

Commercial Drug Discovery and Development Through Government-Funded Industry/Academic Partnerships

Brian Johnstone, PhD
Co-founder,
Director, Research and Development
NeuroFx, Inc
Indianapolis, IN U.S.A



A Next Generation Regenerative Medicine Company

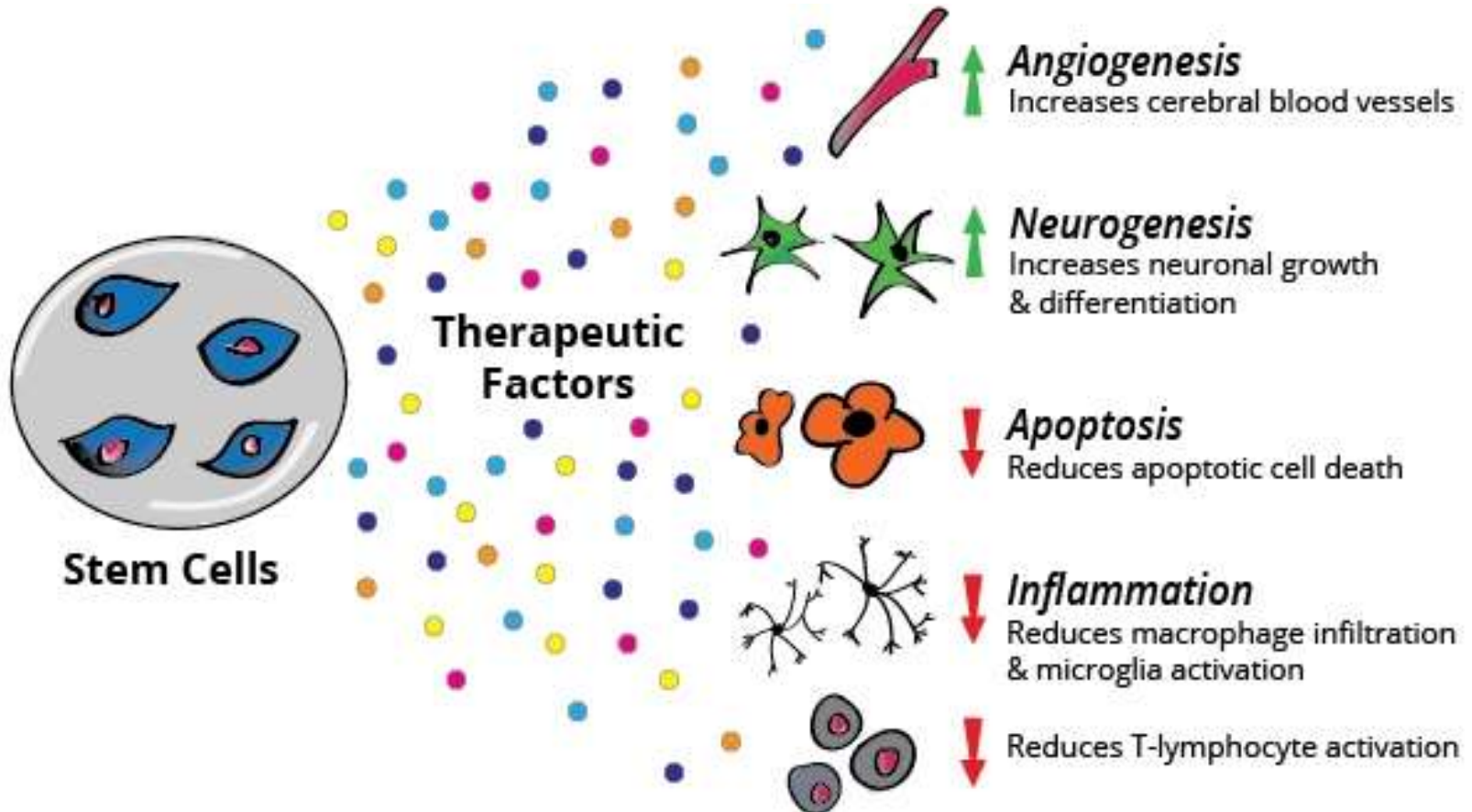


Company Snapshot

- Founded in 2011 based on technology developed at Indiana University
- Single product (NFx-101), multiple diseases (platform technology)
- Preclinical stage
- Raised \$1.85 Million in private financing
 - Funds used primarily to support operations, outsourced manufacturing, consultants and legal
- Virtual Operating Model
 - 1 full-time and 3 part-time employees (incl. CEO)
 - 100% outsourced R&D
- Presently raising \$4 Million to finance Phase I/II first-in-human clinical trial

