

# Stool samples provide marker for bowel disease

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A novel method for distinguishing different types of bowel disease using the stool samples of patients has been created by a group of researchers in the UK.

It works by analysing the chemical compounds emitted from the samples and could provide cheaper, quicker and more accurate diagnoses, at the point of care, for a group of diseases that have, up until now, been very hard to distinguish.

The preliminary results of the test, which have been published today, 28 March, in IOP Publishing's *Journal of Breath Research*, show that patients with either [inflammatory bowel disease](#) (IBD) or [irritable bowel syndrome](#) (IBS) could be distinguished from each other with an overall accuracy of 76 per cent.

This was based on the [volatile organic compounds](#) (VOCs) emitted from their [stool samples](#), which act as a proxy for conditions in the gastrointestinal tract and provide a unique profile, or fingerprint, for the different bowel diseases.

Both IBD and IBS present similar symptoms to each other and other bowel conditions such as colon cancer, making any definitive diagnosis very difficult. IBD—an inflammatory autoimmune disease caused by a response of the immune system to microbes in the gut—is usually diagnosed through endoscopic and histological testing, which are both invasive and costly and come with associated risks to the patient.

IBS—a functional disorder of the digestive tract with no known cause—is often diagnosed by exclusion, ruling out more serious bowel diseases.

The researchers of the study, from the University of the West of England, Bristol Royal Infirmary and the University of Liverpool, overcame these diagnostic problems by building a system that combined a gas chromatograph coupled to a metal

oxide sensor with pattern recognition software.

The system was trained to recognise patterns of VOCs that were specific to known diseases. It then used this information to try and diagnose unknown samples by comparing and matching them to the database of patterns it had previously acquired.

In the researchers' study, 182 stool samples were collected from patients with IBD and IBS between October 2010 and October 2011 and stored at freezing temperatures. Control samples were also collected from healthy patients.

The results showed that patients with IBD could be distinguished from healthy controls with an accuracy of 79 per cent. Differentiating patients with IBS from healthy controls using VOCs appeared to be more difficult and could only be achieved with an accuracy of 54 per cent. The reasons, the researchers write, could be because IBS is a functional disorder as opposed to a structural disorder, so the changes in composition of VOCs in the stool samples would not be as great, producing a very similar pattern to healthy controls.

The method was able to distinguish IBD from IBS with an accuracy of 76 per cent.

Co-author of the study Sophie Shepherd, from the University of the West England, said: "Our work has demonstrated that a low-cost device based on VOC analysis could be used to potentially diagnose, and differentiate, IBS and IBD at the point of care.

"We will continue to study faecal volatiles as a way of detecting IBS, IBD and other gastrointestinal conditions and continue to develop our techniques further. If we're able to produce results that exceed current commercial methods, then our technique could be added to the growing number of medical tests that use VOC analysis as a diagnostic tool."

**More information:** 'The use of a gas chromatograph coupled to a metal oxide sensor for rapid assessment of stool samples from irritable bowel syndrome and inflammatory bowel disease patients' Shepherd S F, McGuire N D, de Lacy Costello B P, Ewen R J, Jayasena D H, Vaughan K, Ahmed I, Probert C S and Ratcliffe N M 2014 *J. Breath Res.* 8 026001 will be freely available online from 28 March 2014.  
[iopscience.iop.org/1752-7163/8/2/026001/article](http://iopscience.iop.org/1752-7163/8/2/026001/article)

Provided by Institute of Physics

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