# NanoStem Biotech, LLC

3D Biodegradable NanoScaffold For Tissue Engineering

**KiBum Lee, PhD**
Professor, Department of Chemistry & Chemical Biology
Rutgers University

**Letao Yang, PhD**
**Dean Chueng, PhD**
Postdoc Research Associates

**Brian Conley**
PhD Student

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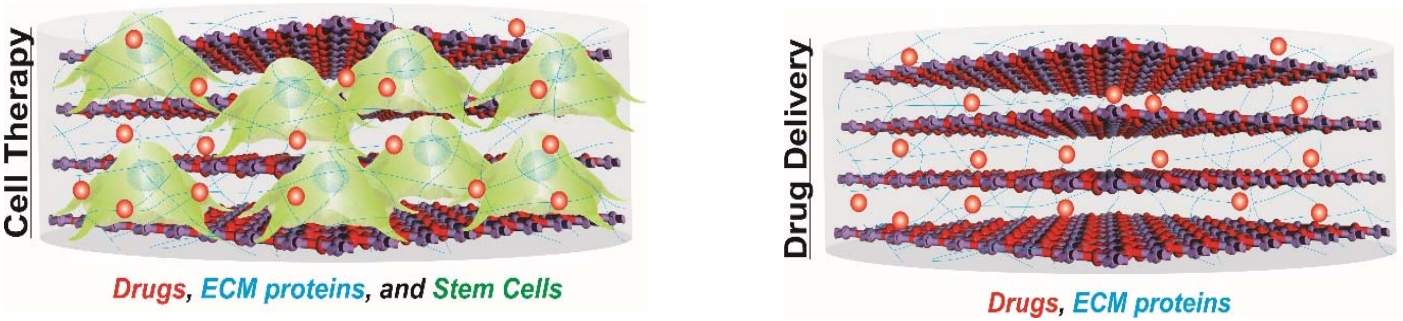
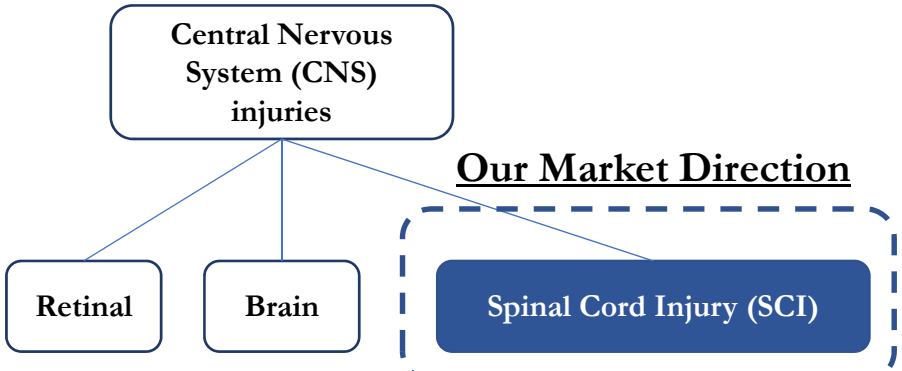
# Introduction




Key scaffold composition: $MnO_2$ and ECM proteins

- Our innovation is a **3D biomimicry hybrid-$MnO_2$ nanoscaffold** for stem cell therapy and drug delivery
  - It provides for:
    - Stem cell **differentiation**
    - Upregulated **ECM-protein binding** affinity
    - Efficient **drug loading** with **sustained delivery**
    - **MRI/FRET-based monitoring** of drug release

# Unmet Market Need




**Our Market Direction**

- **$30B in annual direct costs**
  - Physical therapy
  - Pain reduction
  - Rehabilitation
  - But **no functional improvements**