NeuroFx Technology Platform: Harnessing the Stem Cell Secretome

Adult Stem Cells → Secretome → Therapeutic Responses

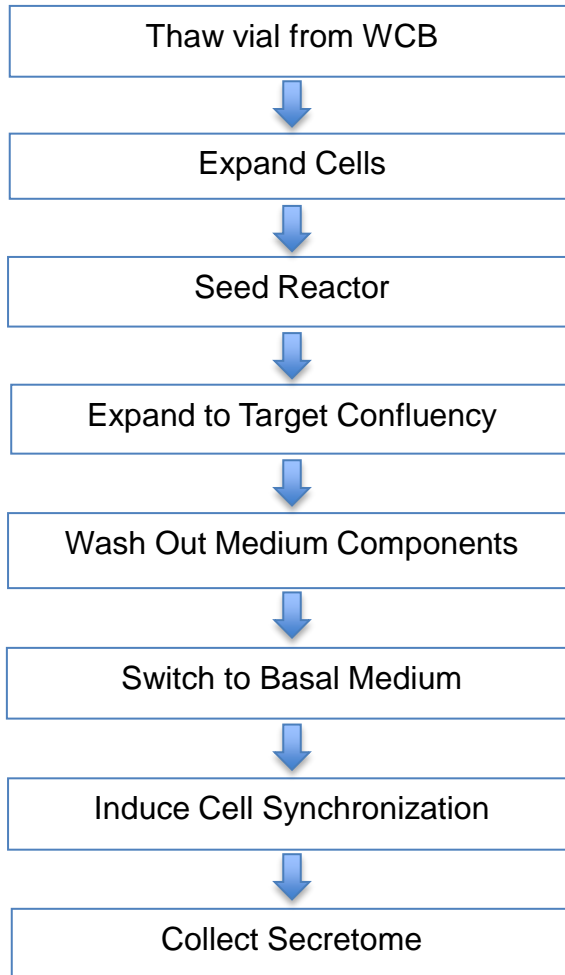


Key Characteristics of Lead Product: NFx-101

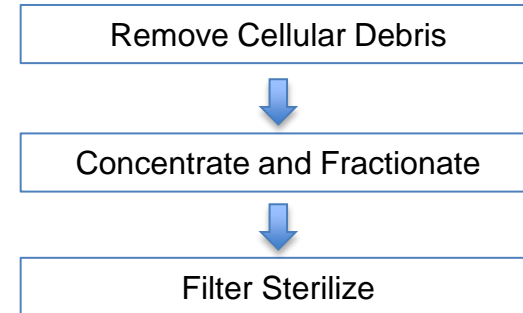
- Off-the-shelf, cell-free product comprised of adipose-derived stem cell (ASC) secretomes
- Physiologic levels of neuroprotective and neurotrophic therapeutic factors, including
 - BDNF
 - GDNF
 - HGF
 - NGF
 - VEGF
- Combination of factors is essential for full potency

Robust, Reliable and Consistent Manufacturing Process

Upstream Processing



Downstream Processing



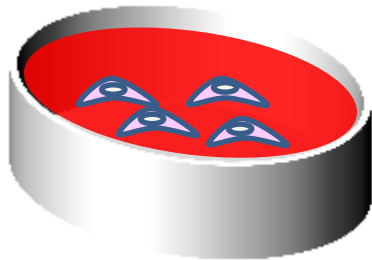
Analytical

Process engineered to enhance consistency of product

- Cell bank derived from a single donor
- Use low passage cells to reduce genetic drift
- Uniformity through synchronization of cells
- Controlled environment

