

"Protein Interaction Networks Regulating Cell Signaling in Cancer"

Short abstract:

The study of integral membrane proteins and the identification of their interacting partners is of critical importance due to their pivotal role in many cellular processes, direct link to human diseases and their extracellular accessibility to drugs. However, due to their hydrophobic nature, they have long been difficult to study in a high-throughput format.

We previously developed a genetic technology for the *in vivo* detection of membrane protein interactions, called the split-ubiquitin membrane two-hybrid (MYTH) system. A unique advantage of MYTH is that it detects protein interactors of full-length integral membrane proteins in a high-throughput screening format.

Our current efforts are directed to identify and characterize protein interactors of all (23) yeast integral membrane ABC transporters, 100 selected pharmacologically important G-protein coupled receptors (GPCRs) as well as all (58) human receptor tyrosine kinases (RTKs) in an effort to understand complex biological processes such as cell signaling and membrane transport at a systems level. During my talk, I will discuss exciting new findings indicating that the newly identified GPCR-, and RTK-interacting proteins play novel roles in regulating the activity of these integral membrane proteins *in vivo* and *in vitro*.

Our initial success suggests that the MYTH system represents a robust technology that can be applied to any organism to identify key interactors for the majority of integral membrane proteins. Such an approach offers an unbiased systems level view that may identify novel drug targets and contribute to therapeutic research.