Signal Transduction in the Immune Response

Gabriella Sármay
ELTE, Dept. of Immunology

In cells of the immune system, signaling leads to activation of cell-type specific immune activities. Ligand interaction with receptors on the surface of cells of the immune system triggers intracellular signal transduction directly or through association with assistant signal transduction molecules (CD3, IgαIgβ, etc.). Regulation of immune cells function upon response to environmental stimuli and to pathogens is essential for the defense of the organism. The strenghts of the signal is a decisive factor in life or death of lymphocytes. Signals above a threshold activate the cell, while below the threshold the cells do not respond. During development of lymphocytes to strong signal may result in programmed cell death to avoid autoimmunity. Tonic signals mediated by the antigen receptors are responsible for keeping cells alive before encountering the antigen. Receptors of the adaptive and the innate immune system interact in regulating the immune response. Innate receptor may activate the cells irrespectively from the antigen, thus the crosstalk between the adaptive and innate receptors must be tightly controlled. We have recently characterized the communication between BCR, TLR9 and BAFF-R mediated signaling pathways in human B cells. The results suggest that these pathways interact at the level of TAK1, the kinase that connect extracellular signals to NFkB activation being responsible for activating the inhibitor κB kinase (IKK) complex. Research targeting TAK1 raises the potential for new therapeutic options for inflammatory disorders, including autoimmune diseases and cancer.