NuvOx Pharma

Oxygen Nanotechnology Platform – Cancer and Other Life Threatening Conditions

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Introduction

NuvOx developing drugs that deliver oxygen to hypoxic tissue to treat life threatening conditions

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Snapshot

- Clinical stage biopharmaceutical company
  - Phase Ib clinical trial in brain cancer
  - Product over 100x more effective than others in ↑ O_2
  - Preclinical data in multiple indications
  - Drug currently produced at NuvOx
- $7.4M raised
  - $3.1M grants; $4.3M equity – A Series 1&2
  - In addition founders contributed $1.8M
- Active in R&D partnering discussions

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Product Development Status

- Development Status
  - Formulation components have been modified to assure a patent estate potential as a barrier to competition
- Manufacturing
  - Lab Scale is 5-15 L with 400-1200 10 mL vials/~$2 material costs per dose.
  - Stability for lab scale batches are 6+ months
  - Process development and optimization under way to increase stability to beyond 1 year

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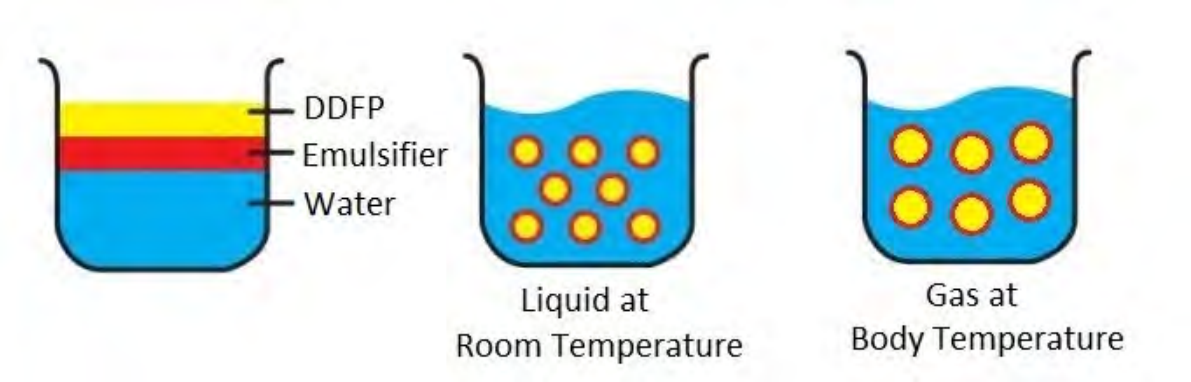
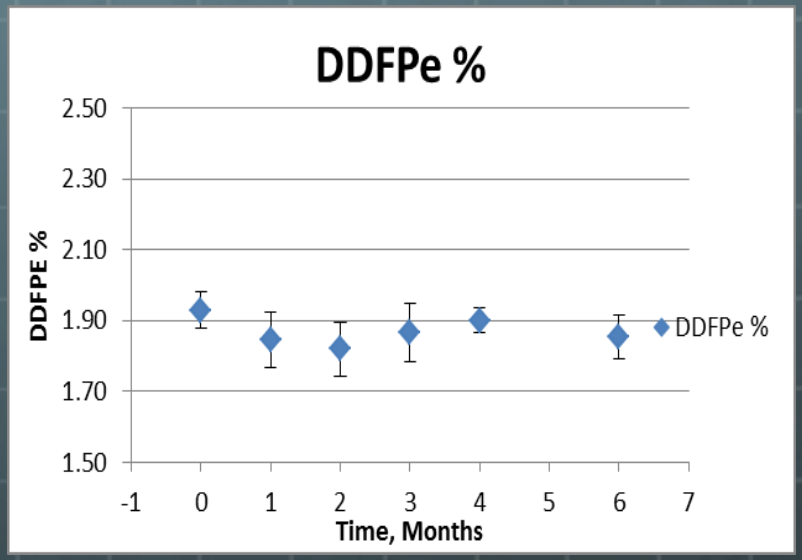
Technology – Description

