

Intertumoral Oxygen Dynamics Precludes Pre-Irradiation Hyperbaric Oxygen Therapy from Improving Tumor Control in a Murine Glioblastoma Model

Session: Therapy SNAP Oral: Radiation Biology, Modelling and Measurement

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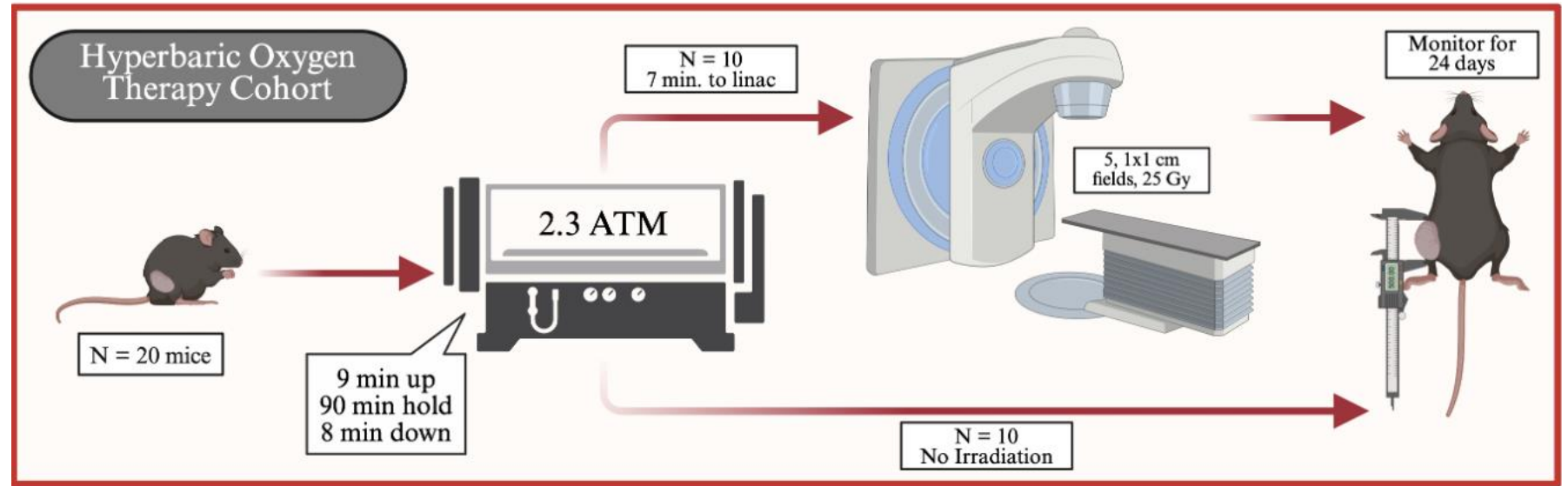
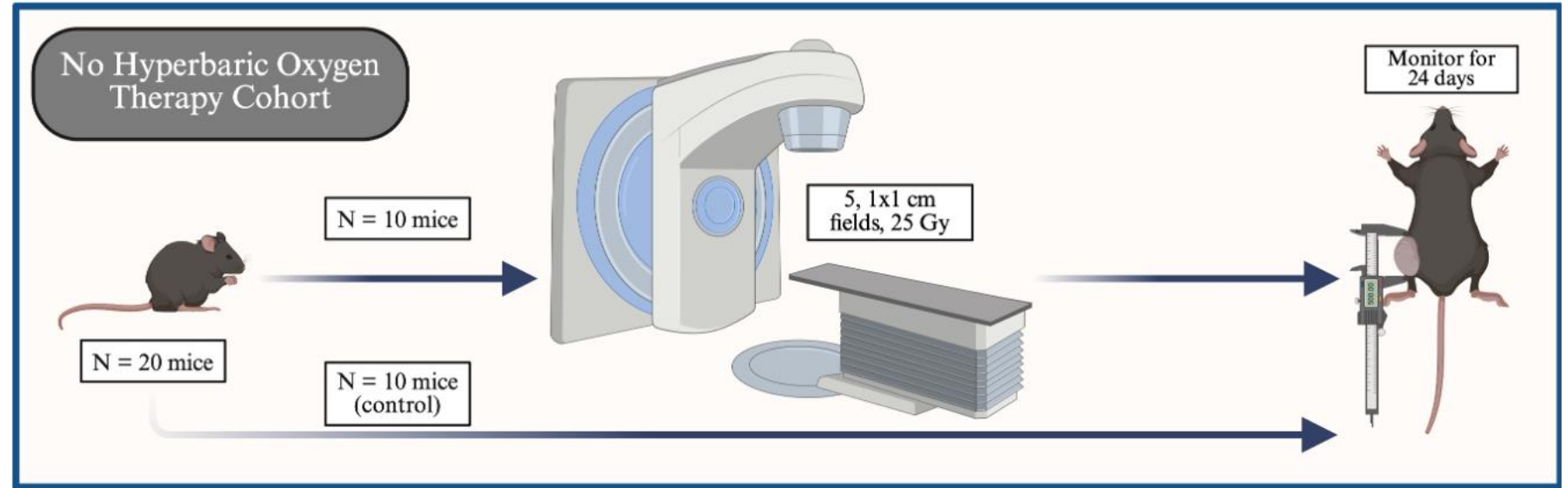
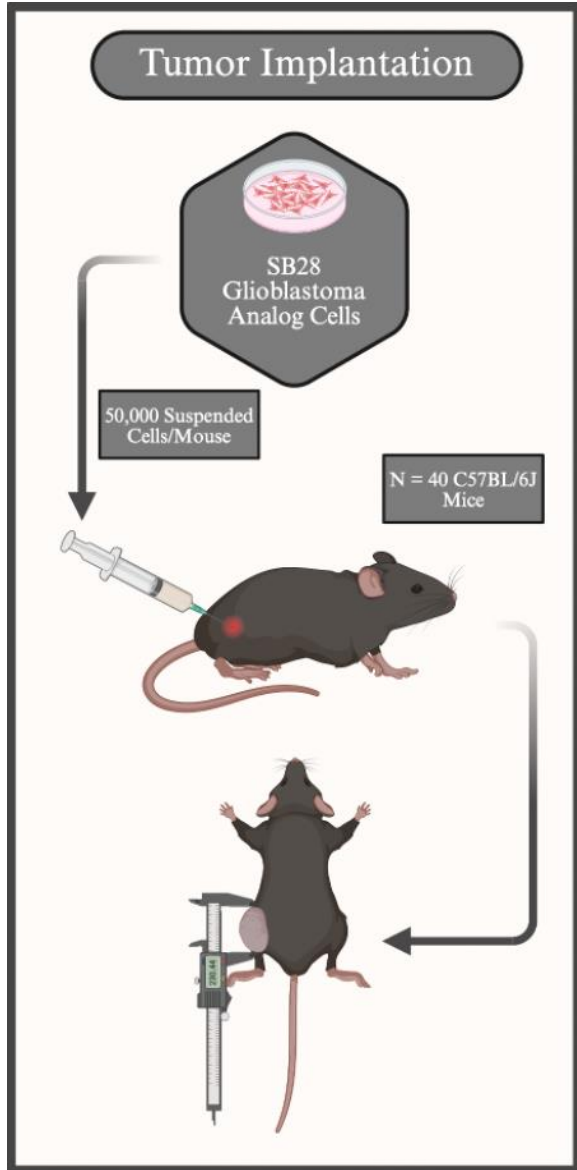


