

# Blood stem cells: the pioneers of stem cell research

## What do we know?

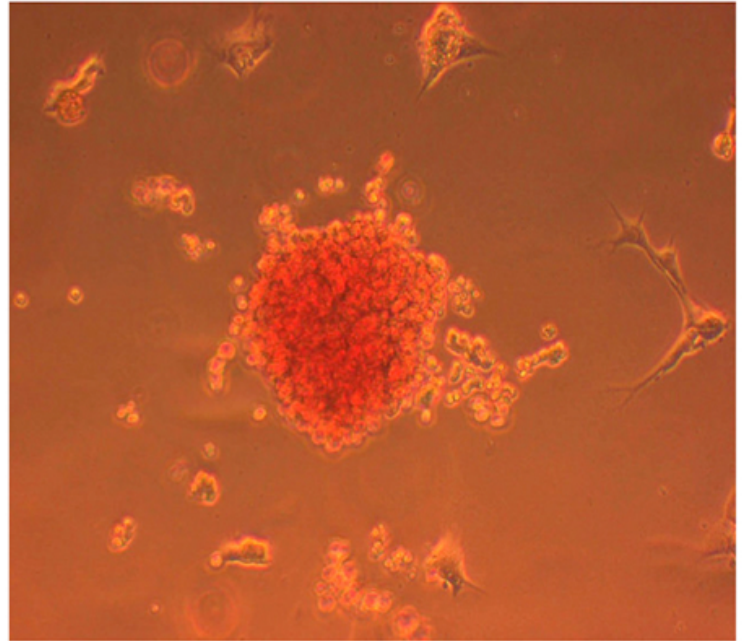
Discovered in the 1960s, blood stem cells (haematopoietic stem cells) were the first stem cells to ever be discovered.

Blood stem cells primarily reside in bone marrow and make all the cells found in blood, including cells important for the immune system.

Transplants of blood stem cells have become widely used to treat diseases such as leukaemia, anaemia and autoimmune diseases.

However, blood stem cell transplants still carry significant risks.

Patients are very susceptible to infection for several weeks after treatment and complications such as graft-versus-host disease can be fatal.



Mature Red Blood Cells. Copyright Jo Mountford, University of Glasgow

## What are researchers investigating?

To make treatments better, scientists are studying the origin of blood stem cells in embryos and what signals control blood stem cells in adults.

Studies are examining what causes blood stem cells to malfunction and lead to diseases like leukaemia and anaemia.

Researchers are developing ways to make blood for transfusions in the laboratory rather than needing to collect blood from donors and test it for diseases.

Using induced pluripotent stem cells to make blood stem cells is currently being investigated to avoid needing to match patients with donors and avoid the risks of unsuccessful matches.

## What are the challenges?

Two primary challenges of blood stem cell transplants are the risks of infection and patient-donor cell incompatibility. Both of these are actively being studied.

Studies to better understand what signals make blood stem cells and control their behaviour is a slow and labour intensive process.

Making blood or blood stem cells in a laboratory from pluripotent stem cells requires researchers to be able to tightly control how stem cells behave to make cells of consistent quality and uniformity. This challenge becomes even more difficult when scaling-up procedures to make large numbers of cells.