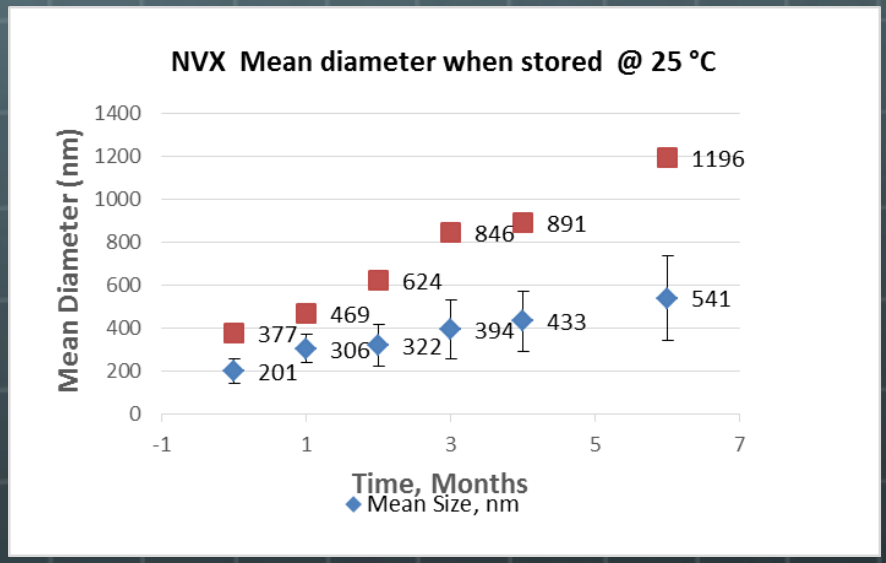
- Manaufacturing Process
  - DDFP mixed with surfactant and buffered aqaueous solution
  - High pressure homogenization makes Nanoemulsion



NVX 2% DDFPe Emulsion Stability Data

Critical Quality Attributes are monitored and displayed below from over 12 in-house batches.





Oncology Indication

- 1 million Cancer Patients per year in US treated with Radiation Therapy
- Hypoxic Tumors are Resistant to Radiation Therapy
  - Require 3x higher dose
- Cannot increase the dose – side effects
- Results in incomplete tumor kill and tumor recurrence.

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Tumor Hypoxia is Prevalent

Tissue Oxygenation, Normal Vs Tumor, (partial presure of O_2 in mm of Hg)

Reviewed in Vaupel, P. *et al.*, Antioxidants & Redox Signaling, ***9***: 1221, 2007

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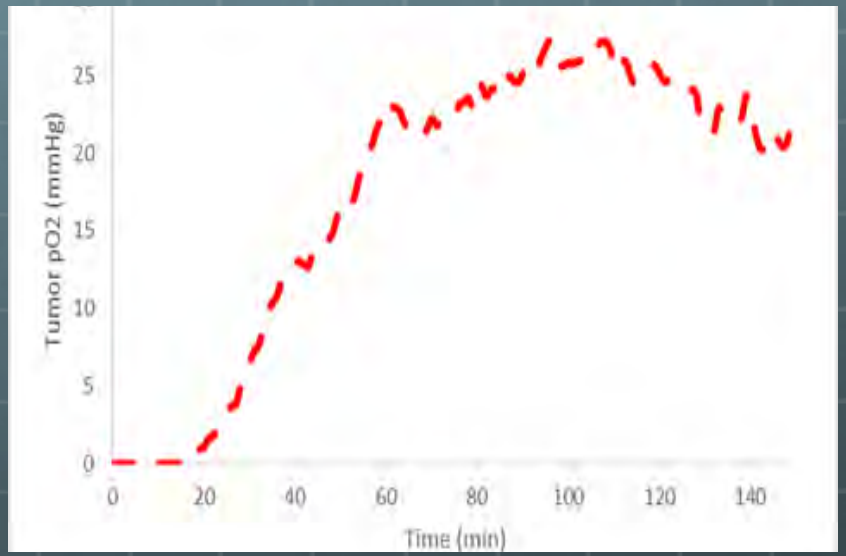
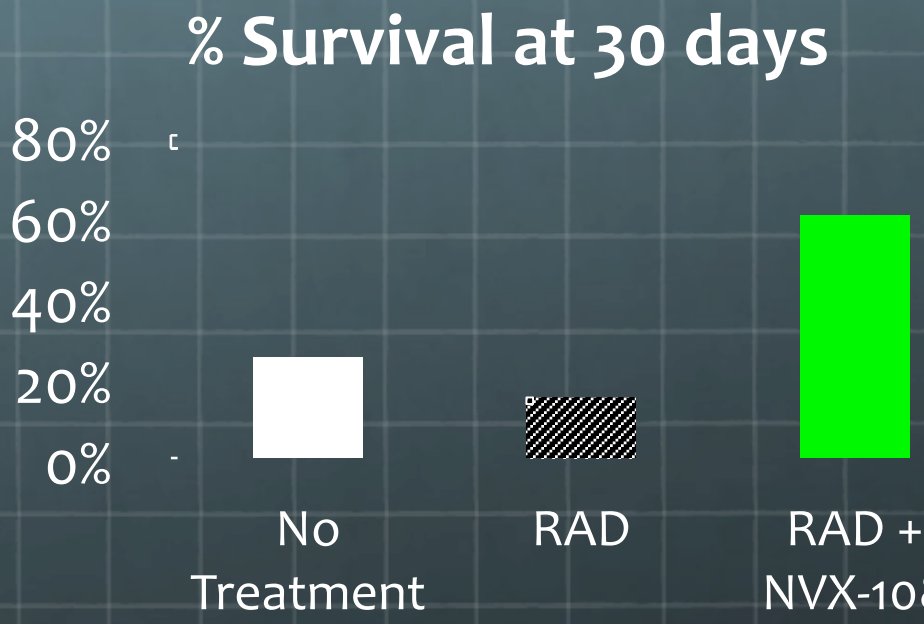
Solution – Increase Oxygenation



