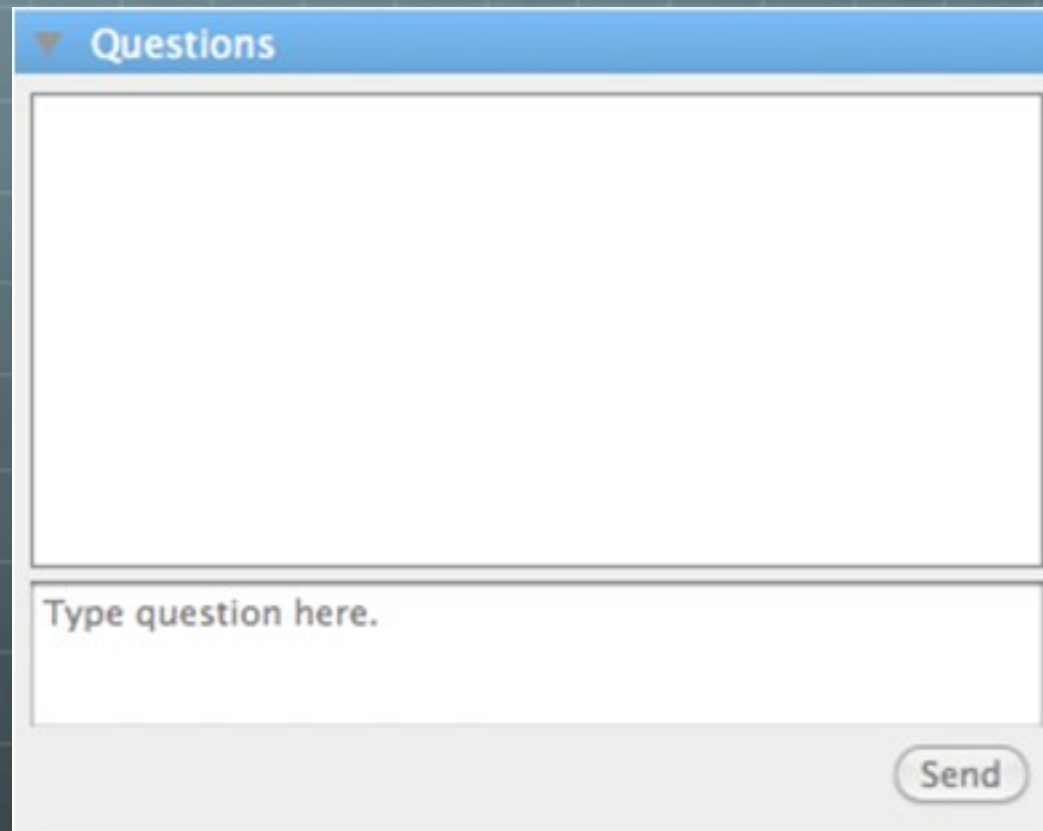


Breakthrough Stem Cell Therapies for SCI

Dr. Kim Anderson-Erisman & Jennifer French
October 23, 2014

Have a Question?



Questions

Type question here.

Send



www.themiamiproject.org

The Miami Project is dedicated to finding more effective treatments and, ultimately, a cure for paralysis resulting from spinal cord injury.



www.NeurotechNetwork.org

*Helping people regain life thru
neurotechnology*

Focusing on education of and advocacy to access neurotechnology devices, therapies and treatments for people living with impairments, their care-givers and medical professionals.

Disclaimer page

The information presented in this session is not meant to replace the advice from a medical professional. You should consult a health care professional familiar with your specific case, concerns and condition.

In this presentation we will discuss experimental, investigational, non-FDA approved therapies or biologics

Neurotech Network and its representatives do not endorse, rate, sell, distribute, prescribe, administer or recommend any products, procedures or services. We highly suggest for you to take information to a trained medical professional familiar with your case to discuss options that are best for you.

