

defitech  
foundation

EPFL



Unil  
UNIL | Université de Lausanne



Mechanistic Division & The Future



Transcriptomic  
Discovery

Regeneration  
Discovery

Stroke  
Applications

High Impact  
Fundamental Mechanism  
Novel Therapy Discovery

Clinical Divisions & The Now



Parkinson  
Disease

Brain-Spine  
Interface

Brain & Spine  
Stimulation

Clinical  
Development

First-in-human  
Clinical Therapy  
Future Treatments

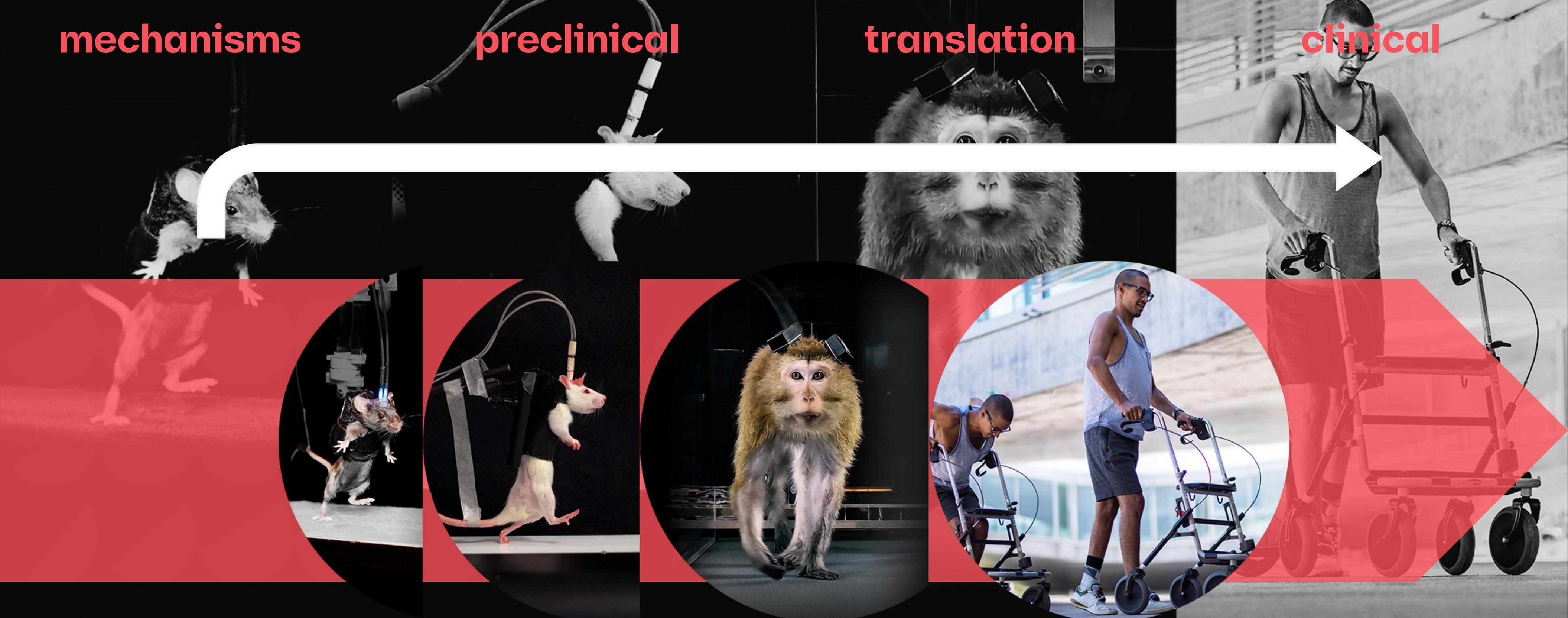


mechanisms

preclinical

translation

clinical



Neuro  
Restore

Science  
in Motion

scale up

## **Background**

What is lost after Stroke

## **Cell Therapy for Stroke**

Cell Therapy approach

Cell therapy in the Clinic

## **Results**

Our previous work

Current Approach

ANCE transcriptome

ANCE neurovascular vs Neuronal

ANCE in vivo (Mice)

ANCE in vivo (Primate)

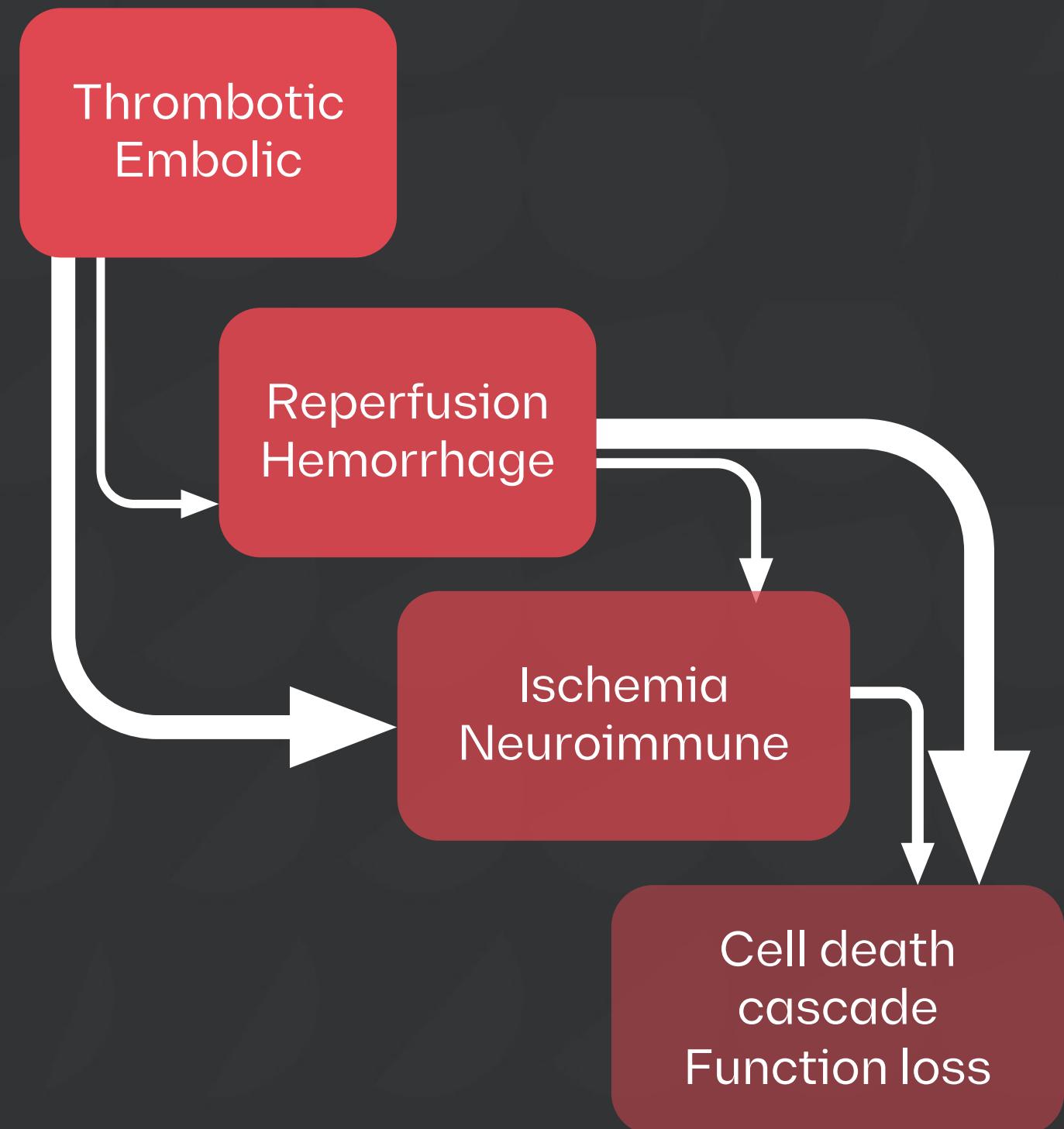
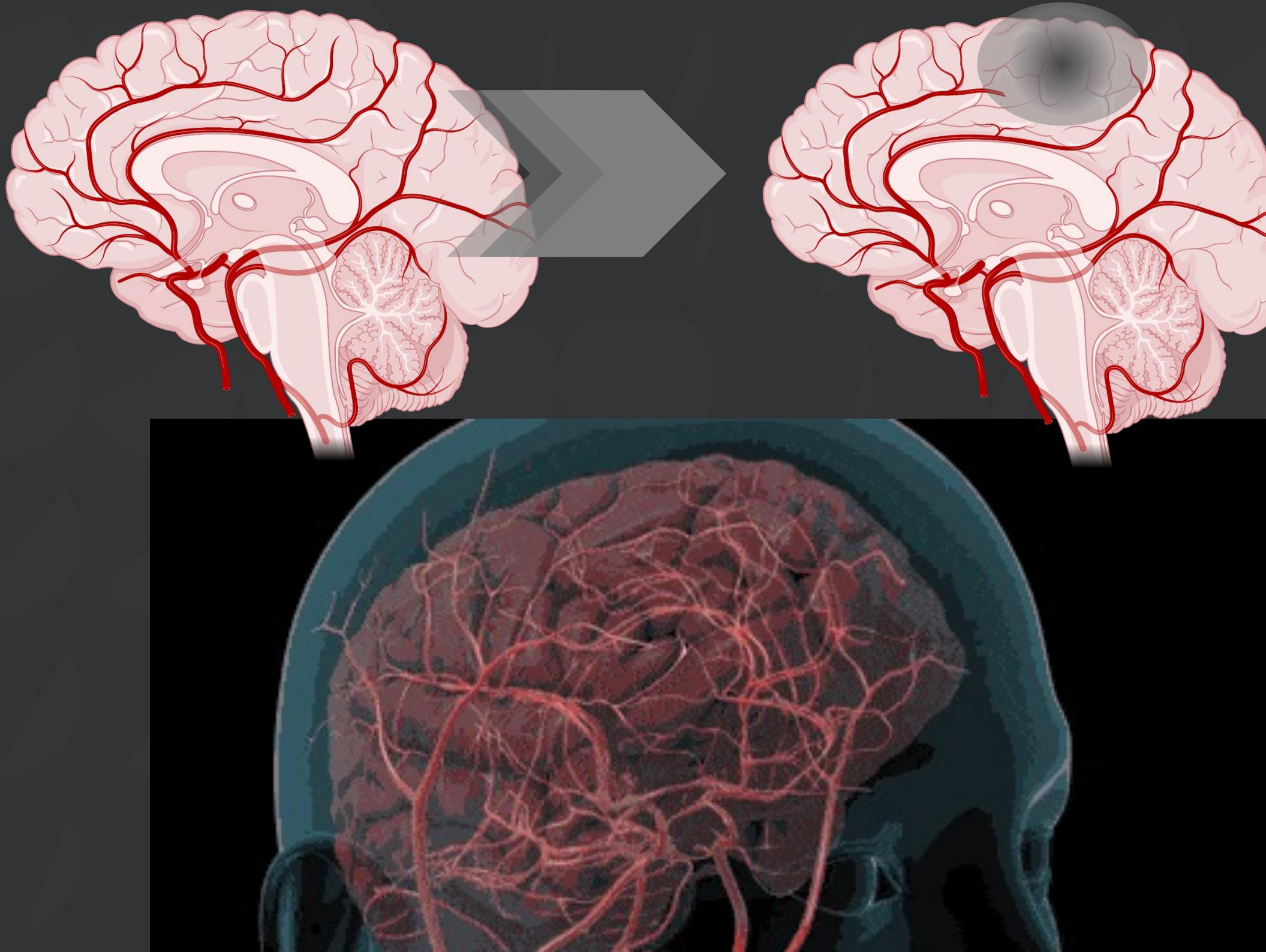
## **Future Works**

