Module 4 Weeks 1-3: Mammalian Cell Culture and Differentiation
Post lab assignment
Due March 11th at 5pm

In Module 4 Weeks 1-3 we worked with 3T3-L1 cells. We examined cell growth, induced the cells to differentiate, froze and thawed cells. Newly isolated or engineered cell lines need to be fully characterized before being used in experiments. Companies like ATCC who bank cell lines provide product reports with their cell lines.

What is a product report?
Product reports are often issued by companies for reagents, kits, or cell lines and describe characteristics and protocols for using their product. Check ATCC website for examples for cell line product reports.

Your task is to write a product report describing 3T3-L1 cells given the data you collected in lab and information covered in lecture. Imagine you are an engineer at a biotech company who first isolated and studied 3T3-L1 cells. You need to provide documentation to other scientists who will use these cells.

Your report should include the following sections with supporting data collected in lab:

- **Description of 3T3-L1 cells.** Brief description of 3T3-L1 cells that was covered in class (what type of cell, what species, differentiation behavior (you do not need to use additional information about the cells if we did not cover it in class))

- **3T3-L1 characteristics.** Cell characteristics, including doubling time (see below), morphology, adherent vs nonadherent, etc

- **Protocols for working with 3T3-L1 cells.** Generalized culture conditions and subculture protocol based on the protocols we used in lab. Generalized protocols for freezing, thawing, and differentiating 3T3-L1 cells based on the protocols we used in lab. Unlike a normal product report, please include the purpose of the steps in your protocol. For example: “The PBS wash is used to remove any dead cells and remove serum proteins that would inactivate the trypsin.” This is great practice for your lab practical.

- **Uses of 3T3-L1 cells.** Based on your data, propose what research area(s) and experiments 3T3-L1 cells are well suited for and why.

Separate from the product report, please perform and include the following analysis as part of your assignment:

**Calculating Doubling Time:**

Data you will collect during Module 4 Week 1 lab:
– 3 pictures of each of 3 plates at hours ~24, 48, 72. Calculate an average per time point per plate using either confluency (%) or cell number(cells/area). Explain which you used and why.

– Seeding and ending cell counts for each plate. Create a graph comparing how the initial seeding density affected cell growth. Give reasons why you think this may be the case.

Given this data, estimate the doubling time for 3T3-L1s and explain how you determined it. Compare your estimated doubling time to published literature.

Guidelines for analysis using ImageJ are posted on the course website.

**How to Use References**

Be sure to cite your references!

Number references at end of report and cite with number within report (reference 1 at the end of the report should be the first reference you cited, reference 2 should be the second reference you cited, etc.) Any reference style is acceptable but you must be consistent.

Example:

In the text of your report:

“3T3-L1 cells are a substrain of 3T3s that have been shown to differentiate into adipocytes under controlled conditions (1).”

In the reference section:

(1) Author list. Journal. Date. etc (order and format depends on style chosen)

Citation managers (EndNote, etc) are highly recommended.