PROTEOMICS

Proteomics is the study of the proteome, which is the entire protein component of a biological specimen at any one point in time. I am particularly interested in using proteomics to decipher some of the most intractable problems from cancer to finding the enigmatic ‘missing’ proteins that may have a role to play in various diseases.

COLORECTAL CANCER DIAGNOSTICS

Colorectal cancer is one of the most lethal of cancers claiming thousands of lives every year. The Cancer Proteomics group working with Prof. Mark Baker (of the Faculty of Medicine and Health Science) is attempting to uncover novel diagnostics to enable the early detection of colorectal cancer from blood plasma using the latest technologies in proteomics. Furthermore, working with Dr. Charlie Ahn (CINSW fellow), we are trying to decipher whether, using histology and associated imaging, we can discern late from early stage cancer leading to significant outcomes for patients.

Having access to the state of the art instrumentation through the Australian Proteome Analysis Facility, in addition to state of the art Imaging facilities through the CNBP and the university means we are now able to drill deeper than ever into the human proteome.

MISSING PROTEINS

Despite the deciphering of the genome in 2001, there remains over 10% of the human proteome undiscovered. These enigmatic ‘missing proteins’ are thought to have diverse functions in a number of human diseases and conditions yet none have been studied or observed at a protein level. In conjunction with Prof. Shoba Ranganathan and Prof. Mark Baker, our team is using 2 distinct ways of uncovering the missing proteins, the first is a bioinformatics approach through the development of a missing protein database (the Missing Proteinpedia-MPP) and second is a proteomics approach to study rare human tissues to uncover these ‘missing’ proteins.

TARGETED MEMBRANE PROTEOMICS

Membrane proteins are a particularly difficult subset of proteins to investigate partially due to their nature, although the most important as they are involved in many of the signaling functions in a cell. In conjunction with Dr. Fei Liu in the department, we have developed a novel light-controlled chemical sequestration method to study membrane proteins enhancing detection limits.
Selected Publications