pO_2 in Tumor Tissue vs. Time.
NVX-108 given at t = 10 mins



Complete reversal of radiation resistance in hepatoma and ↑ survival in pancreatic cancer

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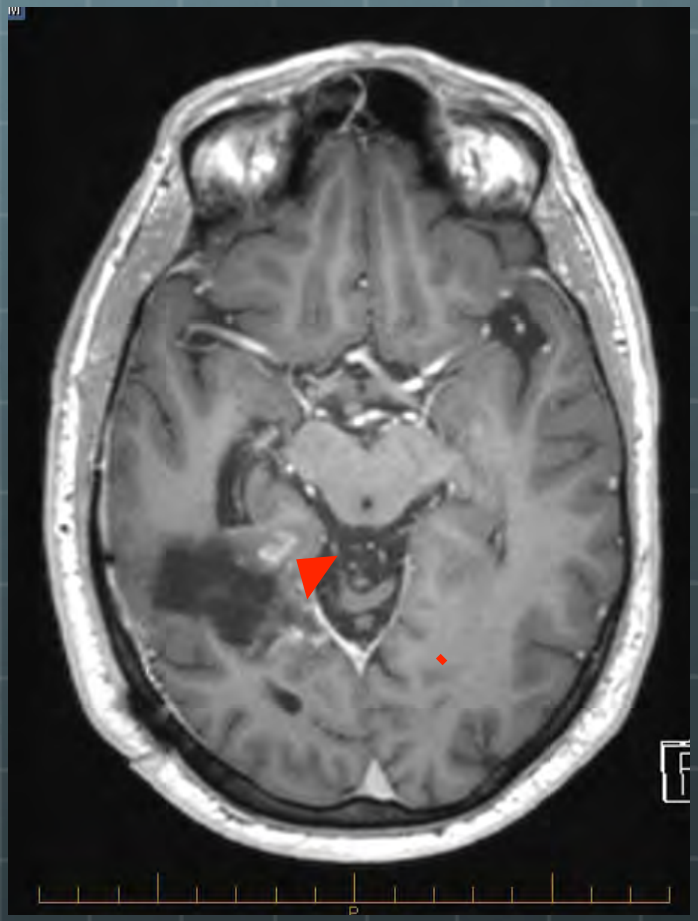
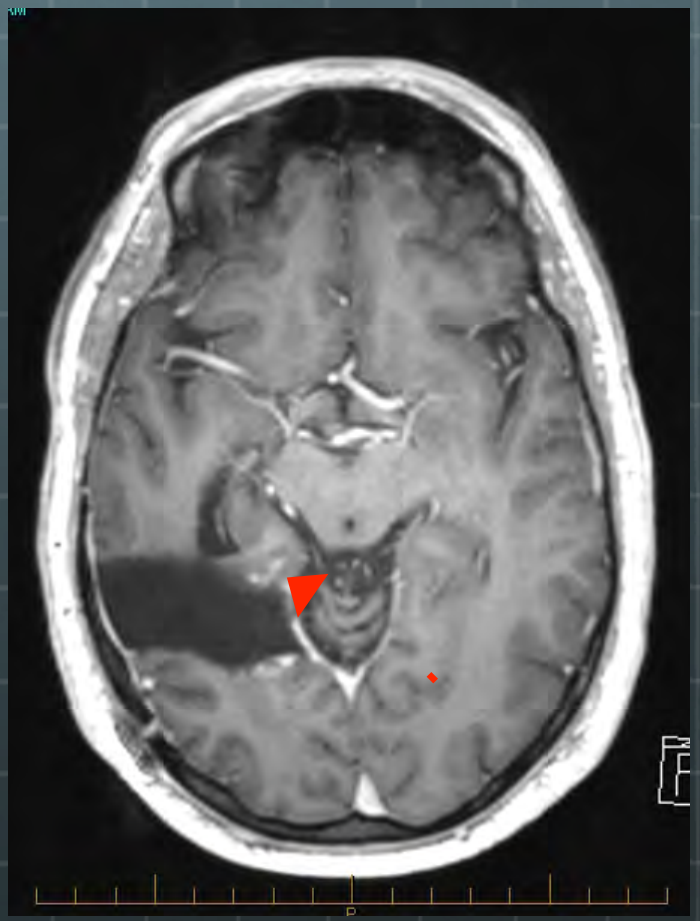
Phase 1b Started in Glioblastoma Multiforme