Disclosures

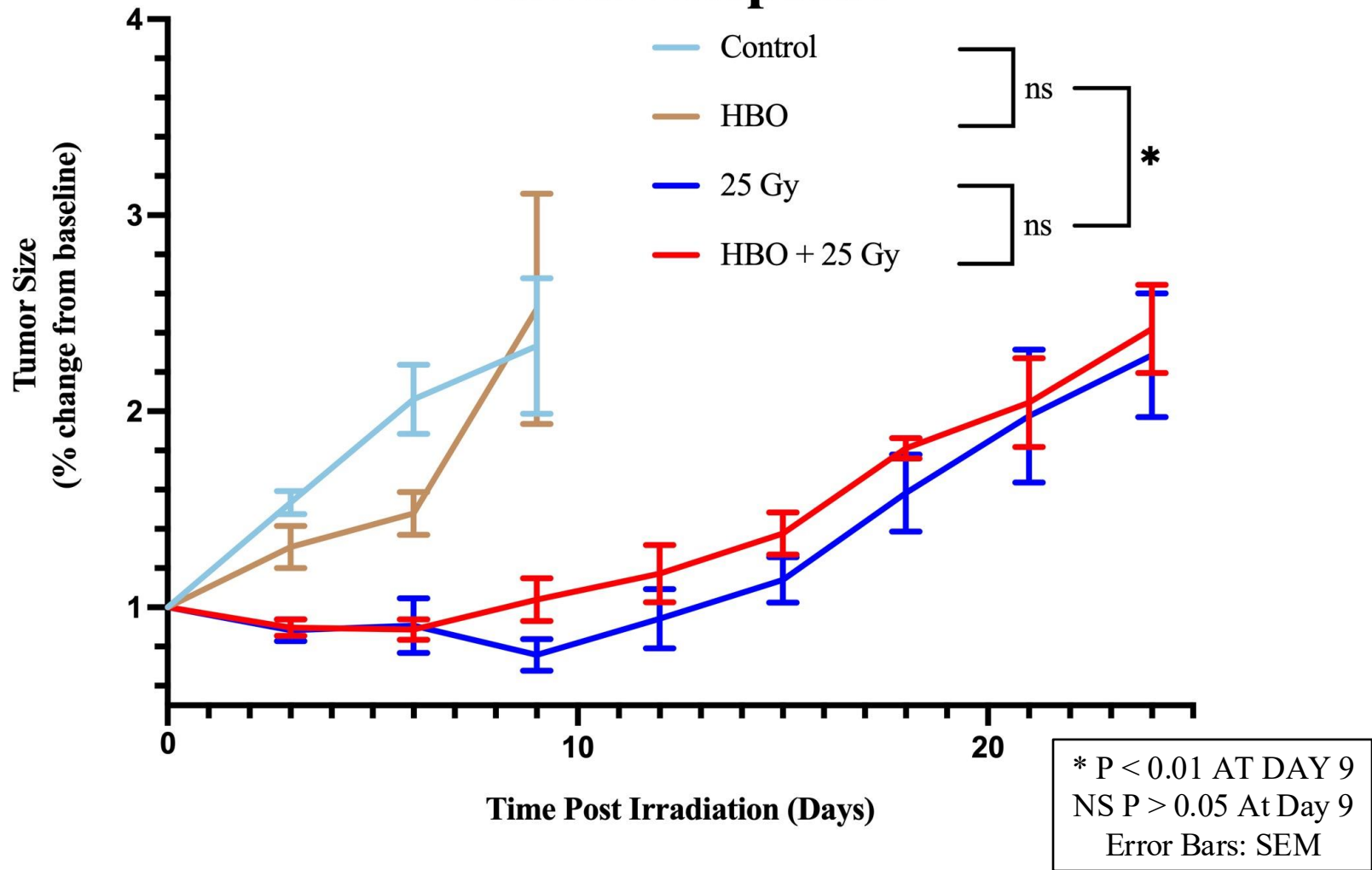
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Purpose and Background

- Hyperbaric oxygen therapy (**HBOT**) is used to increase plasma pO₂
- Used in: CO poisoning, decompression sickness, chronic wounds, post-irradiation side-effects (Meier et al., Geldof et al., Bennett et al.)
- Oxygen enhances radiation damage; **clinical trials have demonstrated feasibility of neoadjuvant HBOT (Buckey et al.)**



