Defining the Mammary Epithelial Changes Induced by UTI in WT and *Brca1*-KO Mouse Models

Gina Jones, Samantha Henry, Steven Lewis, Camila dos Santos
Undergraduate Research Program
Cold Spring Harbor Laboratory

The mammary gland retains plasticity throughout adulthood and is able to rapidly respond to external stimuli by altering cellular proportions and gene expression. Stimuli such as pregnancy, infection, and DNA damage and repair produce changes to the mammary gland environment which can modify tumorigenesis. Mutations in genes important for DNA repair such as *BRCA1* lead to increased risk and earlier instances of breast cancer. We have found increased collagen deposition in the mammary gland after induction of a urinary tract infection (UTI). It is not yet known the relevance of these alterations in the *Brca1*-knockout mice; however, preliminary data suggests that UTI occurrence in *Brca1*-knockout mice hastens tumor formation. Utilizing single-cell RNA sequencing, UTI-induced changes to epithelial cells and the transcriptome of the mammary gland were uncovered in wildtype and *Brca1*-knockout mouse models. There was an increase in the hormone-sensing cells in the wildtype mice infected with UTI, and a unique hormone-sensing cell population that arose with lineage infidelity in the *Brca1*-knockout mouse model. Further analysis of these differences in populations of mammary epithelial cells in the mice with UTI can uncover how these cell populations may influence breast cancer development in women.