

A device that can detect gastric disorders from exhaled breath

Researchers at S. N. Bose National Centre for Basic Sciences (SNBNCBS), Kolkata an autonomous institute under the Department of Science & Technology, Govt. of India have recently developed a new-generation non-invasive diagnostic strategy that can help physicians for early and quick diagnosis of *Helicobacter pylori* infection residing in human stomach through breath analysis.

The strategy called ‘Pyro-Breath’ can detect the bacterial as well as its related complications like ulcer disease and non-ulcerous dyspepsia thus obviating the existing painful endoscopic and biopsy based tests.

Helicobacter pylori infection in human stomach may lead to the development of peptic ulcer disease and certain types of cancer. Interestingly, this bacterial infection is often asymptomatic, making early diagnosis essential to prevent complications.

The ‘Pyro-Breath’ technology exploits a simple residual gas analyzer (RGA) which scans specific ‘Breath-Print Masses (BPMs)’ in real-time. These BPMs are strongly associated with the onset of *H. pylori* infection and various gastric disorders such as gastritis and ulcer. From the nature of the various exhaled molecules or their isotopic species (breath-prints), it is possible to noninvasively monitor whether a person has a specific type of gastric disorder or *H. pylori* bacterial infection or both. As this is a non-invasive and painless method, it would be an attractive and alternative diagnostics method for any persons including infants, children, pregnant woman and seniors. The work done by Dr. Manik Pradhan and his research group at SNBNCBS has been published in the Journal of Breath Research.

This breath test method which can be a game-changer’ in non-invasive medical diagnosis may also help to follow-up the patients after standard therapies, thus avoiding further painful and invasive endoscopic method. The group has filed a patent, dated on 21/01/2016 (File No: 201631002214) for this technological innovation.

Dr. Pradhan has established research collaborations with medical scientists to ensure the translation of the new breath analysis technology, for clinical testing. The group has found new ‘Breath-Prints’ and estimated ‘Risk-Factors’ of various gastric disorders for non-invasive diagnosis of these diseases with accuracy better than 96% when compared with ‘gold-standard’ endoscopic tests.

Among the few prototype breath analysers made, one has currently been installed in a reputed hospital at Salt Lake, Kolkata for large-scale clinical trial. Breath tests are being performed on patients in regular basis for non-invasive diagnosis of *H. pylori* bacterial infection as well as gastric disorders. Three startup companies have already shown their interests to take up this technology for commercialization and the transfer of technology (TOT) is currently under process through NRDC, New Delhi.

Related Publications and Patent:

1. “Residual gas analyzer-mass spectrometry for human breath analysis: a new tool for the non-invasive diagnosis of *Helicobacter pylori* infection”: A. Maity, G. Banik, C. Ghosh, S.

Som, S. Chaudhuri, S. Daschakraborty, S. Ghosh, B, Ghosh, A. K. Raychaudhuri and M. Pradhan; *Journal of Breath Research*, 8, 016005 (2014)

2. “Molecular hydrogen in human breath: a new strategy for selectively diagnosing peptic ulcer disease, non-ulcerous dyspepsia and *Helicobacter pylori* infection”: A. Maity, M. Pal, S. Maithani, B. Ghosh, S. Chaudhuri and M. Pradhan; *Journal of Breath Research*, 10, 036007 (2016)

3. **Patent filed:** “A System and Kit For Non-invasive detection of Peptic Ulcer Diseases, Non-Ulcerous Dyspepsis And *Helicobacter Pylori* Infection”, **Indian Patent: File No: 201631002214 (dated: 21/01/2016)**; Inventors: Manik Pradhan & Abhijit Maity

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