MedicalXpress

Breakthrough holds promise for development of effective cancer therapies

September 2 2009

Researchers Dr. Marc Therrien at the Institute for Research in Immunology and Cancer (IRIC) of the Université de Montréal, and Dr. Frank Sicheri, at the Samuel Lunenfeld Research Institute of Mount Sinai Hospital in Toronto, have discovered a new target that may be instrumental in the development of new, more effective cancer therapies.

A recent article co-authored by Drs. Therrien and Sicheri and published in the leading scientific journal *Nature* sheds new light on the activation mechanism of the RAF protein kinase which, when mutated, is responsible for more than 25 per cent of cancers. Understanding this mechanism may lead to novel anti-cancer agents designed to minimize the toxic side effects caused by chemotherapy.

The RAF family of kinases regulates various cellular processes including cell growth, differentiation and survival. The Therrien-Sicheri team is the first to show that the dimerization, or combination, of two RAF proteins is essential to its activation. Inhibiting the dimerization of RAF may therefore block its activation, thus stopping cancer cells from growing. The study exposes not only the activation mechanism of RAF, but potentially the mechanisms that control other protein kinases, a large number of which are linked to cancer and other diseases such as diabetes, hypertension and neurodegeneration.

"Basic researchers believe that one of the most promising strategies to finding lifelong cures for cancers lies in understanding the molecular

underpinnings specific to cancer cells," explains Dr. Therrien, "It is hoped that this will translate to the development of inhibitors tailored to specific molecular defects and, as a result, should increase the effectiveness of new target-based cancer therapies."

"Protein kinases are the targets for some of the most successful anti-cancer drugs in the clinic," says Dr. Sicheri. "Now that we have discovered how to turn off the RAF protein without interfering with other proteins, we may be able to design drugs that have unprecedented precision in targeting cancer cells while reducing the toxic side effects for patients."

The Therrien-Sicheri team intends to jointly pursue work in this area to identify drug-like molecules to block the dimerization process of RAF, which may possibly lead to the discovery of new classes of anti-cancer agents.

More information: Thanashan Rajakulendran, Malha Sahmi, Martin Lefrançois, Frank Sicheri and Marc Therrien."A Dimerization-Dependent Mechanism Drives Raf Catalytic Activation". *Nature*, prepublished online 02 Sept, 2009; DOI: 10.1038/nature08314

Source: University of Montreal (news : web)

Citation: Breakthrough holds promise for development of effective cancer therapies (2009, September 2) retrieved 27 April 2024 from https://medicalxpress.com/news/2009-09-breakthrough-effective-cancer-therapies.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.