

**MEDIA RELEASE  
FOR IMMEDIATE RELEASE**

**21 NOVEMBER 2016**

**SCIENTISTS SUCCESSFULLY CREATE BLOOD FROM SKIN CELLS**

*Development could pave way for improved therapeutics for patients with immune disorders*

**SINGAPORE** – Researchers in Singapore have artificially generated new mouse blood and immune cells from skin cells. This is a significant first step towards the eventual goal: the engineering of new human blood cells from skin cells or other artificial sources.

One of the major challenges of regenerative medicine is to manufacture new blood and immune cells for patients in need. This development could lead to a robust source of new blood or immune cells becoming available to treat patients with immune disorders and other such diseases, or those who require blood transfusions.

While there were previous efforts to generate new mouse blood cells from skin cells, the yielded cells could last only two weeks once injected back into mice. In contrast, the artificially skin-derived blood cells in this study can last for multiple months in mice. Published in scientific journal *Nature Communications*, this study was led by researchers from A\*STAR's Genome Institute of Singapore (GIS) and Institute of Molecular and Cell Biology (IMCB).

To date, the researchers have identified a cocktail of four factors that can convert mouse skin cells into different types of blood cells. By introducing the four factors that are normally active in blood cells into skin cells, they could artificially 'rewrite' skin cells to adopt features of blood cells.

“On the face of it, skin cells and blood cells couldn't be more different from one another. We have been interested in whether it might be possible to rewrite the identity of cells, specifically to turn skin into blood,” said the study's first author Dr Cheng Hui, who initiated this project as a postdoctoral fellow at GIS.

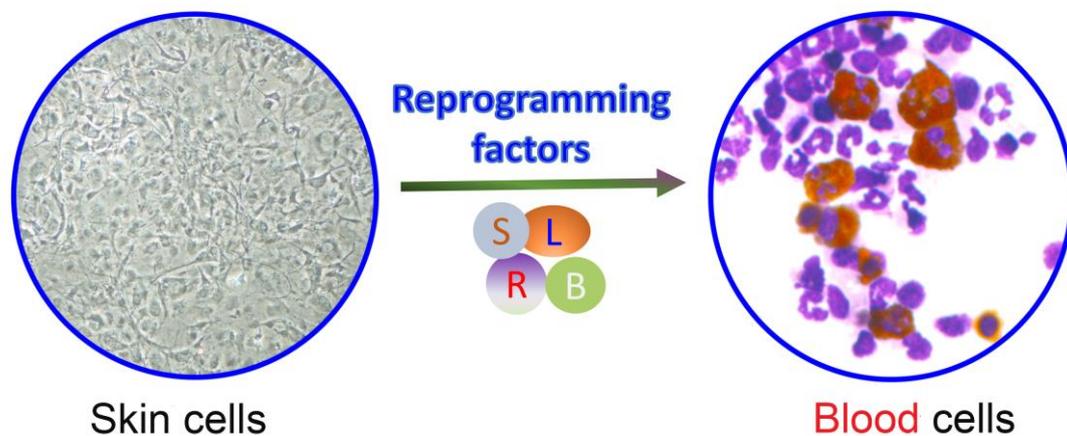
“This is not only of practical importance for regenerative medicine in terms of potentially yielding a source of new blood or immune cells, but it is also interesting from a fundamental biological perspective that two very different

cells – like skin and blood – can be interconverted,” added Dr Kyle Loh, currently an investigator and instructor at Stanford Institute for Stem Cell Biology & Regenerative Medicine, Stanford University School of Medicine, and a member of the project team as a former GIS intern.

GIS Executive Director Prof Ng Huck Hui said, “This development could be a potential game-changer for regenerative medicine. If researchers are able to extend what they did with the mice to human cells in the foreseeable future, it can translate into tangible benefits for the patients in need.”

---

## IMAGE



(Image source: A\*STAR's Genome Institute of Singapore)

Making blood from skin cells through direct reprogramming.