The Media

Tissue Engineering and Regenerative Medicine, Vol. 11, No. 1, pp 1-9 (2014)
DOI 10.1007/s13770-013-1116-7

| Feature Article |

The Global Industry for Unproven Stem Cell Interventions and Stem Cell Tourism

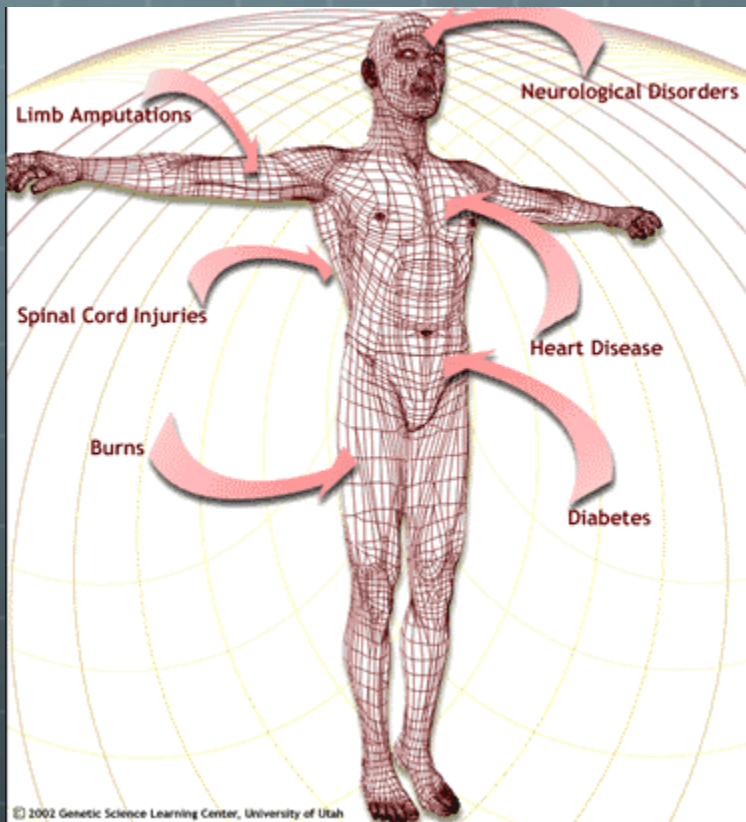
Dominique S. McMahon*

Munk School of Global Affairs, University of Toronto, Canada

(Received: July 30th, 2013; Accepted: October 17th, 2013)



