

Stem Cells and their Use in Treating Diseases

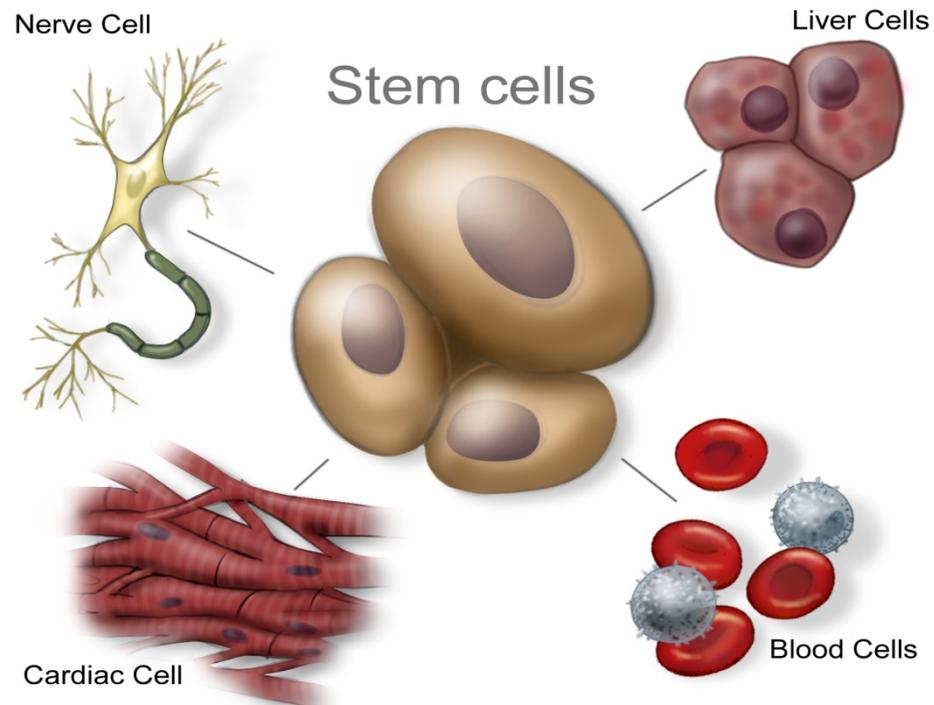


Image obtained from
<https://www.extremetech.com/extreme/185959-woman-grows-a-nose-on-her-spine-after-experimental-stem-cell-treatment-goes-awry>

Introduction

- We are looking at the topic of stem cells and seeing if they can be used to treat any diseases
- There are two main types:
 1. **Embryonic Stem Cells**:- these are unspecialised cells that can develop into any type of cell.
 2. **Adult Stem Cells**:- these are unspecialised cells that can develop into many (but not all) types of cells.
- During the development of an embryo, most of the cells become specialised. They develop features which help them adapt to the function that they will carry out.

What is a stem cell?

