

## Smelly Microbes Help Hyenas to Communicate with Each Other

Bacteria in scent glands give information about hosts' species, sex and reproductive state

By Brian Owens and Nature magazine | Tuesday, November 12, 2013

The hordes of microbes that inhabit every nook and cranny of every animal are not just passive hitchhikers: they actively shape their hosts' well-being and even behavior. Now, researchers have found evidence that bacteria living in the scent glands of hyenas help to produce the smells that the animals use to identify group members and tell when females are ready to mate.

Kevin Theis, a microbial ecologist at Michigan State University in East Lansing, had been studying hyena scent communication for several years when, after he gave a talk on the subject, someone asked him what part the bacteria might play. "I just said, 'I don't know'," he says. He started investigating.

He found that for 40 years, scientists had wondered whether smelly bacteria were involved in animals' chemical communication. But experiments to determine which bacteria were present had been inconclusive, because the microbes had to be grown in culture, which is not possible with all bacteria. However, next-generation genetic sequencing would enable Theis to identify the microbes in a sample without having to grow them in a dish.

### Message scent

Using this technique, Theis and his colleagues last year published a study that identified more types of bacterium living in the hyenas' scent glands than the 15 previous studies of mammal scent glands combined. In both spotted hyenas (*Crocuta crocuta*) and striped hyenas (*Hyaena hyaena*), most of the bacteria were of a kind that ferments nutrients exuded by the skin and produces odors. "The diversity of the bacteria is enough to potentially explain the origin of these signals," says Theis.

Now, they have found that the structure of the bacterial communities varied depending on the scent profiles of the sour, musky-stalks to communicate with members of their clan. In addition, in the spotted hyenas, between males and females, and with the reproductive state of females — all attributes scent pastes. The work is published this week in *Proceedings of the National Academy*

thinks that bacteria probably also have a role in chemical communication in other interactions at Wageningen University in the Netherlands, agrees. He says that the might communicate information about their hosts, and how symbiosis of microbiota behavior".

communicate much more: "Who knows, perhaps microbiota can reveal other information status and social-association patterns."



Pin it

**SCENT COMMUNICATION:** Bacteria living in the scent glands of hyenas help to produce the smells that the animals use to identify group members.

Image: Petr Jan Juračka/Fotopedia

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