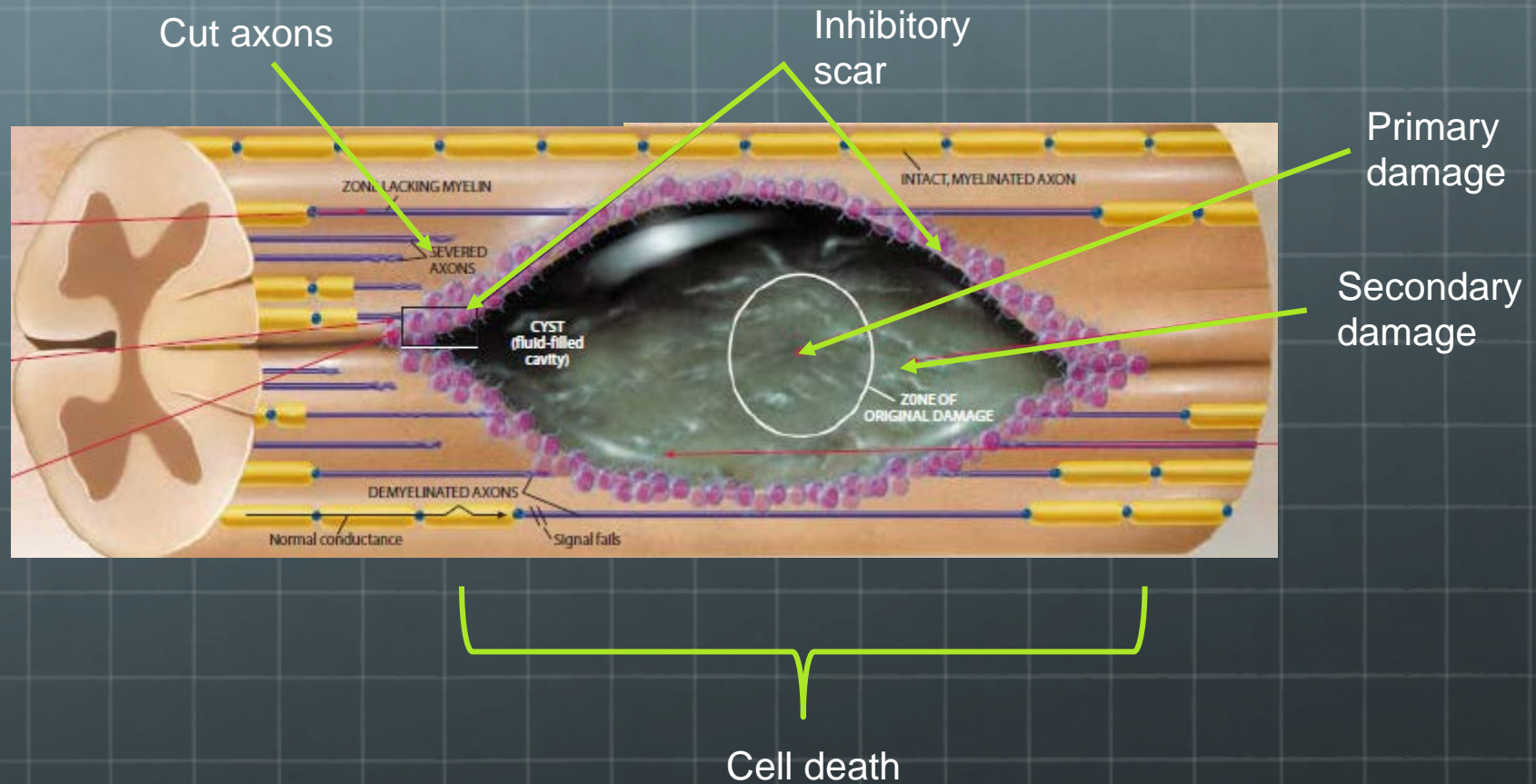
Progress but still...



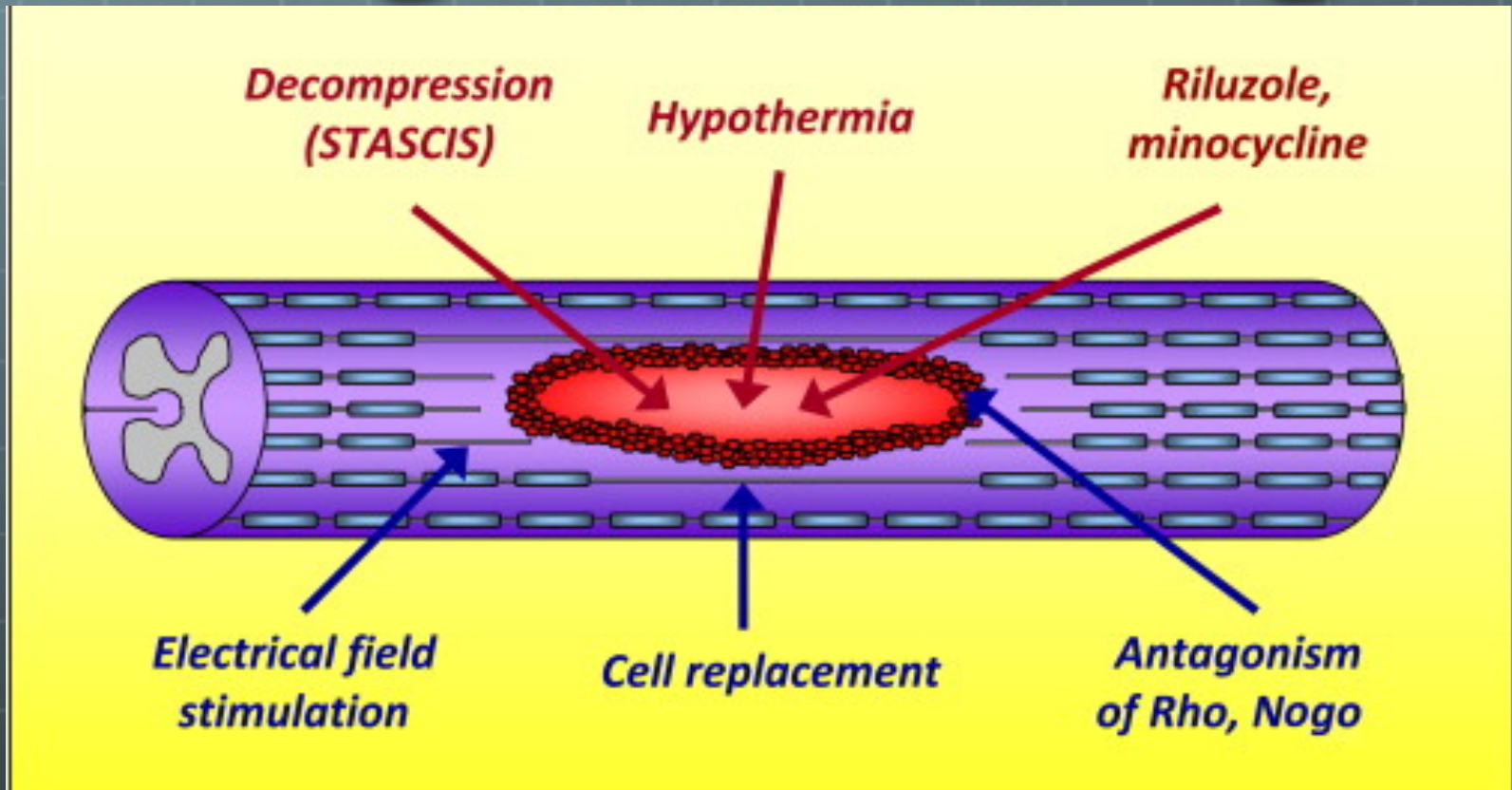
- Many unanswered ?s:
- What type of cells?
- How many cells?
- When to transplant after injury
- Where to transplant
- How to protect from cell rejection

