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Scientists uncover mode of action of enzyme linked with several types of cancer

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Scientists at the Institute for Research in Immunology and Cancer (IRIC) of the Université de Montréal have discovered a key mechanism used by cells to efficiently distribute chromosomes to new cells during cell multiplication. Published in the journal *Molecular Cell*, the study is the first to demonstrate that this mechanism relies on the polo kinase, an enzyme implicated in several cancers. Inhibiting this mechanism could be key to developing effective therapies to treat cancer.

Each human cell contains, in its nucleus, all the coding instructions necessary to direct the cell's activities. A complete set of those instructions is referred to as a genome. Cancer cells are capable of altering their genome in order to promote uncontrolled growth. "Cancer cells achieve this by gaining or losing specific chromosomes, or by inducing structural defects in their genome," explains Damien D'Amours, Principal Investigator at IRIC and director of the study, "We discovered that the polo kinase, overexpressed in a broad range of human tumours, tells the chromosomes exactly when to condense during cell division."

Misregulation of the polo kinase is associated with cancers, thereby suggesting a link between defects in chromosome condensation and the formation of tumours. "Pharmaceutical companies and independent researchers are already working on the development of new cancer drugs to inhibit the activity of the polo kinase," points out Damien D'Amours, "Understanding this enzyme's mode of action should enable us to control it. Such knowledge may reveal itself to be key in developing effective

therapies to treat cancer."

In a preview article commissioned by Molecular Cell, world leader in chromosome dynamics Tatsuya Hirano, of the Riken Advanced Science Institute in Japan, qualifies the research as a tour de force study that will help address outstanding questions in the field.

More information: Julie St-Pierre, Mélanie Douziech, Franck Bazile, Mirela Pascariu, Éric Bonneil, Véronique Sauvé, Hery Ratsima and Damien D'Amours. Polo Kinase Regulates Mitotic Chromosome Condensation by Hyperactivation of Condensin DNA Supercoiling Activity, *Molecular Cell* (2009), 34, 416-426. doi:10.1016/j.molcel.2009.04.013.

Source: University of Montreal (news : web)