Study: Lizards bask for more than warmth

April 20 2009

Keeping warm isn't the only reason lizards and other cold-blooded critters bask in the sun. According to a study published in the May/June issue of *Physiological and Biochemical Zoology*, chameleons alter their sunbathing behavior based on their need for vitamin D.

"It's a longstanding assumption that thermoregulation is the only reason that lizards bask," says Kristopher Karsten, a biologist at Texas Christian University who led the study. "Our results suggest that in addition to thermoregulation, vitamin D regulation appears to have a significant impact on basking behavior as well."

Chameleons, like humans and most other vertebrates, get vitamin D in two ways: They can absorb it from food, and they can produce it in their skin. In order to produce vitamin D, however, the skin must be exposed to UV radiation.

To test whether chameleons alter their sunning behavior based on dietary vitamin D intake, Karsten observed the behavior of two different groups of chameleons. One group had high internal vitamin D levels, thanks to a diet of crickets dusted with a vitamin D powder. The other group ate regular crickets and had low vitamin D. The chameleons were then placed in individual outdoor enclosures that offered open area for direct sun, and a tree to offer filtered sun and shade.

Chameleons generally move from sun to shade throughout the day. But Karsten found that chameleons fed the low vitamin D diet compensated by increasing their exposure to the sun's UV rays. Chameleons with high

vitamin D diets, on the other hand, limited their UV exposure.

"It appears that panther chameleons have the ability to gauge their internal vitamin D levels and alter their basking behavior accordingly," Karsten says.

And they do it with remarkable accuracy.

"The chameleons were as effective as mathematically possible by our methods at regulating toward optimal UV exposure for their vitamin D profile," he says. "We thought they were probably pretty good at regulating their UV exposure; we just didn't think they'd be this good."

It's not clear, however, by what mechanism they are able to sense their internal vitamin D levels, but Karsten thinks there may be a brain receptor sensitive to the vitamin.

"Given the ability for panther chameleons to precisely, accurately and effectively adjust basking behavior as a direct result of vitamin D3, [a brain vitamin D receptor] seems likely to occur in panther chameleons."

More information: Kristopher B. Karsten, Gary W. Ferguson, Tai C. Chen, and Michael F. Holick, "Panther Chameleons, Furcifer pardalis, Behaviorally Regulate Optimal Exposure to UV Depending on Dietary Vitamin D3 Status," Physiological and Biochemical Zoology May/June 2009.

Source: University of Chicago (news : web)