

Prof. Yaw-Kuen Li / Department of Applied Chemistry

Enzyme Technology, Protein Engineering, Biological Essay Sensing & Analysis, Mass Spectroscopy

We are “Cross-disciplinary Enzyme Research Lab” (Figure 1) of the Applied Chemistry Department, NCTU. Our primary research interests include the following three major parts:

(a) Enzyme-based Catalytic Biological Reactions: We have developed all-around biological techniques and tools to synthesize various oligosaccharides and glucoside compounds which can be useful in many biomedical applications. Besides, we invented an “one-pot” protein purification process, including our unique controllable peptide cleavage technology (US Patent issued), which allows us to efficiently purify copious amount of proteins without running chromatography (Figure 2).

(b) Bio-sensors: In the past ten years, our lab has led an interdisciplinary bio-sensor R&D team crossing different departments of NCTU, and achieved several major technical milestones toward our ultimate goal of commercialization, including chip surface modification by molecule-level self-assembly, protein / antibody immobilization and biological signal read-out electrically or opto-electronically (Figure 3).

(c) Solid-state / Biological Interface Chemistry: Recently, we have been intensively focused on the design and synthesis of versatile chemical linkers which can interface between the solid-state nanoparticles (e.g. Si QDs, Au NPs) or substrate (e.g. QCM chip) and the biological system. Moreover, the chemical linkers sometimes can function as a anti-non-specific binding coating (Figure 4).

Key Facilities: High-end Mass Spectroscopy, Fluorescent / Confocal Microscope, Flow Cytometer, Microscale Thermophoresis (MST), and several other critical equipment necessary in biological sample preparation and characterization.



Figure 2

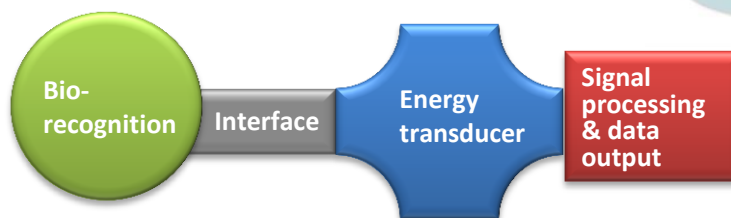


Figure 3

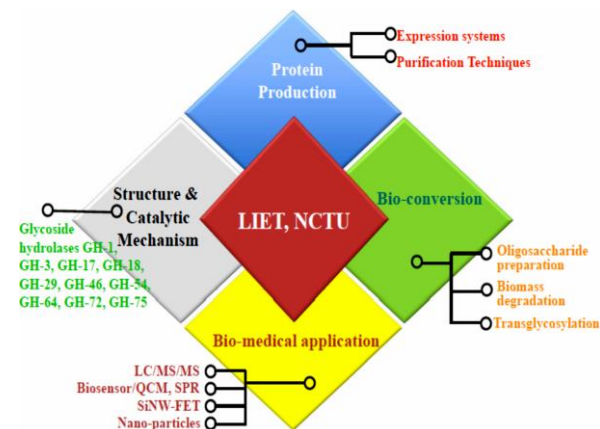


Figure 1

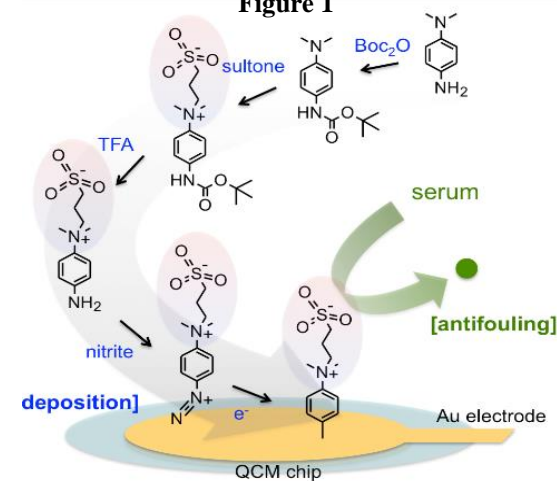


Figure 4