**Abstract:** Innate immune system detects danger signals derived from microbial products and endogenous ligands. These danger signals can initiate and perpetuate inflammation and autoimmunity via recognition of pattern recognition receptors such as Toll like receptor (TLR). We aim to develop transformative therapies in treating patients with autoimmune and inflammatory diseases by targeting danger signal pathways contributing to key disease mechanisms. IRAK4 is an essential kinase that mediates TLR and IL-1R signaling. We have developed a potent and selective IRAK4 inhibitor with a potential to become a novel and transformative therapy in treating autoimmune diseases such as Rheumatoid Arthritis and Lupus.