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Research Interests

The research in our laboratory explores the role of cyclic nucleotides (cAMP and cGMP) in the signal transduction mechanisms that mediate neuronal plasticity. In past studies, we have characterized the protein kinases regulated by these cyclic nucleotides and studied the biochemical properties of specific isoforms of these cAMP- and cGMP-dependent protein kinases. Diversity in the biochemical properties of these proteins suggest that the individual isoforms may be differentially activated in neuronal cells in response to various stimuli. In addition, we have studied the role of these kinase isoforms in the regulation of gene transcription that may form the basis of long term memory. We are currently interested in novel mechanisms for controlling the activity of these protein kinases including specific inhibitor proteins expressed in brain. Future studies will be aimed at characterizing important new physiological substrates which are phosphorylated by these cyclic nucleotide dependent protein kinases.

Our most recent research has focused on the use of a novel high throughput transfection method to characterize transcriptional regulation by protein kinases in neurons. The Surface Transfection and Expression Protocol allows thousands of transfection reactions to take place on a single microscope slide. We are using expression vectors encoding constitutively active protein kinases together with fluorescent reporter vectors with binding sites for specific transcription factors to identify novel regulatory interactions in neuronal development.



Selected References

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