Pre-Radiation Therapy



4 weeks after radiation + TMZ + NVX-108



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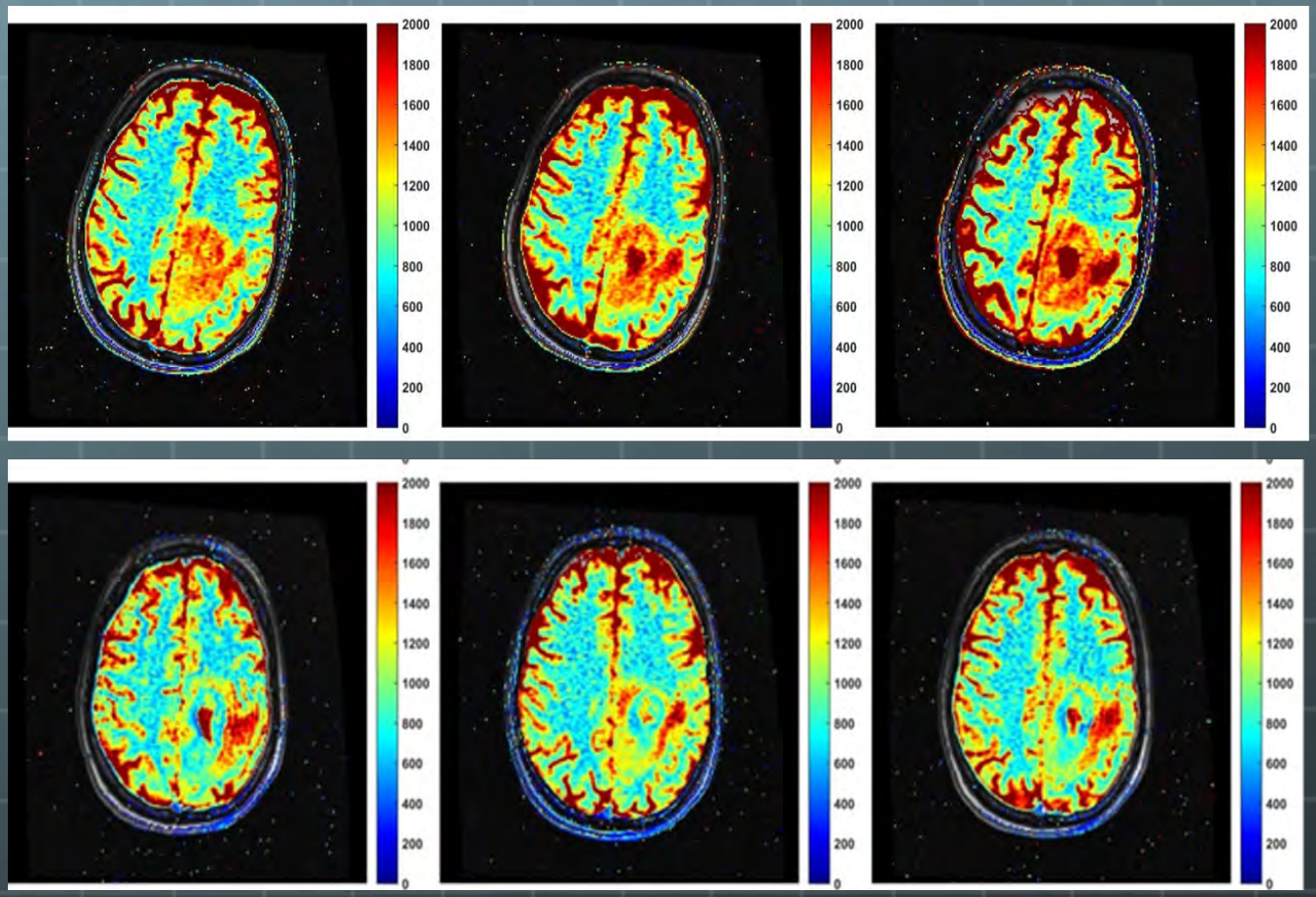
TOLD MRI



Pre–infusion images (top) and post-infusion images (bottom)
TOLD MRI confirms tumor re-oxygenation at 0.17 cc/kg NVX-408

