

## Poster 2

### Investigating the influence of human serum albumin concentration on (Z)-4-hydroxytamoxifen treatment of ER positive breast cancer

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#### Purpose

Serum albumin is a major facilitator of drug transport. However, little is known about the interactions between serum albumin and (Z)-4-hydroxytamoxifen (4OHT) during treatment. The purpose of this study is to explore the influence of serum album concentration on 4OHT's effectiveness in treating ER positive breast cancer.

#### Methods

A pumping system that mimics the circulatory system and blood flow of organs in a mouse has been designed. Two peristaltic pumps were used; one that acts as the liver/kidney elimination system and another that acts as the diseased tissue blood flow, all connected by silicon tubing. A T-25 cell flask acts as a cell compartment that allows for diseased cells to be added into the system. Two parallel systems were used under identical conditions; one is treated with a drug, while another acts as a control.

Once the pumping system was running with cell culture media (no cells), injections of 56  $\mu$ L 4OHT (5 mg/mL) were performed daily to identify the ideal pumping rates to yield the correct half-life of the drug. A daily injection of 56  $\mu$ L 4OHT was given and 10  $\mu$ L samples were taken every 30 minutes to 1 hour. To prepare a sample for LC-MS analysis, 190  $\mu$ L water and 400  $\mu$ L acetonitrile with internal standard were added to the 10  $\mu$ L sample. The mixture was then vortexed at 2000 RPM and centrifuged at 15,000 RPM for 30 minutes. 100  $\mu$ L of supernatant was transferred to a total recovery vial, labeled with the collection time, and analyzed via LC-MS.

MCF-7, ER positive breast cancer cells were seeded into the T-25 flasks and placed into the system (2g/L serum albumin). A daily injection of 112  $\mu$ L 4OHT was injected for 3 days in the experimental system. The control system received blank injections. The crystal violet staining assay was performed to assess the cell viability of the treated and non-treated cells.

#### Results

The LC-MS data shows the 4OHT concentration in the system when the sample was collected. The data were plotted, and the half-life was derived from the slope of the line as being around half a day. The optimal flow rate was determined to be 0.05 mL/min for the elimination pump and 1 mL/min for the diseased tissue pump. Upon analysis of the crystal violet staining assay, there was less MCF-7 cell survival in the 4OHT treated cells, proving that the system was successful in administering the treatment and the treatment was effective in killing the MCF-7 breast cancer cells.

#### Conclusion

This fluidic system has proven to be suitable in testing treatments with cells and successful in mimicking the circulatory system of a mouse. Further studies include repeating experiments at various concentrations of serum albumin to determine its influence on 4OHT treatment of ER positive breast cancer.

**Keywords:** serum albumin, (Z)-4-hydroxytamoxifen, ER positive breast cancer