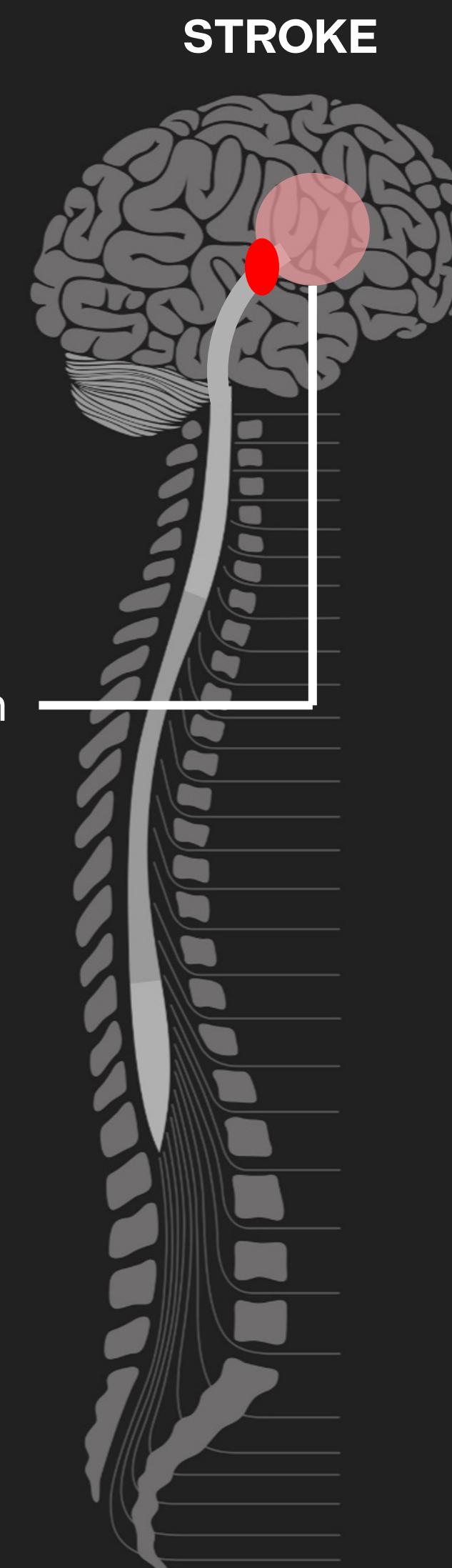
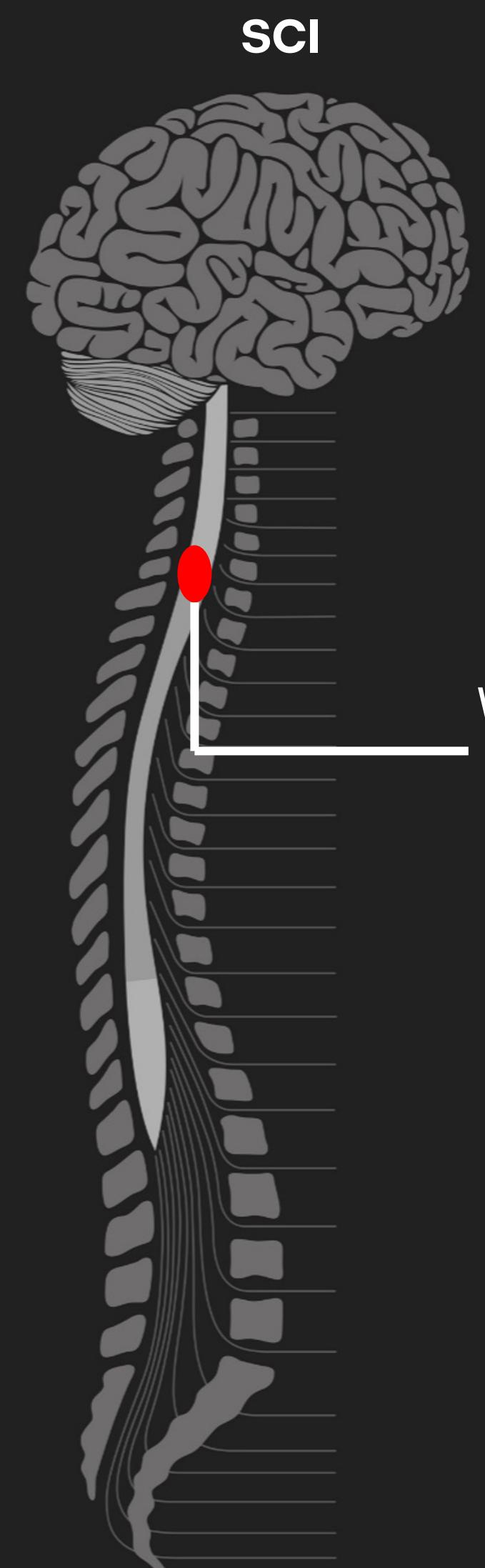
Primate to Clinics



# Stroke

## Types & Mechanisms





**Stroke**  
CNS injury characteristics

Repair

Reconnect

1. Tissue Integrity (matrix, vasc.)
2. Tissue repopulation
3. Tissue functionalization

# Cell Therapy **State of the Art ?**

# THE NEW YORK MEDICAL JOURNAL, JUNE 28, 1890.

## Original Communications.

### SUCCESSFUL BRAIN GRAFTING.

By W. GILMAN THOMPSON, M.D.,

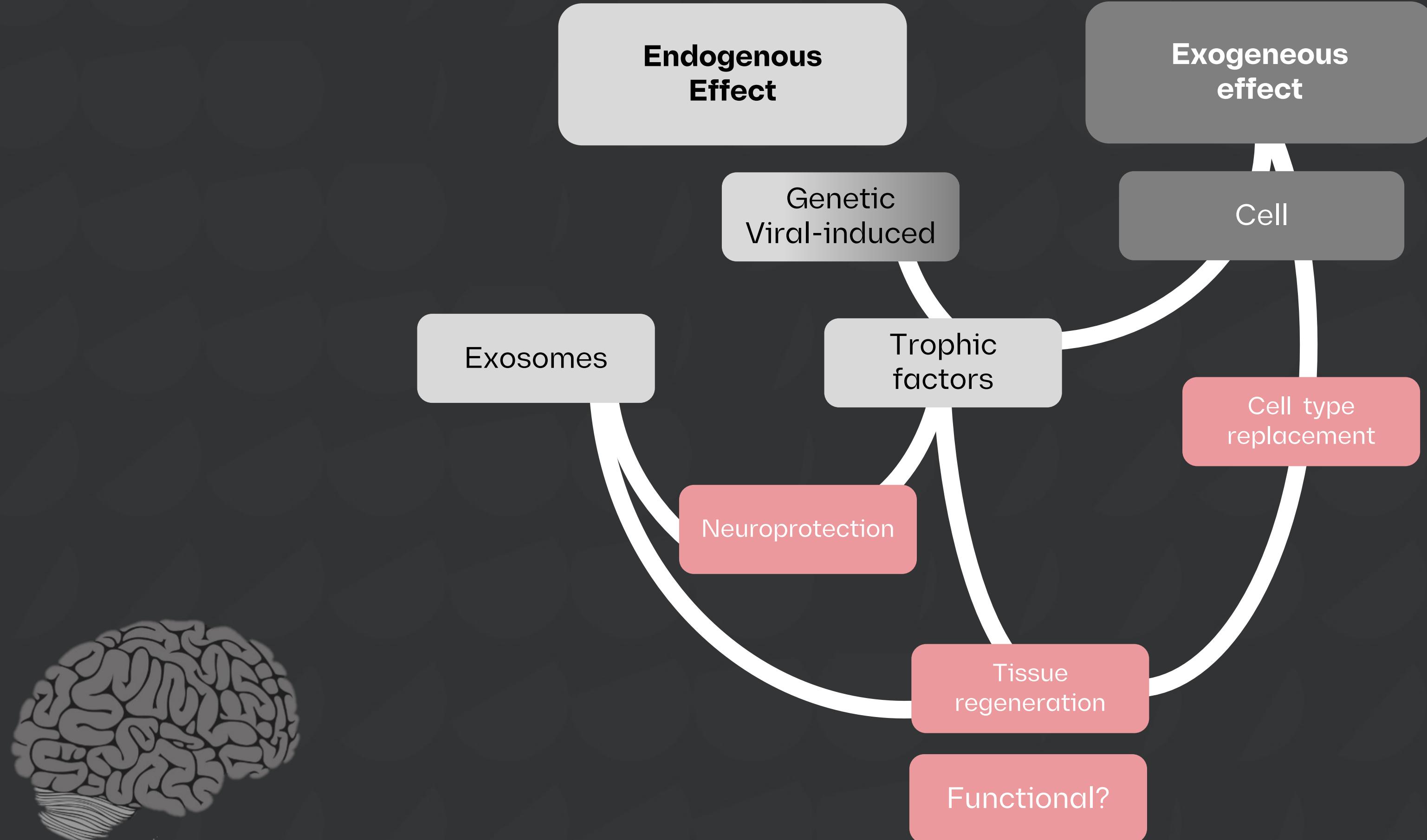
PROFESSOR OF PHYSIOLOGY IN THE NEW YORK UNIVERSITY MEDICAL COLLEGE;  
VISITING PHYSICIAN TO THE PRESBYTERIAN AND THE NEW YORK HOSPITALS.

ATTEMPTS have been made to graft nearly all the different tissues of the body. Skin, bone, teeth, muscle, nerves, glands, eyes, mucous membrane, etc., have all been grafted with more or less success, but successful brain grafting has

dog's left occipital region and transplanted into an opening of the same size in the cat's left occipital region. Three days later the cat was killed. The transplanted dog's brain was found where it had been placed, firmly adherent to the cat's brain by a layer of fibrin, which varied from one fourth to half an inch in thickness. The cat was, of course, totally blind in the right eye.

