



Current Position: Dorothy H. and Lewis Rosenstiel Professor and Chair, Department of Pharmacology and Systems Therapeutics at Mount Sinai School of Medicine in New York, NY

Education: Ph.D. in Biophysical Sciences (1977) from University of Houston

Non-scientific Interests: Music, visual arts and philosophy

I studied the vasopressin-stimulated adenylyl cyclase system as part of my doctoral thesis research and ever since have been interested in G protein signaling. During my postdoctoral training with Lutz Birbaumer, I worked on a computational modeling project in the late 1970s to analyze coupling between receptors and effectors. The project was very revealing in two ways: computational models could provide powerful insights into complex relationships in biochemical signaling systems, but without experiments, these models could not resolve critical mechanistic questions. For example, our original computational models could not predict definitive experiments that would test for the GTPase activity through the measurement of hormone-stimulated adenylyl cyclase activities. When we started developing computational models in the mid-1990s, we used these models to understand how coupled biochemical reactions can give rise to emergent behaviors such as switches. Since then we have tried to integrate experiments and computational models to understand how biochemical reactions lead to cellular behaviors.

The approaches we use have become part of a new field called Systems Biology. These computational analyses, coupled with experiments, have provided us with interesting insights into the logic underlying the design of signaling networks that trigger the cell state change and how cell shape controls the local biochemistry of signaling within cells. Analyses of the physical and biochemical factors regulating signaling microdomains offer deep insights into how dynamical control of the specificity of signaling propagation can be achieved within cells. Computational approaches to study spatial organization of intracellular signaling reactions is the subject of our minireview.

Read Dr. Iyengar's article entitled: Models of Spatially Restricted Biochemical Reaction Systems

<http://www.jbc.org/cgi/content/full/284/9/5445>