Medical Xpress

Metabolic 'fingerprinting' of tumors could help bowel cancer patients

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It is possible to see how advanced a bowel cancer is by looking at its metabolic 'fingerprint', according to new research.

Bowel cancer is the third most common type of cancer globally, with over one million new cases diagnosed every year. Accurately determining the stage that a tumour has reached is crucial for deciding which treatments to offer.

Metabolic fingerprinting looks at the levels of many different metabolites, which are the products of chemical reactions in the body's cells, in a sample of blood, urine or tissue. This mix of metabolites alters as cancer develops and grows. The researchers behind the new study, from Imperial College London, suggest that doctors could use metabolic fingerprinting alongside existing imaging technology to give them the most accurate possible analysis of a tumour. The work is published in the journal *Annals of Surgery*.

Doctors currently use a combination of CT, MRI and ultrasound scanning to evaluate how advanced a tumour is, but as these scans rely on visual estimations of a tumour's size and location, they are not always sufficiently sensitive or specific. Previous studies have shown that these techniques regularly suggest that a tumour is more advanced, or less advanced, than it really is.

Dr Reza Mirnezami, the lead author of the study from the Department of Surgery and Cancer at Imperial College London, said: "Working out the

stage of a tumour is critical for planning a patient's treatment. Increasingly, before we surgically remove a tumour, we will give therapies to try and shrink it down, but the kinds of therapies we offer depend on our assessment of how advanced that tumour is. The more accurate we can be, the better the patient's chances of survival.

"Our research suggests that using metabolic fingerprinting techniques in addition to scanning could give us the clearest possible picture of how the cancer is progressing."

For the new study, researchers analysed the metabolic fingerprint of 44 bowel tumour tissue samples, provided by patients at Imperial College Healthcare NHS Trust, using high-resolution magic angle spinning nuclear magnetic resonance spectroscopy (HR-MAS NMR). Their results were as accurate at determining the stage that the cancer had reached as existing radiological methods.

Lord Ara Darzi, the Paul Hamlyn Chair of Surgery at Imperial, and senior author of the study, said: "We know that even with the impressive scanning technology we have available at the moment, it's not always possible to correctly ascertain the local stage of a cancer. Our study suggests that used alongside medical imaging, metabolic fingerprinting could enable us to gain more accurate information. This would give us greater certainty about the right course of treatment to give to patients, sparing some patients from invasive treatment where they don't need it."

The research also suggests that tumours take on unique metabolic properties as they become more advanced, opening up new avenues for treatment. The researchers hope that ultimately, it may be possible to take out different metabolic targets when the cancer is at different stages, in order to disable or slow down the tumour.

Professor Jeremy Nicholson, Head of the Department of Surgery and

Cancer at Imperial and corresponding author for the study, said: "This study represents one part of our program of advanced technology development to improve patient safety in the surgical environment and shows the huge potential of using metabolic models to stratify patients and optimise therapy."

More information: "Rapid Diagnosis and Staging of Colorectal Cancer via High-Resolution Magic Angle Spinning Nuclear Magnetic Resonance (HR-MAS NMR) Spectroscopy of Intact Tissue Biopsies" *Annals of Surgery*.

Provided by Imperial College London