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Demystifying the targeted removal of red blood cells

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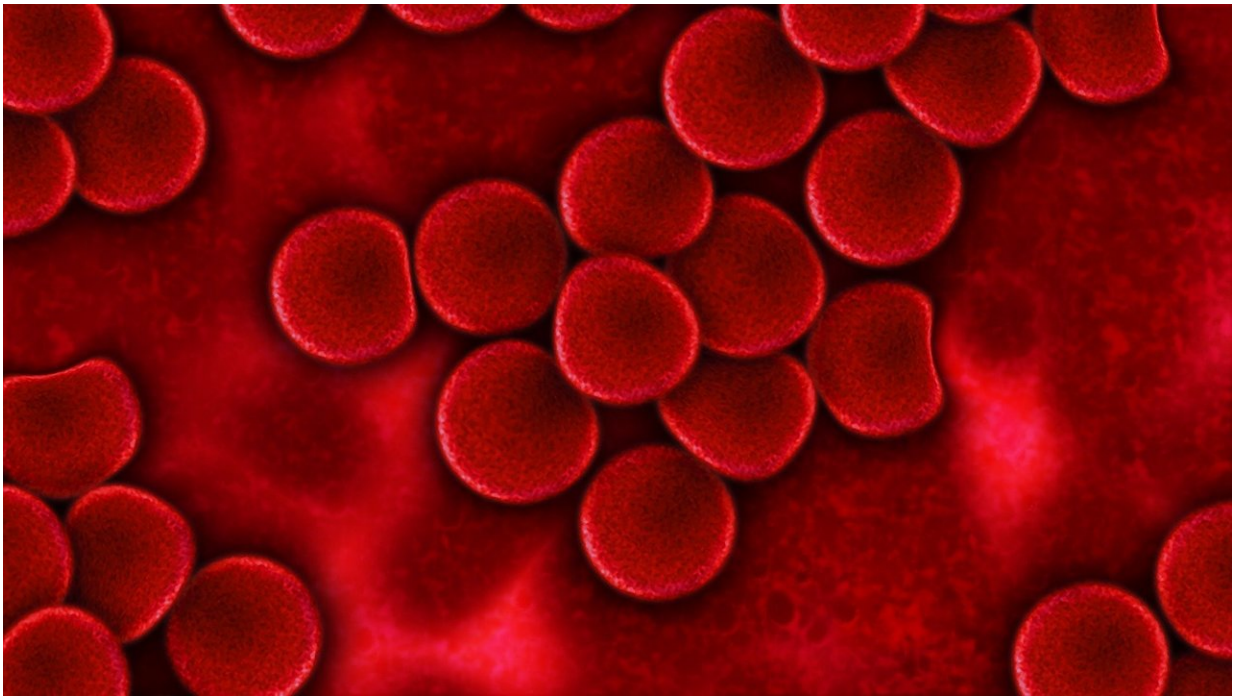

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The mystery surrounding the targeted removal of red blood cells from the human body is at the center of new Griffith University research.

Research Fellow Dr. Lennart Kuck from Griffith's School of Health Sciences and Social Work led a study investigating the enigma and published his findings in *Proceedings of the National Academy of*

Sciences.

"Red blood cells are optimized for oxygen transport and surrender their organelles in the process, thereby losing the tools it would normally have that would regulate the cells' natural, controlled demise," Dr. Kuck said.

"As a consequence, red blood cells age progressively, before their removal from circulation after around 120 days.

"If old red blood cells continue to circulate throughout the human body, it can pose serious health risks with the potential for clots and depriving some tissue areas of oxygen.

"This can lead to cardiovascular events such as a stroke and myocardial infarction."

Red blood cells also carry molecules that are toxic to the body if they are released freely into the blood stream.

By removing old red blood cells, cells in the liver or spleen in a controlled way ensures these molecules can be detoxified in these organs.

Despite the mystery surrounding the process of removing old blood cells, Dr. Kuck's research has made good inroads in explaining how this might occur.

"It seems the removal of red blood cells is regulated by proteins in the cell itself, which provides a first step towards developing novel therapeutics that could prevent premature removal of red blood cells in disease or following a transfusion," Dr. Kuck said.

"It also paves the way for early-stage diagnostics in individuals that may

be at risk of anemia due to excessive clearance of red blood cells."

More information: Lennart Kuck et al, Lysis of human erythrocytes due to Piezo1-dependent cytosolic calcium overload as a mechanism of circulatory removal, *Proceedings of the National Academy of Sciences* (2024). DOI: 10.1073/pnas.2407765121.
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Provided by Griffith University