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MicroRNAs Provide New Insight in Study of Autism, UCSB Scientist Reports

MicroRNAs may play an important role in the development of autism spectrum disorder, according to a new paper by University of California, Santa Barbara professor Kenneth S. Kosik.

Kosik, co-director of UCSB's Neuroscience Research Institute and the Harriman Professor of Neuroscience, was senior author of the paper, "Heterogeneous Dysregulation of microRNAs across the Autism Spectrum," published this month in the journal Neurogenetics.

"There is such a broad interest in autism," Kosik said. "This is the first work in this area."

Autism is a neurological disorder that impairs social interaction and communication, usually before a child turns three years old.

In addition, Kosik's research discovered that autism may be even more genetically diverse than previously thought. "We can't continue to look at this (autism) as a monolithic entity," Kosik said. "This is not a single disease."

Instead, his paper revealed that microRNAs have a unique type of genetic signature that shows the very broad underlying diversity of autism. While many studies lump

together all cases of autism, some recent papers have reported mutations among small numbers of autism patients. Kosik's microRNA research shows that autism does indeed cover a broad spectrum.

Ribonucleic acid, or RNA, is a link between DNA and protein. Some RNAs, according to Kosik, do not make a protein. One such type of RNA is called a microRNA because it's very short. While there are 23,000 genes in the human body, there are about 1,000 different microRNAs.

The short RNA sequences can bind to many different, longer RNAs and inhibit them from making the protein, Kosik's study found. "In this manner, they exert a broad regulatory control over the expression of many different proteins," he said. And many of the genes they control are involved in brain development.

"It was of interest to find that various members of the microRNA family are frequently dysregulated in autism," Kosik said. "This result points to a single control layer in the cell that can change in quite different ways with autism as the end result."

Kosik's study took two years and was funded by the National Alliance for Autism Research and the W. M. Keck Foundation. Working with Kosik on the paper was, among others, Kawther Abu-Elneel, a post-doctoral fellow with the UCSB Neuroscience Research Institute.

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