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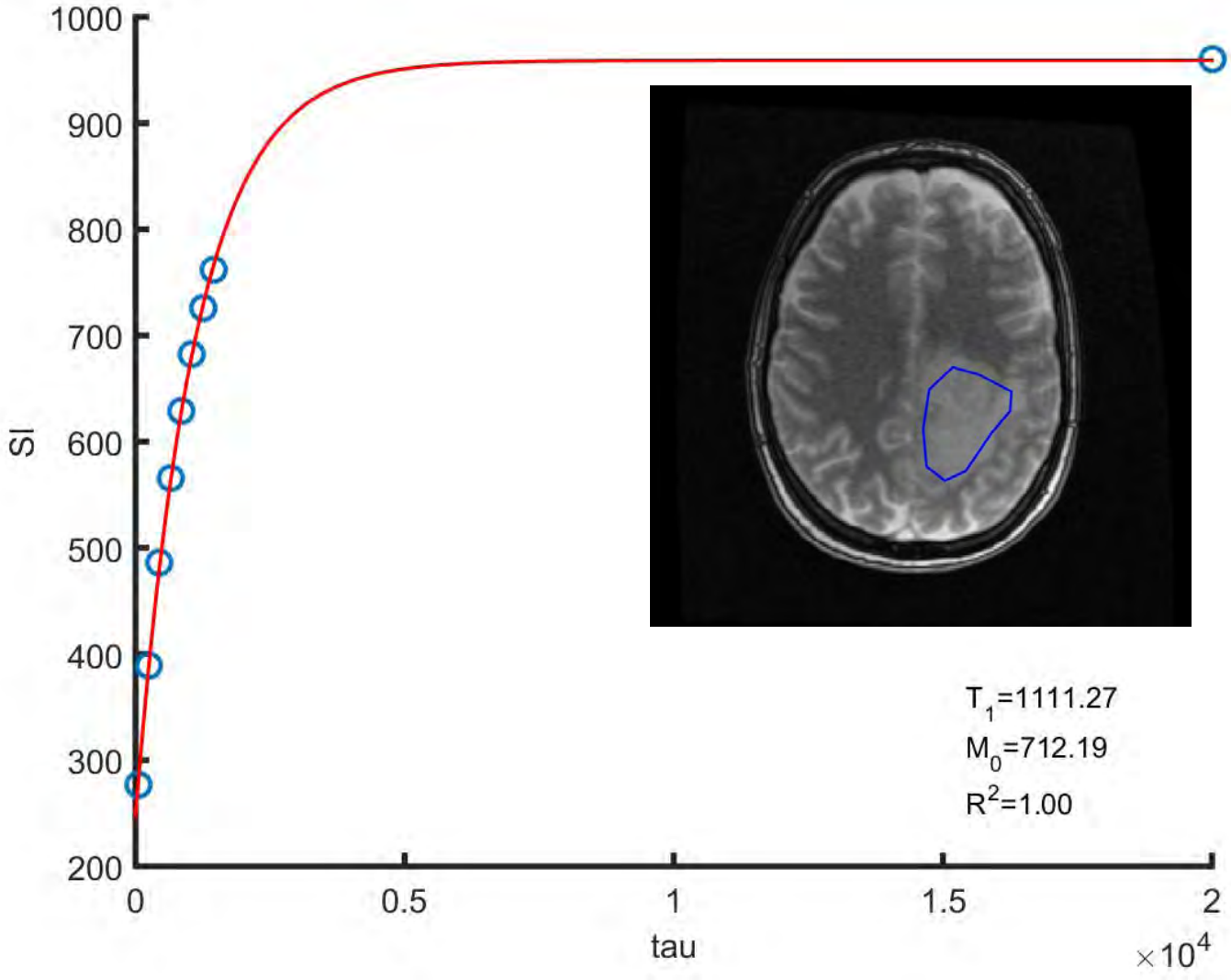
Sample curve fitting for tumor ROI



TOLD MRI Tumor T1 Values (ms)

Set #	Mean	Std
1 (pre)	1533.3	82.2
2 (post)	1115.6	30.9
3 (pre)	1665.3	196.9
4 (post)	1088.9	42.5

Net Present Value for Cancer Indications

Tumor Type	Worldwide ($M)
Glioblastoma	$63
Lung Cancer (NSC)	$1,648
Other Cancers Prostate Cancer, Pancreatic, Head and Neck	$3,349
Total NPV	**$5,059**

Assumptions: First Product Sales GBM 2018, NSC Lung 2020, Other Cancers 2022 $1,000 per dose, Rindopepimut - $100,000 per patient, VAL-083 -$67,200 per patient.

