Ethanol Ablation to Treat Cervical Pre-Cancer

Maya Budzinski
mayabudz@umd.edu
Bioengineering
Science Discovery and the Universe

How can ethanol ablation be optimized as a cervical pre-cancer treatment?

Research Context

Invasive cervical cancer is very preventable through proper detection and treatment of cervical pre-cancer. However, in low-middle income countries (LMICs), many of these methods are not available, leading to a higher morbidity rate in these regions.
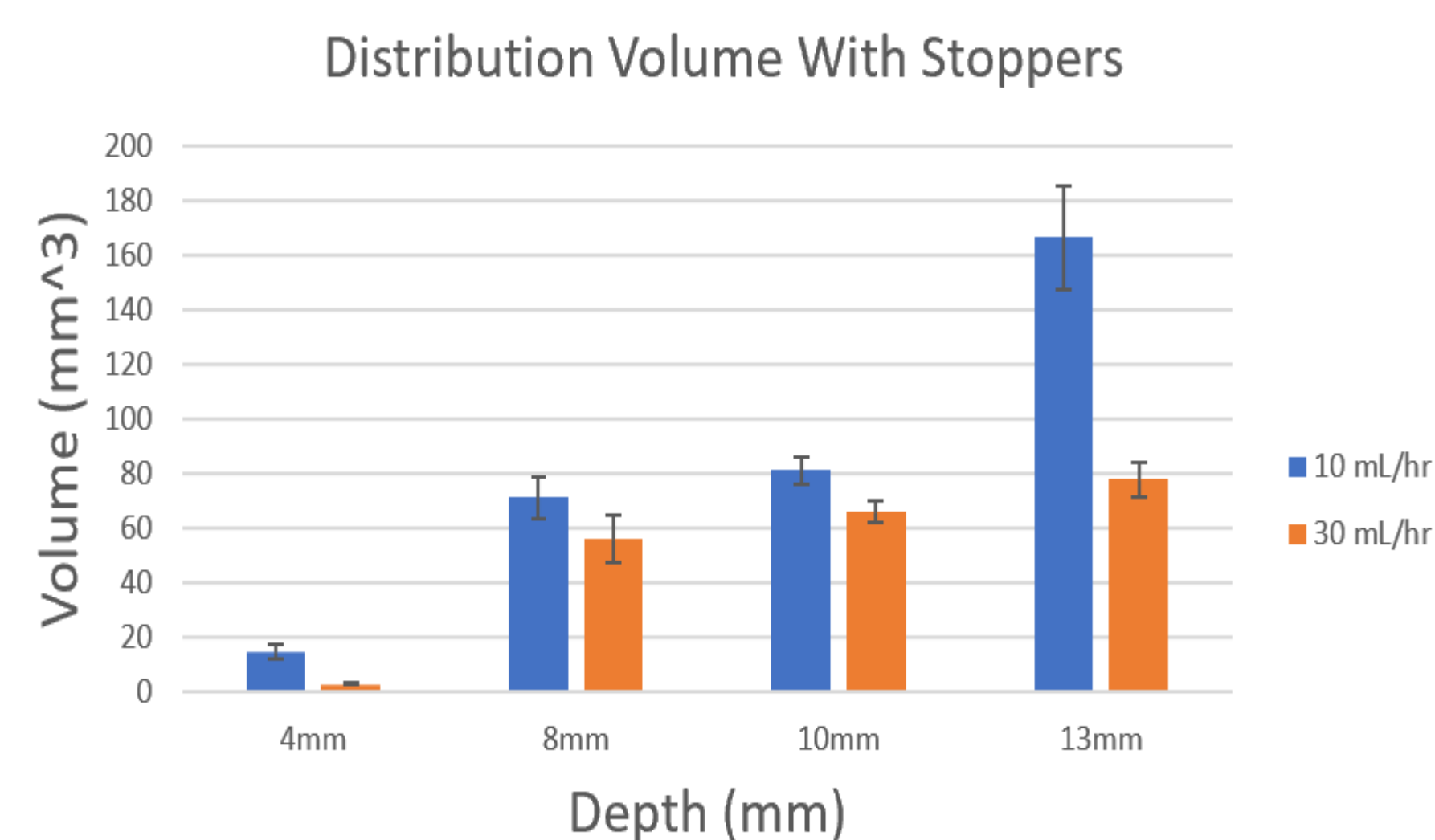
The Mueller Lab is developing a low-cost laparoscope as well as an accessible treatment technique based on ethanol ablation.
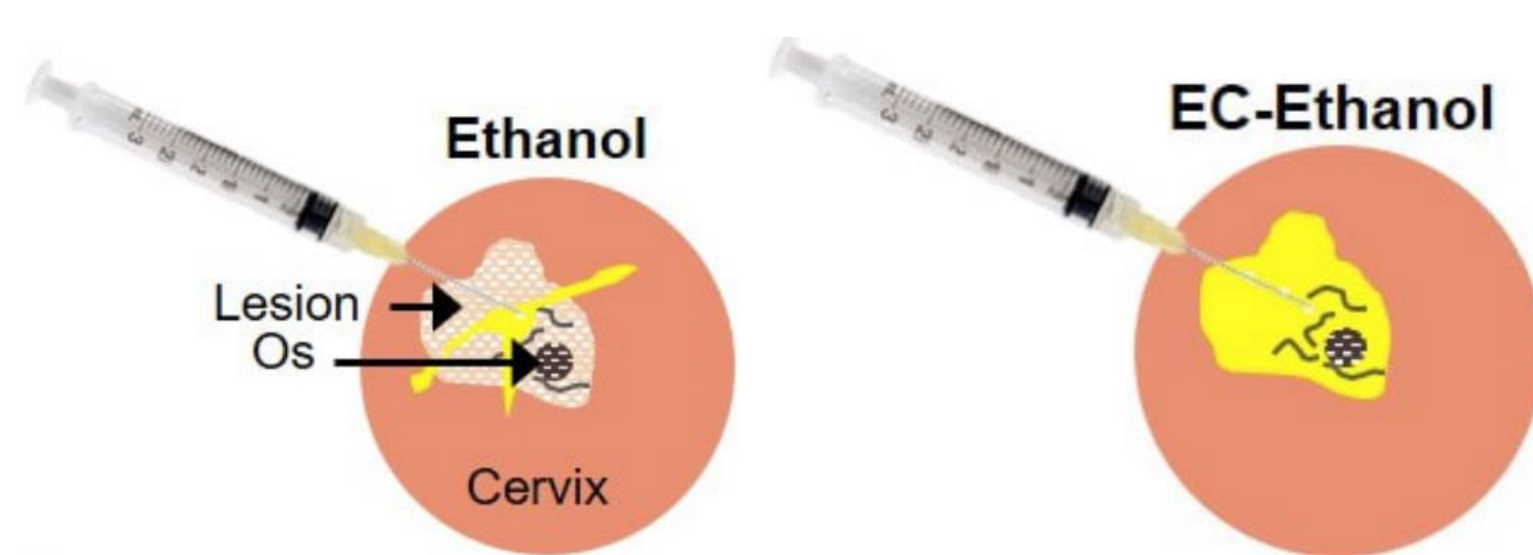
Future Research

