# Measures of T cell Affinity to other cell types in Lymph Nodes

Humayra Tasnim, Janie R. Byrum, G. Matthew Fricke, Melanie E. Moses, and Judy L. Cannon

## Abstract

In immunology, T cells play a vital role to extinguish viruses and bacteria and get rid of the pathogenic infections from the immune system. T cells need to encounter other immune cells in lymph nodes to become activated for fighting off pathogens. Here we illustrate of the affinity of Naïve T cells with different cell types in lymph nodes including Dendritic Cells (DC), Fibroblastic reticular cells (FRC) and High Endothelial Venules (HEV) blood vessels. We try to measure how attracted T cell are to various lymph node cells. This relationship governs T cell activation. We evaluate this affinity with three techniques: *hotspot analysis*, *mutual information analysis* and distance calculation of T-DC cells. We demonstrate computational analysis that mathematically measures the correspondence. We also explore the mechanism and control factors that impact this correspondence. For instance, in the case of the the relationship between naïve T cells and DC, we consider the impact of CCR7 on cell affinity. CCR7 receptors are known to be important in T cell motility. Our results show that knocking out CCR7 receptors from wild type T cells have a marginally significant impact on the affinity of Naïve T cells with DCs. We also measure the affinity of T cells with HEV and FRC. We find that ???.