

DBT/ National Centre for Cell Science (NCCS), Pune

New approach to speed up red blood cells generation in the lab

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New Delhi, March 12: Transfusion of red blood cells (RBCs) is a life-saving treatment for numerous conditions such as severe anaemia, injury-related trauma, supportive care in cardiovascular surgery, transplant surgery, pregnancy-related complications, solid malignancies and blood-related cancers.

However, blood banks particularly in developing countries often face a severe shortage of whole blood as well as components of blood like red blood cells.

Researchers across the world are exploring possibilities to generate RBCs outside the body (*in vitro*) from haematopoietic stem cells (HSCs). These HSCs have the capability to give rise to the different types of cells found in the blood. Various groups have been able to produce RBCs in the laboratory from HSCs. However, the process takes a long time - around twenty-one days. The resources required to grow cells in the laboratory over such a long duration can be very expensive for generation of RBCs on a large scale for clinical purposes.

A team of researchers led by Dr. L. S. Limaye, ex-scientist at the Department of Biotechnology's National Centre for Cell Science (NCCS) at Pune have found a way to tackle the issue.

They have found that the process can be speeded up by adding a very low concentration of a small protein molecule called 'transforming growth factor $\beta 1$ ' (TGF- $\beta 1$), along with a hormone called 'erythropoietin' (EPO), to the growth medium. They could cut down the process time by three days.

Dr. Limaye noted that several tests to assess the quality of the cells formed, and examination of many of their characteristics, including physical appearance, revealed that the RBCs formed using this procedure were normal.

The findings are worthy of further exploration. Additional investigations based on the insights gained from these studies could help assess the relevance of using this approach for blood transfusions in the future. The researchers have published a report on their work in the journal, 'Stem Cell Research and Therapy'.

Keywords: RBC, HSC , TGF- $\beta 1$, hormone, erythropoietin, EPO, transfusion, anaemia, cardiovascular surgery, transplant surgery, cancer.