

2<sup>nd</sup> International Conference on

# Current Trends in Mass Spectrometry

July 20-22, 2016 Chicago, USA

## Nanomaterial based mass spectrometry applied on pathogens, cancer study and single cell detection

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We integrated nanotechnology, microbiology and mass spectrometric techniques for biomedicine studies including pathogenic bacteria analysis, cancer study, single cell detection and also developing biochips. Our various biomedicine projects have been successfully conducted and also briefly described as below: rapid detection of *in vivo* kinetics of pathogenic bacterial infection in mouse blood and urine using MALDI-MS; Nanoparticle (NP) assisted MALDI-MS as bacterial biosensors for rapid analysis of yogurt; ZnO and Ag nanoparticles as bifunctional nano probes for bacterial detection, CdS QDs for degradation of extracellular polymeric substance (EPS) of *E.coli*; mass spectrometry as a bacterial biosensor using TiO<sub>2</sub> NPs assisted MALDI-MS; tracing the *Staphylococcus aureus* on ants using physical preconcentration coupled ZnO NP assisted MALDI-TOF MS. The bacterio-toxicity/compatibility of Platinum nanospheres, nanocuboids and nanoflowers with different size effect was demonstrated. We also have developed bifunctional titania (Ti) chip for highly sensitive pathogenic bacteria analysis in the MALDI-MS. Recently, we also applied gold nano-platform mediated microwave digestion in detecting single cancer cells and cancer stem cells analysis using MALDI-MS. We also successfully applied platinum nanoparticles for photothermal treatment of neuro 2A cancer cells. All these studies show the successful implementation of nanotechnology into mass spectrometry for pathogen analysis and cancer study. Our approaches can be applied as rapid, direct, effective and sensitive techniques for future microbiology and cancer analysis especially in clinical and medical studies.

### Biography

Hui-Fen Wu currently is a distinguished Professor in National Sun-Yat-Sen University. She obtained PhD from University of Texas at Austin, USA (1994). She was a faculty in Tamkang University for 10 years. In 2006, she joined National Sun Yat-Sen University. Her research work is focused on applications of various nanomaterials for pathogenic bacteria analysis and cancer study. She has been served as Editorial Board Members for 15 journals. To date, she has published 205 scientific journals, 250 conference presentation, 13 book chapters and 7 patents.

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