U of L scientists add to knowledge of RNA-based mechanisms underlying Alzheimer's disease

University of Lethbridge researchers who found a new molecular mechanism involved in Alzheimer's disease (AD) in mice have confirmed the same mechanism is at work in patients with the disease. In both cases, the use of high throughput sequencing techniques that study the DNA readout of brain cells helped identify a class of biomolecules, called SINE RNAs, that are produced in different patterns in AD patients versus healthy individuals. These findings will help guide the way for future studies to identify early indicators of AD before symptoms occurs, as well as targets for therapeutic intervention.

The study, led by Dr. Athan Zovoilis, a Canada Research Chair in RNA Bioinformatics and Genomics, was recently published in EMBO Reports, a peer-reviewed scientific journal for molecular biology that ranks among the 10 per cent of most-cited journals. The research was a collaborative effort between the Southern Alberta Genome Sciences Center (SAGSC), the Canadian Centre for Behavioural Neuroscience (CCBN) and the Calgary Brain Bank at the University of Calgary.

"Our results further the understanding of the molecular mechanisms that are implicated in AD," says Zovoilis. "As we improve our understanding of changes in the brain before symptoms of AD appear, we get closer and closer to developing treatments for AD."

AD is the most common cause of intellectual decline in the elderly population. More than 44 million people worldwide currently suffer from AD or related dementia and related costs exceed $12 billion in Canada alone. Although some drugs may improve AD symptoms temporarily, no cure or reliable early indicator of increased risk currently exists. This is largely due to the fact that the molecular process underlying the excessive death of brain cells of AD patients is unclear. This recent study, published in EMBO Reports, identifies a molecular mechanism that may help point to an early indicator of increased risk for AD.

The researchers looked at the set of biomolecules called SINE non-coding RNAs. Previously thought to be produced by "junk DNA," that is, DNA of no functional importance, scientists are now discovering they are important players in how cells function and critical components of disease mechanisms. Zovoilis and his team have shown these biomolecules, when they become over-responsive, are connected to the death of brain cells that occurs in AD.

The study was funded by the Alberta Prion Research Institute, the Alzheimer Society of Alberta and Northwest Territories and Genome Canada.