Discovery of novel regulators of the birth of blood platelets

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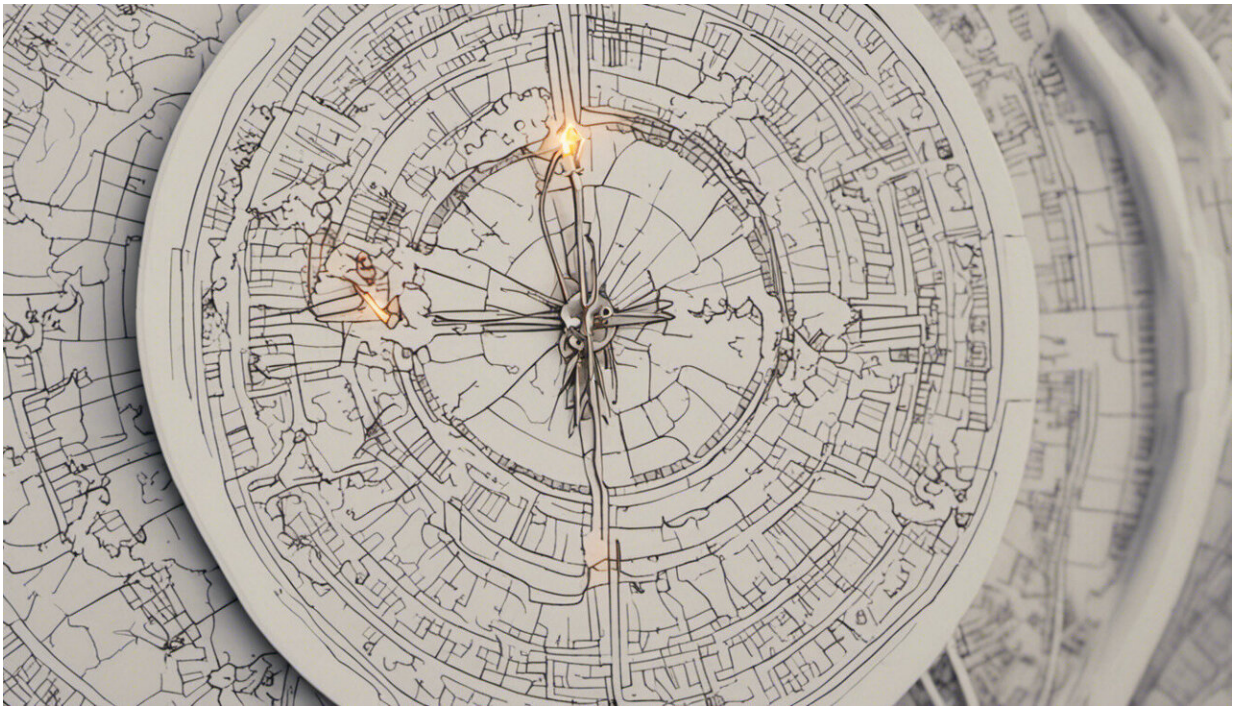

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EU research has led to a better understanding of the molecular mechanisms that make certain blood-producing cells function normally. The research will help prevent diseases that lead to heart attacks and strokes.

The work was done by researcher Marloes Tijssen, who was awarded a Marie Curie Intra-European Fellowship in 2010 for her project MEGAGEN ('Comparison of gene regulatory programs of blood stem cells and megakaryocytes').

Her work focused on 'megakaryocytes', the bone marrow cells that produce blood 'thrombocytes' - the platelets that are necessary for normal blood clotting. Scientists believe that megakaryocytes are highly dependent on gene regulation for proper functioning.

"Increasing our knowledge of how these cells work to form platelets will contribute to the improvement of human health, as platelets are known to be major players in heart and blood vessel disease that can cause heart attacks and strokes," says Tijssen.

"In addition, patients with low platelet counts, often induced by cancer treatment, currently receive platelets harvested from donors. With every transfusion, there is the risk of transmission of blood-borne infectious diseases. Therefore, ultimately, we would want to replace these donor-derived products with safer platelets produced in the laboratory."

Megakaryocytes, like all other types of blood cells, are derived from blood stem cells. These stem cells remain active throughout a person's lifetime, providing a constant supply of new blood cells. Cell identity and normal functioning are highly dependent on protein activity, which, in turn, depends on genes.

Serious problems, such as certain types of leukaemia, can arise when the tightly regulated phenomenon of gene translation is disturbed in blood cells.

Tijssen says that while sufficient numbers of megakaryocytes can be grown in the lab, efficient production of platelets from these cells is

currently hampered by a lack of knowledge of the process of platelet formation.

Tijssen's work is of direct relevance to a number of other research groups focusing on the question of gene translation. Her discoveries are already playing a critical role in understanding platelet production. One of the genes identified in her project has been shown to decrease platelet count in living organisms.

"It is likely that among the key regulators of megakaryocyte growth uncovered by our work, there will be proteins or processes that can be modified to improve the production of platelets in the laboratory for transfusion into patients," she says.

More information: Project factsheet
cordis.europa.eu/projects/rcn/93454_en.html

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