- Number of patients:
  - 18k new patients annually
  - 291k patients today

- Cost per patient:
  - 1st year: $350k-$1M
  - Recurring: $40k-$200k

**Why?**

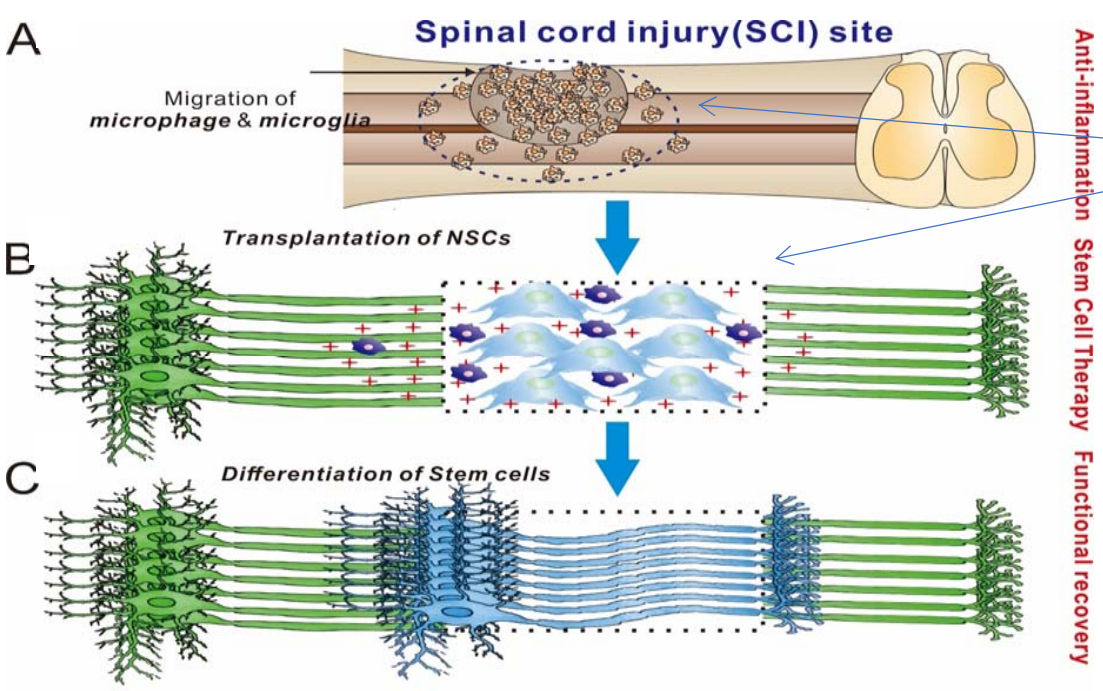
- Large addressable market
- Opportunity to be a market disruptor
- Our team's direct access to KOLs
- Strong supporting in vivo data
- **No effective treatment** today

**Stem cell therapy** is emerging as a promising therapy, but faces **critical challenges:**

- Low cell survival rates after transplantation
- Poor differentiation into specific cells, including neurons
- Limited neurite growth

** Our innovation can be a platform technology. Potential other fields of use: other CNS injuries, cardiovascular, muscularskeletal, and dermatology.*

# The Innovation – Summary



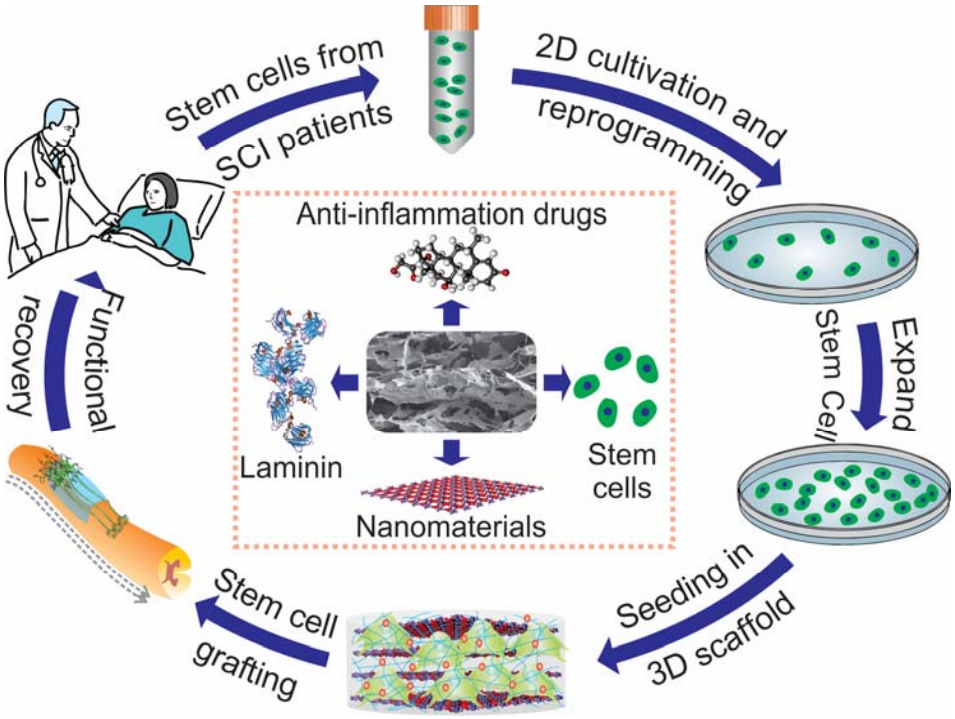

Our technology would **enable effective stem cell therapy in SCI**.

