25<sup>th</sup> World Congress on

## CANCER SCIENCE AND THERAPY

10<sup>th</sup> World Congress on

BIOMARKERS & CLINICAL RESEARCH October 18-20, 2017 Baltimo

Baltimore, USA

## Biomarkers of hypoglycemia in human breath and sensor development

Mangilal Agarwal Indiana University, USA

It is well recognized that trained canines can identify hypoglycemic lows in patients with type 1 diabetes (T1D) from smell alone. In order to build a noninvasive breath sensor to mimic canines' ability to detect hypoglycemia in breath, we've collected breath samples from people with T1D and at the same time we've been developing cross-selective polymer and nanoparticle-based sensors for constructing a nanosensor array. Gas chromatography/mass spectrometry (GC/MS) was used to detect volatile organic compounds (VOCs) in the breath samples, and the GC/MS results were then aggregated and subsequently analyzed using statistical models to identify the specific panel of VOC biomarkers co-related to hypoglycemia. The analysis shows that from the panel of seven identified biomarkers one can detect hypoglycemia in breath with 91% sensitivity and 84% specificity (cross-validated results). Concurrently, we have been developing polymer and nanoparticle-based resistive sensors that can differentiate VOCs specific to the types of VOCs identified by results from the first summer. We have shown how poly(vinylidene fluoride-hexafluoropropylene) (PVDF-HFP)-based sensors can have increased sensitivity and cross-selectivity by modifying specific sensors in an array to increase or decrease both adsorption and transduction efficiency for specific classes of VOCs including alcohols (detector response can be varied by 200%) and ketones (response changes of up to 89%).

## Biography

Mangilal Agarwal received his MS (2002) and PhD (2004) in Engineering from Louisiana Tech University (Ruston, LA). After his PhD, he was a Post-doctoral Research Associate at Louisiana Tech's Institute for Micromanufacturing, which was followed by an appointment as Research Assistant Professor there. He joined IUPUI in 2009 as the Associate Director for Research Development in the Office of the Vice Chancellor for Research. He is currently working as Associate Professor of Mechanical Engineering and Director of Integrated Nanosystems Development Institute (INDI) at Indiana University-Purdue University Indianapolis (IUPUI) and directs the development of interdisciplinary research and education initiatives.

agarwal@iupui.edu

Notes: