INDIAN INSTITUTE OF TECHNOLOGY GUWAHATI
SHORT ABSTRACT OF THESIS

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SHORT ABSTRACT

C1 domain is well known for its' vital role in cell signaling. The localization of different kinase proteins to the cellular membrane through the interaction of their C1 domain with DAG regulates different cell signaling processes. It has already been reported that C1 domain mediated cell signaling is widely involved in progression of cancer, Alzheimer's diseases and others. Therefore it has been considered as an attractive therapeutical target. Here we have chosen two C1 domain containing protein- Protein Kinase C (PKC) and Myotonic Dystrophy Kinase related CDC42 binding kinase (MRCK). The introductory chapter (**Chapter 1**) describes the role of C1 domain in different diseases, structure, function and regulation of C1 domain and a brief summary of C1 domain ligands. The C1 domain of PKC is most widely studied till now. Tremendous efforts are underway for the development of PKC activators. The activity of PKC isozymes is also regulated by the biophysical properties of membrane. Therefore a clear understanding of the membrane interaction properties of the PKC activators is also very important. In this regard in **Chapter 2** and **Chapter 3**, we have focused on the development of PKC activators and understanding it's interaction with model membrane. Lipophilic molecules present in the membrane also affect the membrane biophysical properties and thus modulates the PKC activity. In this regard **Chapter 4** deals with the effects of cholesterol and oxysterols on the membrane biophysical properties which is correlated with PKC activity. MRCK is also a C1 domain containing protein which responds to phorbol ester and DAG. Several studies are carried out to understand the involvement of MRCK on different cellular processes and different diseases. But the mechanism through which MRCK interacts with DAG or phorbol ester is still not clear. Therefore **Chapter 5** deals with the mechanistic investigation into the C1 domain binding properties of MRCKα- and MRCKβ-C1 domain.