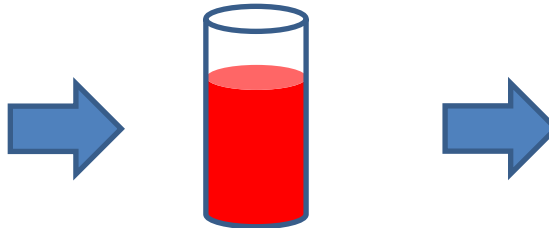
NFx-101 Manufacturing Simplified

Source Material



Secretome produced by MSC in GMP facility

Intermediate



Conditioned medium harvested and filtered to remove cells and debris

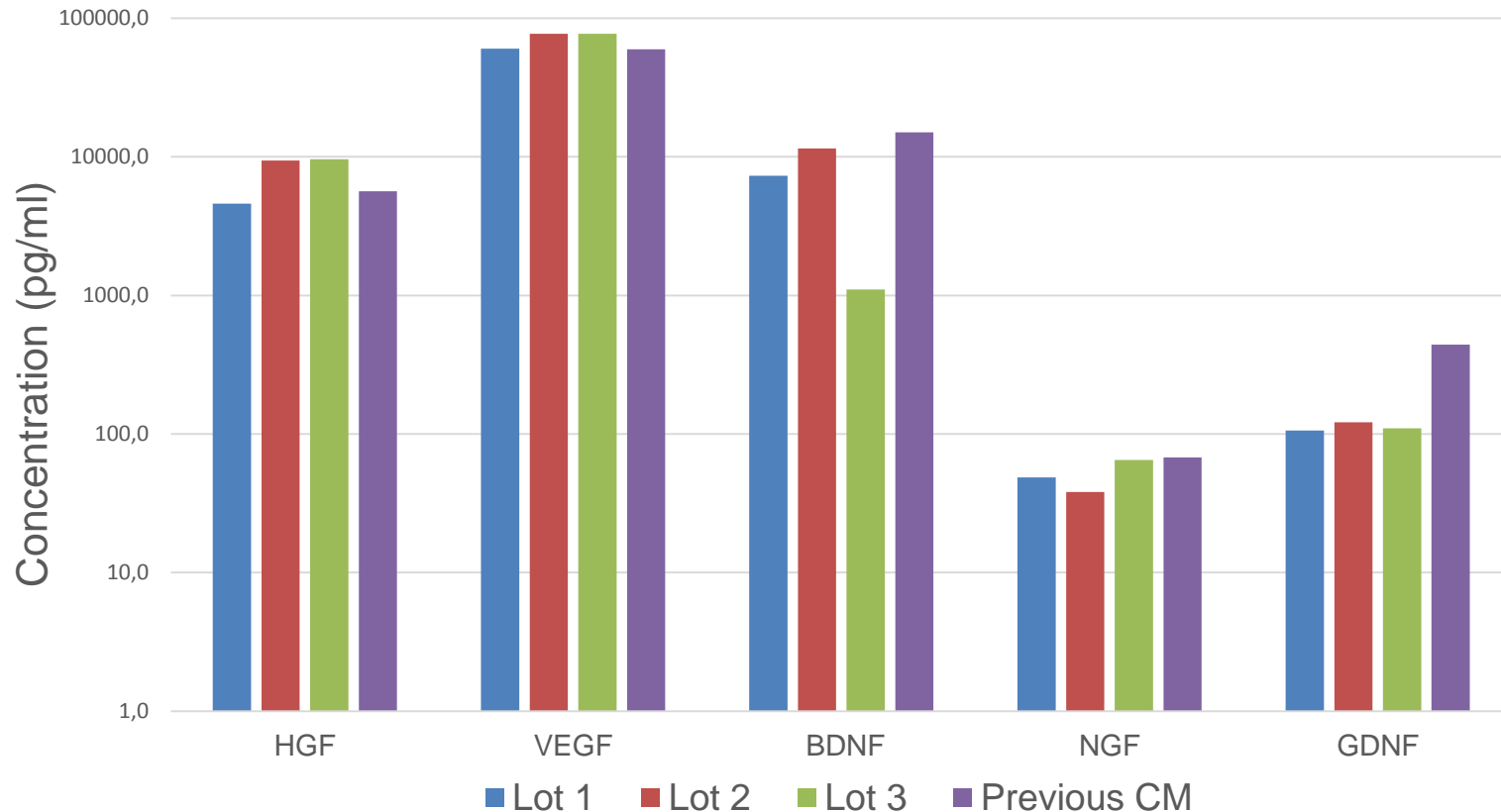
Drug Substance



Fractionate and concentrate secretome

*NeuroFx issued manufacturing patents: US 8,021,882; US 8,067,234; US 9,192,632

NFx-101 Manufacture is Reproducible and Consistent



Bottle the Benefits Leave the Cells Behind



Stem Cells

or



NF_x-101

- Rather than dealing with the beans, we are bottling the ‘coffee’ (secretome), serving up the benefits, and leaving the cells behind

NeuroFx Platform Technology: Multiple Therapeutic Options

NFx Focus

- Neurology
 - Ischemic brain injury*
 - Diabetic neuropathy and retinopathy
 - Macular degeneration
 - Lou Gehrig's disease (ALS)*
 - Cerebral palsy
 - Multiple sclerosis*
 - Parkinson's disease
 - Traumatic brain injury

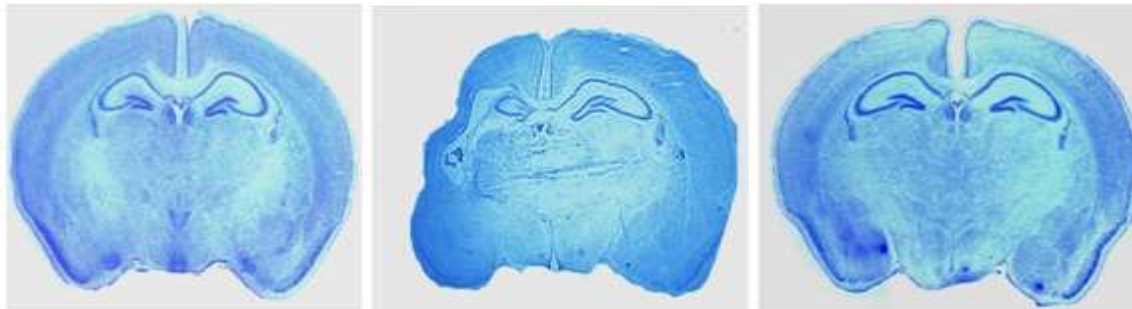
Platform Extensions

- Musculoskeletal
 - Tendon repair
 - Arthritis
- Cardiovascular
 - Cardiac ischemia
 - Critical limb ischemia*
- Renal
 - Acute kidney injury*
- Pulmonary
- Dermatology
 - Wound healing
 - Anti-aging of skin
- Endocrinology
 - Diabetes