**Current Methods**

| Companies by Method | Limitations |
|---|---|
| **Direct Cell Injection**<br>• Nipro Corp<br>• Athersys<br>• Brainstorm Cell | • Uncontrollable stem cell fates<br>• Cell death<br>• Unselective differentiation |
| **Scaffold-based Transplantation**<br>• Allegro 3D<br>• Vericell | • Requires highly complex growth factor cocktails and procedures<br>• Non-injectable |

# The Innovation – Summary *(cont'd)*

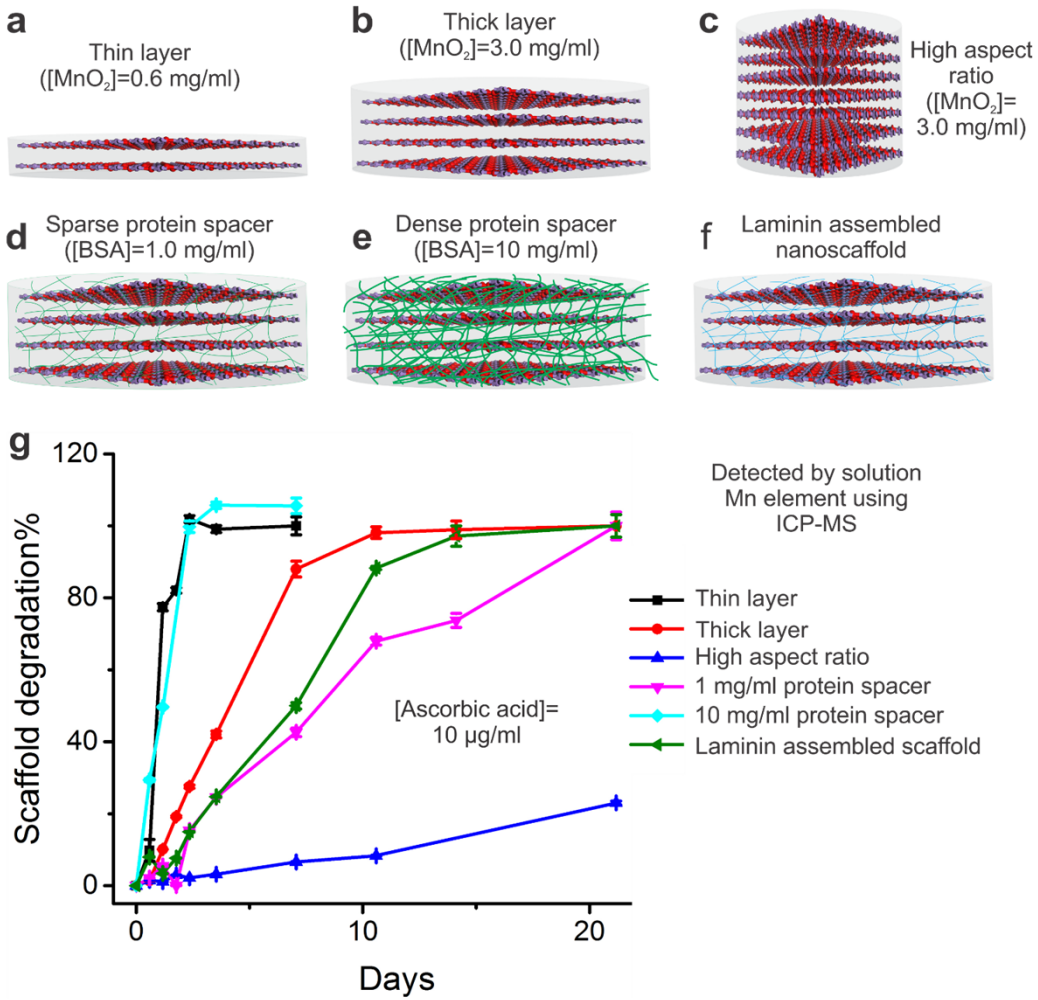
## Our technology envisioned in practice




- ✓ **Suppress inflammation** and promote host axon
- ✓ **Differentiate into neurons** and re-establish the neural circuitry.

