IRCM researchers fuel an important debate in the field of molecular biology

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Dr. Francois Robert, molecular biology researcher at the Institut de recherches cliniques de Montréal (IRCM), and his team confirmed that the phosphorylation of RNA polymerase II, a key enzyme in the process of gene expression, is uniform across all genes. This discovery, which contributes to numerous debates on the topic within the scientific community, will be published tomorrow in the scientific journal *Molecular Cell*.

Phosphorylation, or the addition of phosphate to a molecule, is one of the most important regulation mechanisms for cells. It allows, among other things, to control interactions between proteins.

"During transcription, the first step in gene expression, RNA polymerase II is abundantly phosphorylated," explains Dr. Robert, Director of the Chromatin and Genomic Expression research unit at the IRCM. "This allows for the coordination between transcription and the other steps in the process of gene expression."

By examining a small number of genes, certain pioneering studies that have been long-accepted in the field had shown that phosphorylation of RNA polymerase II always occurred in the same prescribed pattern during transcription. However, recent genome-wide analyses challenged this idea by suggesting that this process was not uniform across different genes. "The latter model is very controversial, because it is unclear how, or why, transcription could work in such radically different ways from one gene to the next," says Alain Bataille, doctoral student and first co-

author of the study.

By using modern functional genomic tools, the team of researchers confirmed the former hypothesis that transcription operates in a uniform way across virtually all genes.

"The identity of enzymes responsible for adding and removing phosphate groups to RNA polymerase II is another controversial topic among scientists," adds Dr. Célia Jeronimo, postdoctoral fellow in Dr. Robert's laboratory and first co-author of the article. "Our research also allowed us to better understand the respective role of these essential enzymes."

"The results of our studies represent a major contribution to the scientific community in the understanding of different cellular processes within the field of molecular biology," concludes Dr. Robert.

More information: http://www.cell.com/molecular-cell/abstract/S1097-2765(11)00951-8

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