*Indicates active preclinical program

NFx-101 Has Demonstrated Efficacy in Multiple Pre-Clinical Models

- Ischemic brain injury (stroke)



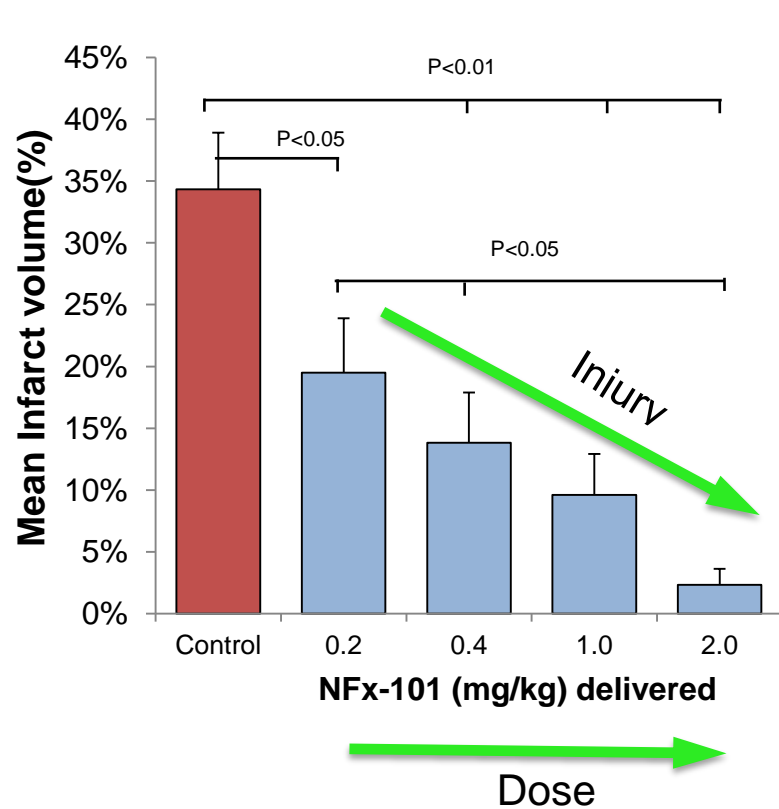
Normal

Hypoxia-ischemia
+ Placebo Control

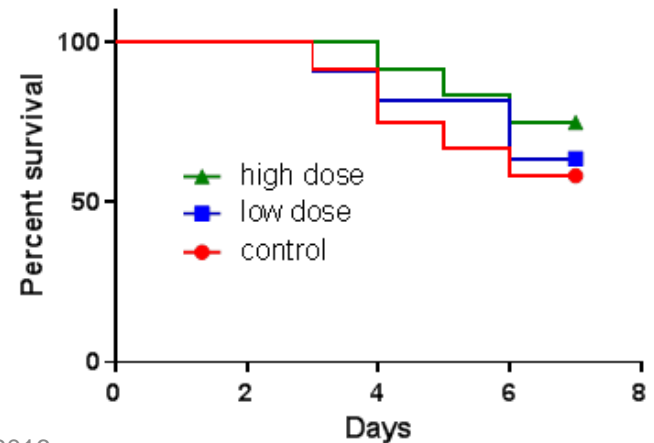
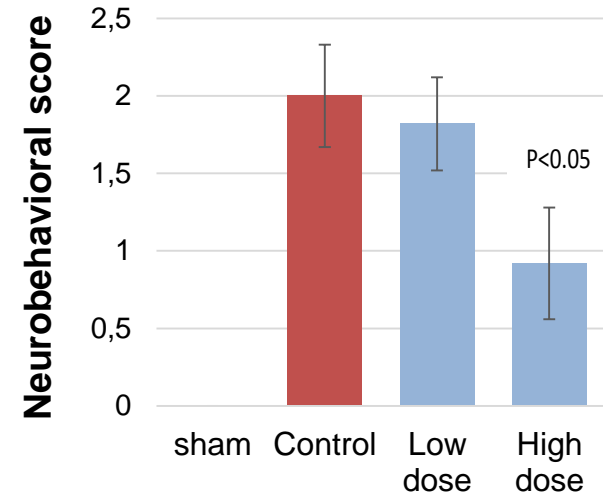
Hypoxia-ischemia
+ NFx101

- Critical Limb Ischemia (CLI)
- Amyotrophic Lateral Sclerosis (ALS)
- Multiple Sclerosis (MS)
- Traumatic Brain Injury (TBI)