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Additional Indications

- Animal Studies Show Improved Outcomes in Additional Indications
  - Heart Attack and Stroke – ~ 80% reduction in tissue damage
  - Hemorrhagic Shock – 100% survival with 40% blood loss – Air Force
  - Traumatic Brain Injury - Navy
  - Sickle Cell Crisis/Acute Chest Syndrome

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Clinical Status

- In this Adaptive Dose Escalation phase, we believe we are the MTD and are confirming that in our clinical trial in Australia.
- After which the trial design calls to add 6 patients with full PK workup with the primary endpoint being safety and secondarily 6-month survival.
- With this PK/Safety our strategy is to file an IND for a multi-center cancer study.
- If no signal of improved survival we will consider other indictions.

NuvOx Collaborations

Cancer	U of A, BNI, Stanford, Monash Univ. (Aus), NCI, RTOG, Ribomed
Stroke	U of Arkansas, U of A, UCLA, NINDS
Heart Attack	U of A, IMCOR (Sao Paolo, BR), NHLBI
Traumatic Brain Injury	US Navy
Hemorrhagic Shock	US Air Force
Sickle Cell	Univ. of Pittsburgh, NHLBI
Acute Respiratory Distress Syndrome	U of A

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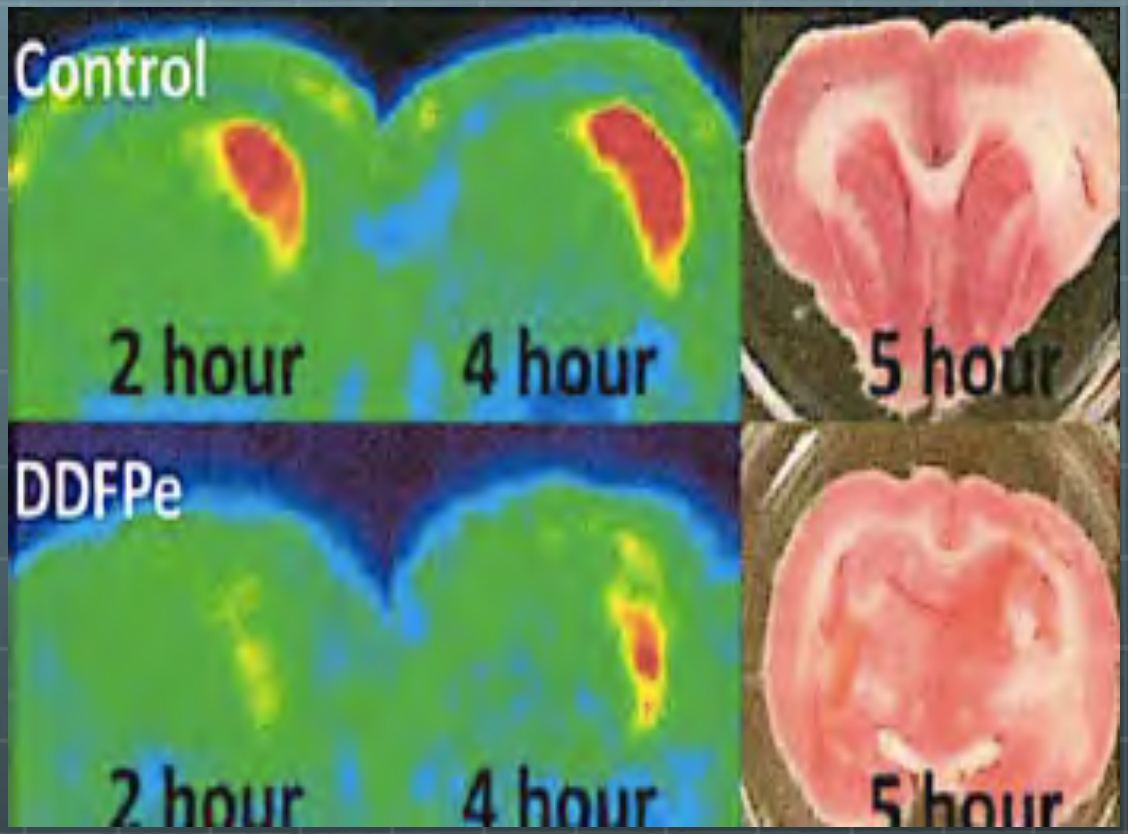
Decreased Stroke Brain Damage by 85%



Rabbits - ^{18}F-MISO PET images and brain tissue specimens, top control and bottom NVX-108 treatment

