of antimicrobial peptides in spider silk glands using Expressed Sequence Tag data

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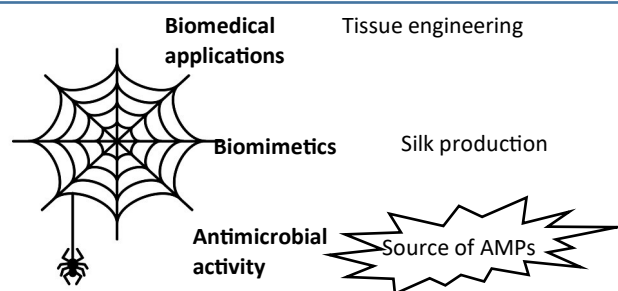
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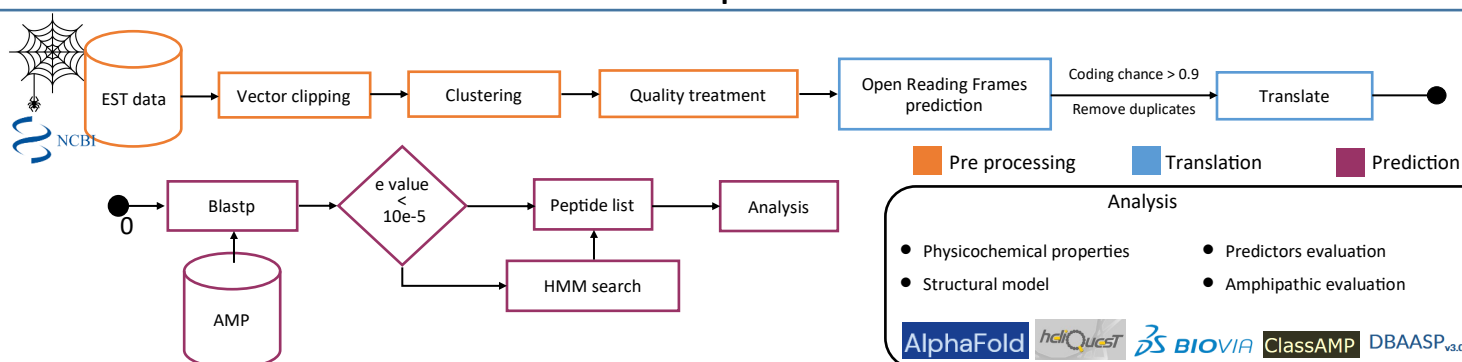


## Introduction

Antimicrobial peptides (AMPs) emerges as a novel solution for the current issue of multi-drug resistance microorganism. These compounds had been isolated from multiple taxa such as plants, mammals, and insects [1]. No efforts had been made to describe these compounds in potential biomaterials such as spider silk. Spider silk had been proposed to have antimicrobial activity [2]. However, no mechanisms or compounds had been described yet. We propose that antimicrobial reports on this biomaterial are due to AMPs presence. We designed a bioinformatic pipeline to discover AMPs sequences from Expressed Sequence Tag data of spiders' silk glands



## Pipeline



## Results

### Data transformation count

6 datasets from  
5 spider species

1024reads



CAMPSign

5Know

3Novel

### Know peptides

Name	CAMP Match	Blast Match	Predictors
LhB_seq1	Ubiquitidin	<i>S. dumicola</i>   Ubiquitin-like protein 1-40S ribosomal protein	11
LhB_seq2	Ubiquitidin	<i>S. dumicola</i>   Ubiquitin-like protein 1-40S ribosomal protein	7
NaB_seq1	CgUbiquitin	<i>Flavobacterium sp.</i>   Ubiquitin	5
NaB_seq2	TCP	<i>Araneus ventricosus</i>   Phenoloxidase-activating factor 2	8
SgB_seq1	Luxuriosin	<i>Schistosoma haematobium</i>   Putative	3
LL37	Cathelicidin	<i>Homo sapiens</i>   cathelicidin antimicrobial peptide preproprotein	9

### Novel peptides

Name	Model	Wheel plot	Net charge	Predictors
LhH_seq1			0	2
Lv2H_seq1			+2	9
SgH_seq1			0	3

### Conclusion and outlook

We designed a bioinformatic pipeline that bio mine AMP from EST data using blast and HMM profiles approaches. Five previously described and three novel AMP sequences were obtained from spider silk gland data. Novel peptides show common properties of helix AMP and LhH\_seq1 shows amphipathic structure and neutral charge. The pipeline can be used to another dataset to screen their potential as AMP source.

### References

- [1] Antimicrobial peptides-promising alternatives to conventional antibiotics. 10.1159/000331009
- [2] Antimicrobial functionalized genetically engineered spider silk 10.1016/j.biomaterials.2011.02.040