# The Innovation – Details *(Slide 1 of 5)*

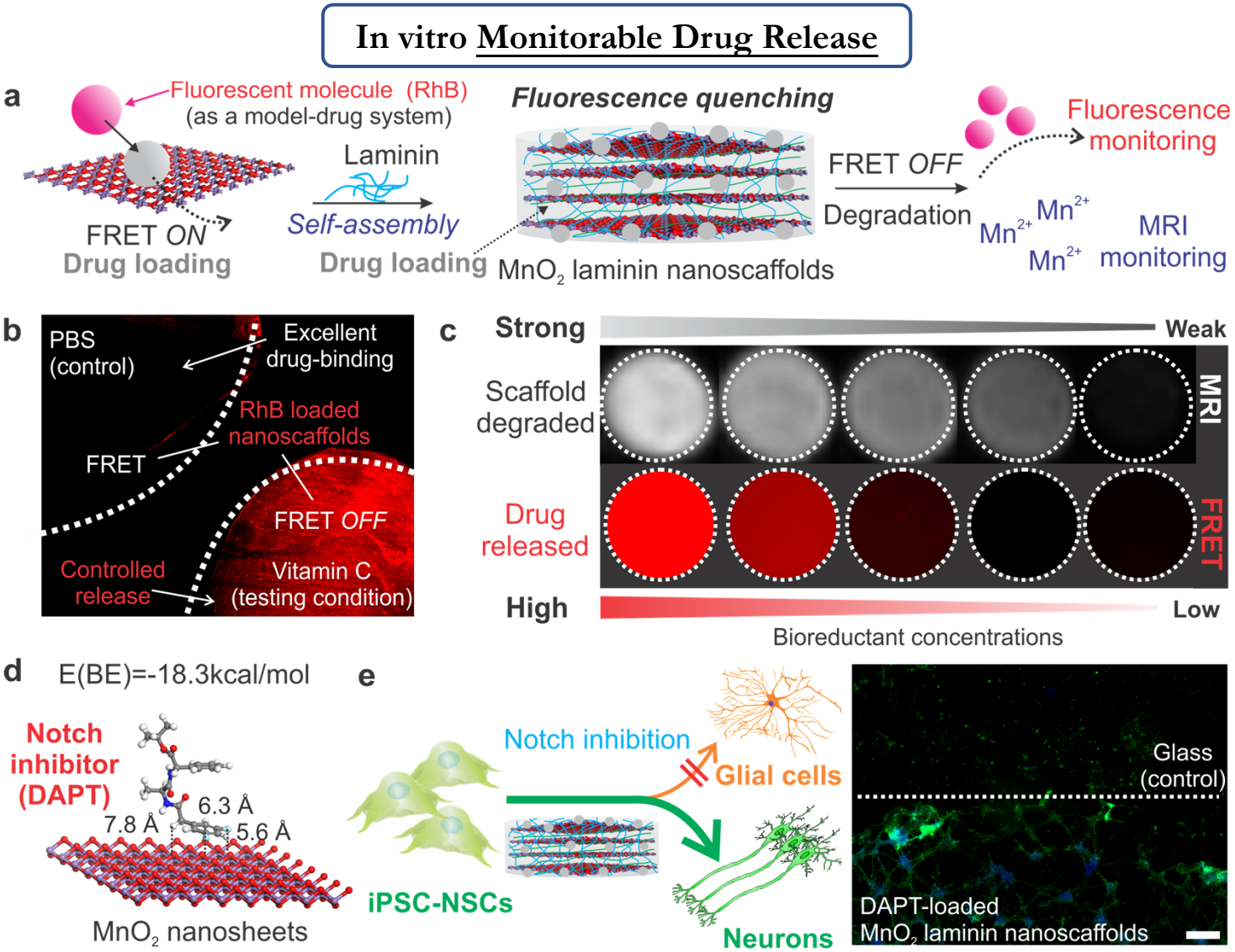
**Tunable biodegradation and drug delivery**