Source: Steeves J, et al, Experimental treatments for spinal cord injury: What you should know (Version 2), 2012

What happens inside the spinal cord?



What are some investigational strategies?



Hawryluk G, Fehlings MG, The center of the spinal cord may be central to its repair, <http://dx.doi.org/10.1016/j.stem.2008.08.009>

TRUE VS PROGENITOR

🌐 **TRUE** - A stem cell is an **unspecialized** cell that **can divide and self-renew indefinitely** and that can **give rise to more mature cells with specialized functions**.

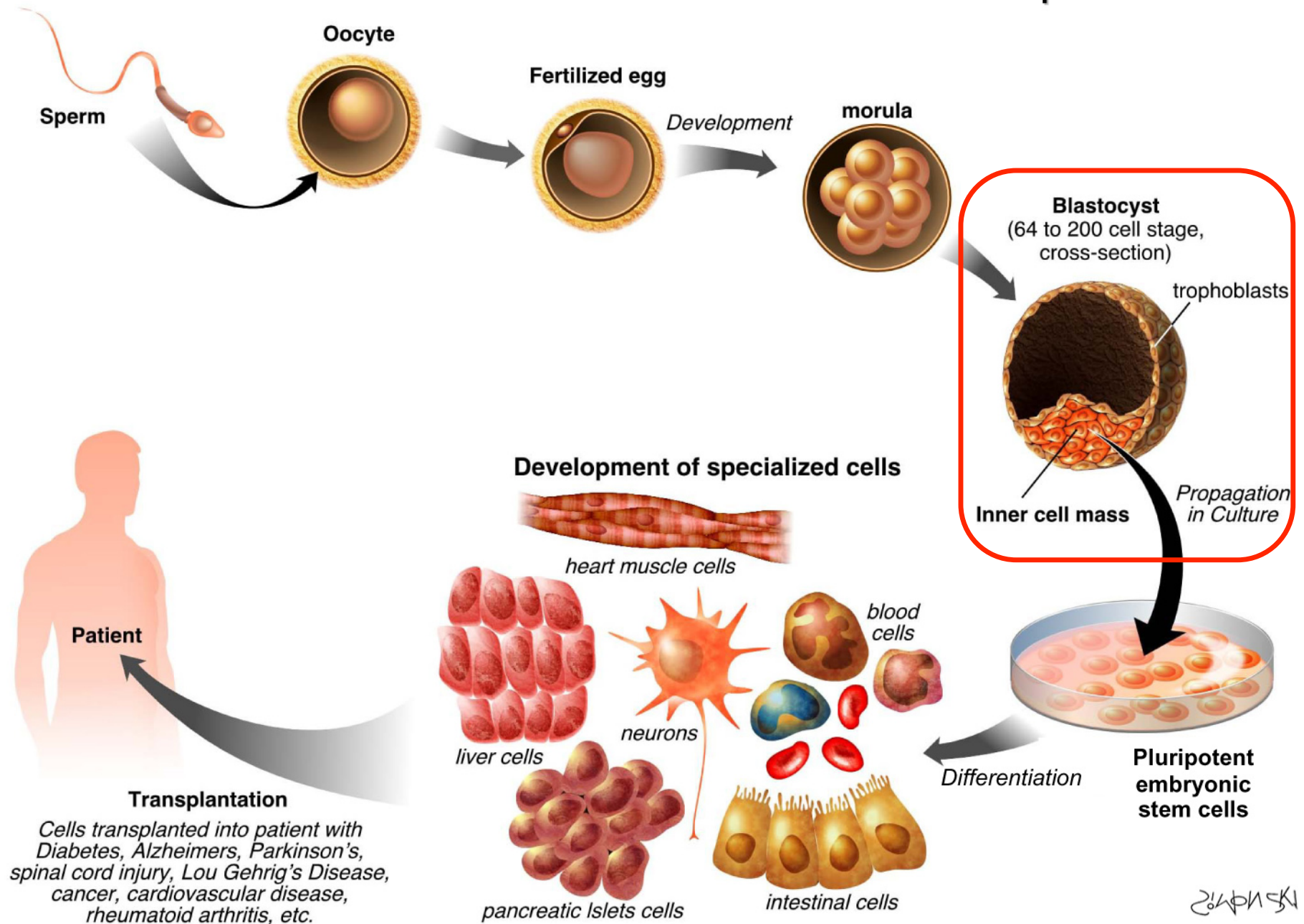


🌐 **Progenitor** – A progenitor cell is more specialized than a stem cell, it **cannot divide indefinitely**, and it **gives rise to a specific type of cell**. Ex. Oligodendrocyte progenitor cell



Source: Steeves J, et al, Experimental treatments for spinal cord injury: What you should know (Version 2), 2012

Transplantation








2/14/05

Potential Benefit

*****once refined & tested*****

- Replace lost cells due to injury or disease
- Provide a platform for axonal outgrowth to create neural connections between cells
- Limit damaging inflammation
- Promote blood vessel formation
- Release beneficial cytokines & growth factors

The journey of testing comes with RISKS

-  Incomplete understanding in laboratory/preclinical studies (animal results can still leave unanswered questions in humans)
-  Poorly defined cell transplantations (no protocols or standards – uncharted territory)
-  Additional damage to the cord could occur; possible loss of existing function
-  Possible stimulation of neuropathic pain or spasticity
-  Possible formation of cancerous tumors

Source: Steeves J, et al, Experimental treatments for spinal cord injury: What you should know (Version 2), 2012

Current Studies

❖ Human Embryonic stem cells

❖ Asterias Biotherapeutics (Geron); multi-center

❖ Phase I safety study of GRNOPC1 (n=10)

- Human embryonic stem cell line pre-differentiated into oligodendrocyte progenitor cells
- Targeting remyelination of demyelinated axons to restore conduction

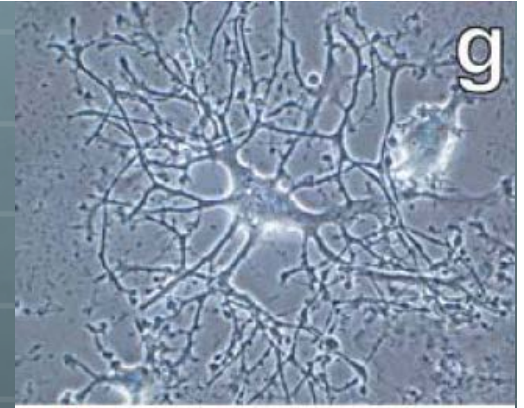
❖ Complete thoracic SCI; within 14 days of injury

