

**Research Interest:**

- Signal Transduction, Reversible Protein Phosphorylation and Gene Expression in Dictyostelium.

We are investigating the signal transduction mechanisms by which extracellular hydrophilic hormones activate genes. We use Dictyostelium discoideum as a model eukaryote because it is relatively easy to perform reverse genetics on this organism and it is also capable of development. We had earlier shown that extracellular cAMP behaves as a hydrophilic hormone in Dictyostelium, activating cell surface receptors and initiating intracellular reactions that induce genes (1). We characterized the control regions required for the induction of one gene (2) and recently, the proteins that interact with them. Reversible protein phosphorylation is involved in signal transduction (3-5): Recently we found that over-expression of a cloned phospho-protein phosphatase gene, PP2A, blocks development, and anti-sense expression of a protein kinase gene, DdK4, blocks aggregation. Moreover we showed that transforming cells with an altered cloned protein kinase gene, DdK6, could disrupt its normal counterpart by homologous recombination-- the reverse genetics approach. The transgenic organism shows deranged development and altered gene expression. The DdK6 protein contains a pleckstrin homology (PH) domain, which has recently been found in some proteins involved in signal transduction and in some cytoskeleton proteins. Our results with DdK6 suggests that the PH domain functions as a signal transduction motif and provides an approach to determining if PH domains are involved in transient protein aggregation during signal transduction.