

Effects of Glucose on Iguana (*Iguana iguana*) Wound Healing

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Introduction

- Ecotourism causes anthropologic disturbance on iguanid physiology due to wildlife feeding activities (1-2)
- Tourists feed wild iguanids inappropriate foods that lead to increased blood glucose and pre-diabetes (1-2)
- Increased blood glucose is known to cause interference with wound healing in humans and other mammals (3-4)
- Increased blood glucose has been shown to impair animal immune response (3-5)
- What are the effects of a high glucose diet on the wound healing abilities of *I. iguana*? And how does an LPS (immune) challenge affect wound healing?

Methods

- Each animal was fed a glucose heavy or a regular diet for 107 days for this experiment
- LPS injection treatments for the LPS trial group occurred on days 34 and 64
- Biopsies were performed and images were taken of each wound 0,3,7,10,&14 days post-biopsy
- Wound closure analysis was done by determining the area (in mm²) of unhealed wound via ImageJ
- Wound healing percentage was calculated from the wound images by dividing the original area (in mm²) by that day's area

| Iguana Treatments | Glucose | No Glucose |
|-------------------|---------|------------|
| LPS | N=9 | N=9 |
| No LPS | N=9 | N=9 |

Results

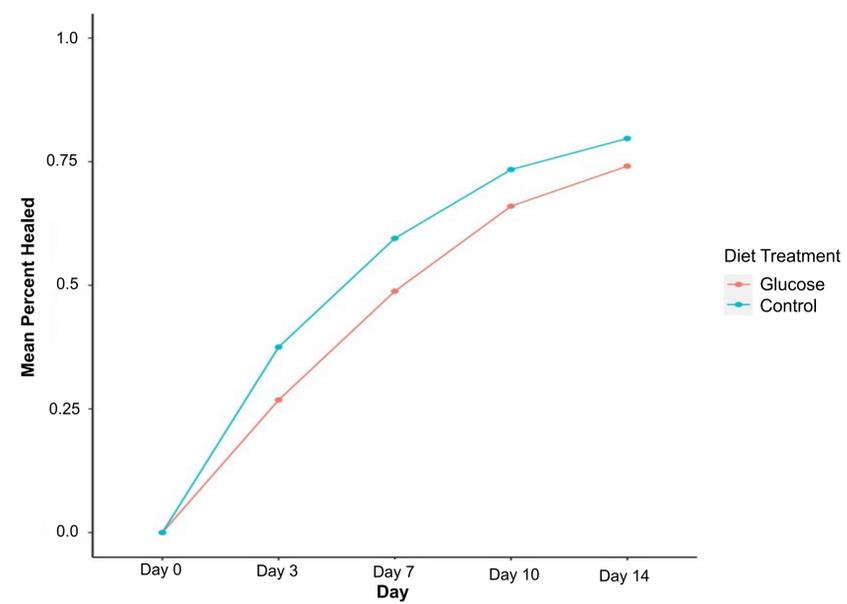


Figure 1: Main effect of sugar diet on wound healing, with the glucose group performing worse (43.1%) than the control group (50.0%).

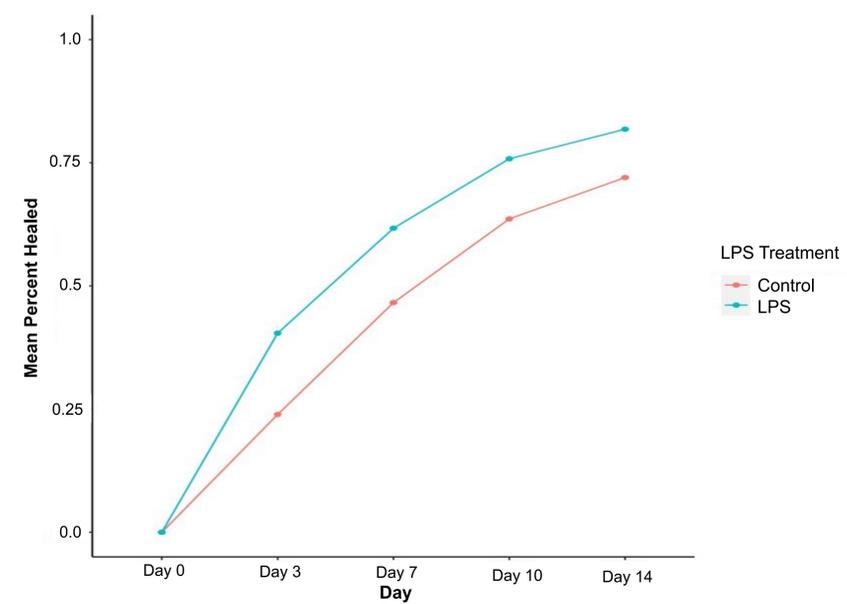


Figure 2: Main effect of LPS on wound healing, with the LPS group performing better (51.9%) than the control group (41.2%).



An example of our model species *I. iguana*

Discussion

- Main effects of LPS and glucose were LPS treated con-specifics healed more and glucose fed con-specifics healed less on average than control con-specifics did
- In both models, days since the biopsy displayed a significant main effect in the post-hoc analysis
- LPS main effect may show that iguanas investing energy in their immune system heal faster; consistent with other research (6)
- High blood glucose may inhibit keratinocyte activity and/or epidermal growth factor hormones in iguanid wound healing; shown to do so in geckos, pigs, and humans (3,4,7,8)



An example of anthropological disturbance on iguanid diet: ecotourists feeding grapes to endangered Bohemian Rock Iguanas (*Cyclura cyclura*)

Summary

- High glucose diet impaired wound healing in green iguanas
- Iguanas with LPS treatment showed faster healing than control iguanas
- Hyperglycemic pathogenesis caused by anthropologic disturbance likely has a negative impact on iguanid wound healing

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