NF α -101 Reduces Stroke Volume

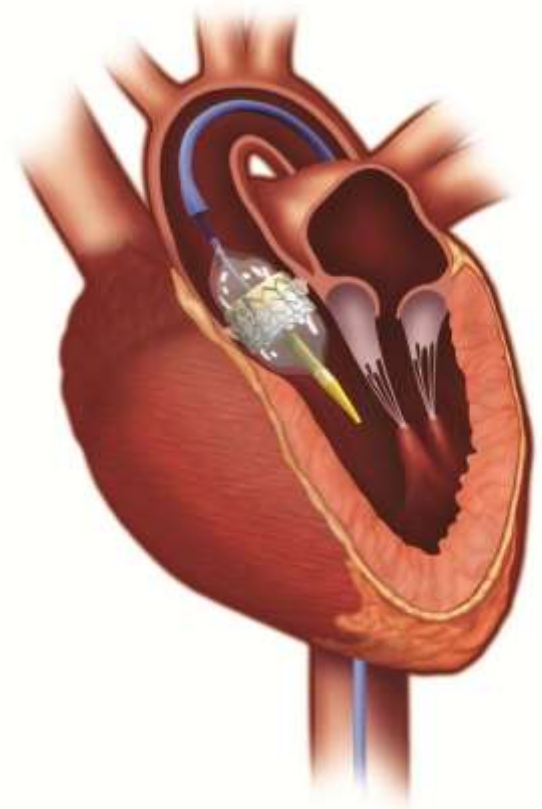


NeuroF α unpublished data



Initial Development Goal: TAVR-Induced Stroke

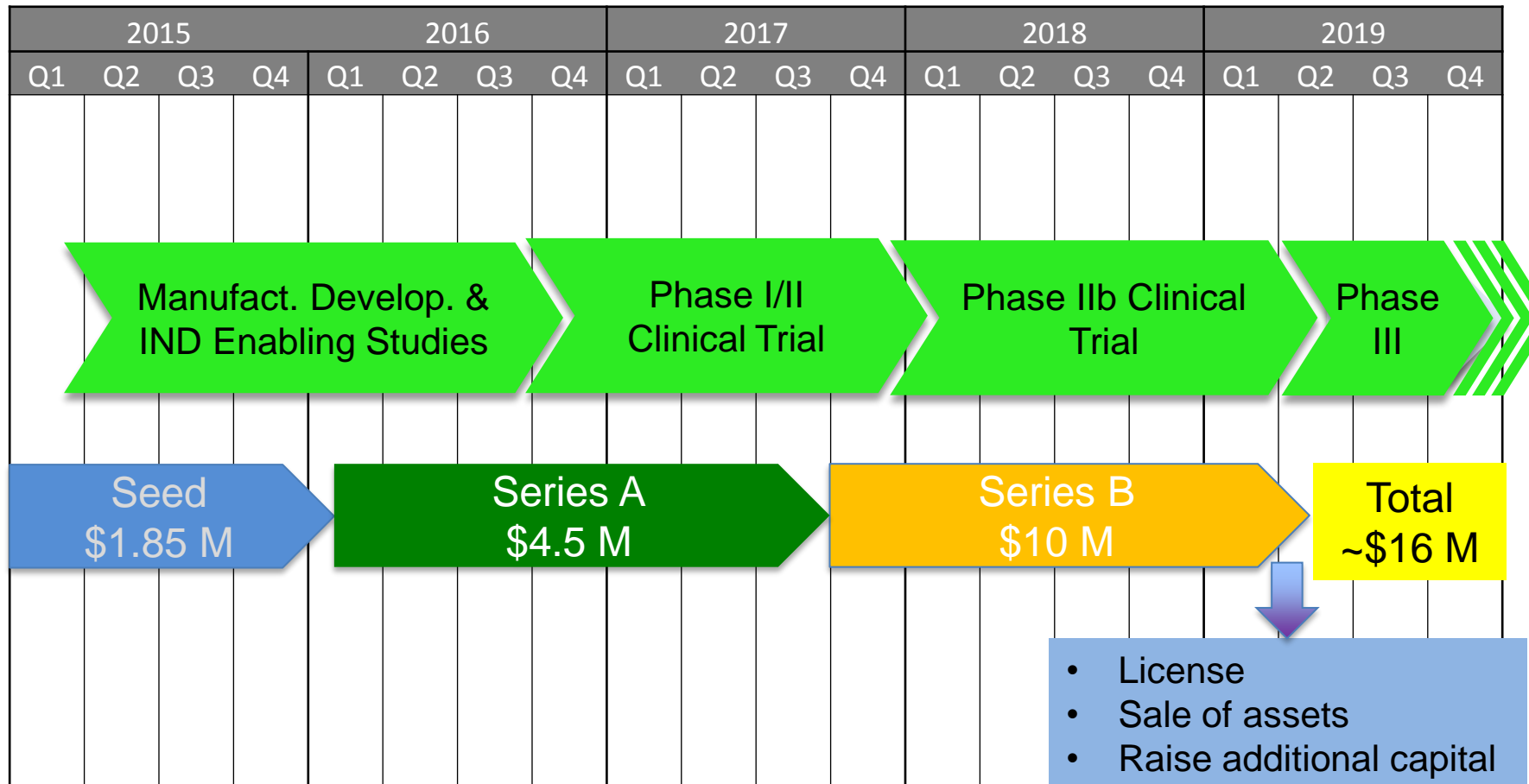
- Transcatheter Aortic Valve Replacement (TAVR)
 - Alternative to open heart surgery for patients with severe aortic stenosis
 - HOWEVER, stroke is a serious complication of TAVR
 - Silent strokes occur in 68% - 100% of patients*
 - \$540,000,000 accessible market
- First-In-Human Trial (Phase I/II)
 - 24 patients
 - Randomized, placebo-controlled, multicenter trial
 - Primary endpoint: safety
 - Secondary endpoint: reduction in ischemic brain lesions



