EuroStemCell

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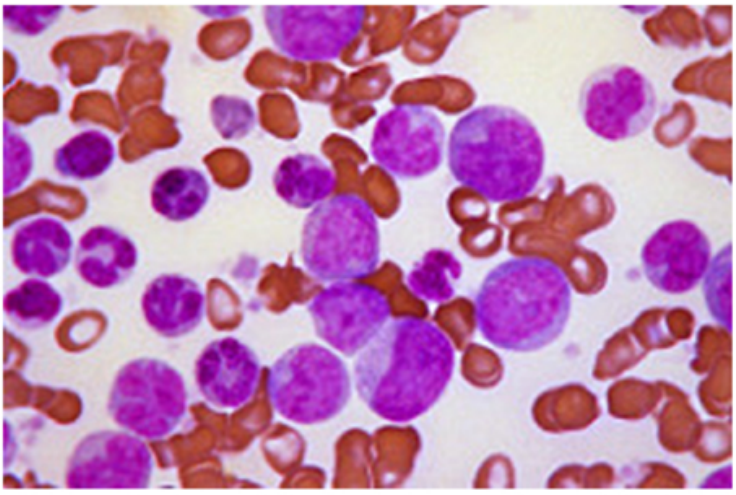
# Leukaemia: how can stem cells help?

## What do we know?

Leukaemia is a group of blood cancers that produce large numbers of immature, non-functional white blood cells that weaken (or completely block) the immune system.

Present stem cell treatments for severe leukaemias include blood stem cell transplants (also known as haematopoietic stem cell transplants or bone marrow transplants).

Thousands of leukaemia patients worldwide have received successful blood stem cell transplants, but these treatments carry very serious risks. However, these risks have greatly decreased over the years as researchers learn more about leukaemia and blood stem cells.



'Blast crisis' in chronic myeloid leukaemia

Image: Stacy Howard, Centers for Disease Control and Prevention

## What are researchers investigating?

Researchers still don't know what gene mutations cause most types of leukaemia. Studies continue to examine haematopoietic stem cells (HSCs) and what turns HSCs into cancerous leukaemia cells.

To reduce problems associated with HSC transplants, researchers are examining new approaches such as, treatments with immune cells, ways to boost patient immunity with growth factors and the use of induced pluripotent stem cells (iPSCs).

There is a general shortage of donors to supply HSCs for transplants. Researchers are working to develop ways of creating large numbers of HSCs using iPSCs.

## What are the challenges?

Immediately before new HSCs are transplanted, the immune system of a patient is completely destroyed by chemotherapy. An ongoing challenge is reducing the vulnerability of patients to infection while transplanted HSCs rebuild the patient's immune system.

Immune system incompatibilities between a patient's body and transplanted HSCs from a donor cause many complications. Even when donor and patient tissue types are matched, incompatibilities can occur and lead to transplant rejections or graft-versus-host disease, which can be fatal in extreme cases.

**For more information visit:** **www.eurostemcell.org/leukaemia**