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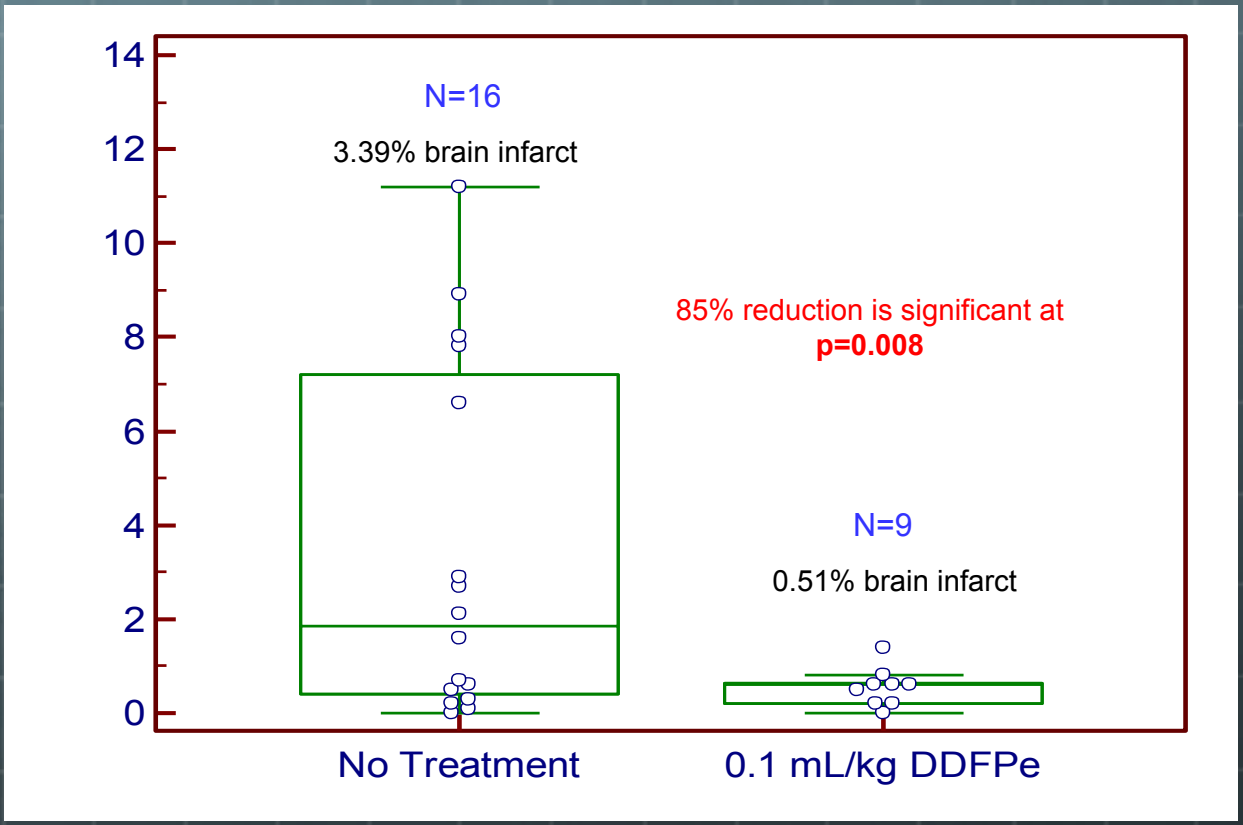
Decreased Stroke Brain Damage by 85%

- Repetitive IV bolus doses of 0.1 cc/kg DDFPe every 90 minutes commencing 1 hr post stroke onset
- Rabbits euthanized 24 hours post stroke onset; % infarct volume quantitated



Woods, S. D., et al. "Progress in Dodecafluoropentane Emulsion as a Neuroprotective Agent in a Rabbit Stroke Model." *Molecular neurobiology* 48.2 (2013): 363-367.

