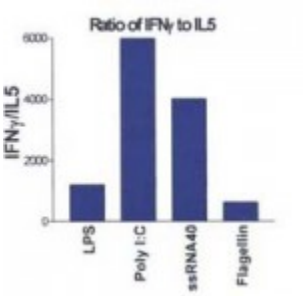
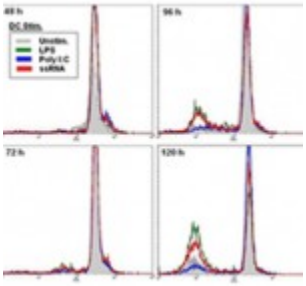
Research Statement

Differential activation of human dendritic cells and their subsequent effect on CD4+ and CD8+ T cell activation and differentiation; Major histocompatibility complex class I and II antigen presentation.

Dr. David Lee's laboratory has one area of study: the differential Toll-like receptor (TLR) activation of human dendritic cells and their subsequent effect on human CD4+ and CD8+ T cell differentiation as a means of tailoring immune responses in vaccines. His laboratory is interested in the effect of differential TLR activation of human DCs, using bacterial agonists such as lipopolysaccharide (TLR4 agonist) and flagellin (TLR5 agonist) and viral agonists such as double-stranded RNA (TLR3 agonist) and single-stranded RNA (TLR7 and 8 agonist), on DC-cytokine secretion and the subsequent proliferation and differentiation of naïve human CD4+ T cells into TH1, TH2, TH17, as well as other subsets of T cells. These studies have important implications in the development of adjuvants in vaccines for customizing T cell responses in humans.



The ratio of the frequency (ELISPOT) of IFNy-to IL5-producing CD4+ T cells as induced by differentially TLR-activated allogeneic human DCs.



DCs activated with the bacterial TLR ligands induce better CD4+ T Cell proliferation than those activated with the viral TLR ligands. Unstimulated or TLR activated DCs were used to stimulate allogeneic human naive CD4+ T cells which had been labeled with CFSE. At the indicated time points, the CD4+ T cells were analyzed by flow cytometry for dilution of the CFSE fluorescence as a measure of proliferation. Separately, the same CFSE-labeled T cells were also stimulated by plate bound anti-CD3 and anti-CD28 as a positive control and t allow us to examine the number of cell divisions that T cell had undergone.