

The Effects of Wound Healing on Innate Immune Function in Grass Lizards (*Takydromus viridipunctatus*)

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Introduction

To better understand how an animal's physiological regulation of the immune system can shift in response to a physical stressor, we investigated changes in immune function and circulating plasma testosterone in response to a cutaneous wound in male grass lizards (*Takydromus viridipunctatus*).



Figure 1. Male *T. viridipunctatus* in Taiwan.

Methods

- Lizards were captured ($n = 25$) and housed individually for 16 days.
- After seven days of acclimation, each lizard was given a cutaneous wound biopsy which was photographed every two days to assess healing.
- Baseline and post-study blood samples were collected for immune and hormone assays.
- To assess immune function, a bacterial killing assay (BKA) and differential leukocyte counts were performed.
- The rate of wound healing, changes in BKA, circulating leukocytes, and plasma testosterone were then analyzed for potential correlations of shifts in immune function.

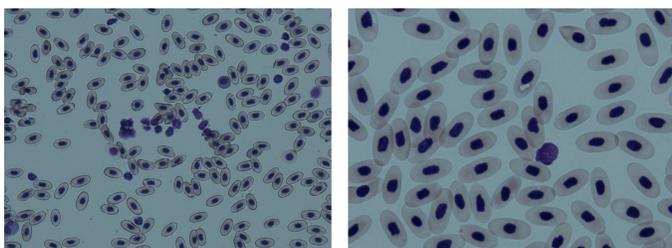


Figure 2. Blood smears showing nucleated reptile erythrocytes and leukocytes.

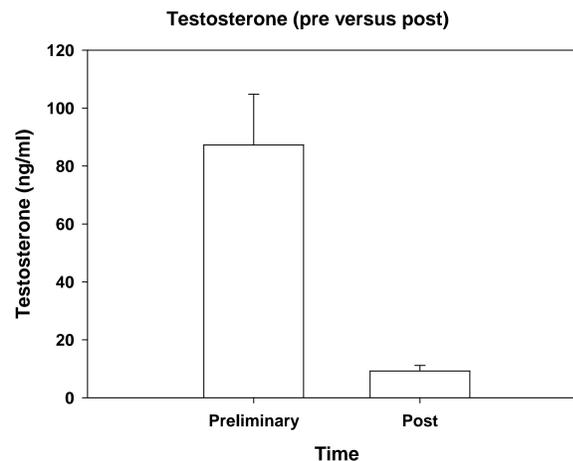


Figure 3. Baseline and post-study testosterone.

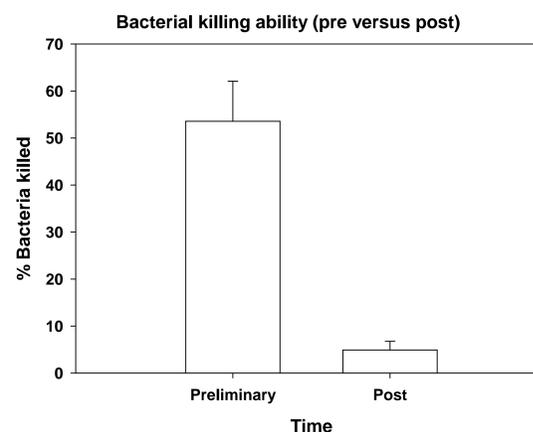


Figure 4. Baseline and post-study bacterial killing capacity.

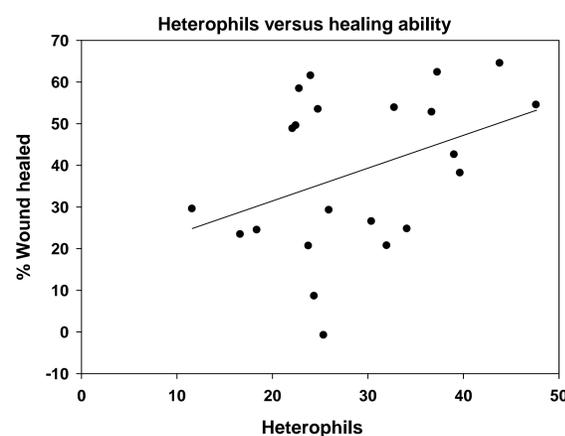


Figure 5. Percent heterophils vs. percent wound healed on day 16 of study.

Results

- Baseline plasma testosterone (T) and bacterial killing capacity were significantly greater than post study values. (Mean baseline T: 87.26 ng/ml; mean post-study T: 9.25 ng/ml; mean baseline BKA: 53.55%; mean post-study BKA: 4.89%).
- Percent heterophils showed a trend of positive correlation with percent wound healed at the end of the study, day 16 ($R=0.15$).
- No other immune factors were significant correlated with wound healing.



Figure 7. Cutaneous wound at baseline, 2, and 4 days after wounding.

Discussion

- The decrease in bacterial killing capacity may indicate that immune resources are being shifted from complement proteins (a major contributor to bacterial killing) to immune cells that function in wound healing, such as heterophils.
- The decrease observed in testosterone could indicate some role of the hormone in mediating immune function.



Figure 8. Collaborators and field work collecting lizards.

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