

Evaluation of a Non-Hemoglobin Oxygen Carrier (OMX) in a High-Volume Exchange Transfusion



Non-Disclosure



No conflict of interest to disclose.



Overview

 Background: OMX is a Non-hemoglobin-based oxygen carrier

 Methods: Rat exchange transfusion protocol

 Results: Cardiovascular response, oxygen delivery, metabolic profile

 Conclusions

Background: OMX

OMX is a novel non-hemoglobin based oxygen carrier.

OMX is an H-NOX protein, a unique family of hemoproteins that is naturally occurring in multiple organisms from bacteria to humans, that has been trimerized and PEGylated

H-NOX proteins have tunable oxygen binding affinity and low nitric oxide reactivity

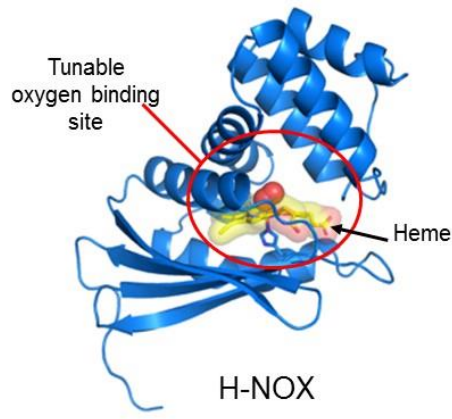
OMX demonstrates a favorable safety profile and pharmacokinetics in small and large animal models of disease

OMX directly oxygenates severely hypoxic tissues and improves outcomes in large animal models of global hypoxemia and controlled hemorrhagic shock

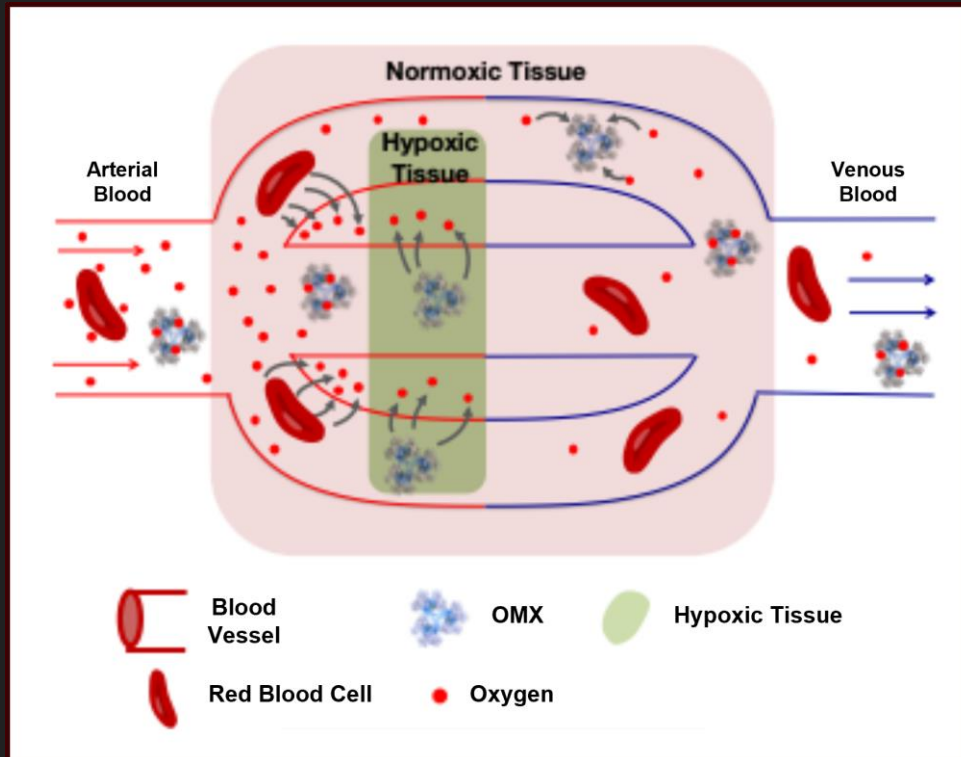
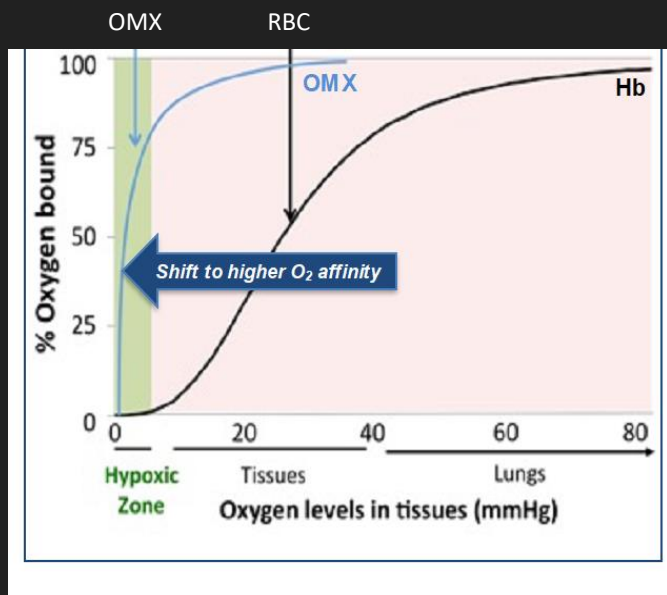
OMX holds promise as a bridge to transfusion in austere pre-hospital environments.