The project will continue to animal trials in the summer as well as testing with different types of needles such as blunt tip and smaller gauges.

### Data/Analysis

Distribution Volume With Stoppers

There was a positive trend with distribution volume and injection depth.

Methodology

To improve the efficiency of ethanol ablation, ethyl cellulose (EC) is added to increase the viscosity and decrease leakage into healthy cells. We inject the dyed EC-ethanol mixture into agarose gels to measure the distribution volume using a Matlab program.

To optimize distribution volume, I test different injection parameters such as insertion depth and injection speed.
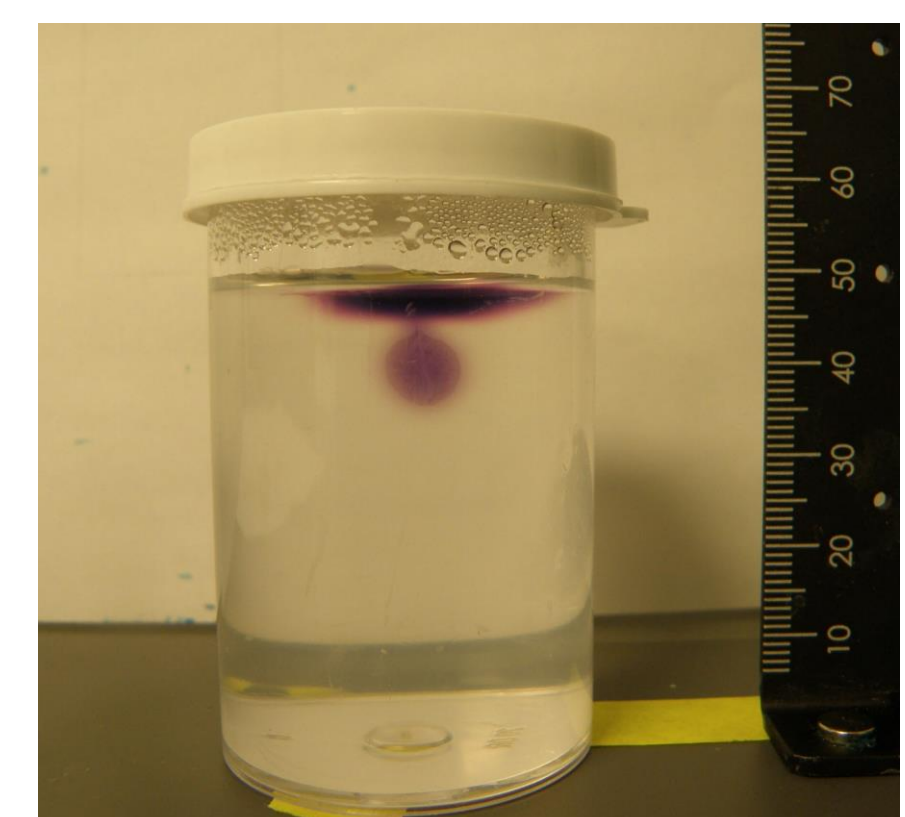
Conclusions

The large increase in distribution volume that occurs from 10mm to 13mm depth at 10 mL/hr shows that these parameters are optimal for a large distribution volume. Through observations, it is evident that this is due to a decreased amount of backflow (EC-ethanol leaking back out of injection site) with increased depth. It is important to note that the jump from 10 to 13mm is much more significant than other depths, and that after 13mm, backflow is avoided to a similar extent. It can be concluded that deeper injections can prevent larger amounts of backflow and are more optimal than shallower depths.

Acknowledgements

I would like to thank Dr. Jenna Mueller, who is the professor in charge and my mentor for this project.