

What bat brains might tell us about human brains

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Could a new finding in bats help unlock a mystery about the human brain? Likely so, say researchers at Georgetown University Medical Center who have shown that a small region within the amygdala, an almond-shaped structure in the brains of all mammals, is responsible for producing emotional calls and sounds. They say this discovery might be key to locating a similar center in human brains.

Localizing and manipulating this center in the human brain may provide a way to treat malfunctions in [emotional responses](#), resulting, for example, in pathological aggression, says the study's senior investigator, Jagmeet S. Kanwal, PhD, associate professor of neurology at Georgetown. On the flip side, he says it may be possible to "give voice to the voiceless—allow those who are deeply withdrawn, perhaps even mute due to aberrant wiring in the amygdala, to speak."

Research points to the possibility of such a center in humans: functional imaging has already shown that the human amygdala—like the bat's amygdala—responds to species-specific emotive sounds, such as laughing and crying, Kanwal says.

But electrostimulation research is difficult to do in humans because of the invasive nature of [deep brain stimulation](#) studies.

Working with mustached bats, Kanwal and his Georgetown co-author, research associate Jie Ma, now at Harvard Medical School, report their findings in the journal *Frontiers in Physiology*. They are the first to

demonstrate the production of multiple physiological effects, what they call "full blown emotive responses, including vocalizations" from single point of stimulation within the [amygdala](#). For example, giving one cluster of neurons a tiny dash of electricity made the bats produce angry sounds, while simultaneously increasing their breathing and heart rates, says Kanwal.

Stimulation at other points produced a vocalized fear response, heightened vigilance, even ear-twitching—all accompanied by appropriate physiological responses.

It makes sense that mammals would share such a critical brain function, Kanwal adds.

"Emotions are designed for survival," Kanwal says. "The world humans and animals experience depends entirely on how sensory stimuli are perceived and processed through an emotional filter."

Provided by Georgetown University Medical Center

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