Chimp and human communication trace to same brain region

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An area of the brain involved in the planning and production of spoken and signed language in humans plays a similar role in chimpanzee communication, researchers report online on February 28th in the journal *Current Biology*.

“Chimpanzee communicative behavior shares many characteristics with human language,” said Jared Taglialatela of the Yerkes National Primate Research Center. “The results from this study suggest that these similarities extend to the way in which our brains produce and process communicative signals.”

The results also suggest that the “neurobiological foundations” of human language may have been present in the common ancestor of modern humans and chimpanzees, he said.

Scientists had identified Broca’s area, located in part of the human brain known as the inferior frontal gyrus (IFG), as one of several critical regions that light up with activity when people plan to say something and when they actually talk or sign. Anatomically, Broca’s area is most often larger on the left side of the brain, and imaging studies in humans had shown left-leaning patterns of brain activation during language-related tasks, the researchers said.

“We didn’t know if or to what extent other primates, and particularly

humans' closest ancestor, the chimpanzees, possess a comparable region involved in the production of their own communicative signals," Taglialatela said.

In the new study, the researchers non-invasively scanned the brains of three chimpanzees as they gestured and called to a person in request for food that was out of their reach. Those chimps showed activation in the brain region corresponding to Broca's area and in other areas involved in complex motor planning and action in humans, the researchers found.

The findings might be interpreted in one of two ways, Taglialatela said.

"One interpretation of our results is that chimpanzees have, in essence, a 'language-ready brain,' " he said. "By this, we are suggesting that apes are born with and use the brain areas identified here when producing signals that are part of their communicative repertoire.

"Alternatively, one might argue that, because our apes were captive-born and producing communicative signals not seen often in the wild, the specific learning and use of these signals 'induced' the pattern of brain activation we saw. This would suggest that there is tremendous plasticity in the chimpanzee brain, as there is in the human brain, and that the development of certain kinds of communicative signals might directly influence the structure and function of the brain."

Source: Cell Press