

Home / News / August 11th, 2012; Vol.182 #3 / [Article](#)

## **Insulin may be Big Antler hormone**

Extra sensitivity to hormone in certain developing tissues might give animals oversized body parts

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**ENLARGE**

The tissue that forms the horn on the rhinoceros beetle *Trypoxylus dichotomus* is more sensitive to insulin than tissue elsewhere, offering a possible explanation for how some animals' outsized ornaments evolved.

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**OTTAWA** — Some of the animal kingdom's showiest extremes, from deer antlers to the outsized horn of the male rhinoceros beetle, may be natural insulin meters.

As an animal grows, the nubbins of tissue that will form its big weapons or displays may be more sensitive to insulin than other developing body parts, Douglas Emlen of the University Montana said July 10 at the Evolution Ottawa scientific congress.

The proposal "potentially narrows the range of explanations for the evolution of ornaments and weapons," said Bob Montgomerie of Queen's University in Kingston, Ontario, who studies courtship-related features in birds.

Insulin orchestrates growth in tune with how much food a young animal gets, Emlen explained. A well-fed youngster flush with insulin will grow the most spectacular horns or other paraphernalia, while underfed rivals remain stunted. If the growing antlers or other extreme structures are supersensitive to insulin, they will supersize out of proportion to less sensitive tissue.

That's the case for the horns of the rhinoceros beetle *Trypoxylus dichotomus*. Males of the species grow horns about two-thirds as long as the rest of their bodies. They use these fearsome weapons to

knock rivals away from sap-oozing wounds on trees where females go to feed. The horns are eight times more responsive to insulin or insulin-like growth factors than some other body parts, Emlen said.

That sensitivity fits with reports from other researchers that insulin or related signals affect development of antlers in red deer and the outsized male claws in a type of shrimp and one kind of crab. For those animals though, researchers haven't yet explored how the weaponry tissues' sensitivity compares with that of other body parts.

Differences in insulin sensitivity could provide an underlying mechanism for some of the outrageous traits that evolve through sexual selection, a quirky force that favors weaponry for trouncing rivals or flashy structures for winning the attention of mates.

"If you don't know how something works, you can't really be certain that you understand how it could have evolved," Montgomerie said.

The insulin hypothesis could also influence the long-running debate over what keeps courtship lures and weapons honest enough to persist, Emlen said. One proposal is that lures must be physiologically costly or else even the puny and the sickly could grow them and cheat their way to sexual success. If such traits are linked to insulin during growth, though, only a well-fed beetle can grow magnificent structures. A big horn might thus be an "unfakeable" signal of robustness, Emlen said.

#### **SUGGESTED READING :**

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