Unraveling mysteries in the blood

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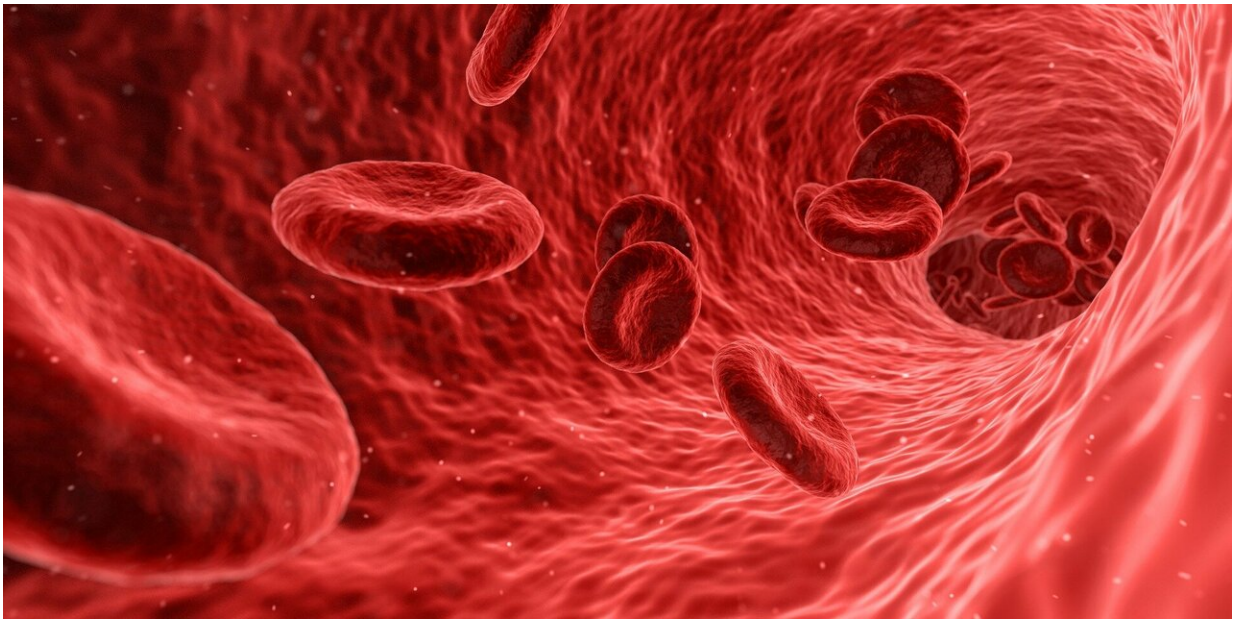

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Queen's University researcher Paula James has revealed women who are carriers of hemophilia A, an inherited bleeding disorder, experience abnormal bleeding in about 30 per cent of cases. Dr. James is working to unravel the mystery as to why this abnormal bleeding, including nosebleeds, heavy periods, and bleeding following childbirth, occurs.

To define abnormal bleeding, Dr. James used a bleeding score where higher numbers represent more intense bleeding.

"It's long been assumed that women who carry this gene don't have bleeding symptoms but we now know that isn't true," says Dr James, who also works as a clinician-scientist at Kingston Health Sciences Research Institute. "Some patients have low levels of clotting Factor FVIII in their blood, and for those that don't, there must be other contributing factors. It's a challenging problem because it has led to their bleeding symptoms being dismissed and not treated properly."

Her team has discovered that women who are carriers of hemophilia A respond differently to the stresses that cause bleeding – even those who have normal levels of Factor VIII in their blood.

"Normally when we're injured or cut or stressed in other ways, a number of the elements that help our blood clot go up. However, we thought that it might not work that way in these women," says Dr. James. "So what other things could be happening within someone's body that would make them at risk for bleeding?"

To find out, Dr. James and her group compared levels of Factor VIII circulating in the blood levels of 17 women who are carriers of hemophilia A with those of seven normal control patients. The volunteers' blood was tested before and after being treated with Desmopressin, a drug that causes an immediate increase in clotting factor levels that mimics the way the body responds to being cut or injured.

The researchers were looking to see whether the women's response to the drug was related to how much Factor VIII was already in their blood. "We wondered whether a person's response was only dependent on where they were starting from using a baseline," James says. "That turned out not to be the case."

Dr. James' study showed that, compared to the control group, the Factor

VIII response in Hemophilia A patients, including those with normal clotting factor levels, was both significantly reduced and shorter-lived. These results were correlated with those that had higher levels of abnormal bleeding.

The research results suggest that the women may not be able to generate and sustain a high enough increase in Factor VIII in response to bleeding, likely because of the FVIII mutation that causes hemophilia A. Abnormal bleeding can lead to iron deficiency, which causes fatigue, sleep disturbance, and impaired learning and work performance.

"It's a huge quality of life issue for these women," says Dr. James. "We need to understand this disease better in order to treat it properly. While we still don't have all the answers, this discovery adds significantly to our understanding of why, even when they have normal clotting factor levels, women who are carriers of hemophilia A have abnormal bleeding."

The study was published in *Blood Advances*.

More information: Victoria Candy et al. A decreased and less sustained desmopressin response in hemophilia A carriers contributes to bleeding, *Blood Advances* (2018). DOI: 10.1182/bloodadvances.2018023713

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