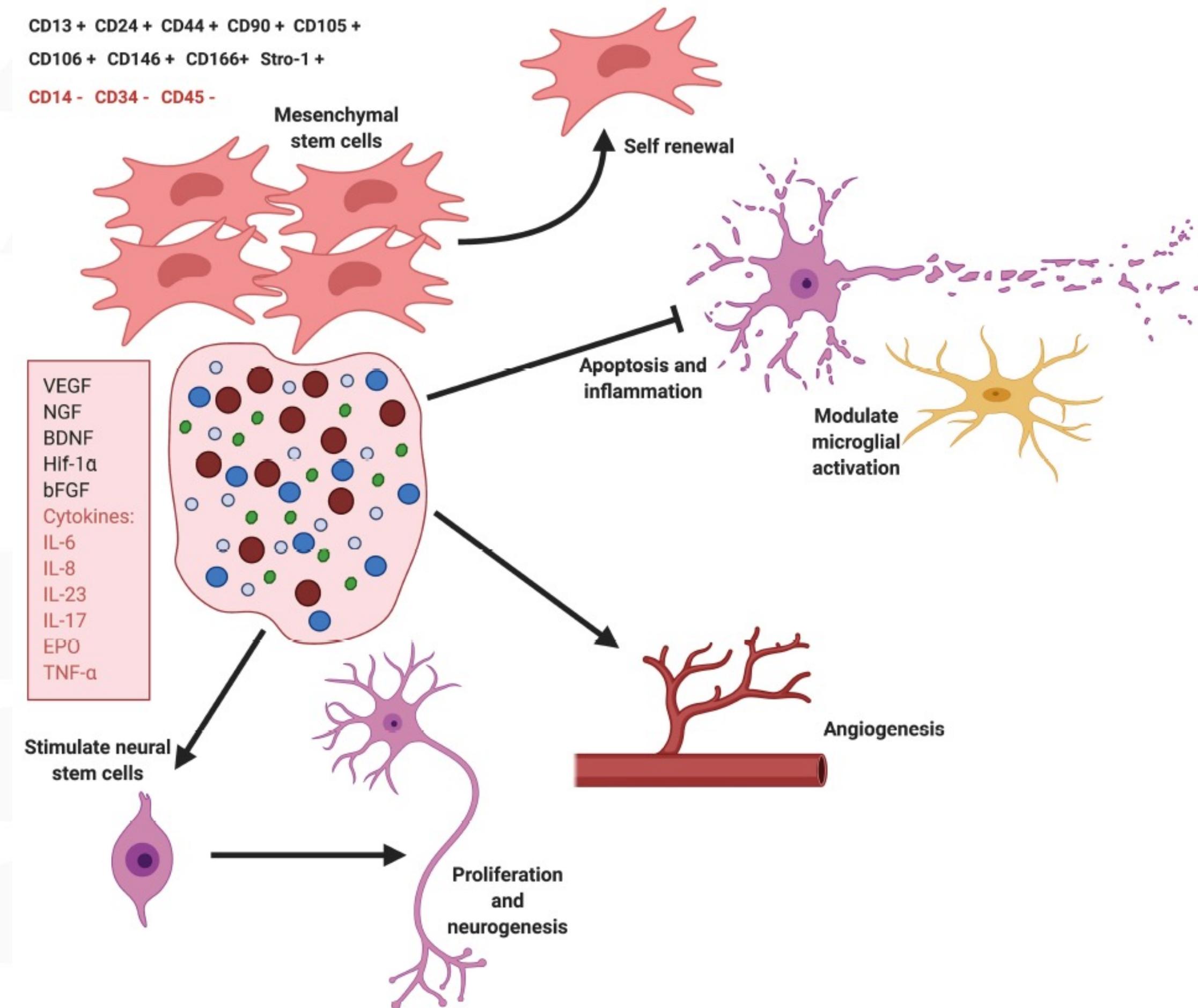
*Experiment III.*—Another cat and dog were simultaneously trephined; 4 c. c. of brain tissue were excised from the dog's right occipital region and replaced by an equal quantity of cat's brain from the same region. On the fourth day the cat's brain was found adherent to the dog's by a layer of fibrin.





