

Kinase Inhibitors: Hope for Cancer

Darshan Malik

*Shivaji College, University of Delhi, New Delhi
E-mail: darshanmalik@yahoo.com*

Abstract—*Cell signalling is a process by which cells communicate with each other and also respond to stimulus from the environment, in an appropriate manner. Cell signalling regulates basic activities and functions of the cell through different kinds of molecules which help in transmitting information, regulation of cell growth, cell division and proliferation. The uncontrolled cell growth produces tumors and can lead to deadly disease cancer. Cancer is not an inherited disease but can be called a genetic disease because it can be tracked to change in genes to oncogenes which code for a protein which accelerates the cell growth and proliferation producing tumors. One of the signalling pathways is MAP Kinase (mitogen activated protein kinase) which belong to ERK(extra cellular signal-regulated kinase) family which plays a key role in signal transduction of binding of growth factors to stimulation of cell proliferation.*

Stimulation and activation of ERK is mediated by a small GTP binding protein called Ras which interacts with another protein kinase Raf and this activates ERK through activation of protein MEK. ERK further activates number of other protein kinases in cytoplasm and many transcriptional factors in the nucleus leading to cell growth and proliferation. Ras protein was first discovered as an oncogenic protein which caused sarcoma in rats .Later it was shown that the mutation in Ras are the most common cause for human cancer. Most of the oncogenes are derived from proto oncogenes which help in growth signal transmission from the environment to the interior of cell through the cell surface receptors present in the membrane. Mutation in the Raf or Ras can maintain the ERK and MEK in a continuous activated state which will lead to cascading effect of MAP kinase pathway causing uncontrolled growth and proliferation of cell producing tumors and cancerous cell.

The study of cell signalling and understanding the mechanism as to how the cells loose the control of regulated cell growth and proliferation is very important to develop inhibitors of the proteins participating in the MAP Kinase pathway. This can be one of the effective therapies for prevention of tumor formation in which the proteins have mutated to proteins having oncogenic potential.