A single cell that can

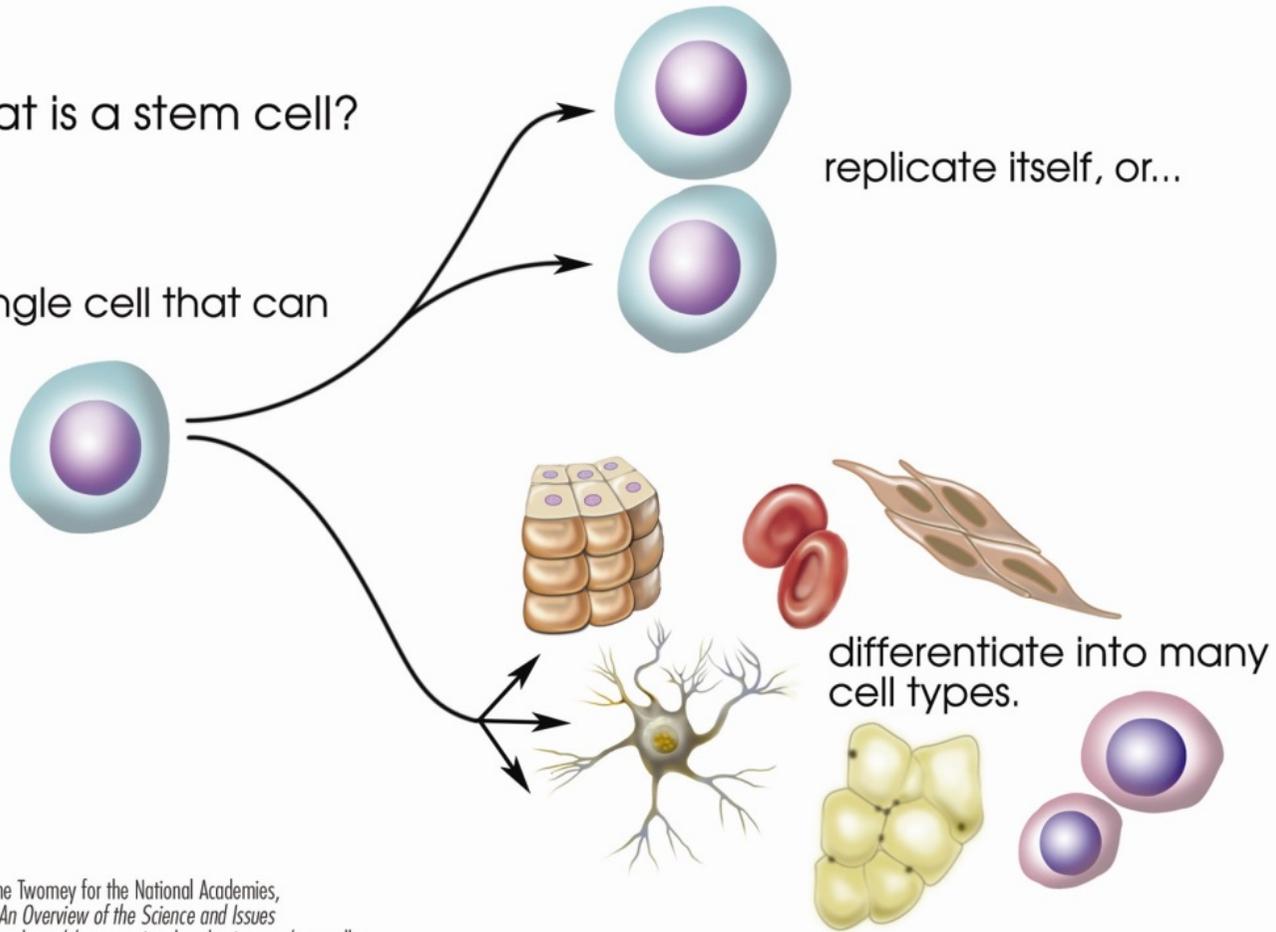


Image prepared by Catherine Twomey for the National Academies, *Understanding Stem Cells: An Overview of the Science and Issues* from the National Academies, <http://www.nationalacademies.org/stemcells>. Academic noncommercial use is permitted.

Hypothesis

- We predict that:
 1. Stem cells can be used to treat many diseases
 2. Lots more research needs to be done to investigate the safety and reliability of these treatments
- We will be looking at current research that is being done by scientists in this area to find our results

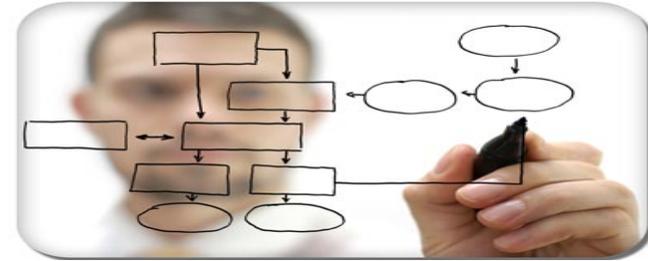


**KEEP
CALM
AND
TEST YOUR
HYPOTHESIS**

Image obtained from <http://www.geoset.info/presentation/my-45-rule-for-reliability-of-a-hypothesis/>

Method

Image obtained
from [http://
www.dynamiq-
eng.co.uk/pages/
method_develop
ment.php](http://www.dynamiq-eng.co.uk/pages/method_development.php)



