

Newly discovered class of RNA lead to neuron generation

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Singapore: Scientists at A*Star's Genome Institute of Singapore (GIS) have discovered an unusual gene that controls the generation of neurons. This finding was reported in the August 8, 2013, issue of the journal, *Molecular Cell*.

The birth of neurons (known as neurogenesis) is a process that requires exquisite temporal and spatial control of hundreds of genes. Researchers at the GIS, led by principal investigator Professor Lawrence Stanton, discovered a key component within a gene regulatory network which controls the birth of new neurons, called RMST. The component is not a protein but is an atypical, long non-coding (Lnc) RNA. The new findings demonstrate that the RNA does not produce a protein to handle the regulatory process. Instead, it acts directly as a regulatory mechanism. LncRNAs are a newly discovered class of RNA whose functions remain mostly unknown.

Prof Lawrence Stanton said, "There is now great excitement about the revelation that RNA is more than just a messenger carrying genetic information that encodes for proteins. New classes of RNA, called long non-coding RNAs (lncRNA), have been discovered, which are capable of unanticipated functional diversity. However, systematic functional investigations of exactly what, and how, lncRNAs do in our cells remain scant. Our study paves the way for understanding a crucial role played by a lncRNA in human neurons."

Associate Professor Leonard Lipovich from the Center for Molecular Medicine and Genetics at the Wayne State University and a member of GenCODE, said that, "In their paper in *Molecular Cell*, Stanton and colleagues show how RMST, a human lncRNA, directly regulates SOX2, a key transcription factor protein that is instrumental for directing the birth of new neurons. Even more intriguingly, they highlight that RMST controls SOX2 by directly interacting with the protein."

"The paper is therefore an important advance in the still nascent and controversial field of riboregulators, or RNAs that regulate proteins in our cells. DNA-binding proteins that turn genes on and off were traditionally thought to be distinct from RNA-binding proteins. Stanton et al, however, illuminate the cryptic, yet crucial, RNA-binding roles for DNA-binding transcription factors: lncRNAs just might be the definitive regulatory switch that controls these factors' activity," he added.