

## INSIDE JEB

## Pit viper heat pits don't have good resolution



The eye is one of the most complex structures in the body, focusing light onto specialized light-sensitive cells, then transferring that information to the brain for processing. But eyes aren't the only way animals sense waves on the electromagnetic spectrum. Pit vipers, such as the western rattlesnake (*Crotalus oreganus*), have evolved loreal pits, which sense infrared radiation given off by their surroundings and other animals. However, these heat sensors aren't nearly as good as the thermal imaging cameras so many documentaries compare them to. In fact, the resolution of the snake's pits is so poor that Rulon Clark, George Bakken, Evan Reed and Ashana Soni from San Diego State University, USA, believe that some pit vipers must have an image sharpener built into their nervous system to help overcome this problem.

The team knew from previous studies that the nervous system of western rattlesnakes is capable of some small amount of image

sharpening, but this isn't enough to make a mouse stand out from a background with varying temperatures. Could there be another area of the nervous system that helps refine the images even further? Clark and colleagues devised a test for the rattlesnakes by placing cool perforated sheet metal in front of a heated plate and swinging a target in front of the resulting pattern of warm polka-dots. Because the target was heated to the average temperature of the polka-dots and the cooler sheet metal, the snakes would only notice the target if they could sense the polka-dots as individual warm spots. The rattlesnakes didn't respond by moving their heads or flicking their tongues, both signs that they noticed the target, even if the temperature difference between the polka-dots and their background was increased to 15°C, or if the polka-dots were larger or smaller.

The team is quick to point out that testing a rattlesnake's heat sensing in a room

with no light is probably not ecologically relevant as there is almost always some ambient light in nature by which to see, and that heat sensing is probably an aid to their eyesight, not their only means of prey detection. Clark and colleagues also mention that while these snakes may not have high-resolution heat vision, rattlesnakes can still sense their prey, especially if the background is relatively cool. While rattlesnakes might not see in the infrared like a thermal imaging camera, they are still able to use their pits to sense their prey and strike.

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