Role of mysterious circular RNAs in development of diabetes

At Department of Biotechnology's autonomous institute, the Institute of Life Sciences (ILS), Bhubaneswar, researchers headed by Dr. Amaresh Panda are exploring the role of circular RNAs in the development of diabetes, as a part of intervention sought outside the current drug targets.

Recently, their analysis of published RNA-sequencing data identified thousands of circular RNAs expressed in pancreatic islets of mice fed with a high-fat diet and regular diet. Serendipitously, it was found that mouse Insulin 2 gene (similar to human insulin) generates multiple stable circular RNAs. It was shown that these *bona fide* stable circular RNA molecules are expressed in pancreatic islets as well as beta-cell line. In addition, the computational analysis predicted association of several molecular regulators like microRNAs and RNA-binding proteins with circular-Insulin2 RNAs.

The circular RNAs are a type of closed-loop non-coding RNA molecules, unlike linear RNAs. New sequencing methods and computational algorithms discovered their expression in all sorts of animals and plants, and very little is known on how they function. Because of their stability, researchers around the world are exploring new ways to use circular RNAs as novel diagnostic and therapeutic targets. In fact, circular RNAs have been implicated in pancreatic β-cell function. In 2018, group published a review article in *NCRI*, discussing the implications of circular RNAs in diabetes.

Diabetes is one of the biggest challenges of this decade, affecting more than 450 million people across the globe. Diabetes is characterized by high blood glucose levels which affect different organs of the body, mainly kidney, liver, muscle, eye, brain etc. Diabetes is mostly caused by loss of insulin receptor sensitivity in the target organ, which leads to the pancreatic β-cell death in a long-run. Pancreatic beta cells remain at the centre to regulate the development of diabetes. Unfortunately, despite intense research for several decades, therapeutic drugs mainly target in reducing blood glucose levels by various means. However, the molecular factors and events that lead to β-cell death during development of diabetes are not well understood.

Contact details:
Dr Amaresh Panda (Scientist D and Welcome Trust/DBT Intermediate Fellow)
Dr Mamoni Dash (Communication officer)
Dr Ajay K Parida (Director, ILS)