# Disrupting cell signals may lead to new cancer treatments

April 29 2013

(Medical Xpress)—Scientists have taken a major step towards developing new treatments for certain cancers by disrupting the internal cellular signals that lead to the uncontrolled growth of cancerous cells.

It is hoped that this breakthrough will open the door to a new generation of therapies that specifically target fast growing cancer cells without the need for heavy doses chemotherapy or radiotherapy.

This discovery hinges on the fact that some cancers are caused by disruptions to specific signalling pathways found within cells. Researchers at the University of Glasgow discovered a method of breaking the signalling pathways that are expressing cancerous genes, which will allow them to significantly slow tumour growth.

Dr George Baillie, the Principal Investigator on the project, said: This is tremendously exciting leap forward in the search for more effective cancer treatments. Controlling this activity within cells gives us the real potential to help cancer patients where conventional treatments cannot be used, and we hope that this discovery opens the door for new ways of fighting the disease."

The hope is that this breakthrough has the potential to lead to a new generation of drugs that will significantly slow cell replication and tumour growth.

Growth and division of cells is regulated, in part, by one particular

cellular pathway called mitogen-activated protein kinase (MAPK). The MAPK pathway controls a variety of cellular responses including cell division and gene expression. It also coordinates the cell's responses towards various external stress factors which threaten its stability.

However, the MAPK pathway often becomes disrupted during the onset of certain cancers, causing tumours to form.

A team of scientists have successfully designed and synthesised a custom built molecule, or peptide agent, in the laboratory which is capable of passing undetected into the cell and disrupting the MAPK signalling channel where it is orchestrating cancer growth.

To disrupt the MAPK signalling channel researchers needed to locate located a particular signalling node within the pathway that regulates its action. At this point, two specific enzymes, Raf-1 and PDE8A, bind together causing a reaction that significantly boosts cell growth.

Researchers were able to map the interaction of the surfaces between the two enzymes and develop a new peptide molecule that could permeate the cell membrane and then disassemble the Raf-1 – PDE8A complex.

This action breaks the MAPK signalling pathway and significantly slows cell replication and tumour growth in instances where cancerous genes are being expressed.

The full research paper is published in the journal *Proceedings of the national Academy of Sciences* (PNAS). You can read it in full on their website: www.pnas.org/content/110/16/E1533.short

Provided by University of Glasgow