

New breath technology picks up high risk changes heralding stomach cancer

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A new type of technology that senses minute changes in the levels of particular compounds in exhaled breath, accurately identifies high risk changes which herald the development of stomach cancer, reveals research published online in the journal *Gut*.

The findings prompt the researchers to suggest that the technology—known as nanoarray analysis—could be used not only to test for the presence of stomach cancer, but also to monitor those at high risk of subsequently developing the disease.

Gastric cancer develops in a series of well-defined steps, but there's currently no effective, reliable, and non-invasive screening test for picking up these changes early on. Most people in the developed world are diagnosed when it's too late to save their lives.

Previous research has concluded that nanoarray analysis could be used to detect stomach cancer, but these studies have involved small numbers of people, and none has looked at the technology's ability to pick up pre-cancerous changes.

The researchers therefore collected two breath samples from 484 people, after a 12 hour fast and abstention from smoking for at least three hours.

Ninety nine of the participants had already been diagnosed with stomach cancer, but not yet treated with chemotherapy or radiotherapy.

Participants were asked about their smoking and drinking habits and tested for *Helicobacter pylori* infection, a known risk factor for stomach cancer.

The first breath sample was analysed using a technique (GCMS) that measures the various [volatile organic compounds](#) in [exhaled breath](#). The second sample was subjected to nanoarray analysis combined with pattern recognition.

The GCMS results showed that both patients with cancer and those without the disease had distinctive 'breath prints.'

Out of a total of 130 volatile organic compounds identified by GCMS in exhaled breath, levels of eight differed significantly when samples from the [gastric cancer](#) group were compared with those from the groups with pre-cancerous changes.

Furthermore, the nanoarray sensing patterns were able to accurately distinguish between the different pre-cancerous stages, marking out those patients at low and high risk of developing gastric cancer.

The findings held true, irrespective of other influential factors, such as age, alcohol intake, and use of stomach acid suppressant drugs ([proton pump inhibitors](#)).

The researchers point out that GCMS technology cannot be used for screening purposes, because it is very expensive and requires lengthy processing times and considerable expertise to operate it.

Nanoarray analysis, on the other hand, is not only accurate and highly sensitive, but offers a much simpler and cheaper alternative, they say.

Being able to accurately differentiate between low and high risk changes

would avoid unnecessary endoscopies, and would enable any progression to cancer or signs of disease recurrence to be monitored, they suggest.

A large trial involving thousands of patients, including those with [stomach cancer](#) or pre-cancerous changes, is currently under way in Europe to test the technology's suitability as a screening method, they add.

"The attraction of this test lies in its non-invasiveness, ease of use (therefore high compliance would be expected), rapid predictiveness, insensitivity to confounding factors, and potentially low cost," they conclude.

More information: Detection of precancerous gastric lesions and gastric cancer through exhaled breath, *Gut*, [DOI: 10.1136/gutjnl-2014-308536](#)

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