OMX-4.80P Lead Drug Candidate

- ~125 kDa PEGylated hemoprotein trimer
 - Engineered H-NOX domain
- Tuned to release oxygen at low tensions
 - Does not release O₂ in normoxia
 - Stable O₂ binding, unlike globins
 - Non-vasoactive
- Pharmacokinetic profile
 - 18-20 h half-life in rodents,
 - 30-40 h in dogs/NHPs;
 - ~42-44 h in humans
 - Linear PK, limited volume of distribution



Background: OMX in Resuscitation



Methods: Experimental Overview

Assessment of OMX in sustaining blood function and addressing peripheral hypoxia

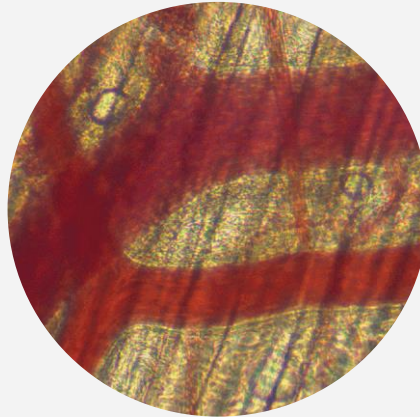
SD Rats

Male, ~225g
40% Isovolemic Exchange Transfusion



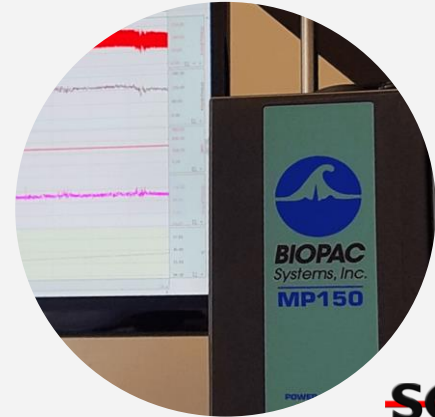
Microscopy

Intravital and Phosphorescence Quenching
(Vasoactivity & Interstitial Oxygenation)



