Brain's grammar function separates us from apes

It could be our talent for grammar that gives us the edge over the ape, providing us with a brain skill that makes us uniquely human.

Researchers at the University of Tokyo have discovered that humans possess a grammar function whereas monkeys do not. The reason this is so important is because it does more than simply allow us to understand a string of words, said researcher Kuniyoshi Sakai. 'It allows us to verbally think, deduce, evaluate and decide, as well as speak and comprehend sentences.'

Sakai and his colleagues at the University of Tokyo discovered that there are two different parts of the brain that deal with grammar and vocabulary and that monkeys do not possess the grammar function. This could explain why humans can talk and monkeys cannot, but more importantly dismisses the dogma that the basic circuits and function of monkey and human brains are similar.

Until now there has been no comprehensive and scientific evidence to explain why monkeys and humans are so different, despite having a mere 1.23% difference in their genome.

Corbis

Monkeys' brains can deal with vocabulary, but not grammar

A team led by Sakai discovered that a specific part of the Broca's area of the frontal cortex is responsible for grammar, while a different part is responsible for vocabulary. Monkeys posses the part of the brain that deals with vocabulary, which suggests that they may have some understanding of words. But without the grammar function, they cannot put these words together or understand them.

'Monkeys may have some understanding of words but there is no guarantee that monkeys understand these words in the same way we understand words. Monkeys have the ability to associate and memorise symbols, but they do this using general learning mechanisms,' said Sakai.

Sakai and his colleagues identified the brain language centres using magnetic resonance imaging. Brain activation in syntactic decision tests was compared with brain activation in short-term memory tasks for sentences or word lists. The results show that the left pre-frontal cortex showed selective activation associated with grammar, which cannot be explained by general cognitive factors like task difficulty and verbal short-term memory.

Sakai reports the existence of a human grammar function in the journal *Neuron* 2002, **35**, 589–597.