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High-throughput Functional Genomics Using Modified Nucleic Acid (MoNA) Technologies

Status	Past
Competition	II
Sector	Health
Genome Centre	Genome Quebec
Project Leader	Sherif Abou-Elela

Project Description

The Human Genome Project methods allow us to learn facts about the human body that contribute to new diagnoses and treatment of diseases. All life processes start with the readout of genetic information from the genome (the DNA). Gene read-out is wonderfully complex; it occurs through a class of molecules called messenger RNAs, which undergo many modifications on their way to carrying out their roles as directors of the cell's activities. Abnormalities in these changes can result in diseases such as cancer.

The genetic information read out from almost every human gene is subjected to a particular modification called alternative messenger RNA splicing. We are experts in RNA splicing and we use this knowledge to gain new insights into how changes in gene expression in humans can lead to disease. We are also skilled in chemical processes for making RNA in the test tube as a way to create new ways of fighting bacterial infections.

We devised a method that we call LISA (Layered and Integrated system for Splicing Annotation). This allows to study alternative RNA splicing in many genes at the same time and to place our results in an organized database. We made chemical modifications of RNA that allow us to study alternative splicing; all together, using LISA we have described alternative splicing in almost 100 genes that are important in cancer. The LISA method and database is available to other researchers all over the world. We made chemical derivatives of RNA molecules that allow them easily to enter cells, particularly bacteria. This method has the potential to form the basis for the development of new antibiotics.

Fast Facts

Highlighted outcome: LISA (Layered and Integrated system for Splicing Annotation), a service platform and database for studying alternative messenger RNA splicing.

Number of research personnel employed by the project: 32

Number of peer reviewed publications published: 4

Number of patents in process or obtained: One provisional and two more in preparation

Co-funders: Government of Quebec