Researchers identify language feature unique to human brain

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Researchers at the Yerkes National Primate Research Center, Emory University, have identified a language feature unique to the human brain that is shedding light on how human language evolved. The study marks the first use of diffusion tensor imaging (DTI), a non-invasive imaging technique, to compare human brain structures to those of chimpanzees, our closest living relative. The study will be published in the online version of *Nature Neuroscience*.

To explore the evolution of human language, Yerkes researcher James Rilling, PhD, and his colleagues studied the arcuate fasciculus, a pathway that connects brain regions known to be involved in human language, such as Broca's area in the frontal lobe and Wernicke's area in the temporal lobe. Using DTI, researchers compared the size and trajectory of the arcuate fasciculus in humans, rhesus macaques and chimpanzees.

According to Rilling, "The human arcuate fasiculus differed from that of the rhesus macaques and chimpanzees in having a much larger and more widespread projection to areas in the middle temporal lobe, outside of the classical Wernicke's area. We know from previous functional imaging studies that the middle temporal lobe is involved with analyzing the meanings of words. In humans, it seems the brain not only evolved larger language regions but also a network of fibers to connect those regions, which supports humans' superior language capabilities."

"This is a landmark," said Yerkes researcher Todd Preuss, PhD, one of

the study's coauthors. "Until DTI was developed, scientists lacked non-invasive methods to study brain connectivity directly. We couldn't study the connections of the human brain, nor determine how humans resemble or differ from other animals. DTI now makes it possible to understand how evolution changed the wiring of the human brain to enable us to think, act and speak like humans."

ource: Emory University