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Personalised medicine approach to improve quality of life for bowel cancer patients

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Researchers from Queen's University Belfast have demonstrated for the first time how molecular analysis of clinical trial biopsy samples can be used to help clinicians identify the key changes that occur in an individual patient's bowel (colorectal) tumour prior to surgery, so clinicians can better understand and treat the disease.

It is thought that this 'personalised medicine' approach could ultimately improve the prognosis and quality of life for bowel cancer patients.

The Queen's led study, in collaboration with the University of Turin, University of Oxford, the University of Leeds and a number of clinical trial centres across the UK, demonstrates how personalised medicine can be successfully used to help improve outcomes in ongoing clinical trials.

For clinicians, identifying which bowel cancer patients are likely to respond to different types of treatment can be particularly challenging. Dr. Philip Dunne, Senior Research Fellow from the Centre for Cancer Research and Cell Biology at Queen's and joint senior author on the study explains: "There are approximately 1.4 million cases of bowel cancer diagnosed annually worldwide, with 41,000 cases in the UK each year. A number of treatment options are available but mortality rates remain high, with bowel cancer the second most common cause of cancer death in the UK.

"In order to develop better treatments for individual patients, we must first understand the biology of that person's tumour; this is the basis of

personalised medicine in cancer. Advances in molecular and genetic analysis in the past 10 years have markedly improved our biological understanding of colorectal cancer, although this increased knowledge it is yet to significantly change standard patient care. This study highlights how we can begin to use this new understanding developed in research laboratories, to identify the biology underlying an individual patient's tumour in the clinic; the 'bench-to-bedside' approach."

The research study has been published in the *Journal of Pathology*.

Matthew Alderdice, a postdoctoral fellow on the project and first author on the study added: "Although molecular analysis is routinely carried out in research laboratories from large surgically removed tumours, in current clinical practice the tissue available for clinical decision-making may be only be the initial small tumour biopsy tissue. This study highlights how a precise understanding of the genetic changes that occur within this biopsy material is crucial to both understanding and treating the disease."

Professor Mark Lawler, Chair in Translational Cancer Genomics at Queen's commented: "Molecular studies have indicated that a 'one size fits all' treatment approach for bowel cancer isn't a viable option if we are to effectively tackle this disease. We have demonstrated the ability of molecular classification systems to stratify patients based on their molecular make-up in a series of colorectal biopsy samples obtained during a phase II clinical trial. The ultimate aim of this work is to allow patients to receive a more tailored disease management plan based on the specific biology of their tumour. Thus, we can tailor treatment to the individual patient, maximising its effectiveness while minimising potential side effects."

This research study is part of the Stratification in Colorectal Cancer (S:CORT) consortium led by Professor Tim Maughan, from the

University of Oxford and funded by a grant from the Medical Research Council (MRC) and Cancer Research UK (CRUK) as part of the MRC's stratified medicine initiative.

Professor Tim Maughan, Professor of Clinical Oncology at the University of Oxford and Principal Lead of the S:CORT Consortium said: "This work highlights the benefit of a UK wide approach, bringing together the collective expertise within our consortium to drive new approaches to improve bowel cancer outcomes. Our S:CORT Consortium is gaining new insights into the key factors that influence bowel cancer development and its treatment and using this knowledge to maximise best treatment and quality of life for bowel cancer patients."

S:CORT involves key partnerships with patients and patient advocacy groups. Ed Goodall, a survivor of bowel cancer and a member of S:CORT explains: "As patients, we are delighted to be involved in this work at a meaningful level, giving our opinions in relation to the scientific approaches that are undertaken within the consortium. As a citizen of Northern Ireland it is also extremely exciting to see the excellent work that is being done by researchers at Queen's University."

Deborah Alsina MBE, Chief Executive of Bowel Cancer UK and Beating Bowel Cancer, the UK's leading bowel cancer charity and a partner in S:CORT, said: "We are delighted to be associated with this research. Our recent Critical Research Gaps in Colorectal Cancer Initiative highlighted the need for better research collaboration. This is an excellent example of the best UK science and clinical care in bowel cancer working together to develop innovative approaches to save more lives."

More information: Matthew Alderdice et al. Prospective patient stratification into robust cancer-cell intrinsic subtypes from colorectal cancer biopsies, *The Journal of Pathology* (2018). DOI:

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