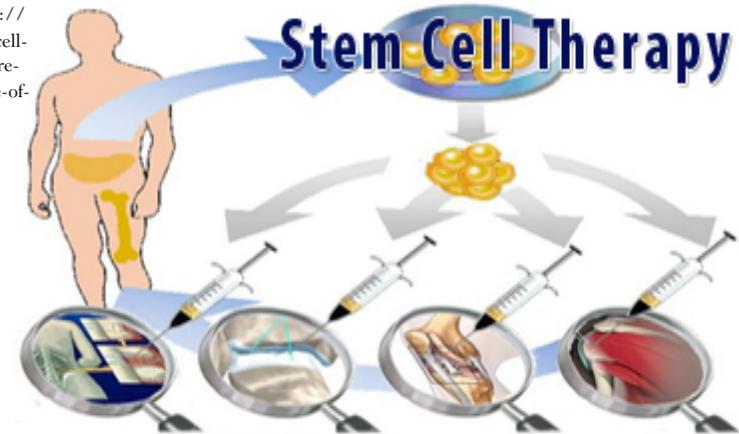
- We were divided into 5 smaller groups to be responsible for each section of the investigation
 - Introduction
 - Hypothesis and method
 - Results
 - Conclusion
 - Evaluation
- We used various websites to find information, including Google Scholar to find journal articles about current research
- Some articles required paid subscription, so we just read through the abstract to get an overview of the study
- We summarised the major findings from various journal articles
- While each group did individual research, we always communicated with other groups to ensure we were all on the right track. At the end, we combined our findings and created this presentation

Results

Can stem cells used to be treat diseases?

- Only a couple of clinical uses of stem cell research have been accepted
- There are still investigations in clinical trials on using different applications of stem cells for a variety of conditions
- The most common use of stem cells is in the transplantation of blood stem cells. It can also be used to restore the blood system after treatments for specific cancers
- Other clinical trials that are in progress using **pluripotent** stem cells for diseases such as:
 - spinal cord injuries
 - Parkinson's disease
 - Diabetes

Image obtained from <http://creativemesh.com/stem-cell-research-and-therapies-are-important-for-a-multitude-of-diseases/>



Disease Focus of NYS Stem Cell Research

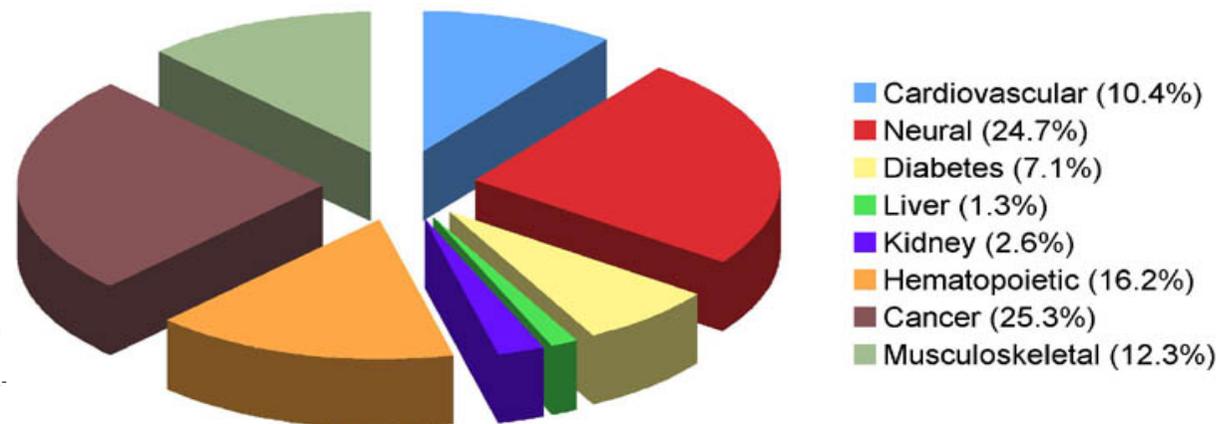


Image obtained from <https://stemcell.ny.gov/stem-cell-research-new-york-state>

Results

Spinal Cord Injury:

- The spinal cord is a collection of millions of nerve cells inside our spine that send signals to and from the brain. Damage will most likely be permanent and could result in paralysis
- There is no effective treatment at the moment
- The injuries often damage neurons and supporting cells that wrap and insulate neurons
- Scientists are trying to find out how stem cells can be used to replace neurons and supporting cells to give the patient a chance of recovery

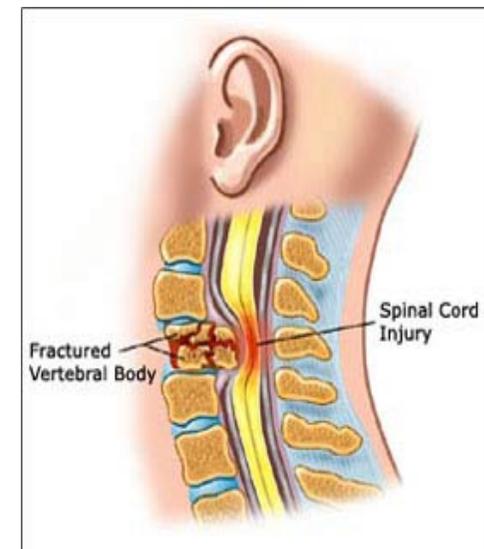


Image obtained from <http://medical.miragesearch.com/treatment/spine-surgery/spinal-cord-injury>

