Embargo: None

Bats that eat insects should be able to taste sweet food but can't.

Insectivorous bats have the same sweet taste receptors as fruit eating bats, but have lost the ability to actually taste sweet food.

Ibrahim Sawal

Bats that eat insects are unable to taste sweet foods, even though they have the genetic ability to do so.

The evolution of taste perception and diet are closely linked for many animals, but in some cases, this link is unclear. Different species of bats have highly diverse diets, ranging from nectar to insects and even blood, despite having similar taste receptor genes.

To discover more, Huabin Zhao at Wuhan University, China and his team sequenced two sweet taste receptor genes in 34 bat species. They found that all bats expressed both genes, meaning all species should be able to taste sweet foods.

They then tested the food preferences of two species, the insectivorous Rickett's big-footed bat (*Myotis ricketti*) and the Leschenault's rousette fruit bat (*Rousettus leschenaultii*). This involved placing two bottles, one filled with just their usual food, the other being a mixture of their food and sugar, in a cage with each bat.

The team found that the fruit feeding bat had a strong preference for the sweet food, but the insect feeding bat did not. "This is surprising because these two species have similarly conserved sweet taste receptors genes which are expected to show similar sensitivity to sugar," says Zhao.

Zhao's team also directly tested the activity of these receptors by expressing them in living cells. They found that in fruit feeding bats, the sweet taste receptors responded to natural sugars, but the same was not true not for insect feeding bats, suggesting a loss of sweet taste.

This makes sense, because insects contain little sugar, so insectivorous bats don't have much to lose by evolving this sense away. "This relaxes the functional constraint on the sweet taste receptor, which eventually resulted in the loss of sweet taste in insectivorous bat," Zhao says, supporting the idea that taste perception is shaped by an animal's feeding preference.

Why these receptor genes are still being passed down and expressed despite the loss of sweet taste in insectivorous bats is unclear. "One possibility is that these receptors have evolved new functions," says George Zhang at the University of Michigan, but exactly what is unknown, he says.

Read more: https://www.newscientist.com/article/2076598-super-bats-what-doesnt-kill-them-could-make-us-stronger/

Reference: Loss of sweet taste despite the conservation of sweet receptor genes in insectivorous bats, *PNAS,* 10.1073/pnas.2021516118.