

Odor that smells like blood: Single component powerful trigger for large carnivores

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African wild dogs compete for a log impregnated with blood or a single component. Both were equally attractive. Credit: Linköping University

People find the smell of blood unpleasant, but for predatory animals it means food. When behavioural researchers at Linköping University in Sweden wanted to find out which substances of blood trigger

behavioural reactions, they got some unexpected results.

Matthias Laska is professor of zoology, specialising in the sense of smell. For some time his focus has been on scents that directly affect the behaviour of animals.

"For predators, food scents are particularly attractive, and much of this has to do with blood. We wanted to find out which chemical components create the [scent](#) of blood," he says.

The study, conducted at Kolmården Wildlife Park, found that for the animals, one particular component of blood odour was just as engaging as the blood odour itself.

"It's a completely new discovery that raises interesting questions on evolution," says Prof Laska.

The study has been published in the scientific journal *PLOS ONE*.

When Prof Laska did a search for the contents of [volatile substances](#) in [mammalian blood](#), he found nothing. Human blood has been analysed for disease markers, but we have very little information on the substances that give blood its characteristic scent.

A master's student was sent to Friedrich-Alexander-Universität in Erlangen Germany, to analyse mammalian blood with the help of gas chromatography and mass spectrometry, methods used for separating and identifying chemical compounds in a sample. The machine detected some 30 substances, of which some are decomposition products from fats. But the machine lost the job to the human scent experts who had also been engaged. They identified scents that the gas chromatograph missed completely.

One substance stood out: an aldehyde called trans-4,5-epoxy-(E)-2-decenal, which emits the typical metallic scent that humans associate with blood.

Once the researchers had identified a scent candidate that the predators should be attracted to, they wanted to test whether the predators were actually attracted to it in reality. So they designed a study to be conducted at Kolmården Wildlife Park, involving four predator species. How would the four predators - Asian wild dogs, African wild dogs, South American bush dogs and Siberian tigers - react when they caught a whiff of the scent?

Half-metre long wooden logs were impregnated with four different liquids: lab-produced aldehyde, horse blood, fruit essence, and a near-odourless solvent. The animals were exposed to one scent per day in their regular enclosure, while a group of students carefully observed their behaviour.

The results were unequivocal. The logs containing aldehyde were just as attractive stimuli as those containing blood, while the two other logs aroused little interest. The commonest behaviours were sniffing, licking, biting, pawing and toying. The tiger was the most persistent, while the South American bush dogs lost interest more quickly than the other species.

The study is the first to show that a single component can be just as attractive as the complex odour.

"How this has developed through evolution is an interesting question. Perhaps there is a common denominator for all mammalian blood," says Prof Laska.

He has plans for several follow-ups of the study, including how prey

animals such as mice react to [blood](#) odour.

For the [wildlife park](#), the study provided results that can be used in its daily operations. Animals in captivity require stimulation, so as not to deteriorate or become fat. The odourised logs can be a popular addition to the animal's environment.

More information: Behavioral responses to mammalian blood odor and a blood odor component in four species of large carnivores by S. Nilsson, J. Sjöberg, M. Amundin, C. Hartmann, A. Buettner and M. Laska. *PLOS ONE* November 10, 2014.

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