Analysis of Glucose Uptake and Doubling Time in Breast Cancer Cells

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Introduction

The Graham Lab utilizes published data depicting 46 individual breast tumor cell lines. The 46 breast tumor cell lines were closely studied to analyze the metabolism of the breast cancer cells. If our research is successful, we can use the info to develop a target-based treatment for one.

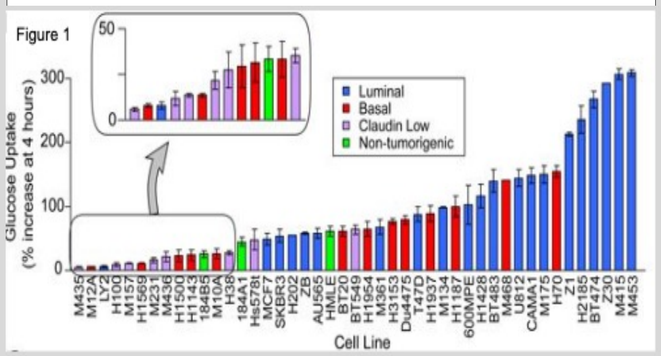


Figure 1: Bar graph with all 46 breast tumor cell lines. . (Timmerman THE, and al. Cancer Cell. 2013.)

Objective & Impact of Professor's Research

-The objective of the research was to run the correlations between glucose uptake and doubling time for each molecular subtype of breast cancer. Even though no correlations were found to be significant, the drastically different rates of glucose uptake across the breast cancer cell lines are motivation to study why these breast cancer cell lines have such different metabolism. For example, M436 and M453 have very different rates of glucose uptake even though they are both triple-negative breast cancers and have similar doubling time.

-This research could impact millions of lives. As we learn and better understand breast cancer metabolism, we can identify vulnerabilities within the tumor itself. These vulnerabilities can be a benefit to finding therapeutic targets that can be used to develop therapies to more than 75% of breast cancer patients who do not have targeted therapies.

Skills Learned

This summer was open for opportunities to expand from what I already know. It was very fun to learn new things that I was introduced to such as:

- Utilizing R Software online to create a correlation table and a scatter plot using the grey lab data

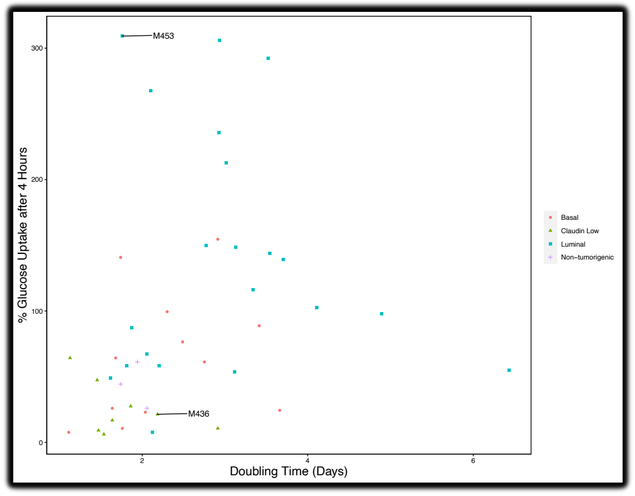
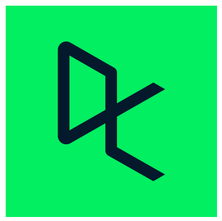


Figure 2: Scatter plot created using R Software Online

Subtype	Correlation Type	Correlation Estimate	p value	N
Basal	Pearson	0.2820	0.375	12
Claudin Low	Pearson	−0.4984	0.209	8
Luminal	Pearson	−0.0737	0.751	21
Non−tumorigenic	Pearson	−0.3844	0.749	3
Basal	Spearman	0.3636	0.245	12
Claudin Low	Spearman	−0.3571	0.385	8
Luminal	Spearman	0.0747	0.748	21
Non−tumorigenic	Spearman	−0.5000	0.667	3

Table 1: Correlation table created using R Software Online`

- Completed DataCamp: Intro to R Basics
  - Vectors
  - Matrices
  - Factors
  - Data Frames
  - Lists



- Successfully completed MATLAB training course
- Completed LabXchange laboratory simulations that taught me how to pipette and how to run a protein gel
- Completing Lab Safety Training

Results

-Upon examination of the cell line metabolism no significant
-Cells showed no significant correlation that indicated the cause of growth being caused by amount glucose being consumed.

Next Steps

- Target Enzymes with the most flux to see if they could be viable candidates for target therapies
- To test whether two breast cancer with different glycolysis rates have different regulatory nodes
- To study the enzymatic regulation of glycolysis in breast cancer cells
- Increase enzyme expression and metabolomics.

Advice for Future SHINE Students

Shine is an amazing opportunity that I was given to partake in. For many other people, it may be true for them too. So, take advantage of every single event. Whether it is a cohort meeting or a meeting with your mentor or an optional event, there is always an opportunity to be taken. Talk to the hosts or mentors. You might just find something motivating or a chance to be taken in doing so.

My STEM Coursework

In SHINE, so much was covered that will be used in my career down the line, such as:

- Reading Scholarly literature and interpreting it to analyze and use in my own way when needed
- Learning how to micropipette and run a gel electrophoresis. I know I will need these skills when I am in a lab setting and doing certain research that requires this kind of training.
- Learning and successful passing Lab Safety Training to be mindful and know what occurs in a lab to be safe at all times.

Acknowledgements

I would love to thank Dr. Graham and Belinda Garana for sharing and allowing me to partake in their research. I would like to thank Ms. Matos and Ms. Ross from HPIAM for allowing me to take this opportunity.