

Expanding horizons for stem cell transplants

The need

Hematopoietic stem cells (HSCs) are responsible for making all the types of cell in our blood. HSC transplants – where stem cells are harvested from donor bone marrow – have been widely used to treat aggressive forms of blood cancer such as leukaemia for more than 30 years. Today, nearly 70,000 such transplants are conducted annually worldwide, and 1,000 each year in Australia alone.

Donating HSCs is not without challenges. Currently, donors are given a drug to stimulate the release of stem cells from bone marrow into the blood for harvesting. The process involves multiple injections over several days and may not always produce a sufficient number of stem cells. It also presents a risk of side effects ranging from bone pain to enlargement and rupturing of the spleen. There is an urgent need to develop faster and safer methods for harvesting HSCs to encourage more people to become stem cell donors, thereby significantly improving the outcomes for cancer patients.

The project

Professor Susie Nilsson and her research team at the Commonwealth Scientific and Industrial Research Organisation have high hopes for improving HSC collection. Also working as part of the Australian Regenerative Medicine Institute at Monash University, the team recently showed that a new molecule, BOP, has great promise. When used in animal studies, BOP combined with the routine drug treatment resulted in HSCs from the bone marrow being mobilised into the bloodstream within an hour, rather than the current standard of 5–6 days.

The impact

The Nilsson team's findings made headlines worldwide when results were published in the journal *Nature Communications* in 2016. Their new approach may revolutionise the way leukaemia and other serious diseases are treated using HSC transplants, in terms of improved outcomes for patients but also donor satisfaction and safety. The team will now test their approach in humans in a phase 1 clinical trial. Reducing the risk of serious side-effects and shortening the process from days to an hour, could one day make donating stem cells simply a matter of going with the flow.

At a glance

A new blood stimulation procedure may provide a faster, pain-free way for stem cell donors to help save lives of cancer patients.



Professor Susie Nilsson

