APh 162 Week 2 Session 2 (Mol Bio Session 4)

NOTE: All positions on this document refer to the Excel file coordinates NOT the plate coordinates (which are the transpose of the excel file, e.g., C1 (in Excel) = A1 (on plate)). Please check with a TA before you start imaging your cells!

This is a list of experiments for Tuesday, and each group will be assigned an experiment. Please consult the Excel spreadsheet for the map of the strains. Note that there are two sheets, one corresponding to each plate. All papers are also posted on the website; on Monday we will discuss the general outline of the experiments and you will choose one, or be assigned one randomly.

Measure YFP expression as an indicator for beta-gal expression as a function of loop size of the lac operon
Plate 1: A1 (no fluorescence control), E1, E3, E5, E7, G1, G3, G5, G7, I1, I3, I5, I7, K1 (looping strains with operator)
Plate 2: A1 (no fluorescence control), E1, E3, E5, E7, G1, G3, G5, G7, I1, I3, I5, I7, K1 (looping strains no operator as control)
See Muller et al., JMB, 1996
Jian, John, Ben

Instructions: No induction required.

Explore multistability of the lac operon switch and the role of epigenetics on gene expression
Plate 1: A3, A5 (+TMG), plate 2 positions A3, A5 (-TMG)
See Ozbudak et al., Nature 2004
Ali, Juhwan,
Kiefer, Vanessa

Instructions: 1. Grow cells overnight in minimal media + succinate with and without 1 mM TMG. 2. Passage ON cultures into minimal media + glucose with TMG at concentrations of: 1 μM - 1000 μM

Measure YFP expression as an indicator for operator strength in the lac operon for one loop size
Plate 1: A1 (no fluorescence), C1, C3, C5, C7 (looping strains with operator)
Plate 2: A1 (no fluorescence), C1, C3, C5, C7 (looping strains no operator as control)
See Muller et al., JMB, 1996

Instructions: No induction necessary.

Measure YFP expression as a function of promoter induction level using IPTG as the inducer.
Plate 1: A1, E1
Yagil et al., Biophys J, 1971
Maja, Alexander, ZeNan

Instructions: Induce cells ~2 hr before imaging while in exponential phase w/ IPTG (10 concentrations ranging from 1 - 1000 μM)

Measure the stochastic properties of gene expression by comparing fluorescence levels from two identical constructs in the same cell.
Plate1: A7
See Elowitz et al, Science 2002
Linda, Esther, Daniel

Instructions: No induction necessary.