Potential uses of **Stem cells**

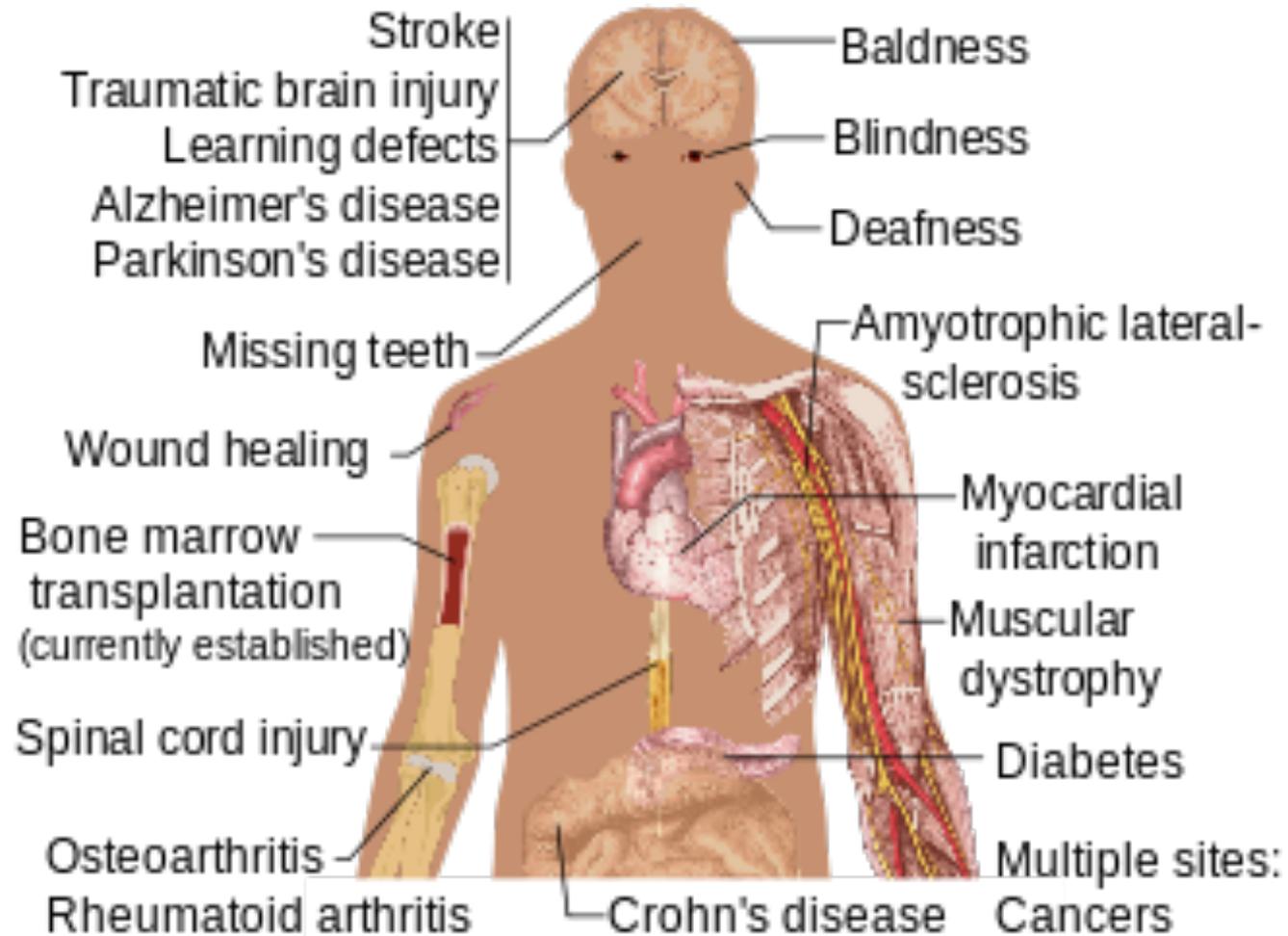


Image obtained from
[https://
en.wikipedia.org/wiki/
Stem-cell_therapy](https://en.wikipedia.org/wiki/Stem-cell_therapy)

Conclusion

Was our hypothesis supported?

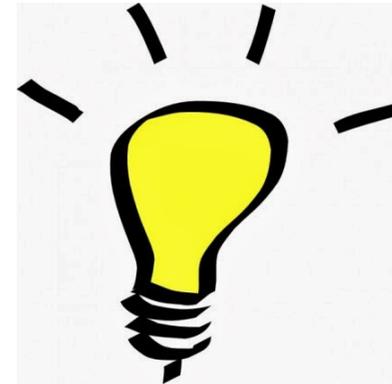
YES

Stem cells have the potential to develop into many different cell types. They offer new possibilities to treat diseases such as spinal cord injury, diabetes, Parkinson's disease and many more. However, much more research needs to be done so scientists can thoroughly understand how to use these cells for therapy.

Other things to consider?

- The diseases that can be cured by stem cells are limitless however only a few have been found to be effective and safe.
- More research is required so the treatments the patients receive are safe and have no negative consequences.
- New research shows that instead of having to use a specific stem cell in treatments, you can use an induced pluripotent stem cell which is ethically acceptable and has the ability to form all adult cell types.

Image obtained from <https://clipartfest.com/categories/view/c248084387be1e007519309d7fea7439f78d8e29/conclusion-clipart.html>



Evaluation



Image obtained from <https://clipartfest.com/categories/view/c248084387be1e007519309d7fea7439f78d8e29/conclusion-clipart.html>

What went well:

- We managed to use a variety of websites in order to collect the results of other experiments. With this reliable information we constructed this presentation.

What we struggled with:

- Information wasn't as accessible due to the requirement of subscription and payment.
- It wasn't easy getting relevant information from each website and deciding what to focus on.

How we could improve:

- Next time we could make the topic of research more specific and also all do the research together in order for it to be more efficient.
- We could speak to scientists that attempted to investigate the same topic as we did, in order to get more opinions



Image obtained from <https://clipartfest.com/categories/view/c248084387be1e007519309d7fea7439f78d8e29/conclusion-clipart.html>

References

- <http://www.closerlookatstemcells.org/stem-cells-and-medicine/nine-things-to-know-about-stem-cell-treatments>
- <https://stemcells.nih.gov/info/basics/1.htm>
- <https://www.technologyreview.com/s/409191/testing-drugs-with-stem-cells/>
- https://stemcells.nih.gov/info/Regenerative_Medicine/2006Chapter10.htm
- <http://www.eurostemcell.org/new-tools-disease-research-reprogrammed-cells-disease-modelling>
- <http://www.nature.com/news/how-ips-cells-changed-the-world-1.20079>
- <http://stemcell.childrenshospital.org/about-stem-cells/pluripotent-stem-cells-101/why-are-pluripotent-stem-cells-important/>
- https://stemcells.wisc.edu/sites/default/files/What_Are_IPS_Cells_0.pdf