# Stroke and Cell therapy

By stander effect

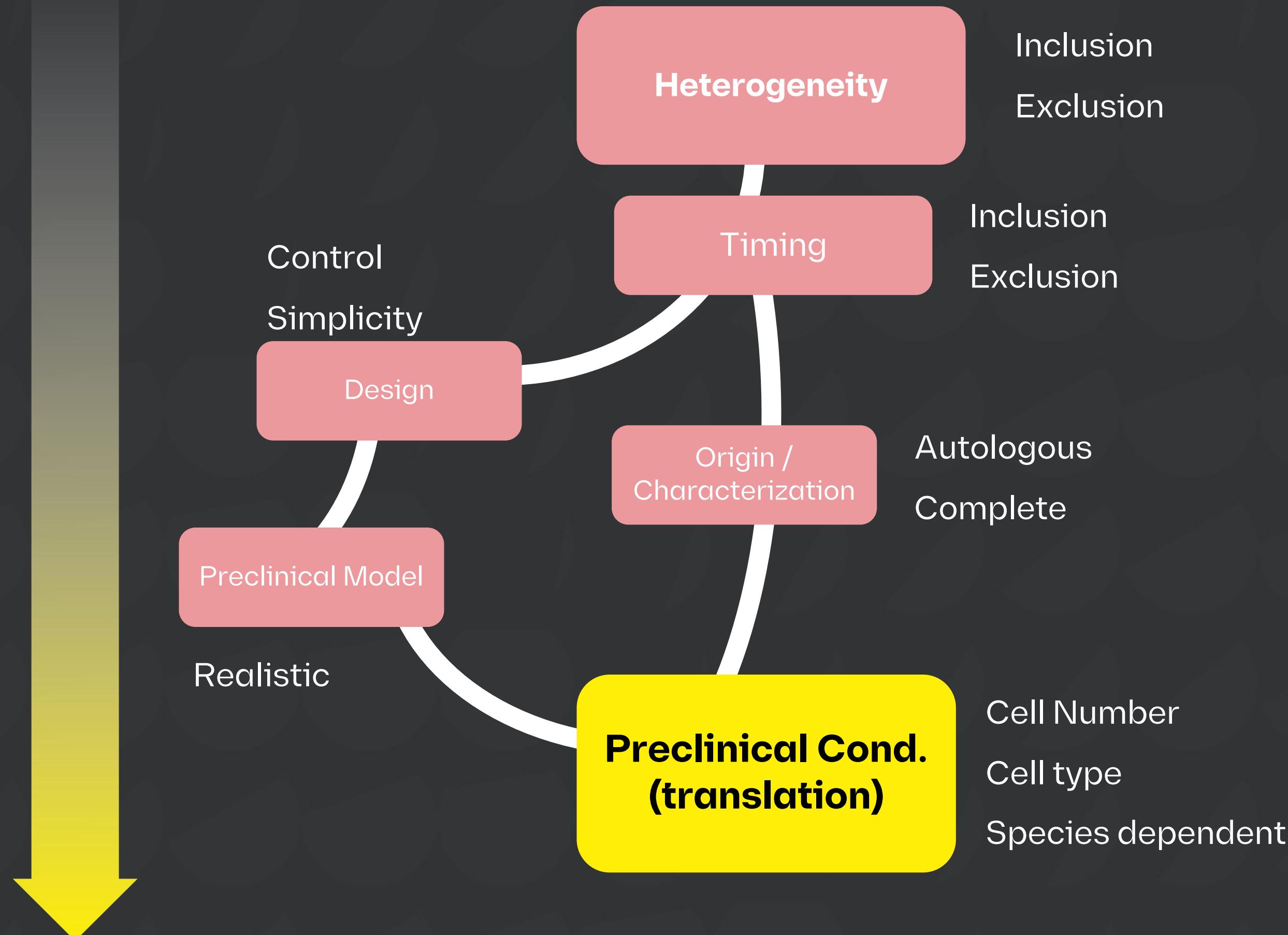




Low

Success

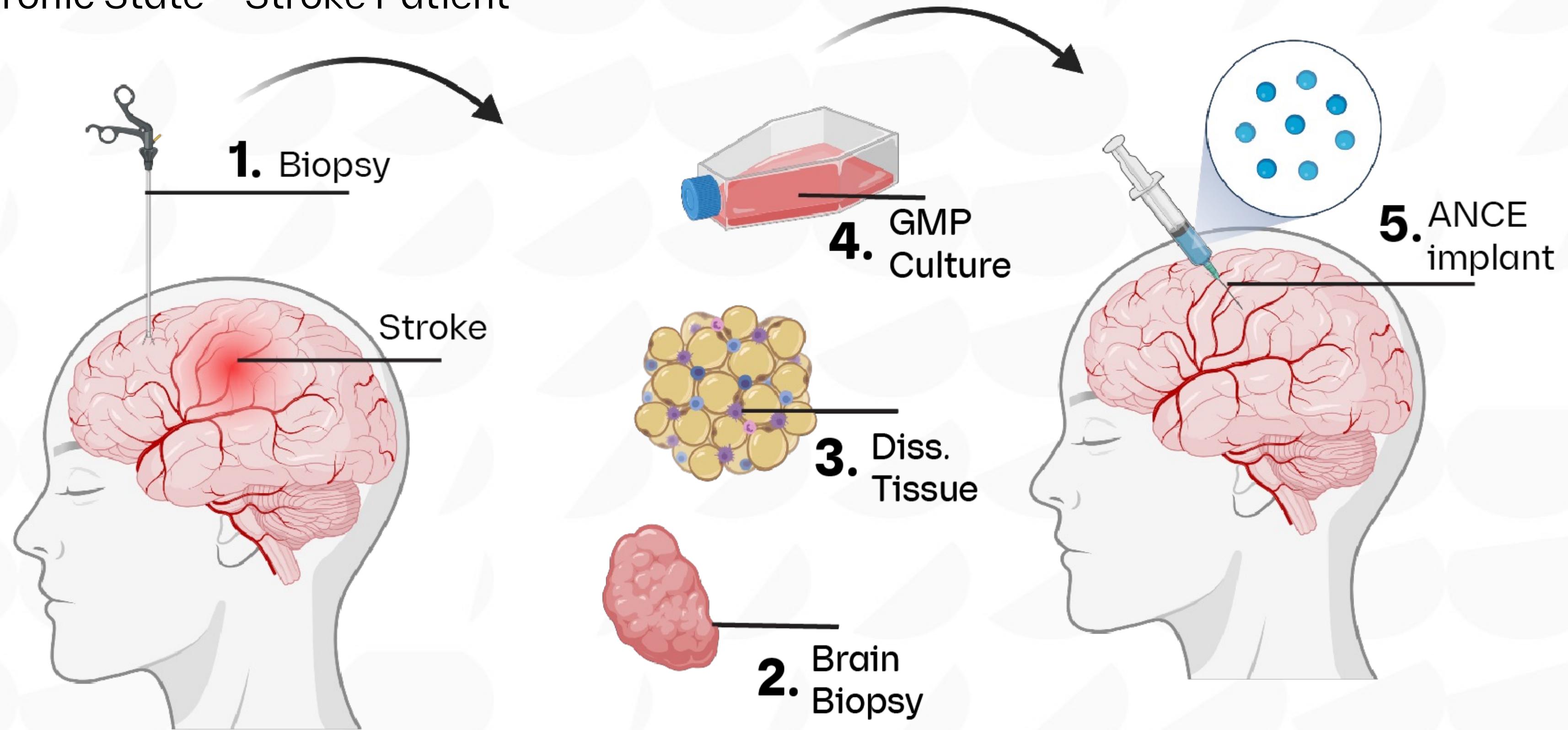
High Success



# Cell Therapy: Autologous Neurovascular Cell Ecosystem

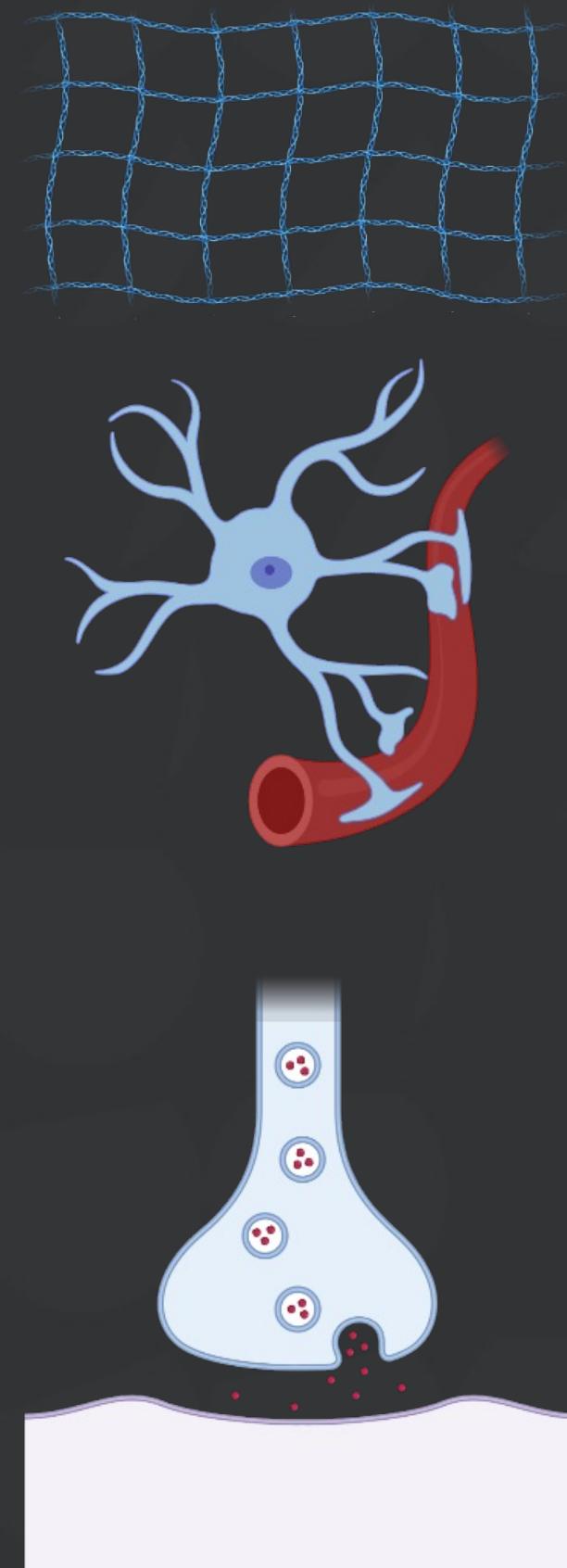
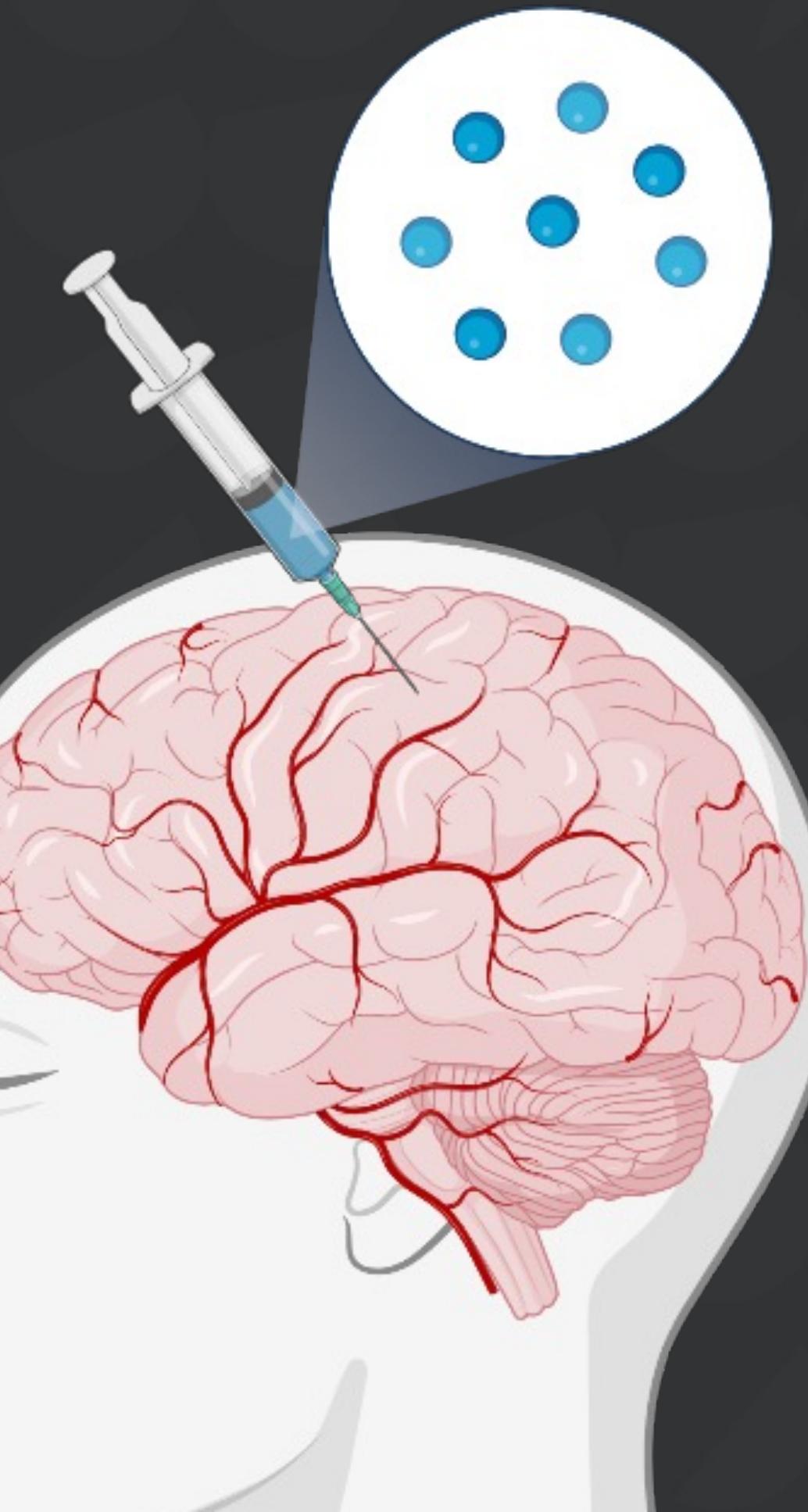


Chronic State – Stroke Patient



# ANCE Therapy

## What Ecosystem?



- Rebuild lost Structure (ECM)
- Neurogenesis
- Angiogenesis
- Neurovascular Coupling
- Synaptogenesis

