

Tonic signaling through the TCR pathway represses β *RAG-1* and *RAG-2* gene transcription.

Components of the T cell receptor (TCR) signaling pathway conduct signals typically initiated by engagement of the TCR with MHC plus peptide. However, without receptor engagement thymocytes display constitutive phosphorylation of the TCR β chains and recruitment of the kinase ZAP-70. Here we describe the functional aspects of a basal signal originating from TCR signaling components independent of ligand and β TCR. We find that expression of a gene cluster including *RAG-1* and *-2* is repressed by a tonic signal in resting T lymphocytes. The adapter molecule LAT appears to play a crucial role in transducing this basal signal. In DNA arrays, we observe an attenuation of tonic instruction in Jurkat T cells defective for the adapter LAT. In these cells, normal expression of *RAG-1* and *-2* is only restored by a stimulus bypassing LAT or by a signaling-competent LAT molecule containing phosphorylatable tyrosine residues and palmitoylation sites. Conversely, induced expression of the phosphatase CD148 that targets phospho-tyrosine residues in LAT results in elevated *RAG-1* expression levels in wildtype cells. Chemical inhibition of a panel of kinases in cell lines and primary cells defines a basal signal that emanates from Src kinase activity and operates through calcium and MAP kinase pathways. Our data indicate that TCR signaling components actively maintain appropriate gene expression profiles via a tonic instruction independent of β TCR stimulation by ligand.