

Iron deficiency may increase stroke risk through sticky blood

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Scientists at Imperial College London have discovered that iron deficiency may increase stroke risk by making the blood more sticky.

The findings, published in the journal *PLOS ONE*, could ultimately help with [stroke](#) prevention.

Every year, 15 million people worldwide suffer a stroke. Nearly six million die and another five million are left permanently disabled. The most common type, ischaemic stroke, occurs because the blood supply to the brain is interrupted by small clots.

In the last few years, several studies have shown that [iron deficiency](#), which affects around two billion people worldwide, may be a risk factor for ischaemic stroke in adults and in children. How iron deficiency could raise [stroke risk](#) has been a puzzle for researchers.

The Imperial team found that iron deficiency increases the stickiness of small blood cells called [platelets](#), which initiate blood clotting when they stick together. Although a link between iron deficiency and sticky platelets was first discovered almost 40 years ago, its role has been overlooked until now.

The researchers studied a group of patients with a rare disease called hereditary haemorrhagic telangiectasia (HHT) that often leads to enlarged blood vessels in the lungs, similar to varicose veins. Normally, the lungs' blood vessels act as a filter to remove small clots before blood goes into arteries. In patients with abnormal lung vessels, blood is able to bypass the filter, so small [blood clots](#) can travel to the brain.

The patients in the study who were short of iron were more likely to have a stroke. In addition, the researchers looked at platelets in the lab and found that when they treated these with a substance that triggers clotting, platelets from

people with low iron levels clumped together more quickly.

Dr Claire Shovlin, from the National Heart and Lung Institute at Imperial College London, said: "Since platelets in the blood stick together more if you are short of iron, we think this may explain why being short of iron can lead to strokes, though much more research will be needed to prove this link.

"The next step is to test whether we can reduce high-risk patients' chances of having a stroke by treating their iron deficiency. We will be able to look at whether their platelets become less sticky. There are many additional steps from a clot blocking a blood vessel to the final stroke developing, so it is still unclear just how important sticky platelets are to the overall process. We would certainly encourage more studies to investigate this link."

The researchers studied data on 497 patients with abnormal [blood vessels](#) in the lung, known as pulmonary arteriovenous malformations, who were treated at a specialist HHT clinic at Hammersmith Hospital. The study found that even moderately low iron levels, around 6 micromoles per litre, approximately doubled the risk of stroke compared with levels in the middle of the normal range of 7-27 micromoles per litre.

Besides this group of patients, many other people have conditions that can allow blood clots to bypass the filter in the lungs. One in four people have a hole in the heart called a patent foramen ovale. Holes in the heart also allow [blood](#) to bypass the lung filter from time to time, though not as often as for the lung patients.

The research was supported by donations from family and friends of HHT [patients](#).

More information: C. Shovlin et al. "Ischaemic strokes in patients with pulmonary arteriovenous malformations and hereditary hemorrhagic

telangiectasia: associations with iron deficiency and platelets." *PLOS ONE*, 19 February 2014.
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