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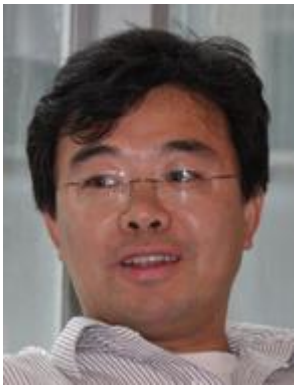
BIOENGINEERING

PRESENTS

Develop Quantitative FRET Technology Platform for Systems Biology and Drug Discovery



THURSDAY, APRIL 28, 2016
1:00 PM – 2:00 PM
2101 ENGINEERING V

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ABSTRACT:

A novel quantitative Förster resonance energy transfer (FRET) methodology has been developed using one-sample method for both basic kinetics parameter determinations and high-throughput screening (HTS) assays for SUMOylation cascade. Ubiquitin-like protein pathways, such as SUMOylation, are critical in protein homeostasis and activities *in vivo* and are emerging as a novel strategy to treat many acute and chronic human diseases, such as anti-infections and cancers. The FRET assay has been widely used in various biological research in vitro and in vivo. However, the quantitative FRET assay has not been fully established due to the complexity of FRET signal. We have developed a novel approach to determine the absolute FRET signal in a three-step procedure using cross-wavelength correlation coefficiency method and then correlate the absolute FRET signal with the molecular events of various biochemical reactions in SUMOylation cascade for their kinetic parameter determinations. The high-throughput screening(HTS)assay has also been developed and applied in a HTS campaign for more than 220,000 compounds and a specific SUMO inhibitor was discovered and characterized in both anti-influenza virus assay and anti-cancer assays. The methodologies have very broad applications for other biological pathways and the novel SUMOylation inhibitor is very promising for anti-infections and anti-cancer drug discovery.

BIOGRAPHY:

Prof.Liao joined University of California of Riverside as founding faculty of Bioengineering Department in 2006. At UCR, Prof.Liao has developed a NIH-funded novel quantitative FRET assay platform that has been used to determine various biochemical parameters in SUMOylation cascade in a systems biology approach and high-throughput screening assay for SUMOylation and other Ubl-like pathways for cancers and infectious diseases.

Prof. Liao obtained his BS degree of Biochemistry from the Peking University of China and Ph.D. degree from the Department of Biological Chemistry of UCLA, School of Medicine. He then went to the Scripps Research Institute for the post-doc. training, and subsequently joined Genomic Institute of Novartis Research Foundation as Principle Investigator and Founding Scientist of GPCR platform, where Dr.Liao's responsibilities included setting up GPCR drug discovery portfolio, novel GPCR discovery and annotation from human genome, high-throughput screening assay development and drug discovery. The HTS led by Dr.Liao and subsequent characterizations of EDG1-specific agonist has generated high impact publications and new immuosuppresant drug, Gilenya, in Norvatis, which sale reached $2.7 billion in 2015. This work has been awarded as the Scripps Molecular Screening Center from two rounds of support from NIH roadmap. He also discovered a novel EDG1 agonist through HTS, which was licensed by Receptos that was acquired by Cellgene for $7.2 billion in 2015. Dr.Liao collaborated with the National Drug Screening of China to discovered the first non-peptide GLP1 agonist, and awarded the Outstanding Oversea Young Scholar from Natural Science Foundation of China(NSFC). This innovative effort has attracted the intensions from major pharms in the world and led to the establishment of the National Compound Library of China. Prof.Liao's research has led to publications with over 3,300 citations and trenty six patent applications including ten PCT patent applications. Prof.Liao is also founder and board members for two start-up companies. Prof.Liao was elected as a fellow for the American Institute of Medical and Biological Engineering(AIMBE).