

T cell receptor signal transduction in T lymphocytes

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The T cell receptor (TCR) recognizes self or foreign antigens presented by major histocompatibility complex (MHC) molecules. Engagement of the TCR triggers the formation of multi-molecular signalsomes that lead to the generation of second messengers and subsequent activation of multiple distal signaling cascades, such as the Ca²⁺-calcineurin-NFAT, RasGRP1-Ras-Erk1/2, PKC θ -IKK-NF κ B, and TSC1/2-mTOR pathways. These signaling cascades control many aspects of T cell biology. Mechanisms have been evolved to fine-tune TCR signaling to maintain T cell homeostasis and self-tolerance, and to properly mount effective responses to microbial infection. Defects or deregulation of TCR signaling has been implicated in the pathogenesis of multiple human diseases.

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