*Courtesy of: Aortic Stenosis and TAVR
Presentation, Kristen Davis, MSN, RN, CCRN,
Lexington Medical Center*

*A.J. Lansky et al, European Heart Journal (2015) 36, 2070–2078

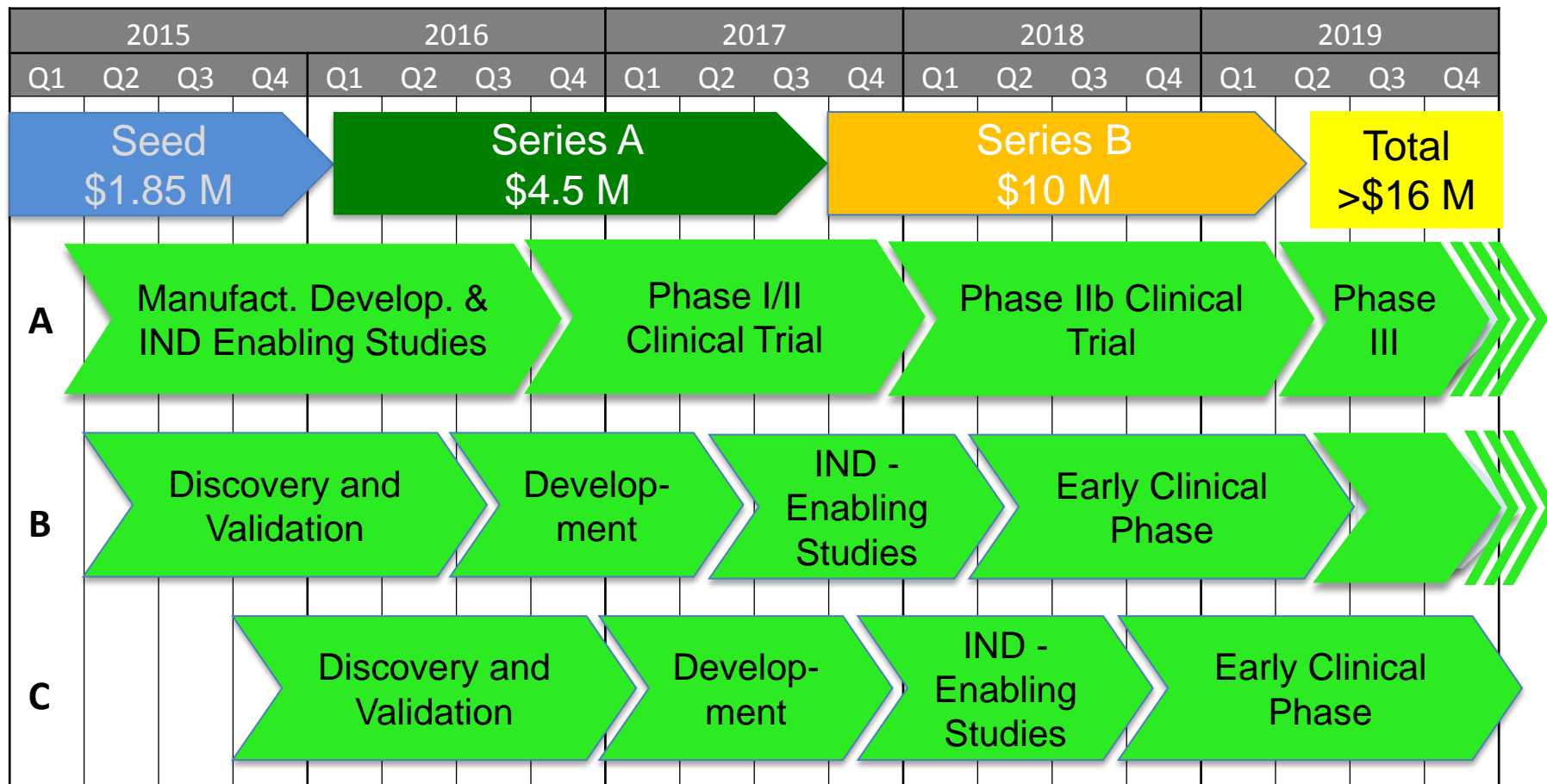
Timeline and Financials



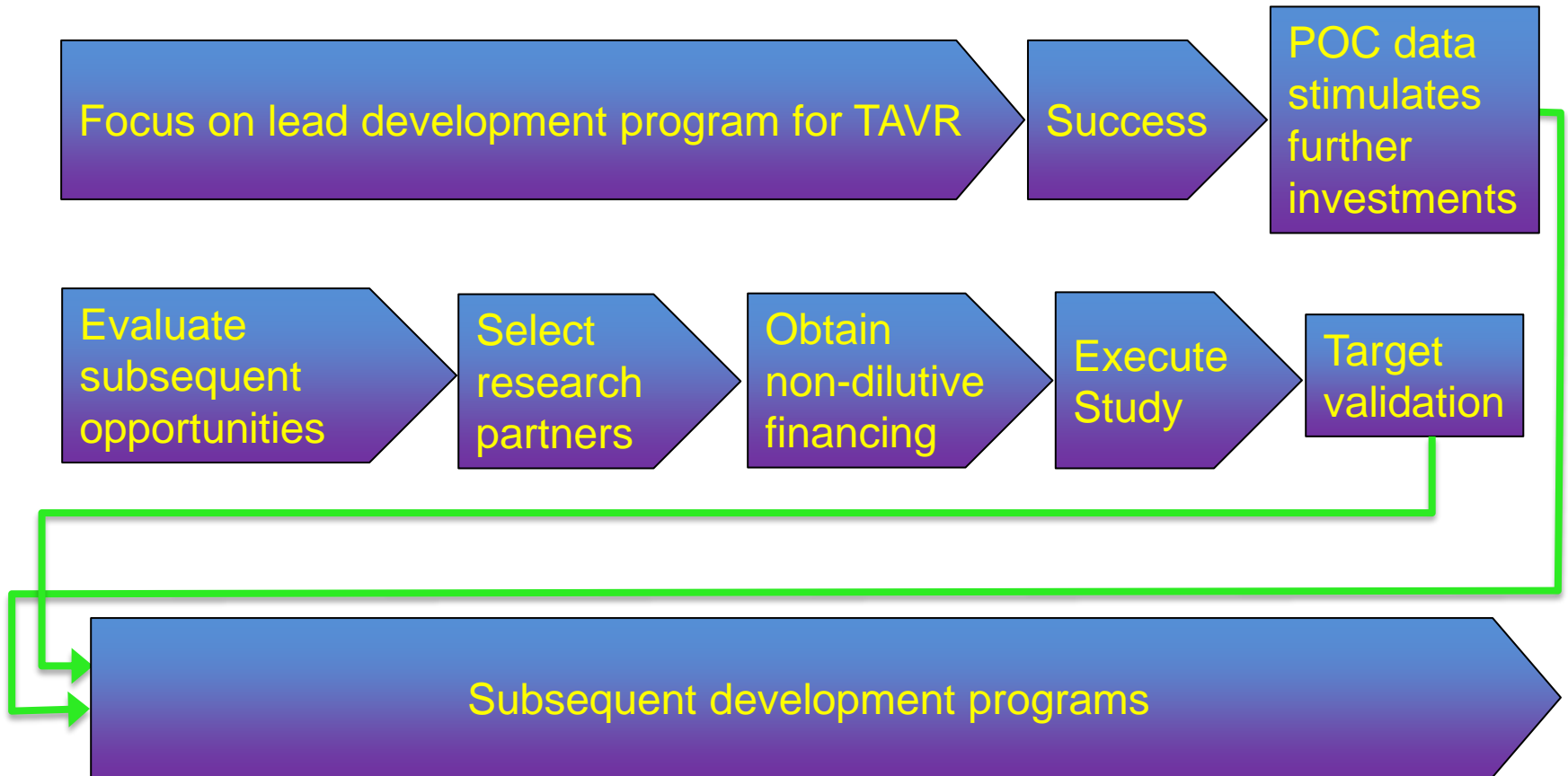
Multiple “Shots on Goal” Required to Score to Score



