Dissecting the steps of HIV cell-to-cell infection with flow cytometry

Human immunodeficiency virus infects and depletes CD4 T cells and is the cause of the disease acquired immunodeficiency syndrome (AIDS). We have been studying immune cell interactions that are induced by the infected cells called virological synapses. We have developed biologically functional viral variants that carry genetically encoded flourophores engineered into viral genome to help us dissect the steps of virus transmission and to measure the efficiency of cell-cell transmission both in vitro and in vivo. Multicolor flow approaches have been critical in allowing us to examine quantitative models for how HIV spreads in animal model systems. Using complementary approaches flow cytometry and intravital microscopy we have been able to develop a quantitative and dynamic living picture of how virological synapses promote the persistence and spread of HIV.