*Lee, K.B. et al. Nature Communications 2018.* 

# The Innovation – Details *(Slide 2 of 5)*

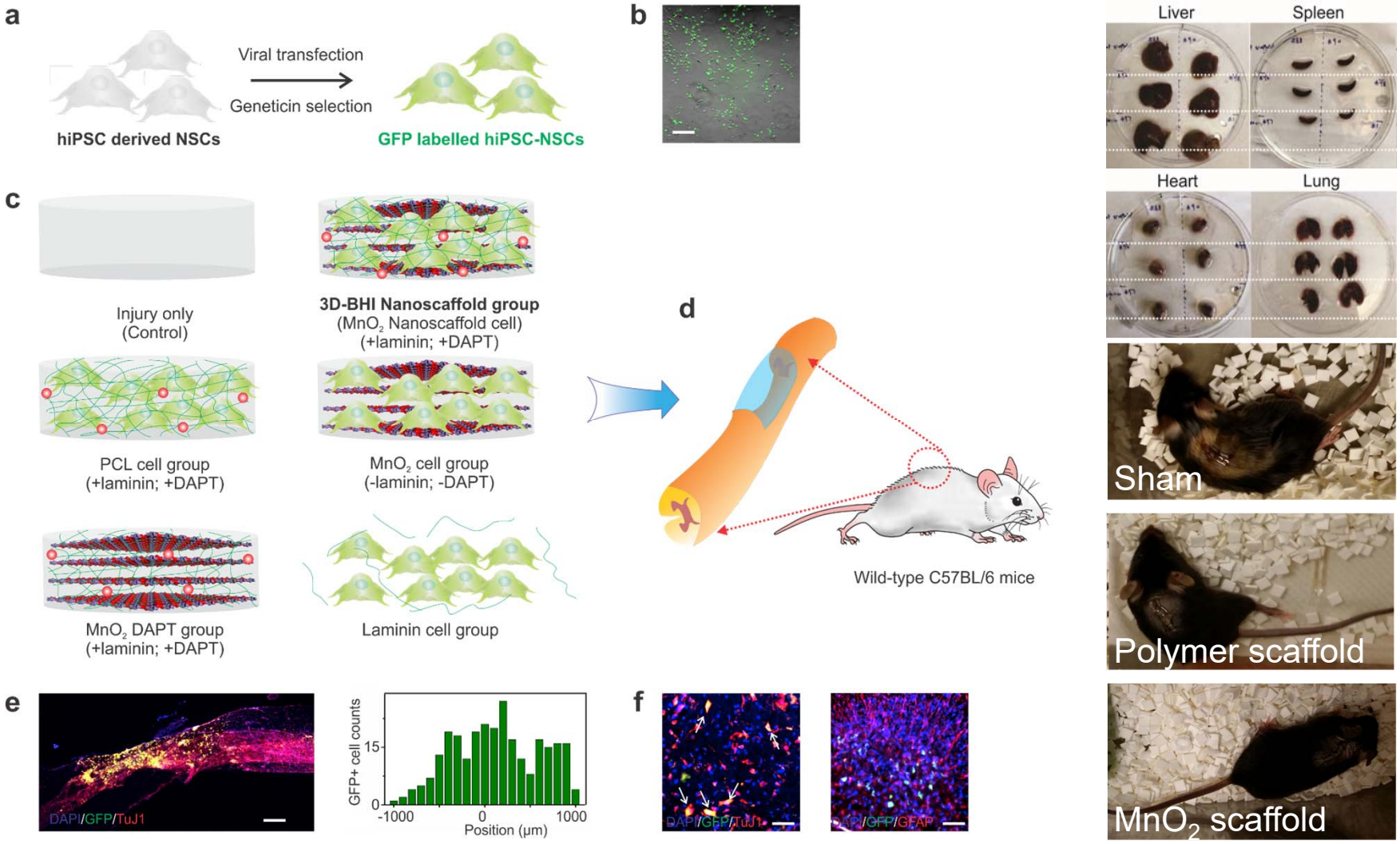





*Lee, K.B. et al. Nature Communications 2018. Wang, L. and Lee, K.B. et al 2018.*