Problem: Resource Limitations



Development Strategy



Leveraging Strategic Partnerships and Financing

- Strategic partnerships with experts



4Medical Innovations
biotech park Ostrava

AMERICAN
HEART
OF POLAND
Spółka Akcyjna

- Non-dilutive financing



Moravskoslezský
kraj



MINISTRY OF EDUCATION,
YOUTH AND SPORTS

U.S. Small Business Administration

SBA
Your Small Business Resource



Example: Rabbit Model of Critical Limb Ischemia

- Study Partners

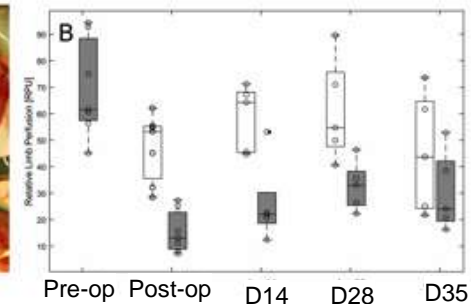
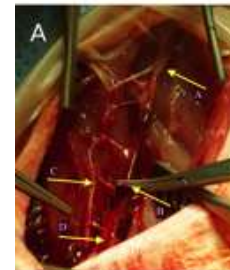


- Funding

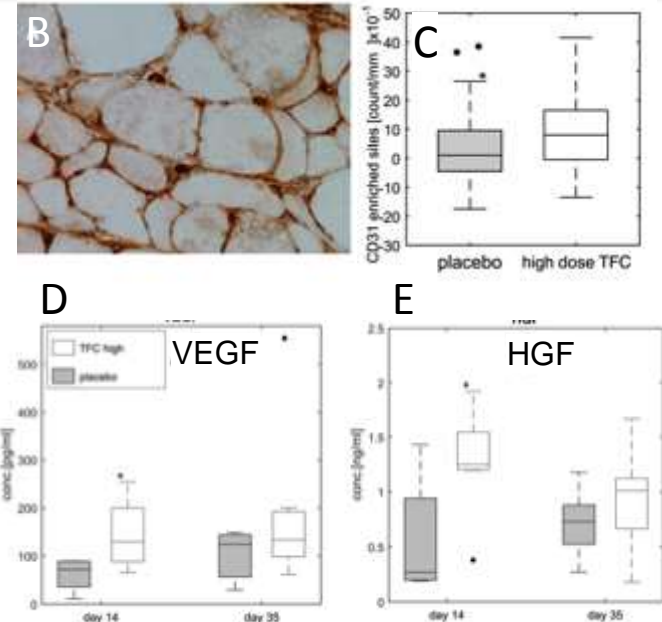
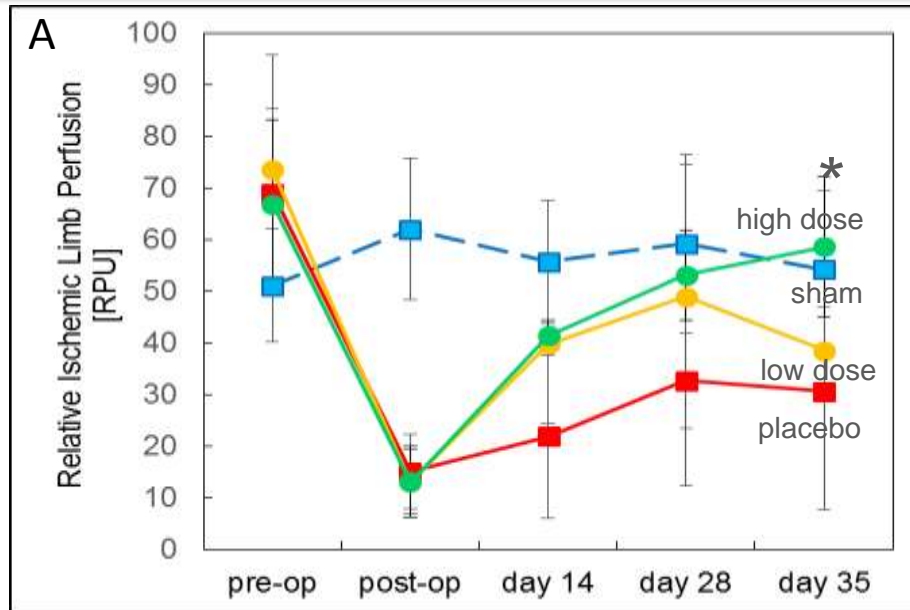


- Study Overview

- Unilateral critical limb ischemia (CLI) in rabbits
- Treated IM with placebo, low or high dose NFX-101



NF α -101 Enhances Reperfusion of Ischemic Limbs



- **Panel A:** Perfusion of ischemic limbs treated with high dose NF α -101 was no different than sham at day 35 (28 days after treatment)
- **Panels B and C:** Increased perfusion was correlated with enhanced capillary density
- **Panels D and E:** A transient increase in levels of angiogenic growth factors was observed in NF α -101 treated rabbits

Summary: Next Steps

- Will select up to 3 target indications to pursue subsequent to TAVR/stroke
 - Dependent on grant funding
- CLI is a prime target candidate
 - Preclinical validation and development is progressing
 - Planning clinical trial at FNO (2018)
- Meanwhile continuing to raise capital for operations and later stage development
- Refine/optimize manufacturing process
 - Purpose is to reduce COGs