

How cobras form hood flares

April 20 2010, by Lin Edwards



Indian Spectacled Cobra. Image credit: Wikipedia.

(PhysOrg.com) -- Cobras, and several other groups of unrelated snakes, form a menacing hood flare by expanding the sides of their necks as part of a defensive display. Now scientists in the US have identified the groups of muscles the snakes use to produce the effect.

The researchers, Bruce Young from the University of Massachusetts, and Kenneth Kardong from Washington State University, wanted to examine what they called an “intriguing problem in evolutionary biology,” and find out how snakes produce a hood. They knew both rib bones and muscles were involved in the process, but wanted to find out how the ribs were able to rotate into the position required.

They did this by implanting tiny electrodes into the muscles in a cobra’s neck to allow them to measure the electrical activity in all the muscles as

the [snake](#) flared its neck to form a hood. Professor Young said the surgery was quite risky because cobras can wake while under [anesthetic](#), which he said could be “disconcerting”.

They found the hooding process begins at the head and extends downwards through the actions of eight sets of muscles, with a set of axial muscles along the ribs being the primary erector muscles that lift the hood. Another set of muscles that connect the ribs to the skin keep the hood skin taut, and a third set of muscles between the ribs spread the load. The eight [muscle](#) sets are also found in non-hooding snakes.

They discovered that keeping the hood erect requires continuous [muscle activity](#). It relaxes when the event prompting the display is ended, partly by passive recoil of the costovertebral ligaments, and partly due to active muscle contractions of a further set of axial muscles.

Professor Kardong said the hood evolved through “co-opting” of the ribs, and is an example of how evolution remodels existing systems. In this case there has been a change in the [nervous system](#) control over the muscles involved, he said.

The findings are reported in the [Journal of Experimental Biology](#). The research team now hope to study how other hooding snakes produce their display.

More information: The functional morphology of hooding in cobras, First published online April 16, 2010, *Journal of Experimental Biology* 213, 1521-1528 (2010), [doi:10.1242/jeb.034447](https://doi.org/10.1242/jeb.034447)

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