❖ Intraspinal injection; single dose

❖ Temporary immunosuppression

❖ Enrolled 5 of 10; halted for financial reasons

❖ Taken over by Asterius in 2013 – beginning new trial in 2015 focusing on cervical injury



Keirstead et al., 2005 J. Neurosci. 29(19):4694

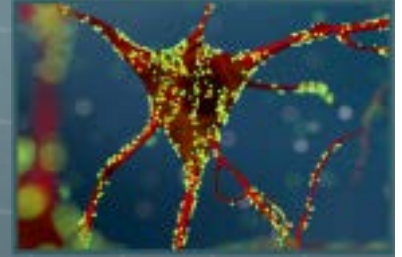
Current Studies



❖ Human fetal CNS stem cells

- ❖ StemCells, Inc.
- ❖ Phase I/II safety & preliminary efficacy of HuCNS-SC (n=12); NCT01321333
 - Human neural stem cells derived from fetal brain tissue
 - Targeting remyelination and possibly neuronal cell replacement
- ❖ Complete and incomplete thoracic SCI (3 cohorts; T2-11; AIS A, B, C); within 3 to 12 months of injury
- ❖ Intraspinal injections
- ❖ Temporary immunosuppression
- ❖ Follow for 1 year intensely, then 4 years long-term
- ❖ Enrolled all 12, some still in follow-up
- ❖ Phase II efficacy trial in site start-up (n=42); NCT02163876
 - Multi-center, randomized, placebo-control, 3 cohorts
 - Cervical 5-7, AIS A 3-12 months of injury, AIS B,C 3-24 months of injury
 - Intraspinal injections, temporary immunosuppression
 - Follow for 1 year intensely

Current Studies




❖ Human spinal cord neural precursors

- ❖ Neuralstem, Inc.; single-center; NCT01772810
- ❖ Phase I safety of NSI-566 (n=8)
 - Human spinal cord neural precursor cells derived from 8 week fetus
 - Targeting growth factor replacement and possibly neuronal cell replacement
- ❖ Complete thoracic SCI (2 dose cohorts; T2-12; AIS A, B, C)
- ❖ Within 1 to 2 years post-injury
- ❖ 6 intraspinal injections
- ❖ Temporary immunosuppression
- ❖ Follow for 1 year intensely, then 4 years long-term


What is a Clinical Trial?


Clinical Research


 Research with human subjects that is:

- (1) Patient-oriented research, which includes:
 - (a) mechanisms of human disease,
 - (b) therapeutic interventions,
 - (c) clinical trials, or
 - (d) development of new technologies.
- (2) Epidemiologic and behavioral studies.
- (3) Outcomes research and health services research.

Clinical Trials

 A **prospective** biomedical or behavioral research study of human subjects that is **designed to answer specific questions about biomedical or behavioral interventions** (drugs, treatments, devices, or new ways of using known drugs, treatments, or devices).

 Clinical trials are used to determine whether **new** biomedical or behavioral interventions are **safe, efficacious, and effective**.

 Long-term goal is to provide **evidence leading to a scientific basis for consideration of a change in health policy or standard of care**. The definition includes pharmacologic, non-pharmacologic, and behavioral interventions given for disease prevention, prophylaxis, diagnosis, or therapy.

Risks of unapproved trials

- ▶ Increased and long-lasting pain and/or muscle spasticity
- ▶ Further loss of function
- ▶ Increased disability
- ▶ Medical complications or death

(FDA requires evidence that complications are minimal)







- ▶ Loss of health care coverage should complication occur after unapproved treatment
- ▶ Exclusion from future SCI clinical trial

Caution - Stem cell tourism

- A form of medical travel to purchase unproven stem cell-based therapies. These unproven treatments hold significant risk for people.
- There is no evidence yet that stem cells have a reparative effect on chronically damaged spinal cord tissue.
- It is unethical to charge people money for unproven, risk-laden medical interventions.
- Be aware of selling Hope for Money
- No Oversight/Reporting



Sample Questions to Ask

-  Anyone interested in participating in a clinical study should know as much as possible about the study and feel comfortable asking the research team questions about the study, the related procedures, and any expenses.
-  What is being studied?
-  Why do researchers believe the intervention being tested is effective?
-  How do the possible risks, side effects, and benefits of this trial compare with those of my current treatment?
-  What are my out of pocket costs?
-  How will it be determined which intervention is effective?