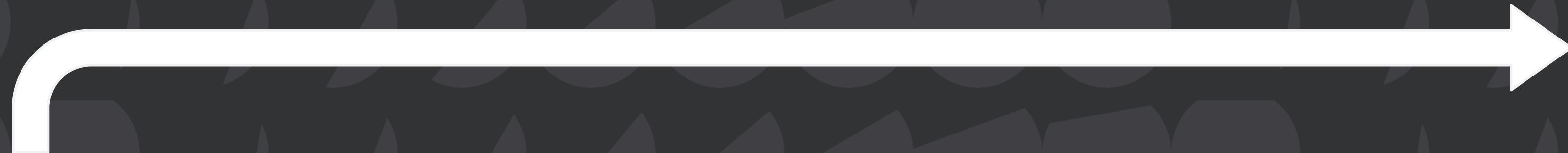


mechanisms

preclinical

translation

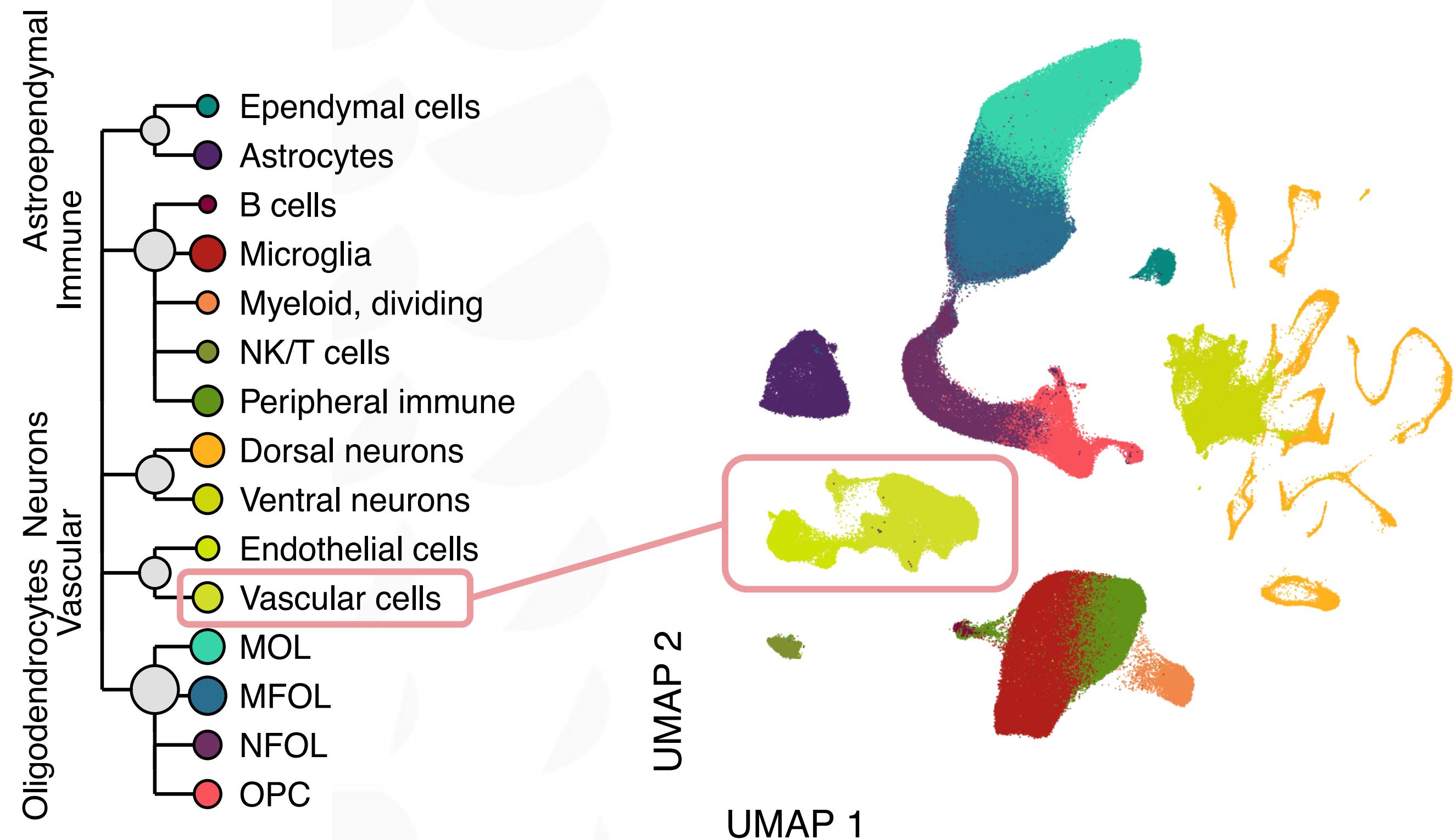
clinical



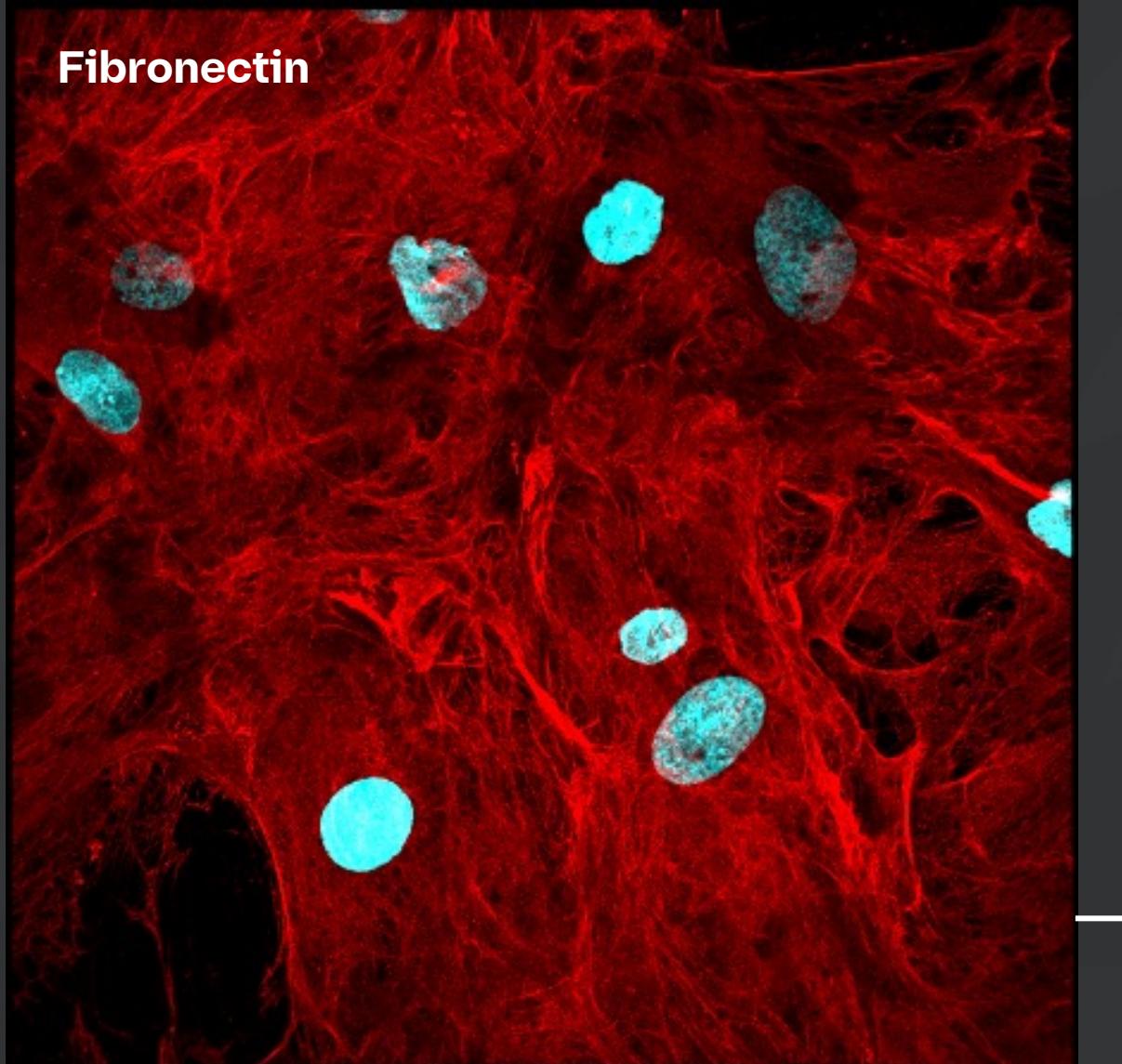
neuro  
restore

Science  
in Motion

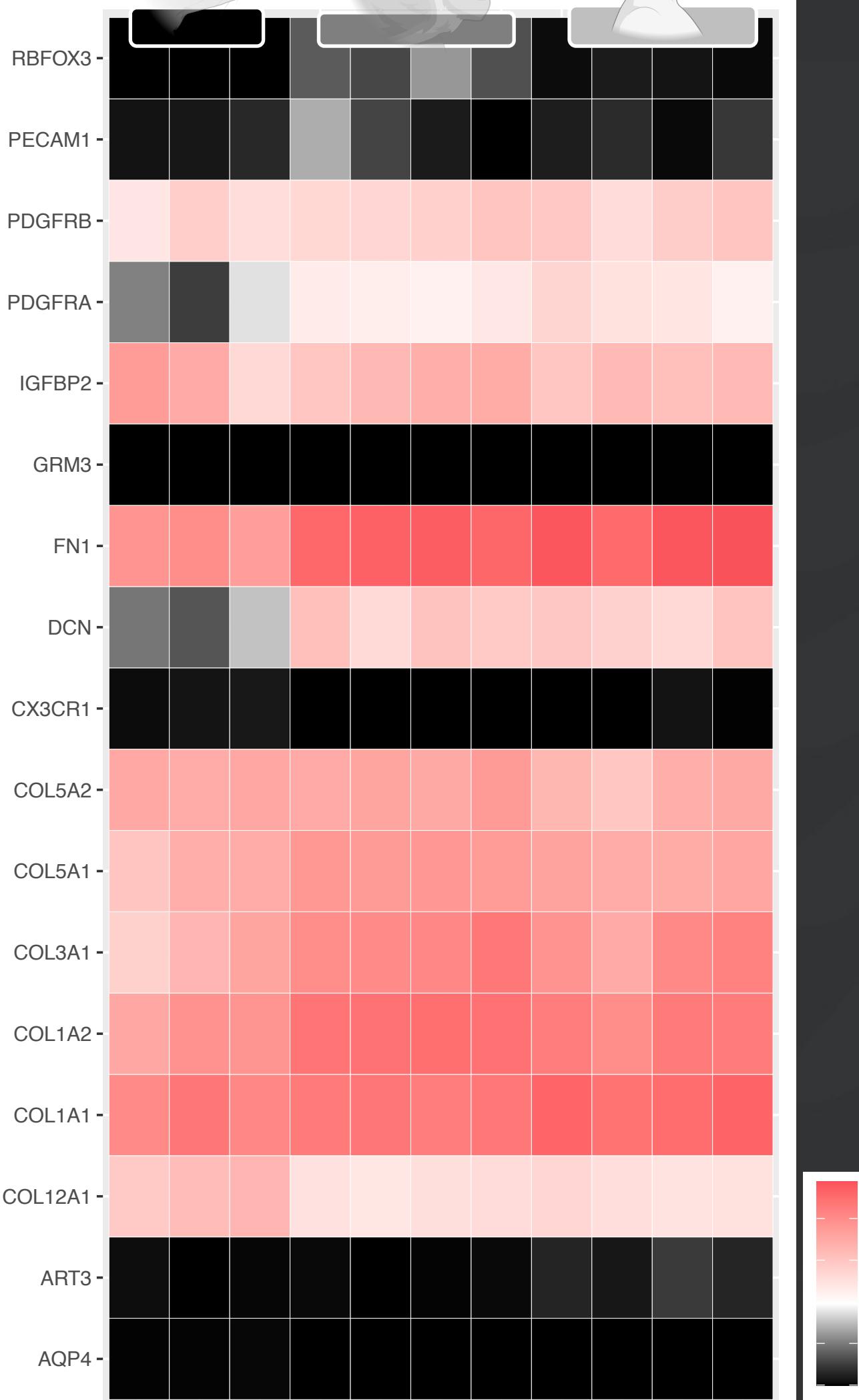
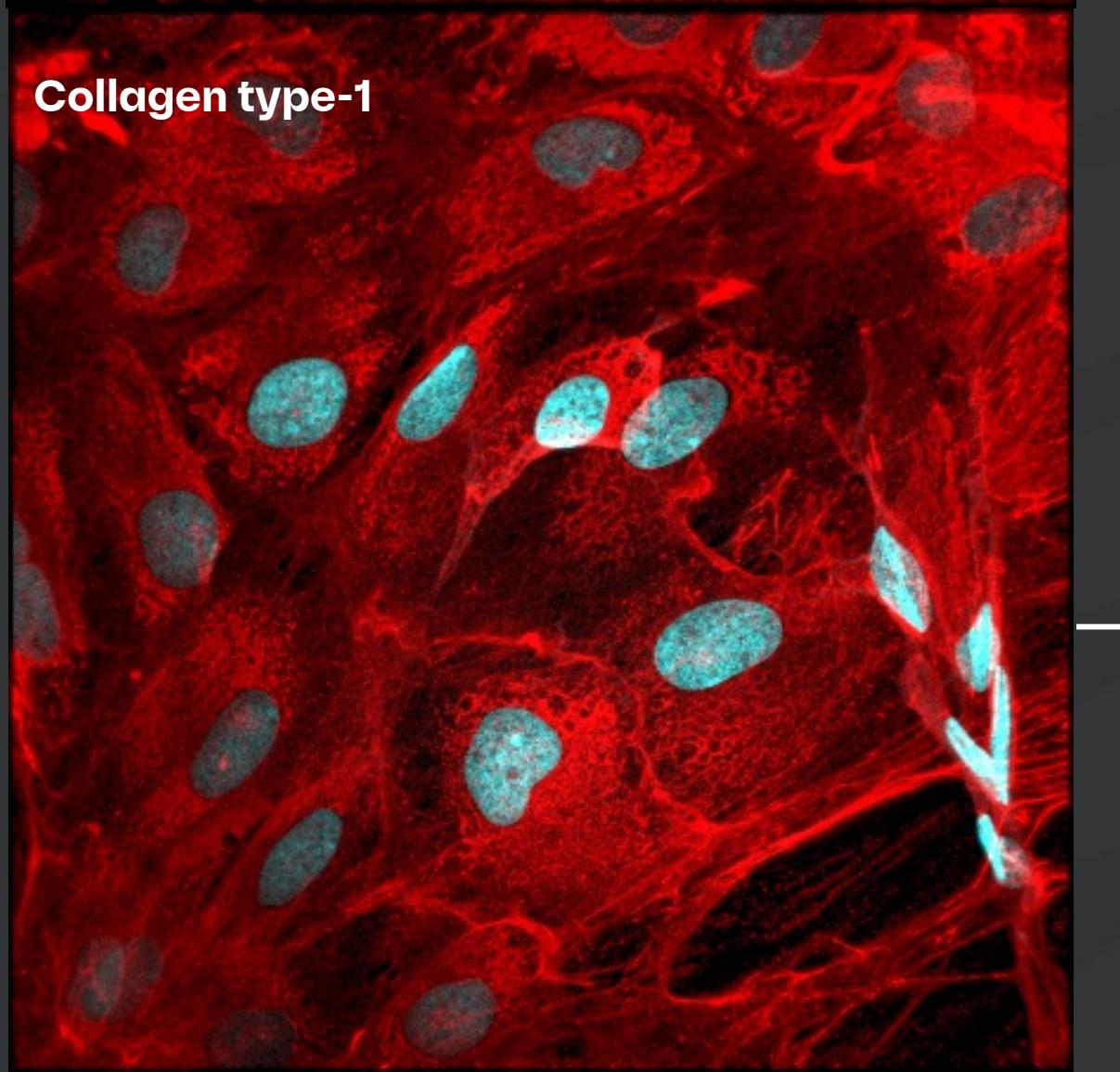
scale up