---

## Notes to Editor:

The research findings described in this media release can be found in the scientific journal *Nature Communications*, under the title, “*Reprogramming Mouse Fibroblasts into Engraftable Myeloerythroid and Lymphoid Progenitors*” by Hui Cheng<sup>1,\*</sup>, Heather Yin-Kuan Ang<sup>1,\*</sup>, Chadi A EL Farran<sup>2,3</sup>, Pin Li<sup>1</sup>, Haitong Fang<sup>2</sup>, Tongming Liu<sup>1</sup>, Say Li Kong<sup>1</sup>, Michael Lingzi Chin<sup>1</sup>, Weiyin Ling<sup>1</sup>, Edwin Kok Hao Lim<sup>1</sup>, Hu Li<sup>4</sup>, Tara Huber<sup>1</sup>, Kyle M. Loh<sup>5</sup>, Yuin-Han Loh<sup>2,3</sup> & Bing Lim<sup>1,6</sup>

<sup>1</sup>Stem Cell and Regenerative Biology Group, Genome Institute of Singapore, Singapore 138672

<sup>2</sup>Epigenetics and Cell Fates Laboratory, Institute of Molecular and Cell Biology, Singapore 138673

<sup>3</sup>Department of Biological Sciences, National University of Singapore, 14 Science Drive 4, Singapore 117543

<sup>4</sup>Center for Individualized Medicine, Department of Molecular Pharmacology & Experimental Therapeutics, Mayo Clinic, Rochester, MN 55905, USA

<sup>5</sup>Department of Developmental Biology, Stanford Institute for Stem Cell Biology and Regenerative Medicine, Stanford University School of Medicine, Stanford, CA 94305, USA

<sup>6</sup>Current address: Translational Medicine Research Center, Merck Research Laboratories, Singapore 138665

\*Equal contribution;

Correspondence: [limb1@gis.a-star.edu.sg](mailto:limb1@gis.a-star.edu.sg) and [yhloh@imcb.a-star.edu.sg](mailto:yhloh@imcb.a-star.edu.sg)

---

For media queries and clarifications, please contact:

Joyce Ang

Senior Officer, Office of Corporate Communications

Genome Institute of Singapore, A\*STAR

Tel: +65 6808 8101

Email: [angjj@gis.a-star.edu.sg](mailto:angjj@gis.a-star.edu.sg)

---

### **About A\*STAR's Genome Institute of Singapore (GIS)**

The Genome Institute of Singapore (GIS) is an institute of the Agency for Science, Technology and Research (A\*STAR). It has a global vision that seeks to use genomic sciences to achieve extraordinary improvements in human health and public prosperity. Established in 2000 as a centre for genomic discovery, the GIS will pursue the integration of technology, genetics and biology towards academic, economic and societal impact.

The key research areas at the GIS include Human Genetics, Infectious Diseases, Cancer Therapeutics and Stratified Oncology, Stem Cell and Regenerative Biology, Cancer Stem Cell Biology, Computational and Systems Biology, and Translational Research.

The genomics infrastructure at the GIS is utilised to train new scientific talent, to function as a bridge for academic and industrial research, and to explore scientific questions of high impact.

For more information about GIS, please visit [www.gis.a-star.edu.sg](http://www.gis.a-star.edu.sg)

## **About the Agency for Science, Technology and Research (A\*STAR)**

The Agency for Science, Technology and Research (A\*STAR) is Singapore's lead public sector agency that spearheads economic oriented research to advance scientific discovery and develop innovative technology. Through open innovation, we collaborate with our partners in both the public and private sectors to benefit society.

As a Science and Technology Organisation, A\*STAR bridges the gap between academia and industry. Our research creates economic growth and jobs for Singapore, and enhances lives by contributing to societal benefits such as improving outcomes in healthcare, urban living, and sustainability.

We play a key role in nurturing and developing a diversity of talent and leaders in our Agency and Research Institutes, the wider research community and industry. A\*STAR oversees 18 biomedical sciences and physical sciences and engineering research entities primarily located in Biopolis and Fusionopolis.

For more information on A\*STAR, please visit [www.a-star.edu.sg](http://www.a-star.edu.sg)