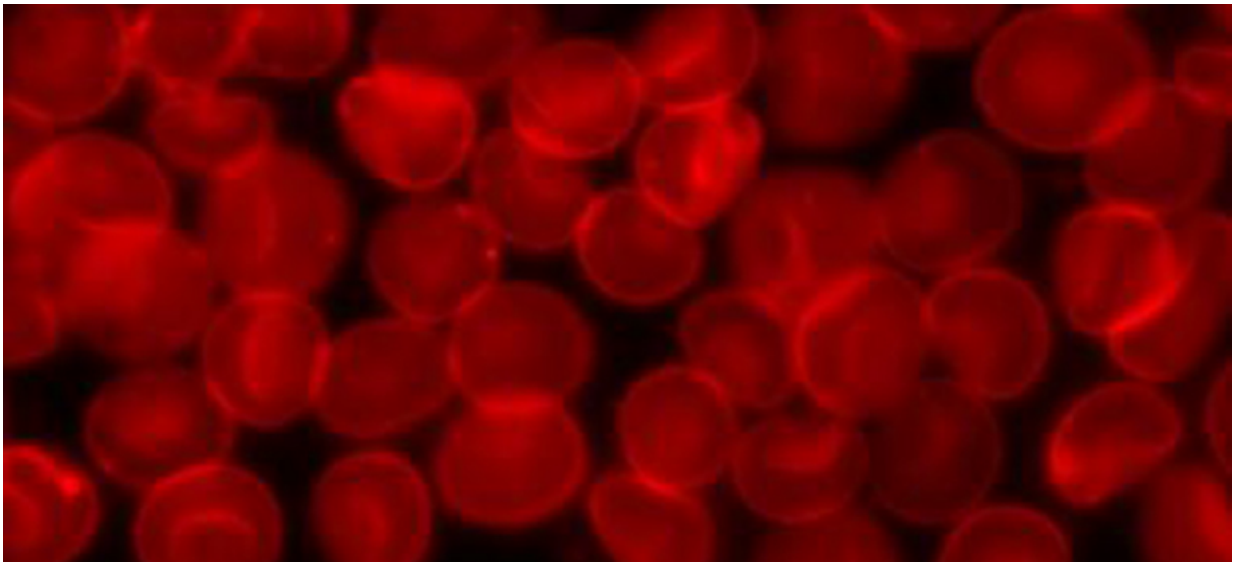


Researchers crack the code of the final blood group system

July 16 2018



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Ever since the blood type was discovered in 1962, no one has been able to explain why some people become Xga positive while others are Xga negative. But now, researchers at Lund University in Sweden have finally solved the mystery, and their study is being published in the scientific journal *Blood*.

In case of a [blood](#) transfusion, it is important to know the blood type of both the donor and the patient. The reason is that you want them to

match in order to reduce the risk of side effects. The well-known blood group systems ABO and Rh are prioritised as they are clinically the most important. However, other blood types can also cause problems.

Over the past ten years, researchers have developed methods to determine many of our blood types using DNA technology rather than by [red blood cells](#). Modern technology is particularly important for patients who have received large amounts of blood or those who need blood often, as their blood becomes a mixture consisting of several different donors. This makes it difficult to determine the patient's own blood type.

However, for the DNA tests to work, the genetic cause of each blood type system must be known. This is the case for the majority of our 36 systems, including ABO and Rh.

In practice, it's actually only one system – the Xg system – that has continued to elude physicians and researchers over the years. A third of all men and a tenth of all women lack the Xg protein that carries the mysterious blood type Xga on their red blood cells, i.e. they are Xga negative. Furthermore, the protein's function is still unknown. The Xga blood type was discovered in New York back in 1962, but it wasn't until now that researchers in Lund managed to figure out why a large part of the population lacks Xga.

"We enjoy solving old mysteries where others have failed, so we combined computer-based analyses with laboratory experiments," explains Martin L Olsson, professor at Lund University and medical consultant at the Nordic Reference Laboratory for Blood Group Analysis, who conducted the study.

Although this blood type was the first to be linked to a specific chromosome in humans (sex chromosome X), Xg is the last blood type

system to surrender its secret and thus be included in modern genetic testing.

"We used a bioinformatic strategy to find the underlying genetic cause," says doctoral student Mattias Möller, who used to work in the tech industry before making a switch to become a physician and blood researcher.

"I sat down at my computer and analysed and compared results from previous major studies, partly using my own tools, to solve the problem. Then my colleagues took over to confirm my findings through experiments in a lab environment," says Mattias Möller.

The lab experiments showed that a small variation close to the XG gene prevents the transcription factor GATA1 from binding to the DNA, which is why the Xg protein cannot be expressed in the red blood cells in some people. The finding makes it possible finally to determine also the Xga [blood type](#) using genetic typing/methods.

"Now we are in the process of introducing it in the clinic and aim to find out what this exciting protein does and the consequences of the fact that so many of us don't have it," concludes Martin L Olsson.

More information: Mattias Möller et al. Disruption of a GATA1-binding motif upstream of XG/PBDX abolishes Xga expression and resolves the Xg blood group system, *Blood* (2018). [DOI: 10.1182/blood-2018-03-842542](#)

Provided by Lund University

Citation: Researchers crack the code of the final blood group system (2018, July 16) retrieved 15

May 2024 from <https://medicalxpress.com/news/2018-07-code-blood-group.html>

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