Medical Xpress

Scientists discover new method of predicting response to chemotherapy in bowel cancer

January 18 2013

Scientists at the Royal College of Surgeons in Ireland (RCSI) and Beaumont Hospital have developed a new method of predicting which patients with bowel (colorectal) cancer will respond effectively to chemotherapy. The results of this study are published in the current issue of the prestigious *Cancer Research* journal.

The discovery could, in the future, help identify individuals who will not respond to chemotherapy, before they commence treatment, and may therefore require additional therapies. The new tool measures the amount of drug required for a cancer cell to die without harming healthy tissue. This prediction tool may also be used in clinical trails to develop new drugs to treat bowel cancer.

Commenting on the results, lead researcher, Professor Jochen Prehn, Director of the Centre for Systems Medicine at RCSI said: "Our study has enabled us to predict which patients are likely to be resistant to chemotherapy by examining how certain proteins in their cancer cells interact. We hope that the clinical decision-making tool that we have designed will enable doctors to develop personalised therapies for patients to ensure the best outcomes and potentially avoiding unnecessary chemotherapy and the negative side effects that go with it."

Chemotherapy destroys cancer cells by bringing on a process of programmed cell death, known as apoptosis. However, sometimes mutations in cancer cells alter the levels of certain proteins and prevent this process of cell death occurring which results in chemotherapy being

ineffective in some individuals with bowel cancer. In other patients, mutations in cancer cells have the opposite effect and promote the destruction of the cancer cells.

"The prediction tool also has the potential to be used in clinical trials so that new drugs can be developed for bowel cancer patients who are resistant to chemotherapy. The model we developed in this study could eventually be applied in other cancers." Professor Prehn concluded.

The first author on the study is Andreas Linder, a PhD researcher who carried out the research with Professor Prehn and RCSI colleagues (Dr. Caoimhin Concannon, Dr. Gerhardt Boukes, Dr. Suzanne Hector, Dr. Heinrich Huber) in collaboration with clinicians (Deborah Ryan, Mary Cannon, Karen Boland, Ms. Deborah McNamara, Professor Elaine Kay, Prof Frank Murray) and research nurse Joan Kehoe at Beaumont Hospital, Dublin, and collaborators at St. Jude's Children's Research Hospital, Memphis, Tennessee (Dr Fabien Llambi and Professor Douglas Green).

Bowel cancer is the second most common cancer in Ireland. In 2009, 2,271 people were diagnosed with the disease. It is also the second most common cause of cancer death in Ireland.

More information: Systems Analysis of BCL2 Protein Family Interactions Establishes a Model to Predict Responses to Chemotherapy, Andreas U. Lindner, Caoimhín G. Concannon, Gerhardt J. Boukes, Mary D. Cannon, Fabien Llambi, Deborah Ryan, Karen Boland, Joan Kehoe, Deborah A. McNamara, Frank Murray, Elaine W. Kay, Suzanne Hector, Douglas R. Green, Heinrich J. Huber, and Jochen H.M. Prehn, *Cancer Res*, January 15, 2013 73:2 519-528; doi:10.1158/0008-5472.CAN-12-2269