Tumor Response





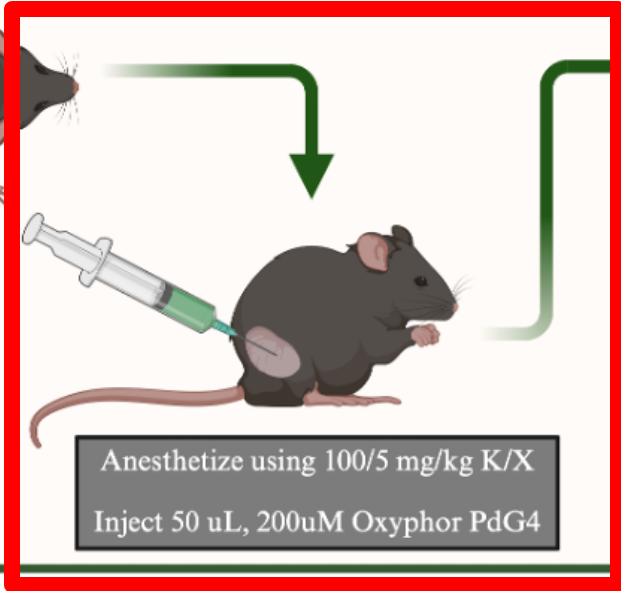
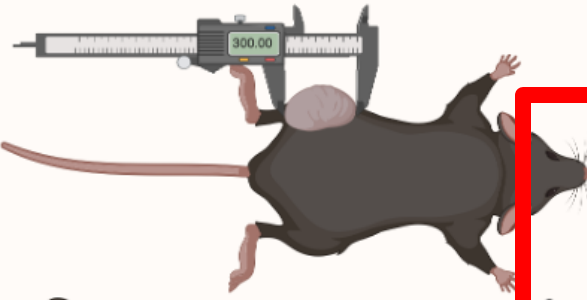
SB28
Glioblastoma
Analog Cells

50,000 suspended cells per-mouse
intra-dermal injection



N = 10 C57BL/6J Mice

Grow tumors to size (100-500mm³)

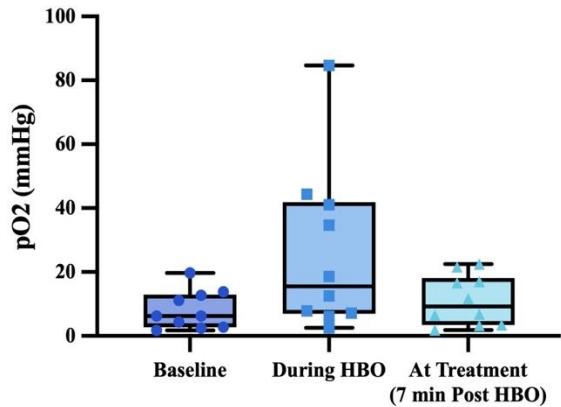


Anesthetize using 100/5 mg/kg K/X
Inject 50 uL, 200uM Oxyphor PdG4

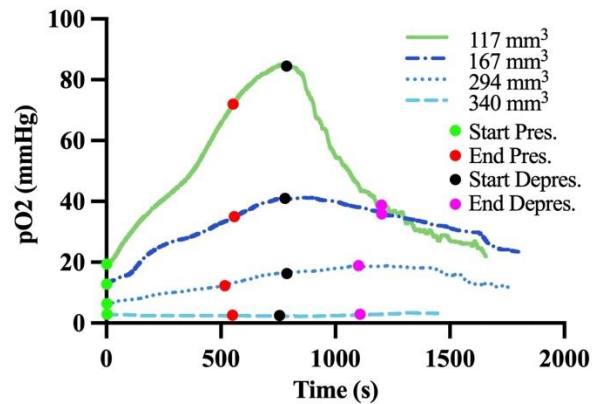
OxyLED used to measure pO₂ during
pressurization, at pressure (2.3 atm), and
depressurization via custom pass-through



