

# Scientists identify key regulator controlling formation of blood-forming stem cells

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Stem cell scientists have moved one step closer to producing blood-forming stem cells in a Petri dish by identifying a key regulator controlling their formation in the early embryo, shows research published online today in *Cell*.

step closer to our goal of developing a new and unlimited source of these stem cells for transplantation for the treatment of different blood cell diseases."

The work was reported by Dr. Gordon Keller, Director of the McEwen Centre for Regenerative Medicine, and Senior Scientist at Princess Margaret Cancer Centre, both at University Health Network. Dr. Keller is also Professor in the Department of Medical Biophysics at the University of Toronto and holds a Canada Research Chair in [stem cell biology](#).

Provided by University Health Network

Using mouse models to study the process of blood cell development, Dr. Keller and his team demonstrated that the retinoic acid signalling pathway is required for formation of blood-forming stem cells. Retinoic acid is produced from vitamin A and is essential for many areas of human growth and development.

When the researchers genetically disrupted the pathway that produces [retinoic acid](#) in mice, no blood-forming stem cells were produced. When they activated the pathway at the precise stage when stem cells develop, they observed a large increase in the number of blood-forming stem cells.

"Understanding how different cells and tissues are made in the embryo provides important clues for producing human cell types from [pluripotent stem cells](#) in a Petri dish," says Dr. Keller. Pluripotent stem cells are master stem cells that are able to generate many different cell types including heart, blood, [pancreas](#) and liver. To make a specific cell type from pluripotent stem cells, one must direct them down the appropriate developmental path in the Petri dish.

Dr. Keller adds: "Our findings have identified a critical regulator for directing pluripotent stem cells to make blood-forming stem cells, bringing us one

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