

Newly discovered blood protein solves 60-year-old riddle

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Researchers at Lund University in Sweden have discovered a new protein that controls the presence of the Vel blood group antigen on our red blood cells. The discovery makes it possible to use simple DNA testing to find blood donors for patients who lack the Vel antigen and need a blood transfusion.

Because there has not previously been any simple way to find these rare donors, there is a [global shortage](#) of Vel-negative [blood](#). The largest known accumulation of this type of blood donor is found in the Swedish county of Västerbotten, which exports Vel-negative blood all over the world.

The Vel blood group was first described in 1952, when American doctors discovered a patient who developed serious complications from blood transfusions from normal donors. The patient lacked a previously unknown blood group antigen, which was named Vel. It has long been known that around one in 1 000 people lack the Vel antigen, but the molecule that carries it has been a mystery.

Lund University researchers Jill Storry, Magnus Jöud, Björn Nilsson and Martin L. Olsson and their colleagues have now discovered that the presence of the Vel antigen on our red blood cells is controlled by a previously unknown protein (SMIM1) that is not carried by those who lack the Vel antigen. The discovery has been published in the renowned journal *Nature Genetics*.

The findings have major clinical significance, according to Professor Martin L. Olsson, a consultant in [transfusion medicine](#).

"Until now there has not been a simple way to find these [blood donors](#) and there is therefore a major shortage of Vel-negative blood. Now we can identify these donors with simple DNA tests. From having previously only had access to one such donor in our region, there are now three and further screening is being carried out", says Professor Olsson.

Two research groups with completely different focuses have collaborated to solve the 60-year-old riddle, explains Reader Björn Nilsson, who has led the work together with Reader Jill Storry and Professor Olsson.

"Many researchers have tried to find the Vel molecule. We realised that it might be possible to find it using advanced DNA analysis techniques. Our idea proved to be correct and we found that the Vel blood group is inactivated in exactly the same way for all Vel-negative individuals",

says Björn Nilsson.

Another interesting aspect is that the new protein is unlike any previously known protein and appears to be present on the red [blood cells](#) of other species as well.

"Interestingly, the new protein, SMIM1, is reminiscent of other molecules used by malaria parasites to infect humans. It is therefore possible that SMIM1 could be a long-sought malaria receptor on the [red blood cells](#)", says Jill Storry.

More information: 'Homozygosity for a null allele of SMIM1 defines the Vel-negative blood group phenotype'

www.nature.com/ng/journal/vaop...nt/full/ng.2600.html

Provided by Lund University

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