Fibronectin



Collagen type-1

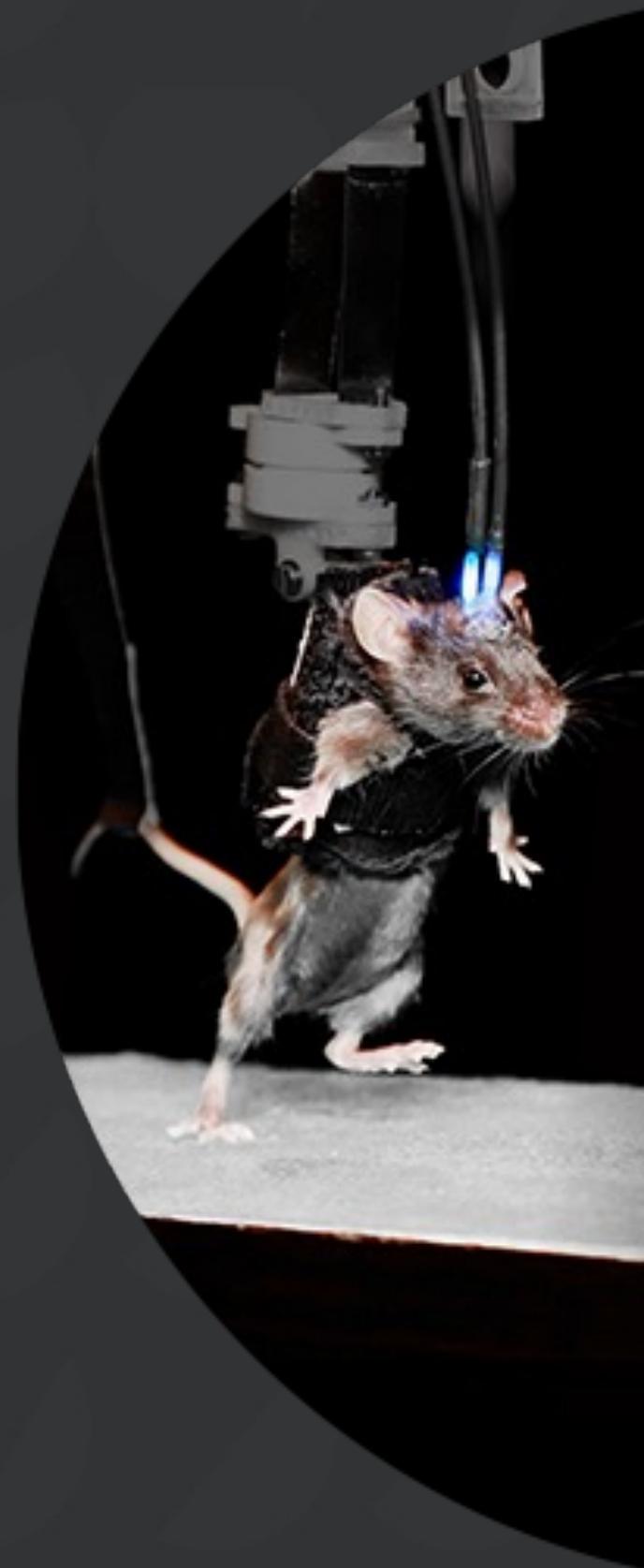


ANCE  
VLMC/MSC

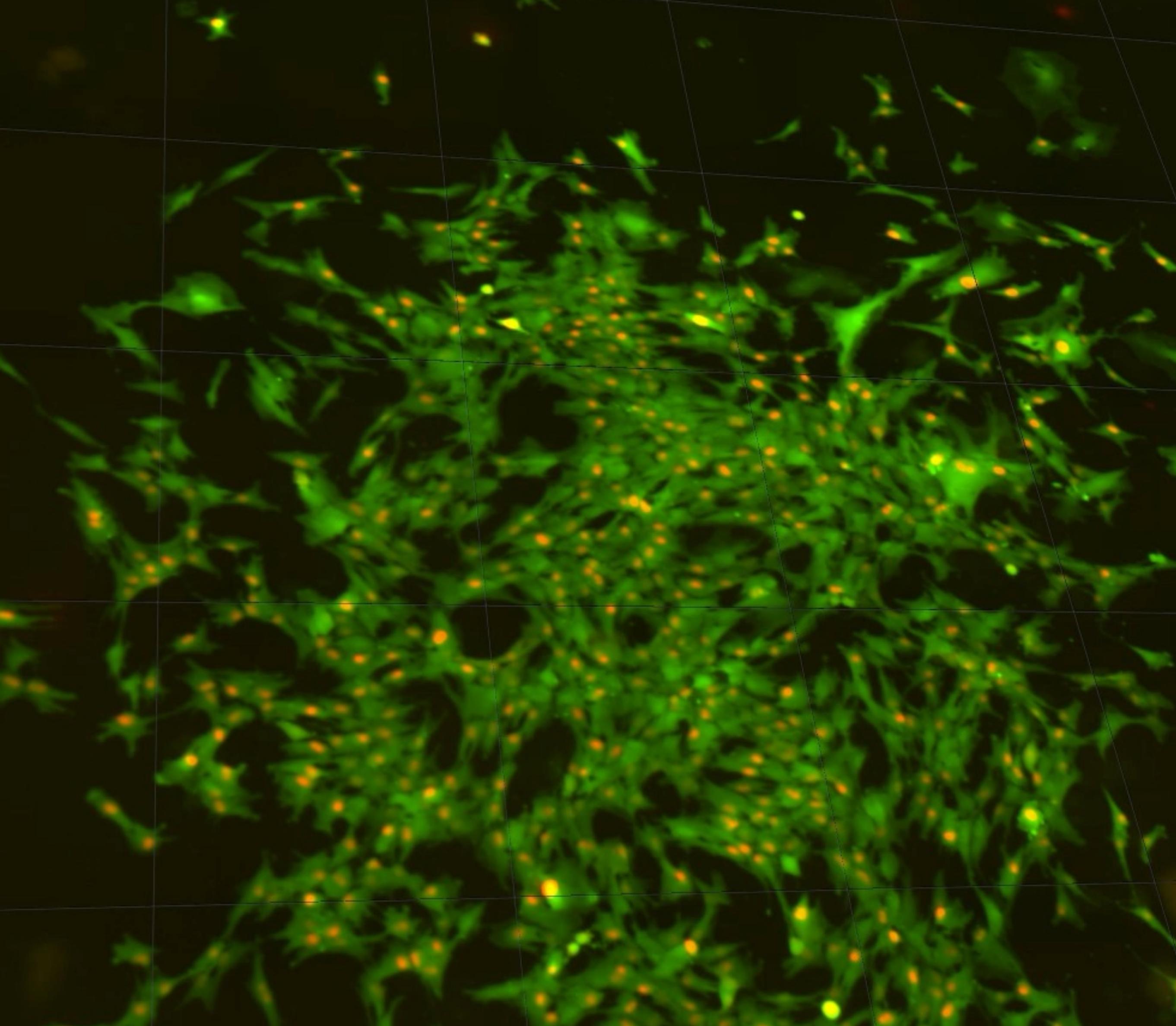
- Stem Cell-like
- MSC properties



**ANCE Therapy**  
Mechanistic Validation

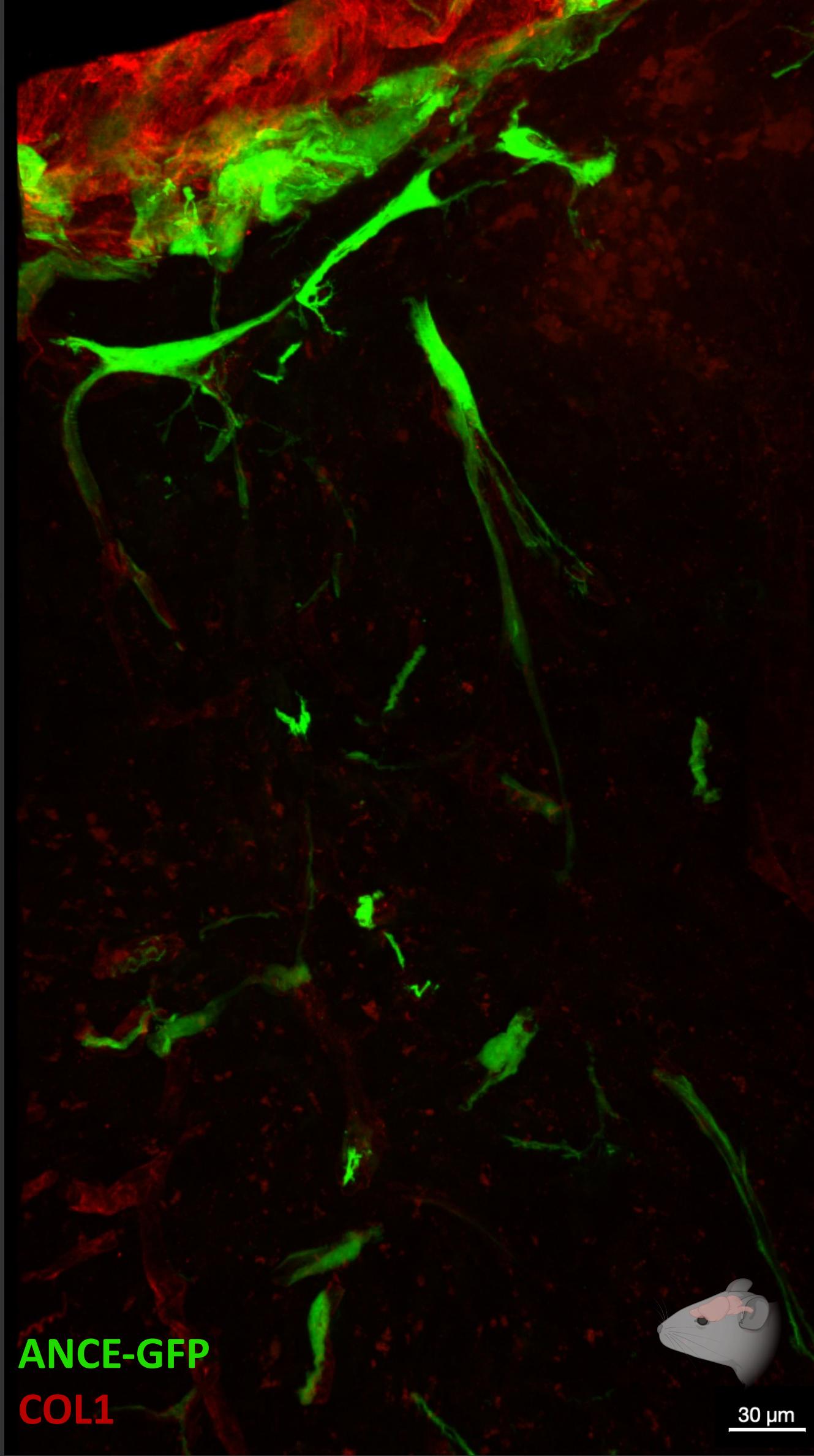


## ANCE – Cell culture



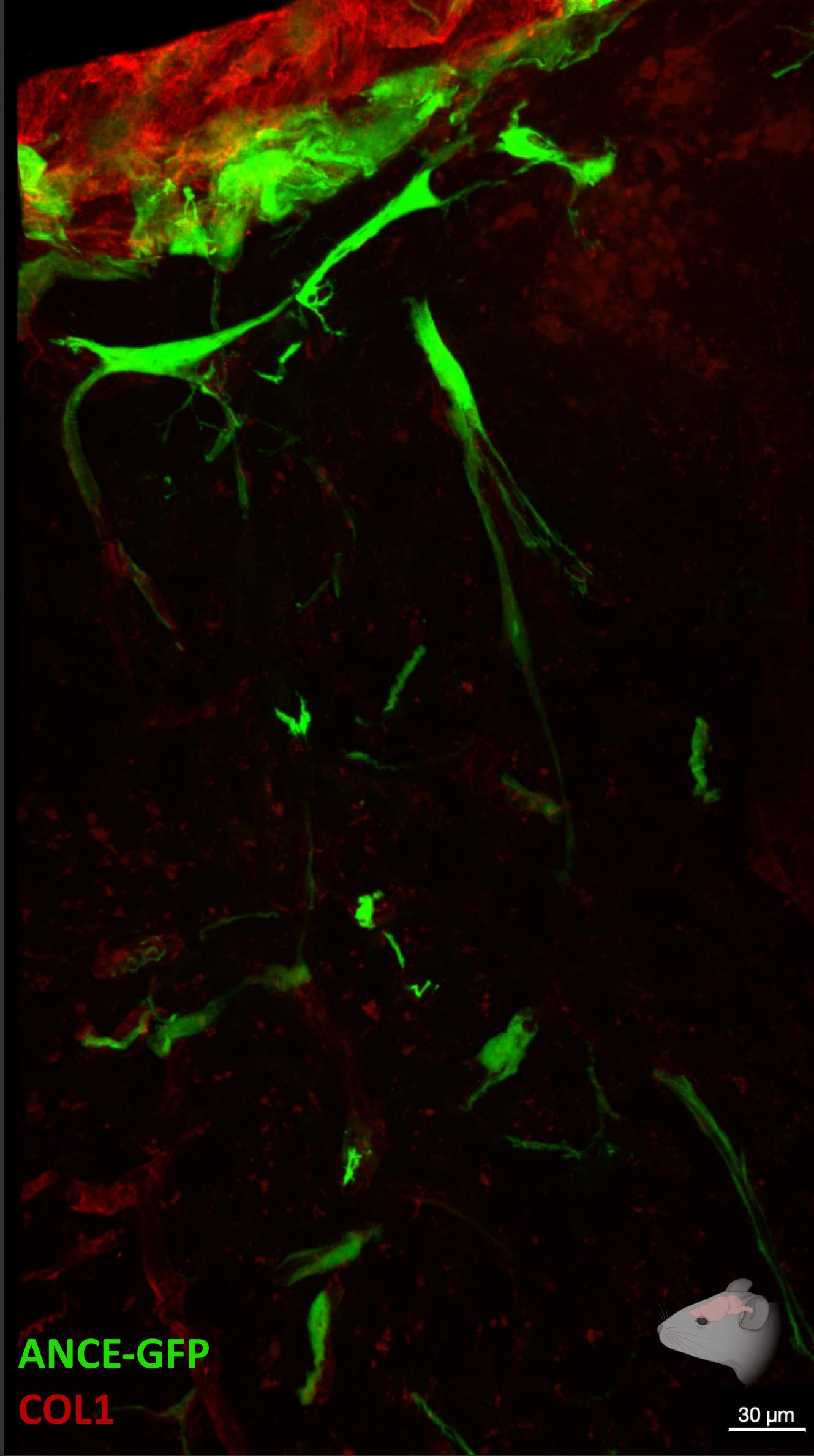
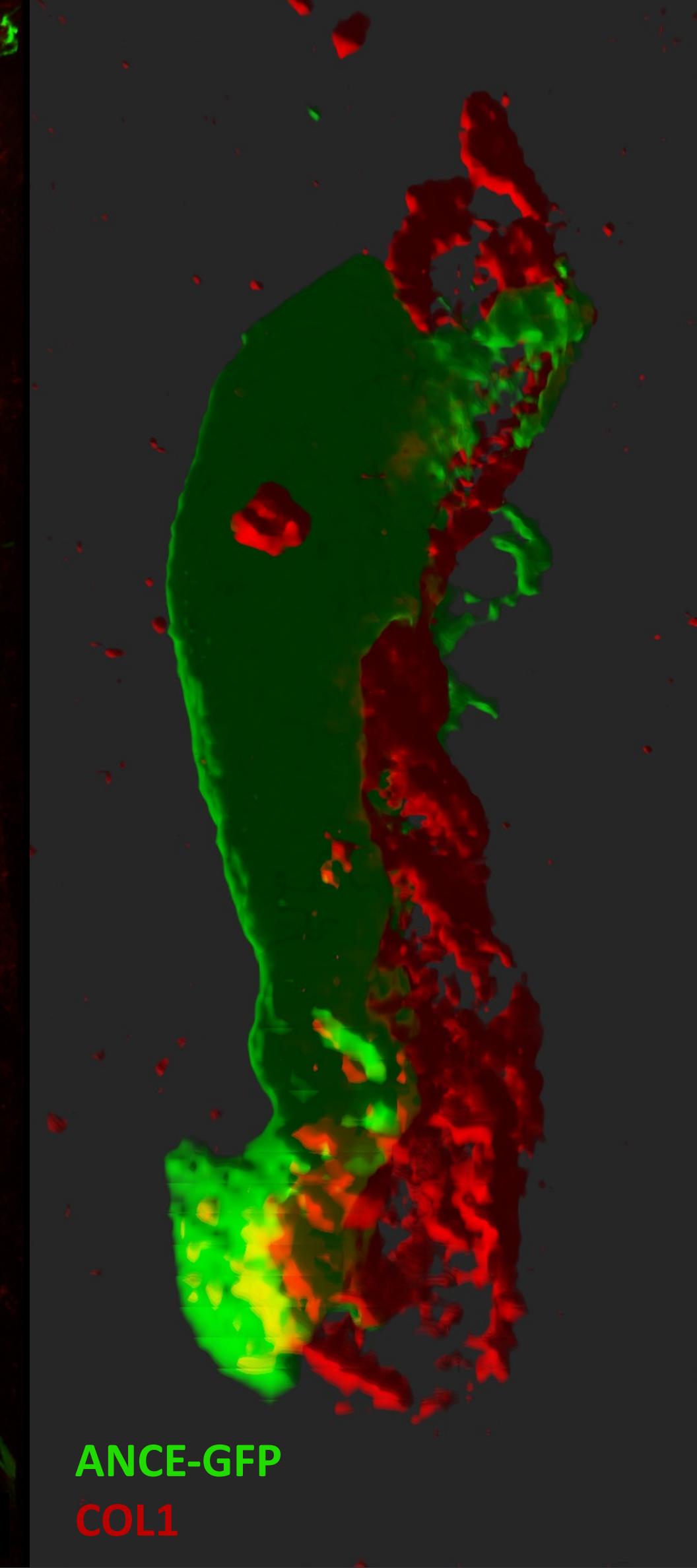
- **Genetically Tagged**
- **Expand Fully**
- **Human Grade**
- **Fully Characterized**





