# THE NEUROPEPTIDOME OF *RHODNIUS PROLIXUS* BRAIN

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Chagas' disease is an important arthropod-borne disease in Central and South America. Recent estimations from the World Health Organization indicated 16-18 million people infected. The disease is vectored by insects, which are the main target of disease spreading. Disruption of the activity of vector physiology through manipulation of regulatory peptides is an attractive direction towards a novel generation of insecticides.

In this study we performed a peptidomic analysis of the brain and hemolymph of *Rhodnius prolixus*. This is the first comprehensive high throughput neuropeptidomic study of a human disease vector to date. Performing off-line nano-LC MALDI TOF-MS/MS analysis with subsequent *de novo* sequencing and database search, we have identified 42 novel neuropeptides from *R. prolixus*. Some of the molecules identified present unique characteristics compared to known insect neuropeptides. Peptides identified were classified as extended FMRF-amide-related peptides, sulfakinins, myosuppressins, short neuropeptide F, long neuropeptide F, SIF-amide-related peptides, tachikinins, orcokinins, allatostatins, allatotropins, calcitonin-like diuretic hormones, corazonin and pyrokinin. Some of them were detected in multiple isoforms and/or truncated fragments. Interestingly, some of the *R. prolixus* peptides, as myosuppressin and sulfakinins, are unique in their characteristic C-terminal domain among insect neuropeptides identified so far. Furthermore, orcokinins, which are a novel family of peptides detected in only a few species, were identified in brain and hemolymph. The presence of orcokinins in hemolymph suggests a neurohormonal role for this molecule. To validate the data, we confirm the presence of peptides in the brain by immunohistochemistry and determine a map of neurosecretory neurons. In addition, our work provides useful information towards the annotation of genes in the ongoing *R. prolixus* genome sequence project, opens new paths of research in vector biology and in comparative and evolutionary studies of the neuroendocrine system.