# The Innovation – Details *(Slide 3 of 5)*

**Enhanced neurogenesis and biocompatibility**

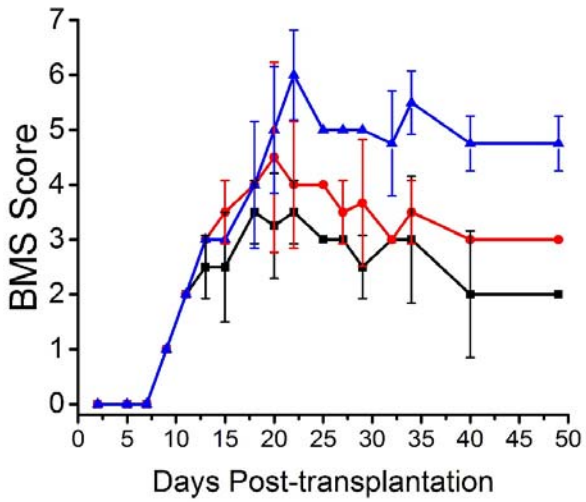




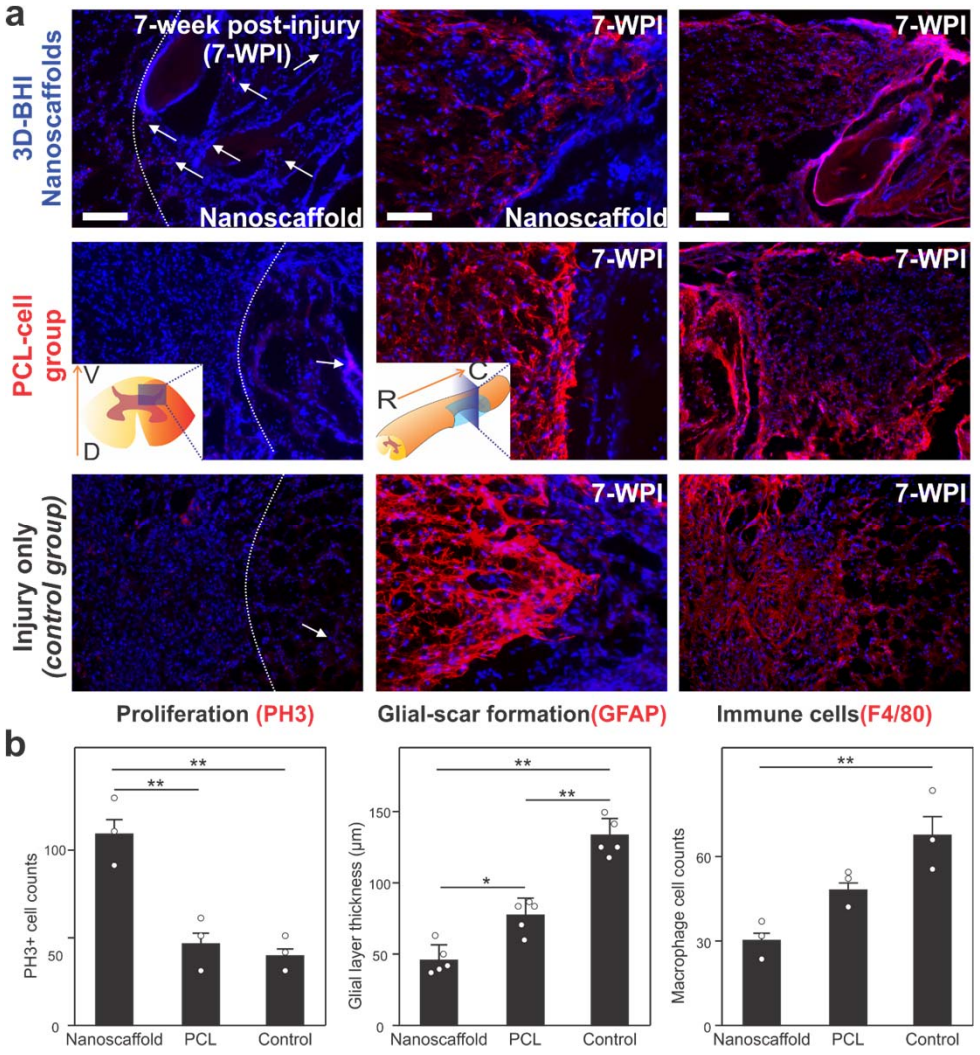

*Lee, K.B. et al. Nature Communications 2018.* 

# The Innovation – Details *(Slide 4 of 5)*

**Dramatically improved therapeutic effects with lower glial-scar formation**




*In collaboration with Prof. Li Cai's team at Rutgers*

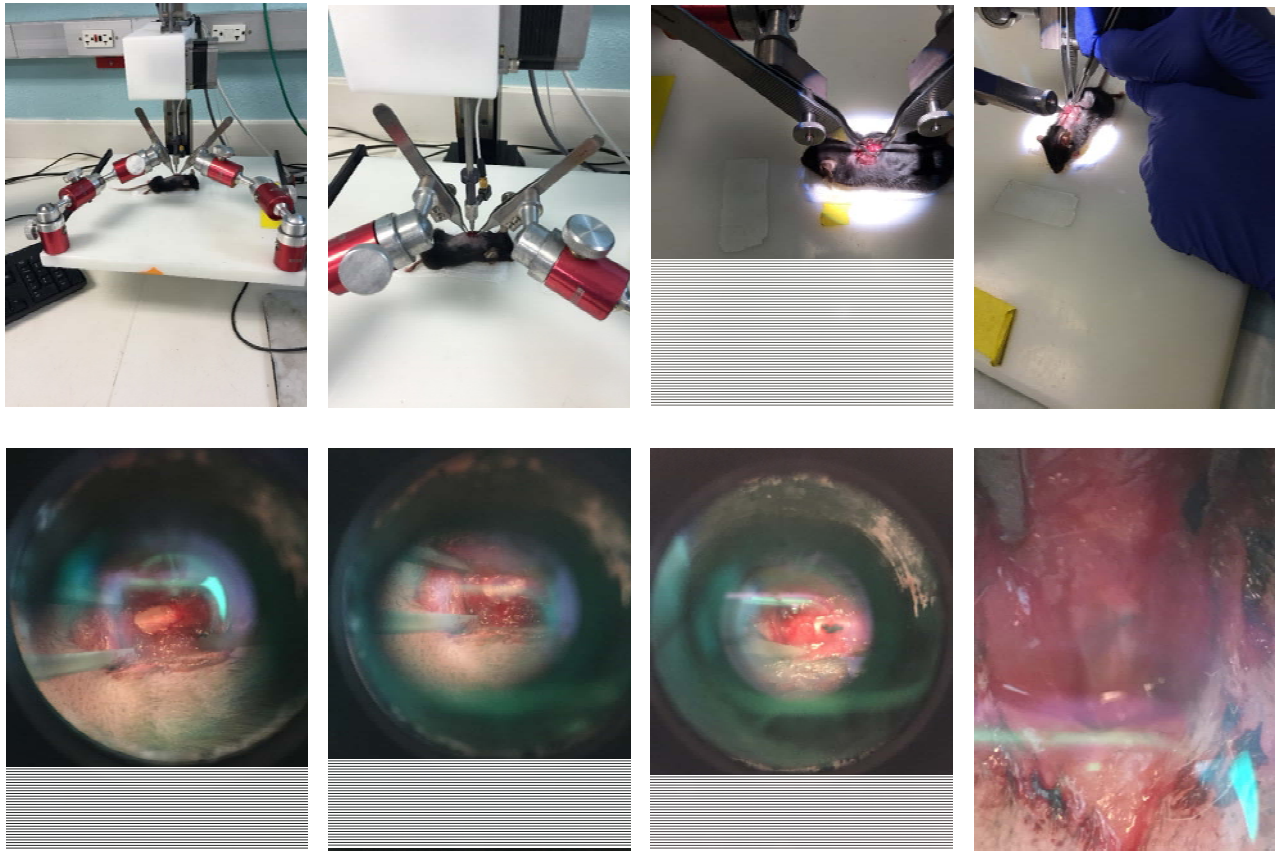




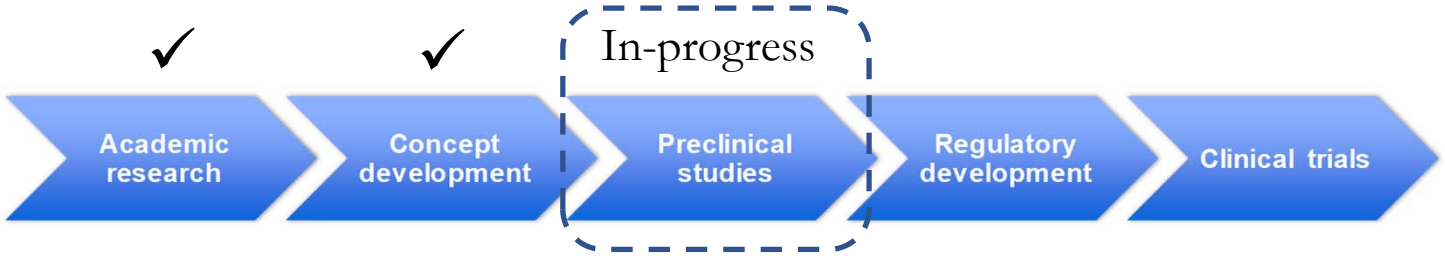

*Lee, K.B. et al. Nature Communications 2018.* 

# The Innovation – Details *(Slide 5 of 5)*

**Procedures for administration**



## Current Stage of Technology

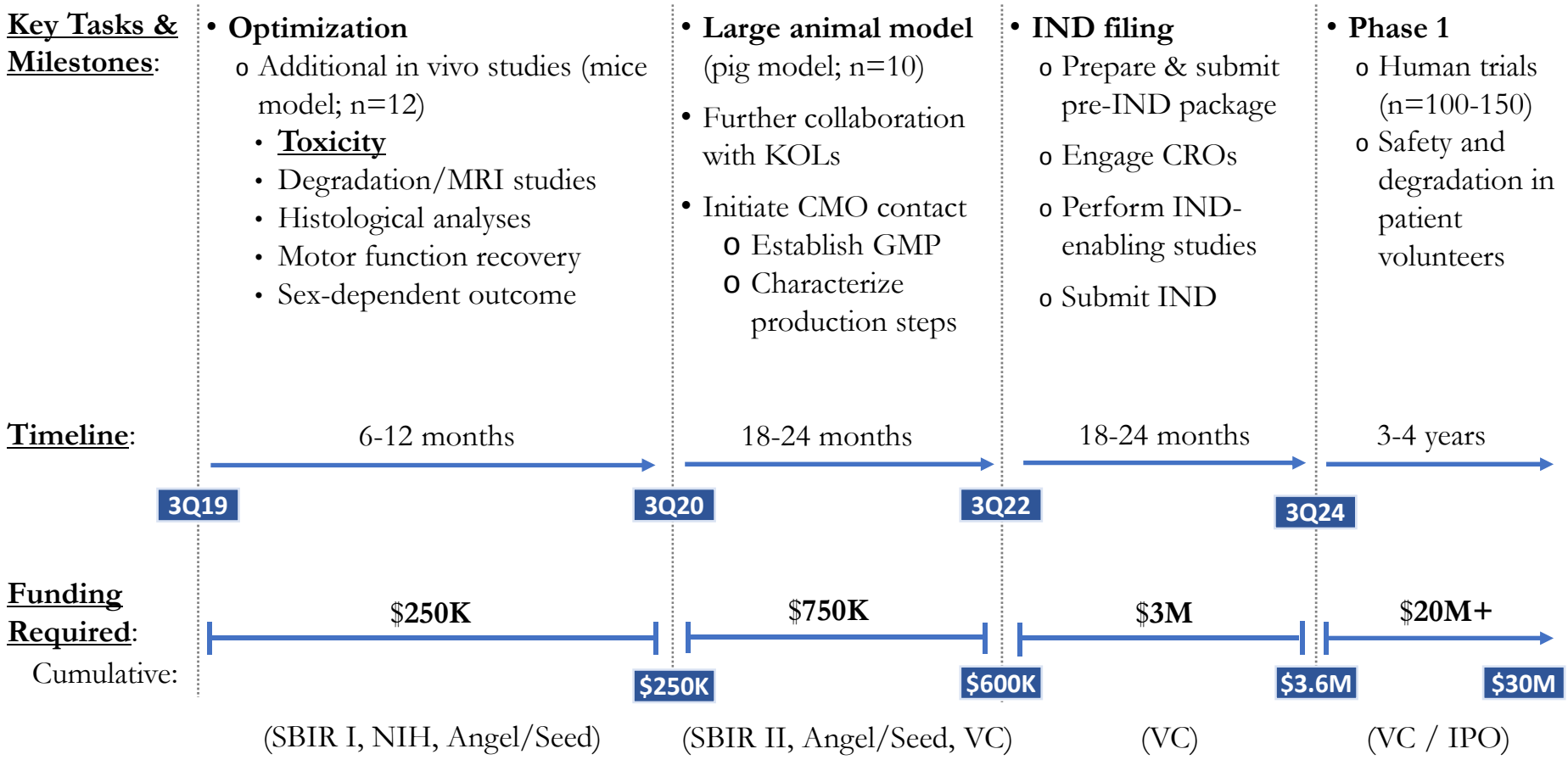



