

# Stem Cells and Leprosy

Angelo, *Biomedical Engineering, University of Rhode Island*  
BME 181 First Presentation, February 19, 2013 <angelo\_butera@my.uri.edu>

**Abstract**—Recent breakthroughs in the study of how leprosy spreads throughout the body have major implications on the future of stem cell research

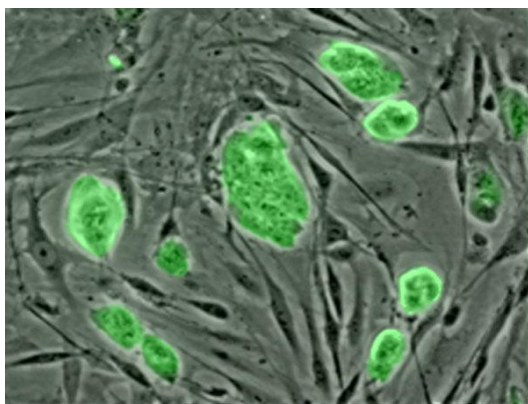
## I. INTRODUCTION

A recent breakthrough made while studying leprosy could change the field of stem cell research forever. While researching how leprosy spreads through the body, a startling fact was discovered: it appears that leprosy was utilizing stem cells to spread. Even more shocking was that it seemed to be turning back the clock on the body's own cells, reverting them back to their stem form, before selectively differentiating them for its own uses.

## II. METHODS

Leprosy appears to first attack parts of the nervous system. It takes the nerve cells associated with repair and manipulates them for its own purpose. Researchers hope that this can be replicated in a lab setting. Doing so would provide a nearly limitless supply of stem cells, and therefore a limitless supply of tissue with which to repair the body.

These stem cells (seen highlighted below) could theoretically be differentiated into any cell in the entire body. By using scaffolds and growing layers of different cells, entire tissues and even organs can be built out of stem cells. Right now stem cells are hard to come by, and those that are available are the source of much ethical debate. By merely modifying existing body cells, both these hurdles are eliminated.



## III. RESULTS

Stem cell research has been very promising, with a few sample cases showing that stem cells can be used to treat formerly debilitating injuries. Specifically, nerve tissue, which is known for the very slow, if any, repair it undergoes, has been grown back using stem cells.

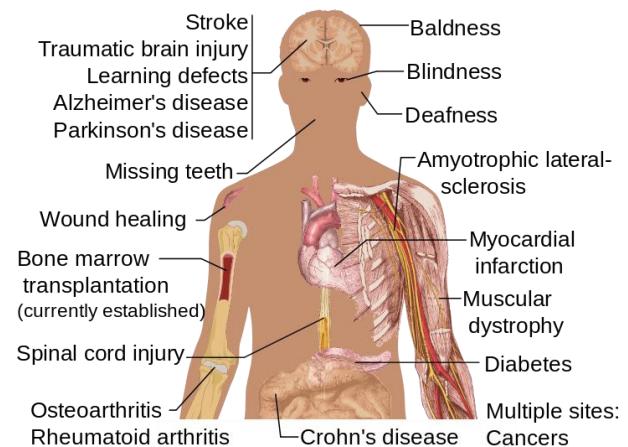
However, research into whether the change that leprosy exerts can be replicated hasn't really even begun yet. This is

very cutting edge, and we don't even truly understand the process. We need to be able to reverse-engineer leprosy before we can begin utilizing it for our own purposes.

## IV. DISCUSSION

Obviously the potential implications for this are huge. With the ability to basically rebuild body parts at will, a large range of diseases and injuries will be eradicated, many of them which were formerly crippling or fatal.

### Potential uses of Stem cells



The social stigma that surrounds the treatment should be eliminated, and we can get back to making real progress on stem cells.

However, there are a few hurdles we must jump through first. Obviously we need to do the research to understand the methods first. Right now differentiating cells is an issue, because we still don't fully grasp the signals sent to direct differentiation. Improper signals can result in cancerous growths. It will likely be expensive, and there is always the danger of weaponization. Despite these hurdles, it looks like stem cells have a bright future ahead of them.

## REFERENCES

- [1] "Cell - Reprogramming Adult Schwann Cells to Stem Cell-like Cells by Leprosy Bacilli Promotes Dissemination of Infection." *Cell - Reprogramming Adult Schwann Cells to Stem Cell-like Cells by Leprosy Bacilli Promotes Dissemination of Infection*. N.p., n.d. Web. 19 Feb. 2013.
- [2] Costandi, Mo. "Leprosy Spreads by Reprogramming Nerve Cells into Migratory Stem Cells." *The Guardian*. Guardian News and Media, 28 Nov. 0017. Web. 19 Feb. 2013.
- [3] "Frequently Asked Questions." *Info Center [Stem Cell Information]*. N.p., n.d. Web. 19 Feb. 2013.
- [4] "Stem Cell Treatments." *Wikipedia*. Wikimedia Foundation, 02 June 2013. Web. 19 Feb. 2013.