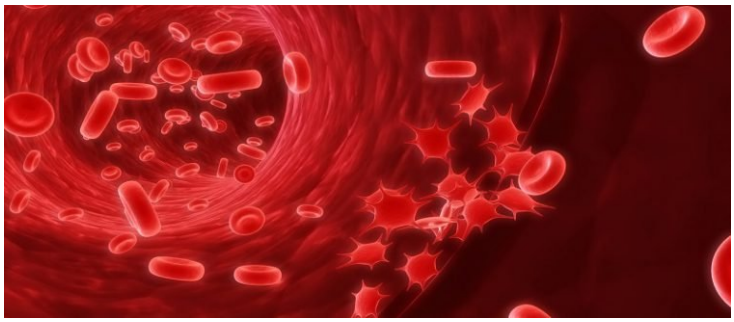
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Researchers develop platelets in lab

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Manufactured platelets could one day provide a reliable, safe supply for transfusions



Researchers have developed a way to grow human platelets in the laboratory from stem cells derived from fat tissue. These manufactured platelets could eventually reduce the reliance on donated platelets to help patients with cancer and other disorders.

In the new study, researchers led by Yumiko Matsubara, PhD, of Keio University School of Medicine in Tokyo, Japan, built on previous efforts to prove that fat (adipose) tissue could be used to create a stem cell line that yielded functioning platelets in just 12 days.

"By removing the donor from the equation, adipose-derived stem cells could be used to provide a ready supply of safe, tolerable platelets to meet an ever-changing demand," said Dr. Mastubara."

Researchers initially sought to derive platelets from two other types of stem cells including one known as induced pluripotent stem cells. They noticed adipose-derived cells, which were being used as a negative control in the experiments, had produced megakaryocyte- and platelet-sized cells that naturally expressed several genes important to producing platelets.

After refining methods for coaxing adipose-derived stem cells to produce platelets, the researchers conducted a series of tests to determine whether the manufactured platelets would function similarly to natural human platelets. They verified that the lab-grown platelets contained hallmark proteins found on the surface of natural platelets, as well as granules that are key to the clotting process. Blood clotting simulations and experiments using mice confirmed that the platelets behave like donated platelets, gathering together into clumps to form clots.

"Though more expensive to harvest compared to donor-derived platelets, this research demonstrates that platelets can be produced from adipose-derived cells by a rather simple method," said Matsubara. "Now that we have established an efficient manufacturing process to yield a large number of adipose-derived platelets, we next plan to perform preclinical studies using animal models to demonstrate efficacy and safety, followed by clinical trials in human patients."

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