

**UNIVERSITY OF UTAH**  
**CENTER FOR CELL AND GENOME SCIENCE**  
**SEMINAR**

**DONALD BURKE, PHD**  
**SCHOOL OF MEDICINE**  
**UNIVERSITY OF MISSOURI**

**“RNA Synthetic Biology from Fluorescent Logic  
Gates to Broad-Spectrum Aptamer Inhibitors of HIV”**

*RNA can be readily engineered for new molecular and cellular functions. “Split-Broccoli” is the first RNA split-aptamer reporter system to operate in vivo. Split-Broccoli assembles from two separate transcripts to generate a binding pocket that activates fluorescence from a bound dye, acting as an all-RNA, stand-alone AND gate for synthetic circuits. The two strands also assemble when they are fused to other RNAs that regulate translation upon RNA-RNA hybridization, demonstrating its utility for monitoring RNA-RNA assembly in vivo. In a separate study, we have used new selection and informatics methods to identify broad-spectrum RNA aptamers that inhibit Reverse Transcriptase (RT) from phylogenetically diverse strains of HIV-1. Cells that express these aptamers inhibited replication of recombinant HIV-1 that encode diverse RTs and overcame the resistance that was observed for aptamers that were specific for binding only certain RTs. Aptamer encapsidation specificity suggests that the RT segment of GagPol is already dimerized and exposed to cytoplasm during assembly, and that later during infection, the viral capsid remains essentially intact during reverse transcription.*

**Wednesday, March 1, 2017**  
**4:00 pm, Room 210 ASB**

*Refreshments before seminar*

**Host: Dr. Jennifer Heemstra**  
**Questions? Jason Socci 1-6517**