ANCE

Neurovascular Integration



30 μm

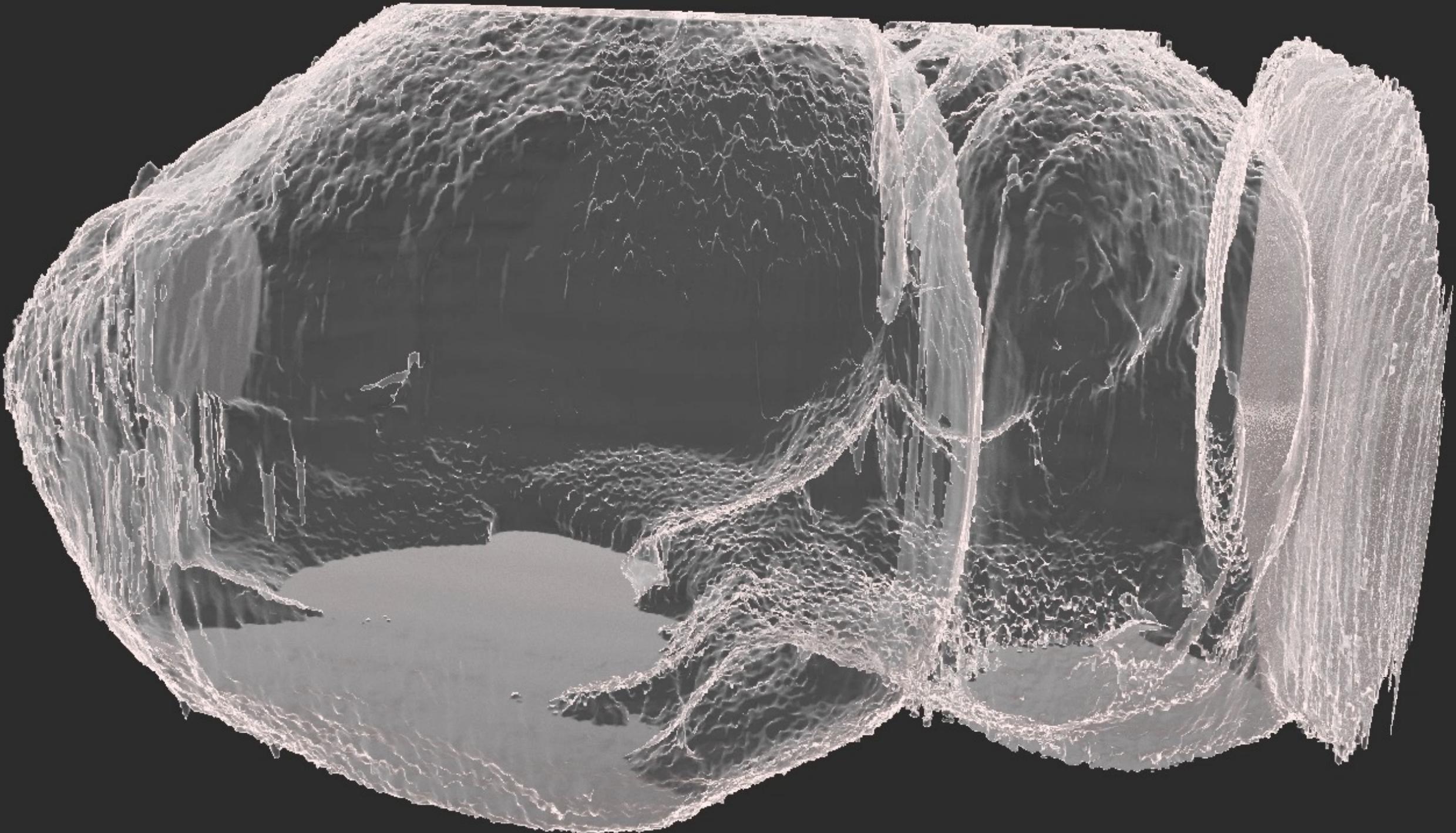


NIR

# Cortical Stroke (Mouse)

ANCE cells

ANCE in Stroke  
Integrate and Repair



1000 µm



NIR



# ANCE Therapy

## Translational Validation

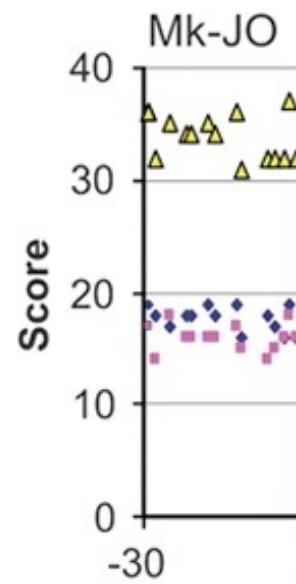
ANCE

Translational Platform

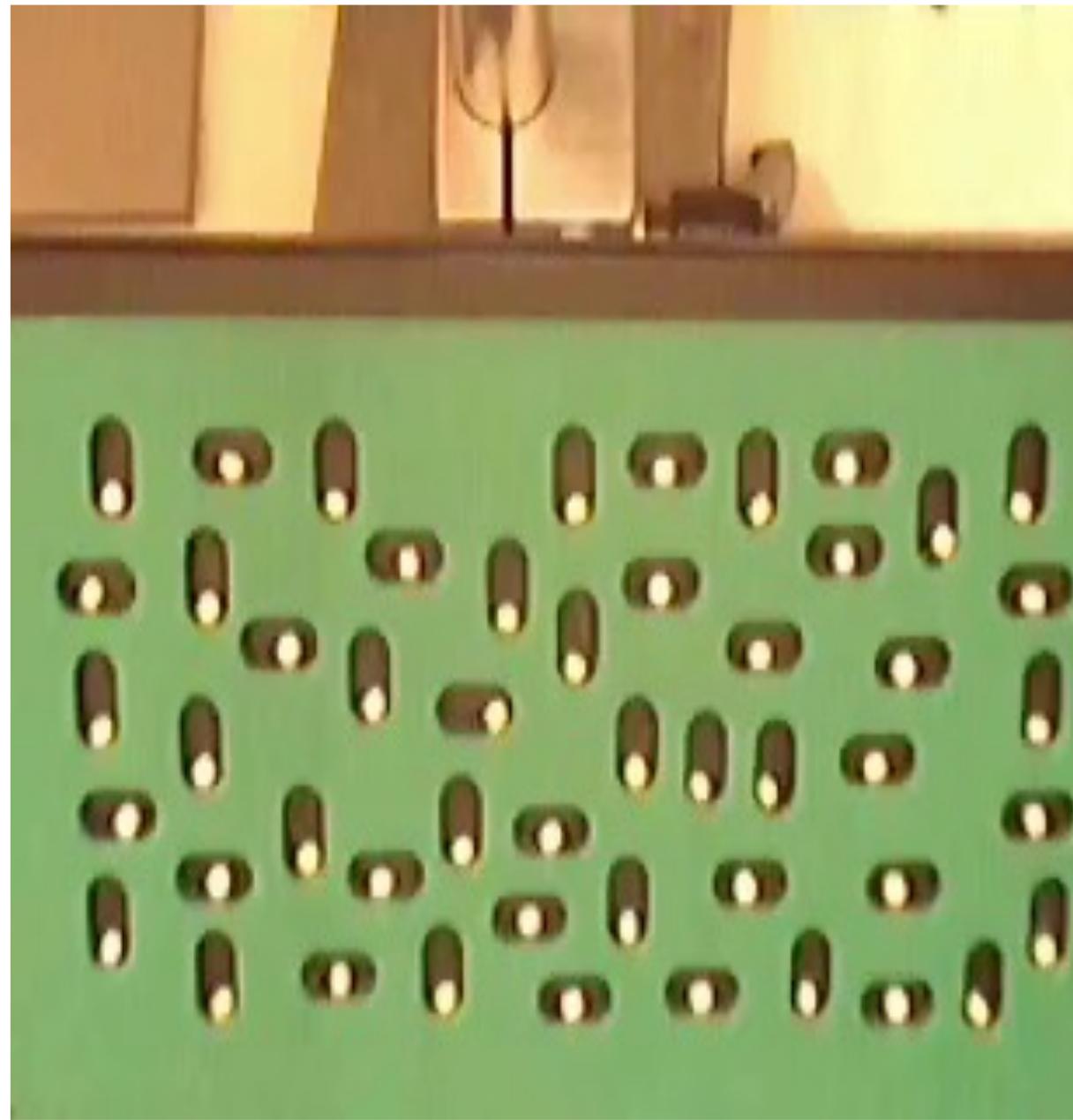


**ANCE**

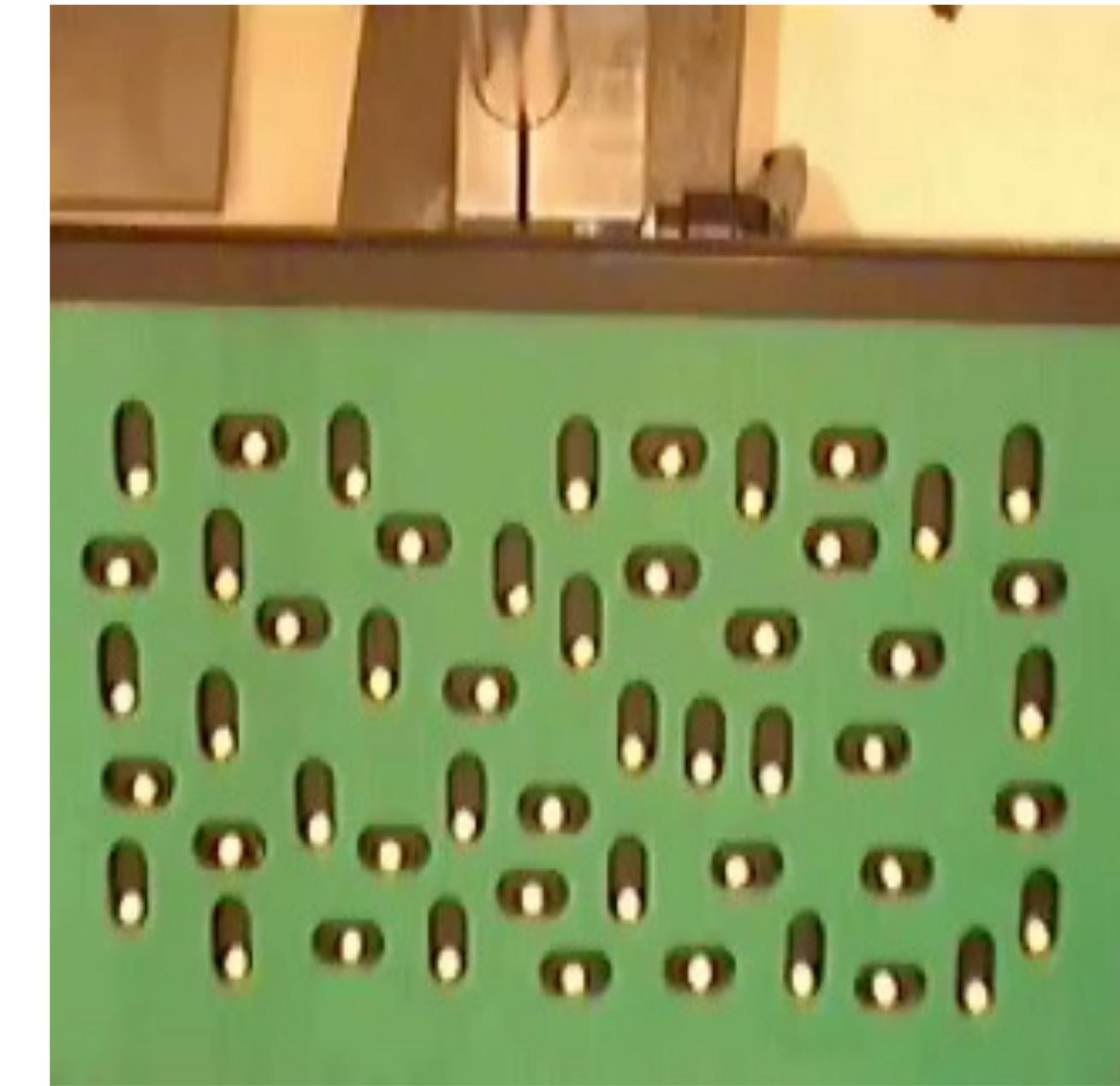
Repair Cortical Motor Functions



Post-Lesion Recovery



Post-ANCE implant Recovery



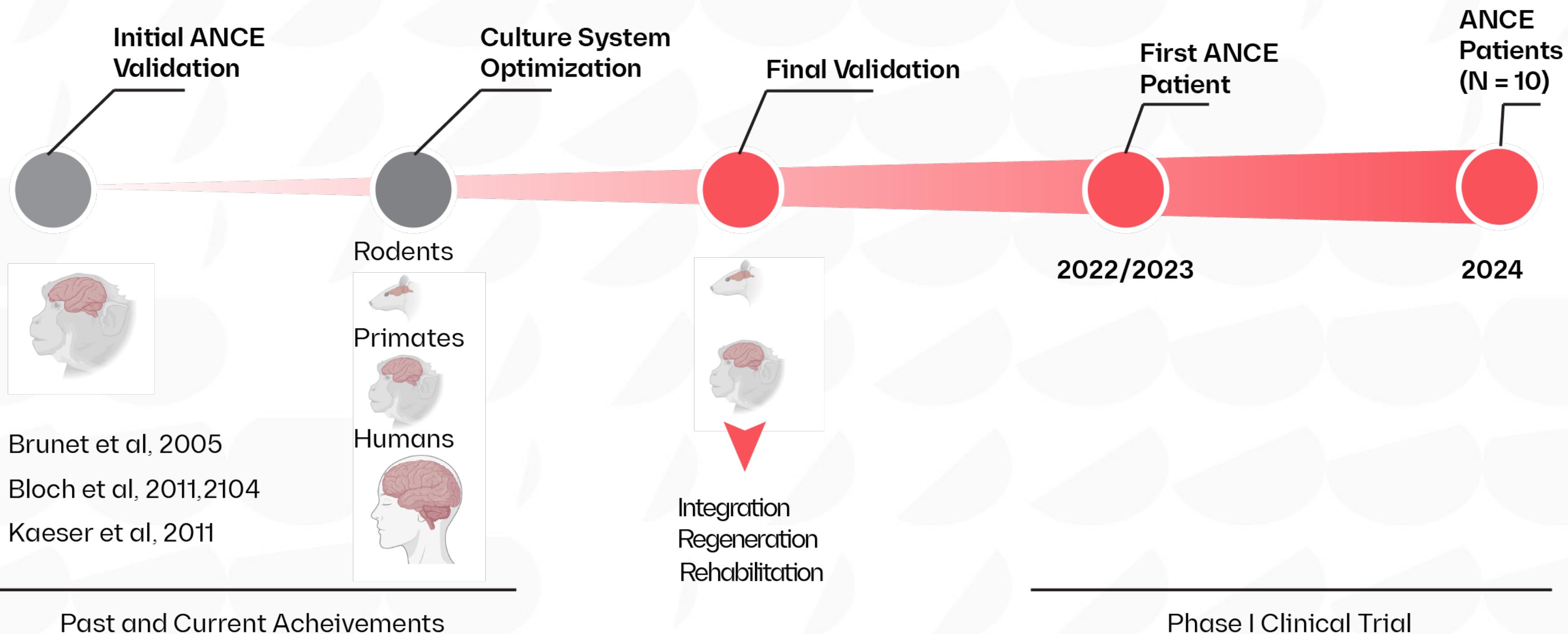
**ANCE Therapy**  
Clinical Validation



