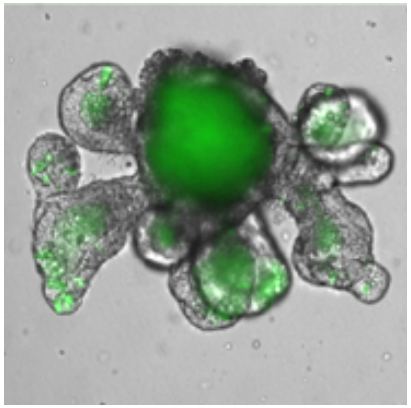
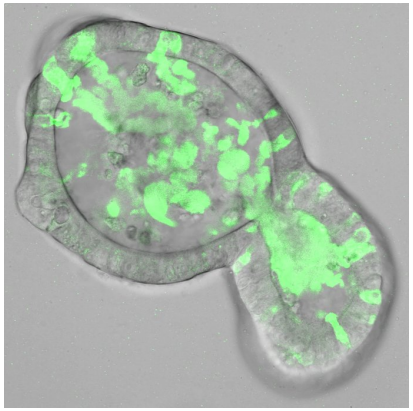
BIOTECHNOLOGY
NC STATE UNIVERSITY

BIT 495/595: Organoids



OVERVIEW

- Learn how to use organoids to test a multi-hit model of cancer
- Hands on lab skills development in:
  - advanced tissue culture techniques
  - growing intestinal epithelial organoids
  - genetic engineering
  - phenotypic screening
  - microscopy
- Experimental design, analysis, and reporting



Lecture

1. **Stem cell** basis of cancer and **organoid models** of disease
2. **Organoid** culture systems
3. **Genetic engineering** via CRISPR/Cas9 and Cre/Lox
4. **Techniques** for manipulating organoids
5. **Genotyping** – primer design and identification of specific mutations
6. **High throughput** technologies for disease treatment discovery
7. **Bioethical** considerations for organoid technologies

Lab

1. **Advanced** tissue culture technique, organoid culture media formulation
2. **Organoid culture** techniques
3. **CRISPR/Cas9** tool synthesis
4. **Gene deletion** by CRISPR/Cas9 and inducible Cre/Lox
5. **Phenotypic screening,** organoid imaging and image analysis
6. **Genotyping** to identify mutations
7. **Apply drug screen** to treat cancer organoids