

Stem cells also rust

October 24 2016

Oxygen in the air is well known to cause damaging rust on cars through a process known as oxidation. Similarly, a research group at Lund University in Sweden, has now identified that certain cells during embryonic development also are negatively affected by oxidation. This oxidation is capable of leading to a block in cellular function.

The researchers use a laboratory based culture system to generate new blood from [pluripotent stem cells](#). They hope in the future to be able to use the system to generate new blood cells, including [blood stem cells](#), for patients in need of [bone marrow transplants](#). However, laboratories worldwide attempting to generate laboratory derived blood cells, find these cells do not perform as well as blood cells from donor sources. The cells appear normal but do not grow and expand as well.

When investigating why the derived blood cells did not function as well as donor blood cells, the Lund University researchers found high levels of reactive oxygen species (a class of molecules that cause oxidation) in the newly derived blood cells. The levels were high enough to damage the cells and cause them not to grow in culture. The researchers have also developed a cocktail of factors that could reduce oxidative damage in the cells, and when used resulted in over twenty times more newly generated blood stem cells that could grow.

"By identifying the negative role of [oxidation](#) in new [blood cells](#) derived from pluripotent stem cells, we have identified what is perhaps the most significant hurdle in developing laboratory derived blood stem cells for transplantation based therapies.", says Niels-Bjarne Woods, who is

leading the study.

Short facts pluripotent stem cells

Pluripotent stem cells are cells that have the ability to make any specific cell type in the body. They are either derived from embryos (referred to as embryonic stem (ES) cells), or they can be generated from [adult cells](#) using a combination of factors that induces them to becoming pluripotent (referred to as induced pluripotent stem (iPS) cells).

More information: Roger E. Rönn et al. Reactive oxygen species impair the function of cd90hematopoietic progenitors generated from human pluripotent stem cells, *STEM CELLS* (2016). [DOI: 10.1002/stem.2503](#)

Provided by Lund University

Citation: Stem cells also rust (2016, October 24) retrieved 24 April 2024 from <https://phys.org/news/2016-10-stem-cells-rust.html>

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