- Nationalized PCT patent filed Nov 2018
  - Covers material, methods of use, and manufacture thereof
  - Strong in vitro and in vivo data

- Published and submitted high-profile articles
  - Nature Comm., 2018
  - J. Phys. Chem., 2018
  - Biomaterials (submitted manuscript)

- Extensive in vitro and in vivo data available upon request

# Development Timeline & Funding Requirements



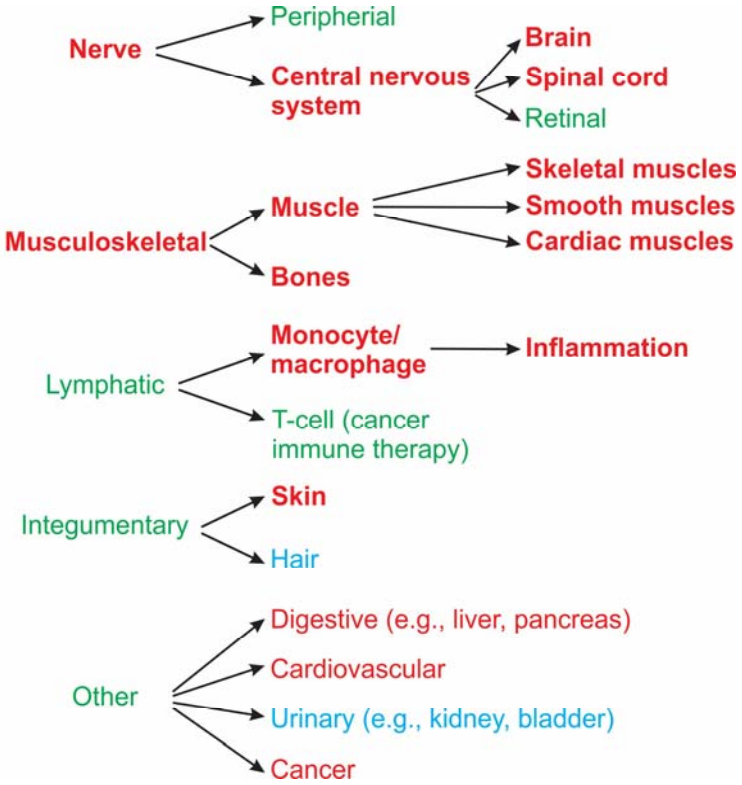

**Other Notables:**

- **Cumulative Funding To-Date:**
  - New Jersey Commission on Spinal Cord Research & Rutgers TechAdvance: $1M

# Long Term Goals

- Leverage our innovation as a **platform technology into other fields of use**
  - We see significant number of potential fields of use:

**Red fonts: fields of use with high importance;**
Green fonts: medium importance
Blue fonts: importance currently unknown

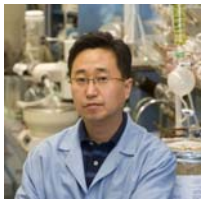


## The "ASK"

- We are looking for a **seasoned and proven business executive**
  - Become a business co-founder
  - Help refine and execute our market strategy
  - Lead fund raising efforts for both dilutive and non-dilutive capital
  - Coordinate regulatory efforts

- We also welcome **partnerships** that can help us advance our technology into commercialization
  - CMOs/CROs

## Current Team



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# THANK YOU