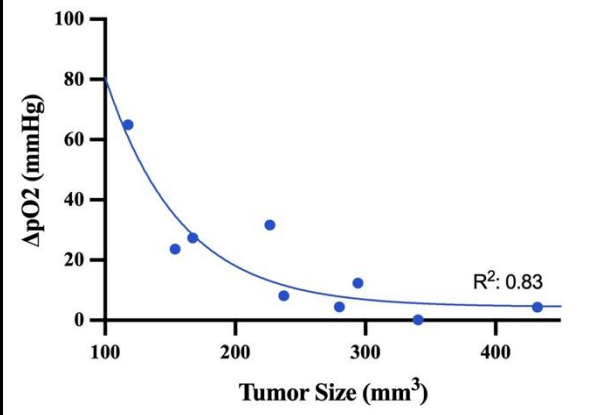
Tumor pO₂ Response



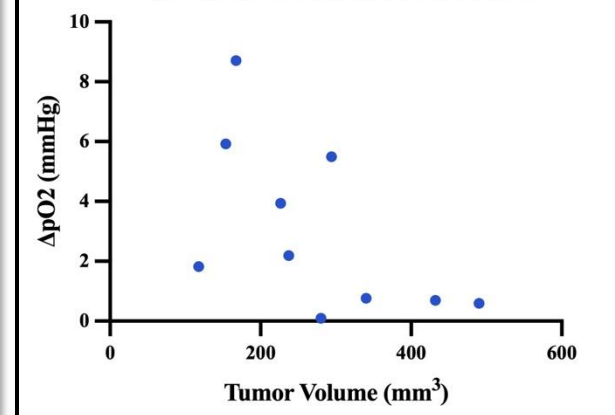
Oxygen Saturation Across Sample Volumes



Δ pO₂ (at HBO - Initial) vs. Tumor Volume



Δ pO₂ (Post - Initial) vs. Tumor Volume



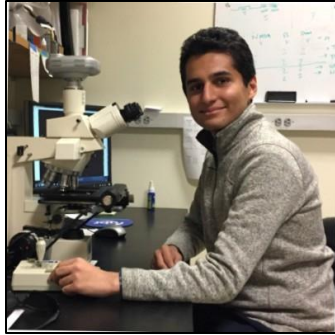
Conclusions

1. Our molecular oxygen reporter has allowed us to gain an insight into the dynamics of oxygenation prior to, during, and post HBOT
2. HBOT may vary pO₂ elevation effect based on solid tumor volume, with larger tumors having lower ΔpO_2 during and after HBOT
3. Mice return to relatively normoxic conditions upon leaving the chamber and being transported to the linear accelerator (**within 7 minutes**)

Acknowledgements and Team



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Contact Information (LinkedIn)



