**Week 2: Find Sequence of Interest**

Learning Objectives for DNA Control Element Discovery

*Skills*

* Sign up for your user account (DNA Parts Registry for M Campbell Lab Page)
* Search published papers to find genetic regulatory element of interest

*Cognitive*

* Employ a scientific approach to answering biological questions and test hypotheses.
* Evaluate publications to find a suitable DNA sequence.
* Explain how DNA fragments are cloned.
* Review the information contained within promoters and RBSs.

**Pre-Lab**

Before you come to lab:

1) Create an account on the [Campbell lab wiki page (http://igem.org/Lab.cgi?id=66)](http://igem.org/Lab.cgi?id=66) (top right "login", apply for new account)

2) Listen to this 6 minute information story about synthetic biology: <http://www.npr.org/templates/story/story.php?storyId=90014997>

3) Answer each of these four questions in two sentences or less.

A) What are the -10 and -35 regions of a promoter?

B) What is a plasmid? What parts are essential to its function?

C) What are oligonucleotides (often referred to as oligos)?

D) What is a ribosomal binding site (RBS)? To what does an RBS base pair?

**Information: DNA Control Elements**

In Lab:

1) Watch [movie of restriction enzyme](http://www.dnalc.org/view/15476-Genetic-engineering-inserting-new-DNA-into-a-plasmid-vector-3D-animation-with-with-basic-narration.html) cutting DNA (<http://www.dnalc.org/view/15476-Genetic-engineering-inserting-new-DNA-into-a-plasmid-vector-3D-animation-with-with-basic-narration.html>)

See the [structure of a restriction enzyme bound to DNA](http://bioinformatics.org/firstglance/fgij/fg.htm?mol=1RVC). (<http://bioinformatics.org/firstglance/fgij/fg.htm?mol=1RVC>)

Discuss sticky ends. How do we connect two segments of DNA with compatible sticky ends?

2) Each group will design a unique promoter for use with pClone Red.

Look at the Registry map that illustrates a portion of your receiving plasmid. You will need to read the pClone Red paper (see lab web schedule) to understand how you will modify the existing part to produce a predictable behavior.

3) Identify how a promoter could be designed and tested so that you can compare its actual function with your predicted function. For pragmatic reasons, avoid regulatory mechanisms such as “expose cells to X-rays” or “put cells in space where there is no gravity”, *etc*.

4) Working in your lab group, home in on a DNA sequence of interest. You will want to find a promoter described in a published paper that can be located via PubMed. The only thing each group needs to do today is identify a sequence and make a prediction for its function. You will have more time to work on this next week when you specify the exact DNA sequence you want to test.