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Breath test for distinguishing gastric cancer from healthy and non-malignant gastric conditions

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Most of the gastric cancers are diagnosed at advanced stages when the survival results are unsatisfactory. Therefore, there is a need for non-invasive tool to diagnose the disease at early stage. Here we report initial results of distinguishing gastric cancer through breath test using sensors array. The goal is to investigate the feasibility of odour prints for discriminating the gastric cancer (GC) patients from the healthy and peptic ulcer disease (PUD) with nanomaterial-based sensors and to identify the potential volatile markers of GC through using gas-chromatography mass spectrometry (GC-MS). 988 breath samples were collected from 99 GC patients, 53 peptic ulcer disease (PUD) patients and 342 controls in Latvia. Sensors array was used to discriminate the GC from the non-malignant patients. Classification success was calculated by (i) building Discriminant Function Analysis (DFA) model for 70% of the samples as a training set and (ii) randomly blinding 30% of the samples as a validation set. GC-MS was used to identify the significant volatile markers in GC. Blind DFA models presented: a) An excellent discrimination between the GC and controls (91% accuracy); b) An excellent discrimination between the GC patients and PUD patients (86% accuracy); c) An excellent discrimination between the GC vs. PUD and Healthy volunteers (92% accuracy). Hexadecane, 2-butoxy ethanol and 2-propenitrile were identified as the potential volatile markers for GC using GC-MS. The primary results could lead for a new non-invasive promising screening tool for diagnosis early stage of GC and thus lowering advanced stage occurrence and mortality

Biography

Haitham Amal (28 years) has completed B.Sc in pharmacy, M.Sc in pharmacology and now is in the second phase of Ph.D. in the department of chemical engineering and Russell Berrie Nanotechnology Institute at the Technion institute, Haifa, Israel. His Ph.D. is on detection of gastric cancer through breath. He has published three papers as a first author. He has got several awards from the faculty 2011-2013, Education ministry 2012-2013 and from the ISOBM conference 2012. He gave several presentations at conferences in USA, Latvia, Tel-Aviv and Jerusalem. Amal is a lecturer of pharmacology at the medicine school in the Technion.

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