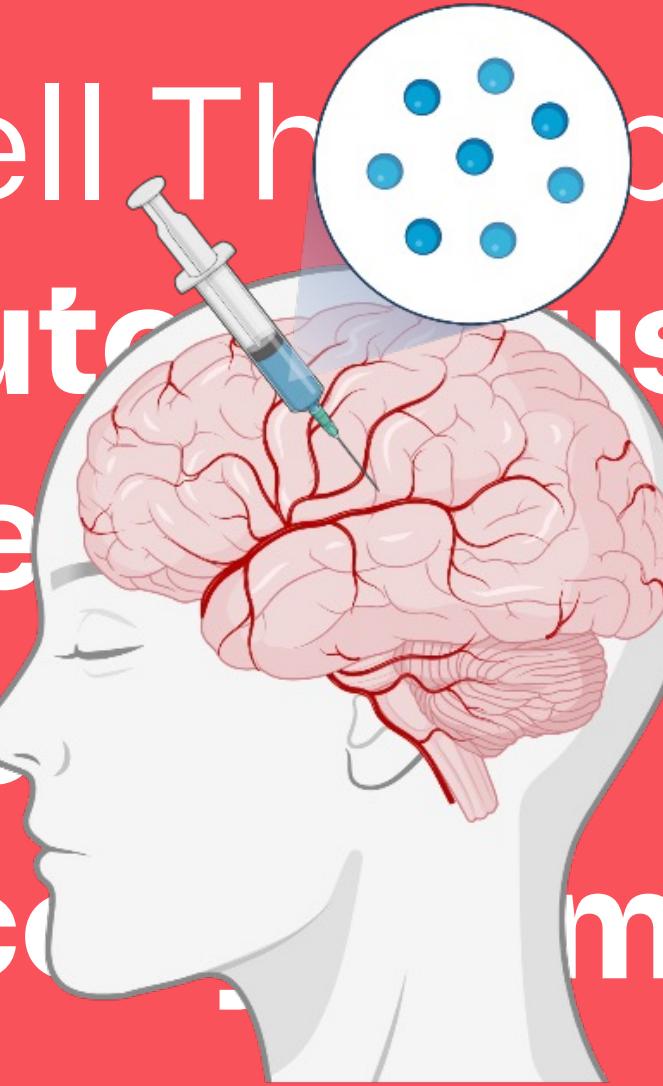
# Healing Stroke with ANCE

bench to the clinic

## ANCE from bench to bedside - Milestones



# Cell Therapy: Autologous Neurotrophin Conditioning



Prof. Jocelyne Bloch  
Prof. Gregoire Courtine



## Cell Culture

Lukas Rambousek, PhD (All)  
Jean-Francois Brunet, PhD (GMP)



## Transcriptomics

Lukas Rambousek, PhD  
Jordan Squair, PhD  
Katia Galan



## Histology & Imaging

Katia Galan  
Quentin Barraud



## Animal Work

Olivier Rizzo  
Fanny Demon  
Charles Latchoumane, PhD