

StarCellBio Problem Set Builder Functionality

COURSE

1. What is the name of your course?
2. What course code would you like to provide to your students?

ASSIGNMENT

1. Upload an assignment PDF (While we won't have a text editing feature for instructors to input their assignment, we may have the ability for instructors to upload a PDF of their assignment to be displayed within StarCellBio.)

EXPERIMENTAL SETUP

1. What = experimental setup mode would you like your users to have?
 - ☐ Basic Setup Mode (The user uses checkboxes in the "Add Samples" window to select the treatment protocols for their experiment)
 - ☐ Advanced Setup Mode (The user uses dropdown menus that allows users to manipulate each of the independent variables. We may phase out this setup mode entirely, but it may be default selection when the setup considers more than one option for more than 4 variables (see below))

* Note: We will also want to consider the option of setting up a new experimental setup based off of an already created experimental setup. This would mean that the instructor would potentially have to edit fewer variables.

2. What variables are required in your experimental setup?

Strains

- ☐ Number of strains
- ☐ Strain name

Treatments

- ☐ Number of treatments
- ☐ Treatment name
- ☐ Treatment concentration
- ☐ Temperature
- ☐ Treatment start time
- ☐ Duration
- ☐ Collection time

The instructor will first need to define which of these variables is required for the assignment, and then the instructor will need to define the number and name(s) of all of the options for each selected variable.

In the basic setup mode, all of the various combinations will be computed and displayed to the instructor. The instructor will have the option to have the user select each treatment protocol

or to provide sorting options to sort the list of protocols based on a specific variable, such as strain or treatment.

3. Additional Setup Features

- ☐ Copy (this is available as the default option)
- ☐ Delete (this is available as the default option)

EXPERIMENTAL TECHNIQUES

1. Which experimental techniques are available in your experiments?

- ☐ Western blotting
- ☐ Flow cytometry
- ☐ Microscopy

For each of the selected experimental technique(s), the instructor will then define all of the necessary variables.

A. Western blotting

Sample Prep

1. What lysate types are available to your students?

- ☐ Whole cell lysate
- ☐ Nuclear fractionation
- ☐ Cytoplasmic fractionation

2. Which western blotting analyses are available to your students?

- ☐ Western blot
- ☐ IP-Western
- ☐ Co-IP-Western

If IP-Western and/or Co-IP-Western is/are selected, the instructor will need to define the conditions for those analyses (specifically the name(s) of the antibodies used).

3. Which lysate types, analyses & conditions are available for each of the samples?

Prepare Gel

1. What percentages of acrylamide are available?

- ☐ 10%
- ☐ 12%
- ☐ 15%

Blotting

1. How many primary antibodies are available?
2. What are the names of each of the primary antibodies?
3. How many secondary antibodies are available?
4. What are the names of each of the primary antibodies?

Develop

1. Define the phenotype of all of your samples with each of the antibodies.

The instructor will need to define the size(s) of bands that would appear for each of the samples with each of the antibody combinations. The instructor will also need to define the intensity of each of the bands, but this should have a default value.

2. Would you like background bands to appear?

B. Flow Cytometry

Sample Prep

1. What cell treatments are available to your students?

☐ Fixed cells

☐ Live cells

2. Which flow cytometry analyses are available to your students?

☐ Dye/Stain

☐ Antibody-labeling

3. The instructor will need to define the conditions for each of the selected analyses.

4. Which cell treatments, analyses & conditions are available for each of the samples?

Analyze

1. Define the phenotype of all of your samples for each type of flow cytometry analysis.

The instructor can either select a pre-defined graph or the instructor will need to define the graph by defining the number of peaks, the relative height of each of the peaks, and the x-axis label, for each of the samples.

C. Microscopy

Sample Prep

1. Which microscopy analyses are available to your students?

☐ Dye/Stain

☐ Antibody-labeling IF

☐ Antibody-labeling IHC

☐ Brightfield

2. The instructor will need to define the conditions for each of the selected analyses.

3. Which analyses & conditions are available for each of the samples?

Analyze

1. Upload the image(s) for all of your samples for each type of microscopy analysis.

2. Define whether multiple images exist as options for each sample. (image randomization)

ADVANCED FEATURES

A. Randomization

1. Would you like to create different versions of the assignment for your students?

☐ Yes

☐ No

2. Which randomization mode would you like to use?

☐ Randomize the names of strains (for example) or

☐ Randomize a set of mutants that are provided to your student

3. Would you like to randomize the images that appear in microscopy from a group of potential images?

B. In the Lab features

1. Would you like to customize any of the “In the Lab” features for your assignment?

- We would need to have an option to upload images / write captions as well as insert link(s) to YouTube video(s).

C. Lab Notebook

1. Will students submitting their work electronically from the lab notebook?

☐ Yes

☐ No

2. To which email address should the lab notebook data be sent?