Research / Bio
The Barlow laboratory investigates the causes and consequences of genome instability, focusing on the impact of DNA damage on B lymphocytes of the adaptive immune system. B cells are highly prone to DNA damage arising from two distinct sources: base modifications made by the enzyme AID (Activation-induced cytidine deaminase) during immunoglobulin gene rearrangement, and replication stress due to their high rate of proliferation. Primary lymphocytes provide an ideal system to study causes and consequences of planned and unplanned gross chromosome rearrangements (GCRs). GCRs are when pieces of a single chromosome or pieces of 2 or more chromosomes are glued together in a new pattern. GCR formation is particularly important for B cell function, as planned chromosome rearrangements govern antibody formation during B cell development and antibody production during activation in response to infection while unplanned GCR formation promotes cancer initiation and evolution. A new area of study is the impact of increased endogenous DNA damage from loss of Senataxin on innate immune system hyperactivation and neurodegeneration.

Publications