Physiology

Hemodynamic and Blood Chemistry



Methods: Surgical Preparation

Anesthesia

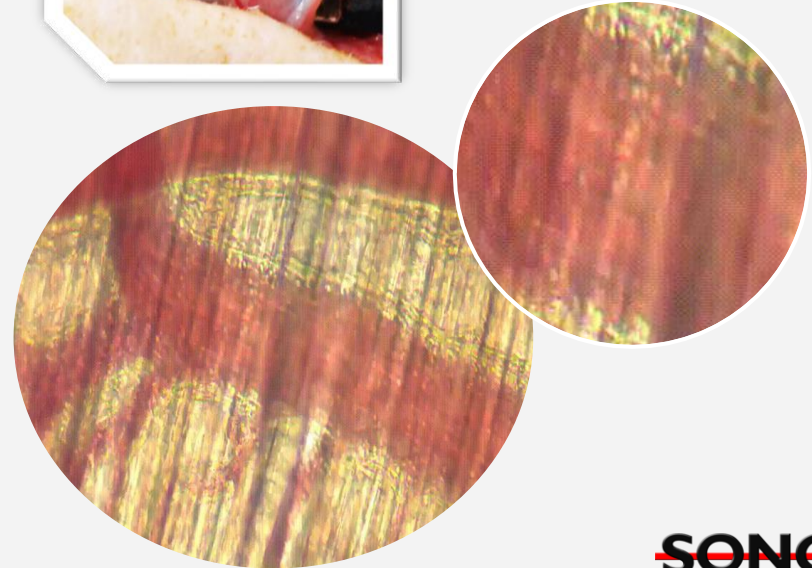
- Isoflurane (induction to anesthesia)
- Alfaxan (primary)
 - CIR IV infusion with minimal impact on cardiovascular metrics
 - Depth assessed for maintenance of anesthetic plane by toe, and heel reflexes

Tracheal Intubation

- To maintain airway patency

Cannulations

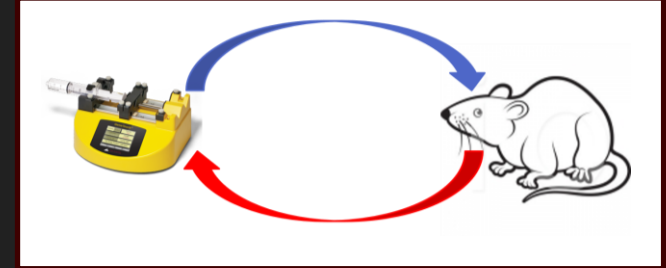
- Arterial lines (e.g., carotid and femoral)
- Venous lines (e.g., jugular and femoral)



Experimental Protocol

Exchange Transfusion; 40% of Total Blood Volume with Test Article

- Rate controlled/ Volume targeted
- 1.0 ml/kg/min
- Simultaneous blood withdrawal and Test Article infusion



Groups N=10

- 1) Normal Saline – Low oncotic pressure (COP), no oxygen carrier
- 2) OMX – High COP, oxygen carrier