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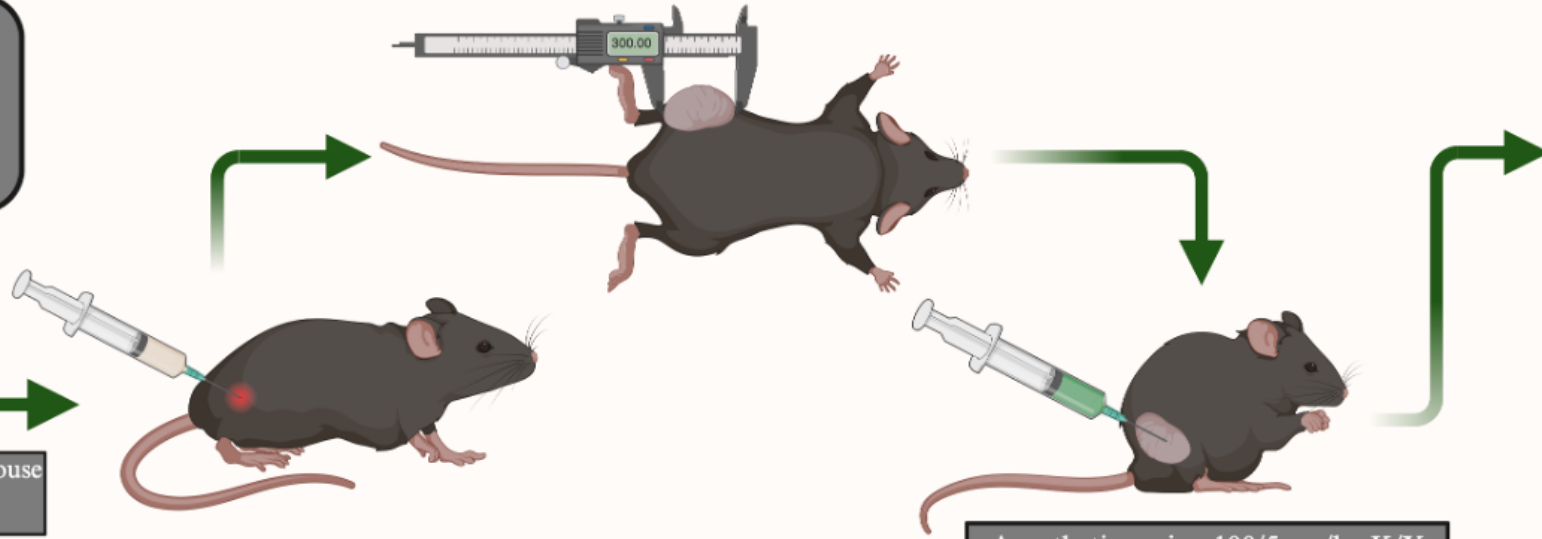


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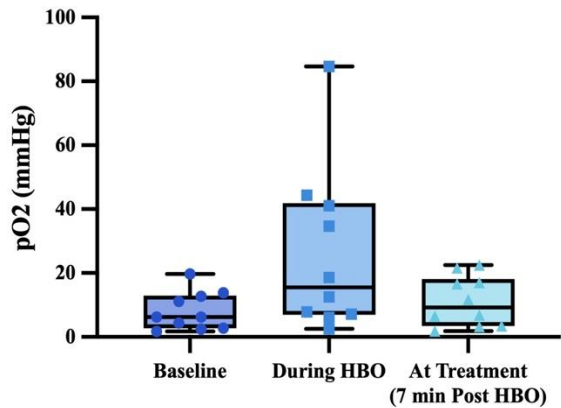


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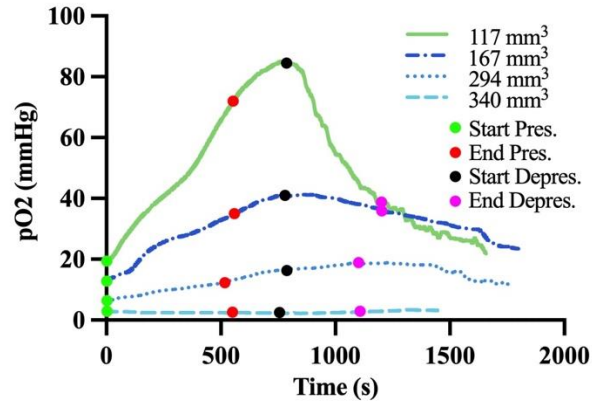
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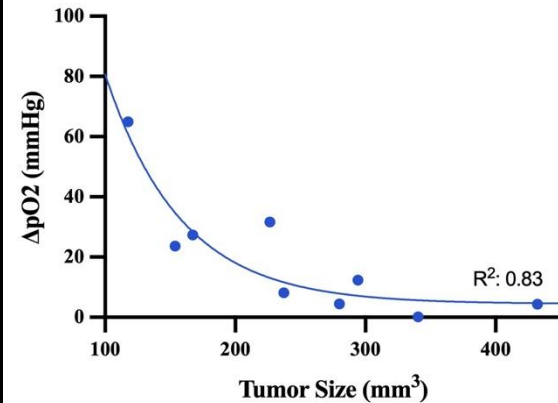
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