APPENDIX B: What to ask before taking part in a clinical trial or human study? (your participation checklist)

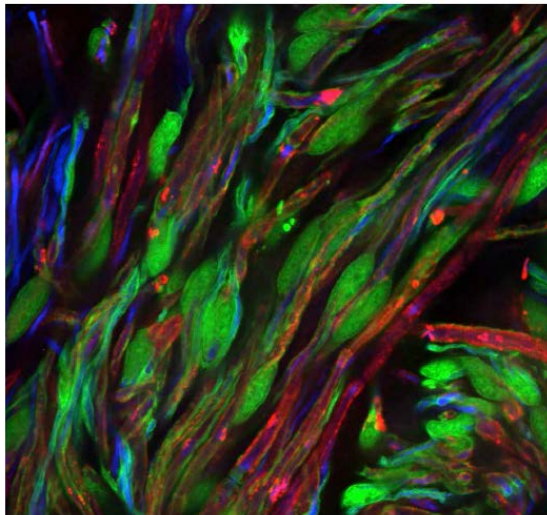
Note: most of these questions should be answered during the informed consent process

Question	YES	NO	Additional Information
1. Safety			
a. Are there safety risks associated with this experimental treatment?			
b. Could my condition or my health get worse after this experimental treatment?			
c. If so, can you describe the possible risks associated with this experimental treatment?			
2. Possible benefits			
a. Can you describe the possible specific benefits of this experimental treatment?			
b. Can you describe the maximum level of recovery I might see after this treatment?			
c. Can you describe how any potential benefit will be measured?			
3. Clinical trial protocol			
a. Is this study registered as a clinical trial with an appropriate qualified regulatory body?			
b. Can you describe what clinical trial phase this particular human study falls within (Phase 1, 2, or 3) and what is the emphasis of study for this phase of the trial program?			
c. Is there a control group in this study?			
d. Could I be randomly assigned to the control group?			
e. Can you tell me how long I will be assessed for any change in outcome?			
f. Will I be blinded to whether I have received the experimental or control treatment?			
g. Will the investigators and examiners be blind to what treatment I have received?			

Question	YES	NO	Additional Information
4. Payments and costs			
a. Do I have to pay for this treatment?			
b. As a possible participant, are there other costs I have to pay to be involved in this study?			
c. Will my expenses associated with participating in this study be paid (e.g. travel to center for follow-up assessment)?			
5. Participation in Other Trials			
a. Will my participation in this clinical trial limit my participation in other SCI clinical trials?			
b. If I am assigned to the control group and the experimental treatment is subsequently shown to be an effective therapy for my type of SCI by this clinical trial program, will I be eligible to receive this treatment later?			
6. Preclinical or prior clinical evidence			
a. Can you describe the preclinical or prior clinical evidence that indicates this experimental treatment might be beneficial?			
b. Have these findings been independently confirmed by other researchers?			
c. Are there any dissenting opinions and do these arguments have some validity for not going forward with this treatment?			
7. Independent assessment of the treatment and investigator			
a. Can you provide me several names of scientists and clinicians (not involved with this study) who can provide me independent advice about this treatment and your reputation?			

Resources

Experimental treatments for spinal cord injury:
What you should know (Version 2)



A guide for people living with spinal cord injury,
their family, friends and health care professionals

Free download of this booklet:

<http://www.miamiproject.miami.edu/page.aspx?pid=428>

Follow: Paralysis Support/Research Participation/Experimental
Treatments

ClinicalTrials.gov

www.ClinicalTrials.gov

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ISCOS

The International
Spinal Cord Society



International Spinal Cord Society
(ISCoS), www.iscos.org.uk

Questions



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