4 Hour Observation Period

BL

ET₀ w/ NS

ET₁₂₀ w/ NS

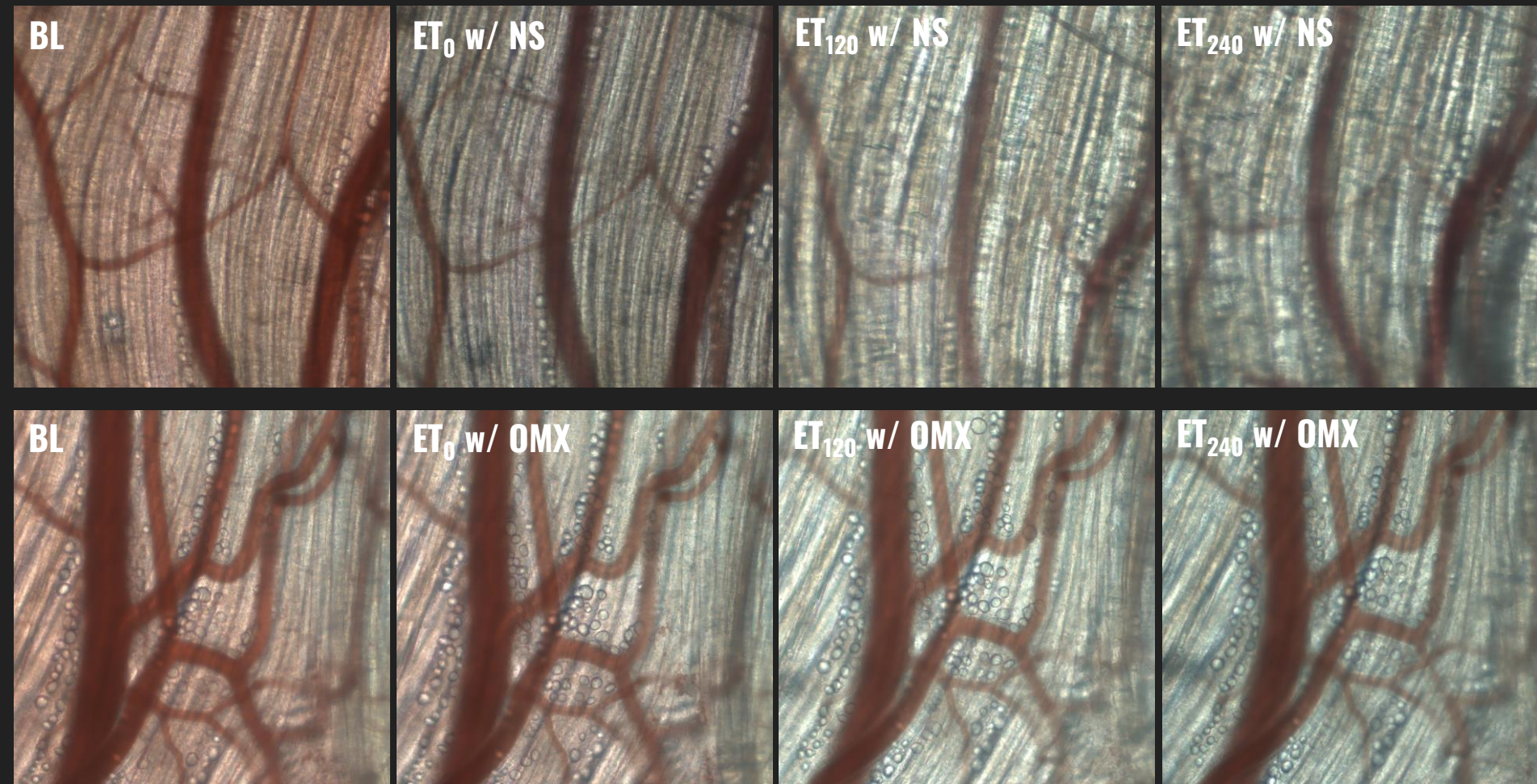
ET₂₄₀ w/ NS

BL

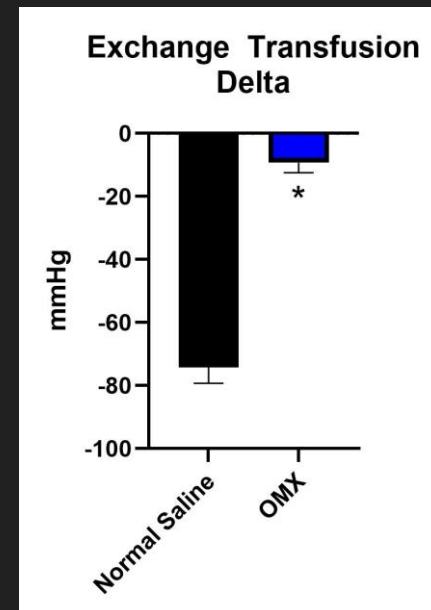
