

Cytokines Gene Expression on Macrophages Exposed to Triatoma Salivary Gland Extracts

Kenyanna Jones^{1,2}, Lidia Montenegro-Cadena¹ and Berlin Londono-Renteria¹

¹Department of Entomology, College of Agriculture, Kansas State University

²Department of Animal Science & Industry, College of Agriculture, Kansas State University



Abstract

Triatoma sanguisuga and *Triatoma Indictiva* are vectors of Chagas disease. These two vectors goes to the host and bites down to feed on blood, which is necessary for the egg laying process. The disease however is not spread through their bite, but through their feces. When they become full of blood, they defecate and that is where the parasite is. The parasite is then introduced into the skin when the host scratches at the bite and feces enter the skin. An estimated 8 million people worldwide are infected with *T. Cruzi*, and the United States has the 7th highest prevalence of Chagas infections. The Macrophages produces cytokines including TNF (Tumoral Necrosis Factor), IL-10 and IL-18 in responses to danger or infections, the function include tissue inflammation and destruction.

Purpose

The goal of this study was to explore the immune response of the macrophages against the salivary glands of *Triatoma sanguisuga* and *Triatoma Indictiva*.

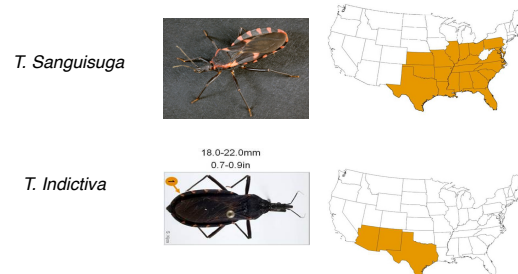
Question and hypothesis

Question: Do the salivary gland extracts of *T. Sanguisuga* and *T. Indictiva* have any effect on the cytokine gene expression levels?

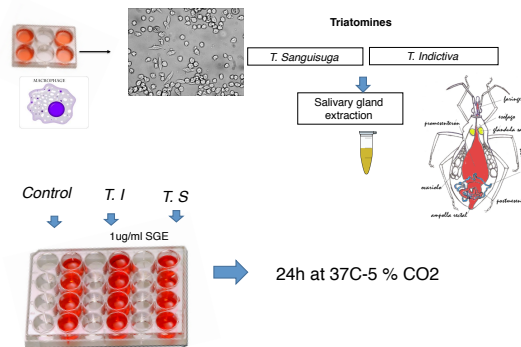
Hypothesis: We hypothesis that there is a difference in the macrophages production of IL-10, TNF and IL-18 between the two insects species after the treatment with the salivary gland extracts.

Study System

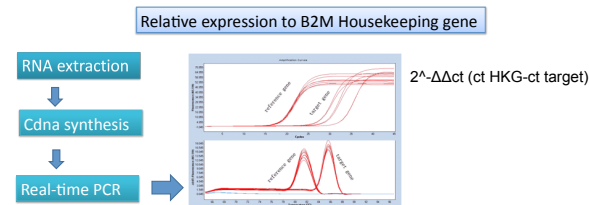
The *T. Sanguisuga* and *T. indictiva* are insects of the Triatominae subfamily (kissing bugs), also known as the Eastern Bloodsucking Conenose or Mexican Bed Bug. It has an incomplete/hemimetabolous lifecycle. After the egg hatches, the immature bug feeds and molts 8 times, taking a blood meal before each molt.



Methods and Experimental Design



Relative gene expression: Cytokines Interleukin 1, Tumoral Necrosis Factor and Interleukin 18



Results

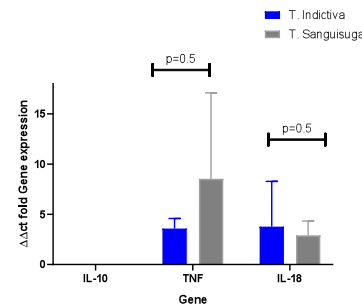


Figure 1. Fold gene expression of IL-10, TNF and IL-18 on macrophages cells after the treatment with *T. Sanguisuga* (blue) and *T. Indictiva* (gray) SGE.

Conclusions

Our findings concluded that the Cytokines TNF and IL-18 were upregulated (>1 fold) for both Triatominae species. Interestingly we also found that IL-10 expression was downregulated in both species.

Although no significant difference between both species was found. The SGE from the two tested species shown high levels of innate immune response interleukines as TNF and IL-18 and low levels of adaptative response interleukins (IL-10). Also, *T. Sanguisuga* induces higher immune response as compare with *T. indictiva*.

Future Directions

The next steps would be to repeat the experiment to make sure that the results that were produced initially are the same so that it is known that the steps and procedures used are valid and able to be replicated. Also, try to separate the proteins contained in the whole SGE that we tested, and making the same experiment with the isolated proteins. Possible future application could be using what we found to find other ways to treat Chagas disease.

References

- <http://www.discoverymedicine.com/Marc-A-Williams/2009/05/21/il-12-and-il-18-cytokines-linking-innate-and-adaptive-immunity/>
- http://entnemdept.ufl.edu/creatures/urban/triatoma_sanguisuga.htm
- Bern, Caryn et al. "Trypanosoma cruzi and Chagas' Disease in the United States" Clinical microbiology reviews vol. 24,4 (2011): 655-81.

Acknowledgements

Special thanks to Dr. Jeremy Marshall, Dr. Berlin Londono, Lidia Montenegro-Cadena and the Department of Entomology