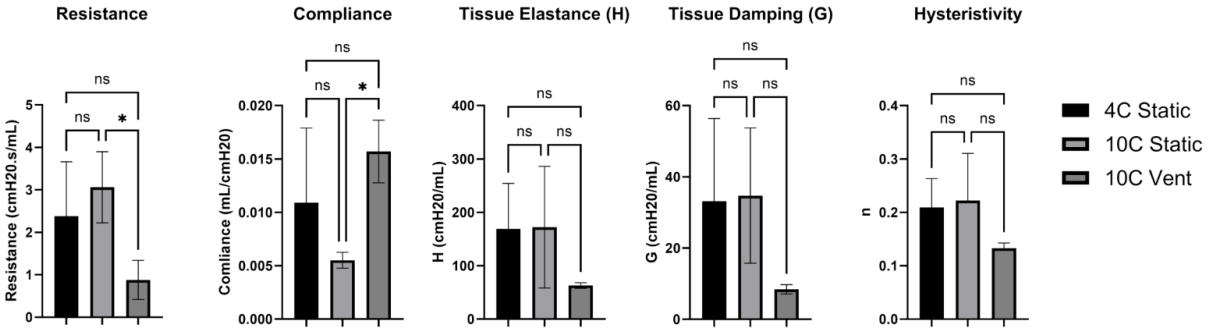
Evaluation of Lung Function in an Ex Vivo Murine Model using flexiVent Technology

D. Bailey Watts, BS, Morgan A. Hill, MD, Megan Tennant, PhD, Richard O'Neil, PhD, Barry C. Gibney, DO

Introduction: Respiratory mechanics are a key area of study when defining and treating lung pathologies and assessing donor lungs for lung transplantation. Various oscillatory waveforms are computated and analyzed to provide a detailed report of the subject's overall lung function, including resistance, compliance, elastance, tissue damping, and tissue elastance. The present protocol serves as the first of its kind and details a stepwise method of assessing respiratory mechanics using an **ex vivo** murine model that is both comprehensive and reproducible.

Methods: Lungs were procured from C57Bl/6 mice by standard protocol. Lungs were stored for 24h in 4°C and 10°C. The following morning, respiratory mechanics were conducted on each pair of lungs using the flexiVent system. Lung resistance, compliance, tissue damping, and hysteristivity were recorded.

Results: Our preliminary data shows that donor lungs stored at 10°C were found to perform better than all groups stored at 4°C in all parameters. In the 10°C storage groups, the donor lungs were found to have a significant decrease in resistance, a significant increase in compliance, and trends toward decreased tissue elastance, tissue damping, and hysteristivity. This preliminary data demonstrates the efficacy, efficiency, and reproducibility of flexiVent technology in studying the respiratory mechanics and lung function of ex-vivo donor lungs.



Conclusion: Ex vivo donor lungs can be stored and assessed using the flexiVent system to analyze respiratory function of donor lungs prior to lung tranplantation. The preliminary data supports storage at 10°C in comparison to the standard of care static cold storage at 4°C.