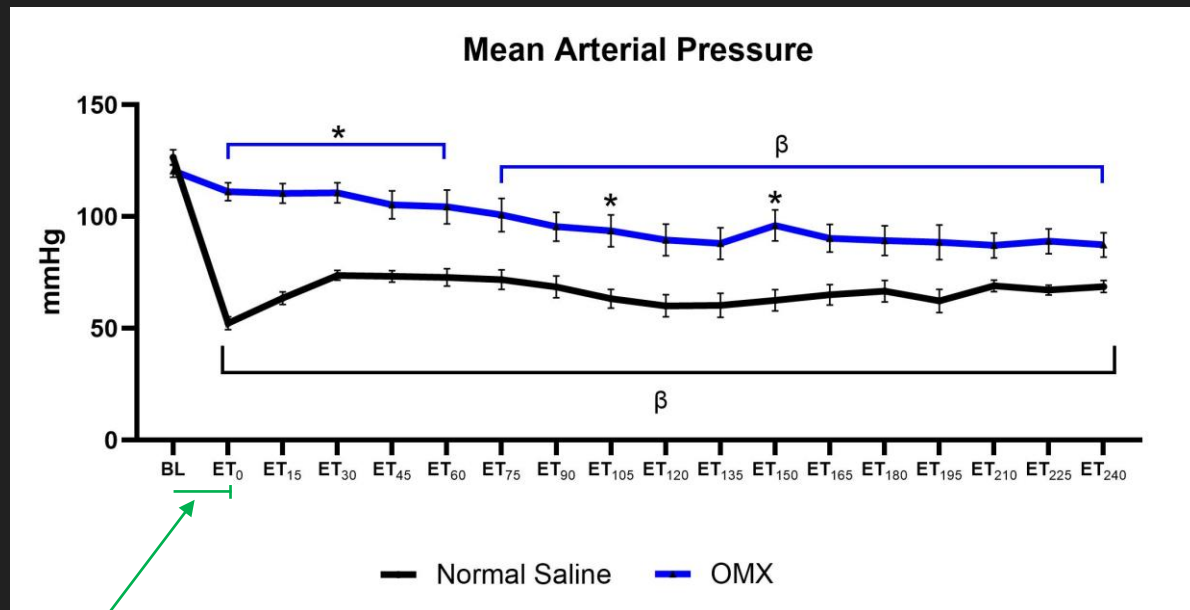
ET₀ w/ OMX

ET₁₂₀ w/ OMX

ET₂₄₀ w/ OMX



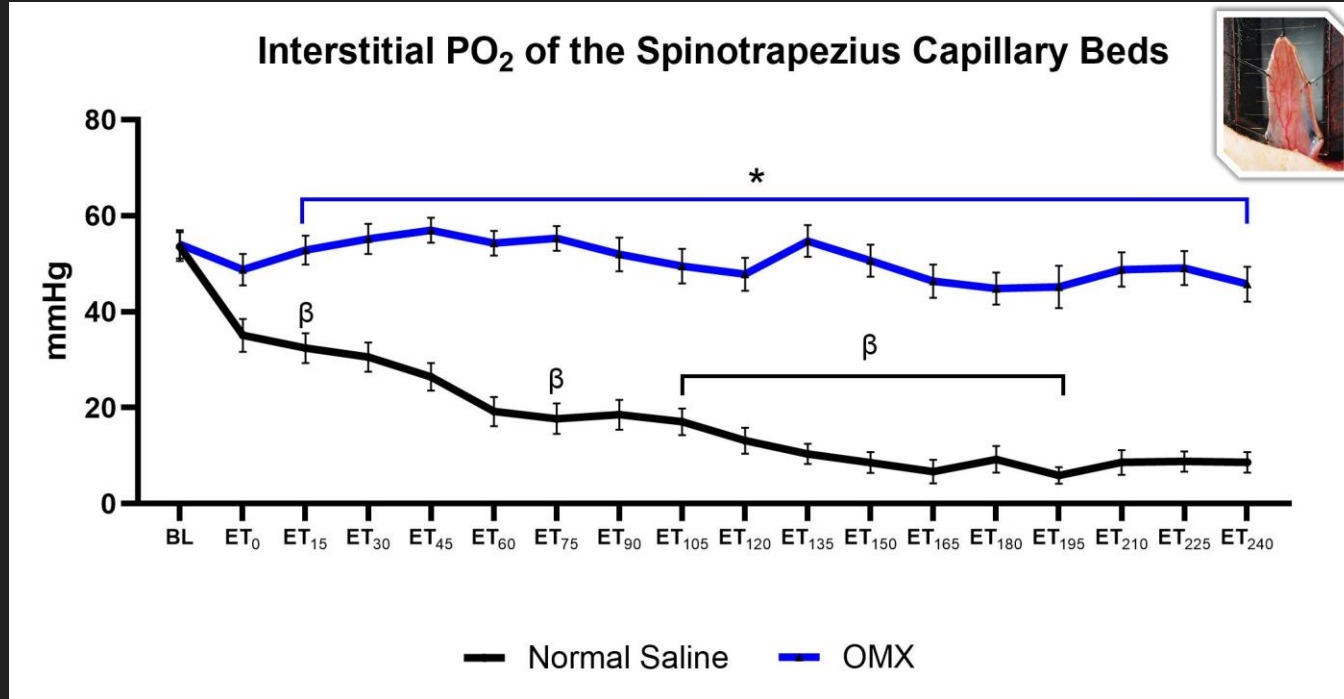
Results: Mean Arterial Pressure Response



