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Bone marrow banking is a possibility in future

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Singapore: More than 50,000 stem cell transplants are performed each year worldwide. A research team led by US-based Weill Cornell Medical College investigators may have solved a major issue of expanding adult hematopoietic stem cells (HSCs) outside the human body for clinical use in bone marrow transplantation, a critical step towards producing a large supply of blood stem cells needed to restore a healthy blood system.

In the journal *Blood*, Weill Cornell researchers and collaborators from Memorial-Sloan Kettering Cancer Center describe how they engineered a protein to amplify adult HSCs once they were extracted from the bone marrow of a donor. The engineered protein maintains the expanded HSCs in a stem-like state, meaning, they will not differentiate into specialized blood cell types before they are transplanted in the recipient's bone marrow.

Finding a bone marrow donor match is challenging and the number of bone marrow cells from a single harvest procedure are often not sufficient for a transplant. Additional rounds of bone marrow harvest and clinical applications to mobilize blood stem cells are often required.

However, an expansion of healthy HSCs in the lab would mean that fewer stem cells need to be retrieved from donors. It also suggests that adult blood stem cells could be frozen and banked for future expansion and use Ã?Â¢Ã¢â??Â¬Ã¢â?¬Å? which is not currently possible.

"Our work demonstrates that we can overcome a major technical hurdle in the expansion of adult blood stem cells, making it possible, for the first time, to produce them on an industrial scale," says the study's senior investigator, Dr Pengbo Zhou, professor of pathology and laboratory medicine at Weill Cornell.

If the technology by Weill Cornell passes future testing hurdles, Dr Zhou believes bone marrow banks could take a place alongside blood banks.

"The immediate goal is for us to see if we can take fewer blood stem cells from a donor and expand them for transplant. That way more people may be more likely to donate," Dr Zhou says. "If many people donate, then we can type the cells before we freeze and bank them, so that we will know all the immune characteristics. The hope is that when a patient needs a bone marrow transplant to treat cancer or another disease, we can find the cells that match, expand them and use them."

Eventually, individuals may choose to bank their own marrow for potential future use, Dr Zhou says. "Not only are a person's own blood stem cells the best therapy for many blood cancers, but they may also be useful for other purposes, such as to slow aging."