Background: People with diabetes are prone to fungal infection (Figure 1).

Antidiabetic medicines alleviate the disorder but can increase susceptibility.

Aim: To define the effect of of anti-diabetic drugs metformin and PTP1B inhibitor (Figure 2) on growth and hyphal formation of common fungus of C.albicans

Hypothesis: 1. Metformin and

PTP1B enhance C. albicans | growth and hyphenation

2. Infections with Candida are caused by impaired immune system of Type II|

Diabetes patients|

Methods

Figure 1 candidiasis in diabetic patients

Figure 2 Mechanism of action of anti-diabetic drugs

RESULTS

0м Metformin 40x 24h

20 mM

6 uM

Metformin

Average CD ct CJabicars of tour MITT Assay

PTP1B

Rusrage 00 of C.Alsicans of four MTT Assary with

Average largth ct Hyphye at 24 he is Metformin

Conclusion: This project shows that Metformin potentially does not have any effect on C.albicans growth and hyphae development and the increase in infections observed with this drug is more likely to be related to effects on the immune system. PTP1B Inhibitors can increase the growth and hyphal length of C. albicans so may increase the susceptibility of prescribed patients. Further studies need to be concluded to validate the results for these medications.

Overview of my research experience

This project aimed to compare the effects of different anti-diabetic medicines on the growth of the opportunist pathogen Candida albicans using growth curve assays and microscopy measurement analysis. Metformin was chosen as a commonly prescribed drug for type 2 diabetes and PTP1B inhibitors are in clinical trials for type 2 diabetes, and an upcoming therapeutic. The project was related to a similar project in the lab observing the effect of drugs on immune cells and the susceptibility to Candida albicans infection. I had a chance to learn and observe isolation/culture of human blood-derived macrophages, Candida albicans culture, macrophage phagocytosis, killing and MTT assays and detailed microscopy work with the use of Imagel software which I used for measuring the length of Hyphae. I did not have enough time to learn qPCR analysis of immunometabolic genes in breast cancer, but I had a chance to observe it performed by a PHD student. I received an extensive training in experimental design, data analysis, time, and data management. One thing I did not do properly (because I always put it off for another time) was proper lab book management and keeping everything up to date what was clearly asked of me many times by my supervisor, and I would not make that mistake again as see how crucial this is. I had a chance to attend different seminars that allowed to learn basic understanding of how research work. I was exposed to software called R that researchers use for data analysis, but it was only brief introduction for future statistics. I also learned how to keep a properly organized lab book, but I did not put that knowledge to practice yet. I also learned how to properly present data concluded in any performed experiments and how to interpret them to get the best results for publications. I have learned a lot about independent work as my day-to-day Supervisor Sam allowed me to work with Candida albicans by myself when he felt I was competent enough to perform cell count, microscopy work and MTT assays. It taught me how to prioritize and manage my time properly under time pressure of just 8 weeks project. With the time constraint I was able to get enough data to conclude that two of the anti-diabetic drugs used in the experiments had slightly different result on Candida albicans growth and hyphae length. I feel I was given enough freedom and opportunities to learn what it means to work in a lab research environment without pressure of doing as many experiments as possible, so I felt comfortable while still being challenged on my understanding of this fungi in Diabetic patients. I also embraced literature searches to better understand the hypothesis and to interpret the results and put my work in context of others. It was also good to experience how to prepare posters and write up a report for my supervisor. I would never be able to learn as much as I learned on this placement, and I am extremely grateful for that. I appreciate the fact that the funding was provided as well as I would not be able to do it without it. I feel much better prepared for a scientific career after my experience and thank Eastbio for providing funding to give me this opportunity.