Exchange Transfusion

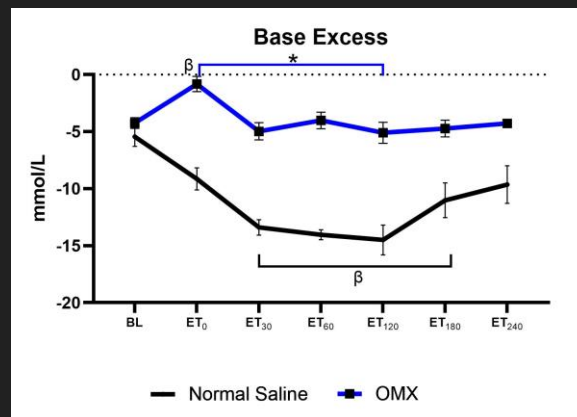
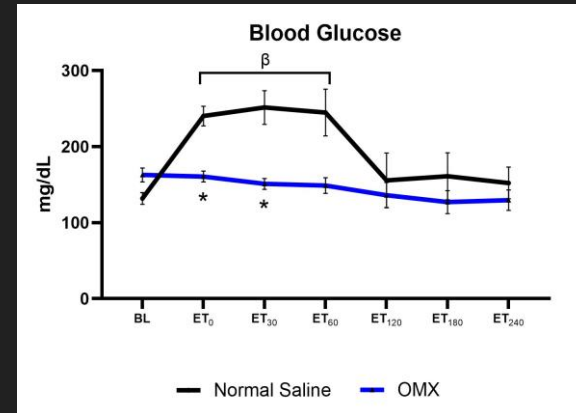
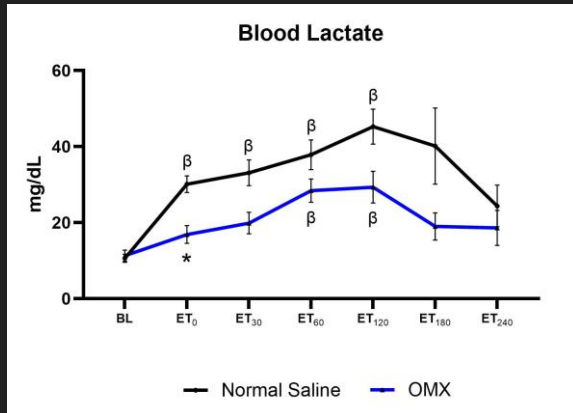
* P < 0.05 vs Normal Saline; β p < 0.05 vs Baseline (BL)

Results: Oxygenation



* P < 0.05 vs Normal Saline; β p < 0.05 vs Baseline (BL)

Results: Metabolic



* P < 0.05 vs Normal Saline; β p < 0.05 vs Baseline (BL)



Conclusions

-  OMX sustained systemic perfusion (MAP)
-  Maintained peripheral oxygen delivery, with OMX providing only ~10% of the total O₂ carrying capacity
-  No evidence of hypertension, consistent with prior studies
-  Sustained circulatory function for 4 hours without redosing

Thank You

Questions?

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