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UCLA Scientists Use New Method In Brain Study

(CBS) LOS ANGELES A team of UCLA scientists has identified a new way to pinpoint the genes that separate us from our evolutionary relative, the chimp, according to a study published Monday.

Using a new analytical approach developed by UCLA associate professor Steve Horvath, the scientists identified networks of genes that correspond to specific brain regions, and compared them to those of the chimp. They found that the gene networks differed most widely in the cerebral cortex, the brain's most highly evolved region, which is three times larger in humans than chimps.

Researchers also found that many of the genes that play a central role in cerebral cortex networks in humans, but not in the chimpanzee, show significant changes at the DNA level.

Many of the human-specific gene networks identified by the scientists related to learning, brain cell activity and energy metabolism.

"If you view the brain as the body's engine, our findings suggest that the human brain is like a 12-cylinder engine, while the chimp brain is more like a 6-cylinder," Dr. Daniel Geschwind said, who is the principal investigator and Gordon and Virginia MacDonald Distinguished Professor of Human Genetics at the David Geffen School of Medicine.

"It's possible that our genes adapted to allow our brains to increase in size, operate at different speeds, metabolize energy faster and enhance connections between brain cells across different brain regions," he said.

Employing Horvath's approach, the UCLA team used data from DNA microarrays, vast collections of tiny DNA spots, to map the activity of virtually every gene in the genome simultaneously.

"Genes don't operate in isolation, each function with a system of related genes," first author Michael Oldham, UCLA genetics researcher said.

"If we examined each gene individually, it would be similar to reading every fifth word in a paragraph, you don't get to see how each word relates to the other. So instead we used a systems biology approach to study each gene within its context."

Future UCLA studies will focus on linking the expression of evolutionary genes to specific regions of the brain, such as those that regulate language, speech and other uniquely human abilities.

"We share more than 95 percent of our genetic blueprint with chimps," Geschwind said. "What sets us apart from chimps are our brains: homo sapiens means `the knowing man.'"

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