Researchers identify protein controlling brain formation

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Researchers at the University of Toronto have identified a protein which plays a key role in the development of neurons, which could enhance our understanding of how the brain works, and how diseases such as Alzheimer's occur.

U of T graduate student John Calarco, working in the labs of Professor Ben Blencowe (Donnelly Centre for Cellular and Biomolecular Research, University of Toronto) and Professor Mei Zhen (Samuel Lunenfeld Research Institute, Mount Sinai Hospital), has identified a protein known as nSR100, which is only found in vertebrate species and which controls a network of "alternative splicing events" that are located in the messages of genes with critical functions in the formation of the nervous system. The findings are published in a paper in the current edition of the journal *Cell*.

Alternative splicing events greatly expand the diversity of the genetic messages and corresponding proteins produced by genes in vertebrate cells, and this process partially accounts for the evolution of remarkable complexity in organs such as the mammalian brain. Calarco, recipient of a prestigious Alexander Graham Bell Studentship, together with colleagues in the Blencowe lab, identified nSR100 using computational and experimental methods and then determined its role in the control of alternative splicing in the brain. These studies revealed that nSR100 regulates splicing events in genes that help form neurons.

Collaborator and co-author Brian Ciruna and his colleagues at the the

Hospital for Sick Children (SickKids) in Toronto further demonstrated that nSR100 plays a critical role in the development of the vertebrate nervous system.

"The brain is by far the most complex organ in the human body and understanding how it functions represents one of the foremost challenges of biomedical research. A large number of neurological disorders arise when the development and function of certain neurons is impaired. A major research goal is therefore to identify key genes required for the specification and function of neurons in the brain, and nSR100 represents such a gene," said Blencowe, principal investigator on the study.

Calarco added that the findings present a new avenue of investigation for researchers. "The study provides intriguing insight into how the evolution of a single protein has contributed to the expansion of brain complexity in vertebrates - including humans.

Further investigation into the complex network of splicing events regulated by nSR100 may uncover important aspects of how neurons normally function and also how they become impaired in neurological diseases like Alzheimer's."

Provided by University of Toronto (news : web)

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