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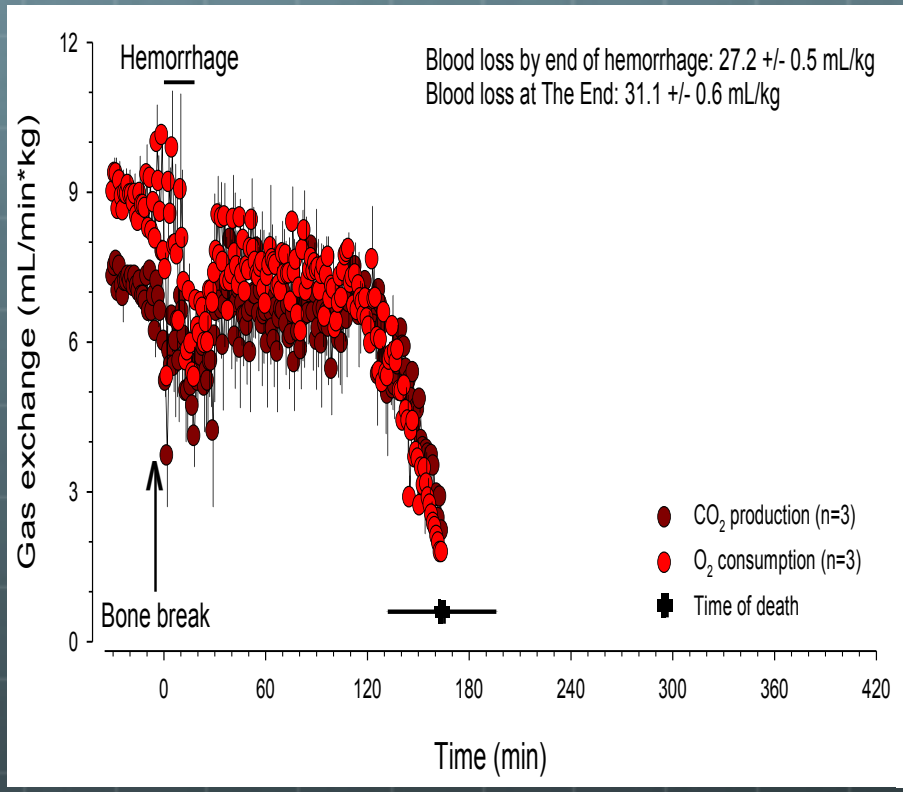
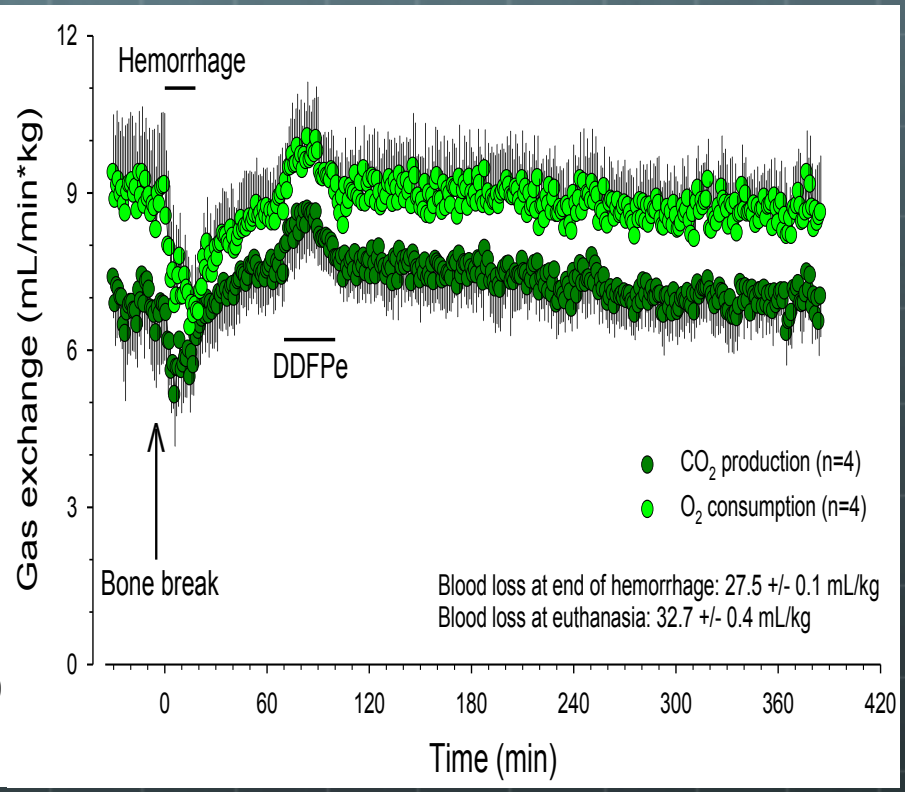
100% Survival in Hemorrhagic Shock





Pigs - Tyssebotn et. al. Study Final Report to USAMRMC, 2008.

Competitive Advantages

- **Reduced Development Risk**
  - Core technology **Approved in Europe** as an ultrasound contrast agent
  - **$100 million** spent by licensor developing core technology
  - Used safely in **2,200 patients**
- **5 patents issued, 5 pending**
- **12 years exclusivity** for each first-in-class indication

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Collaboration Outline

- Partner makes an equity investment in NuvOx with option to negotiate an R&D Partnership
- NuvOx provides relevant pre-clinical/clinical data to support product development in the Region
- Collaboration terms for Development
- NuvOx to provide DDFPe for evaluation and clinical development
- Exclusive commercial rights for the Region

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Thank You!!

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