Glycoprotein VI Deficiency

Subjects: Genetics & Heredity

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Glycoprotein VI deficiency is a bleeding disorder associated with a decreased ability to form blood clots.

genetic conditions

1. Introduction

Normally, blood clots protect the body after an injury by sealing off damaged blood vessels and preventing further blood loss. Because people with glycoprotein VI deficiency cannot form blood clots normally, they have an increased risk of nosebleeds (epistaxis) and may experience abnormally heavy or prolonged bleeding following minor injury or surgery. In some affected individuals, spontaneous bleeding under the skin causes areas of discoloration (ecchymosis). Women with glycoprotein VI deficiency often have heavy or prolonged menstrual periods (menorrhagia).

2. Frequency

The prevalence of glycoprotein VI deficiency is unknown. At least 15 cases have been described in the scientific literature.

3. Causes

Glycoprotein VI deficiency can be caused by mutations in the *GP6* gene, which provides instructions for making a protein called glycoprotein VI (GPVI). This protein is embedded in the outer membrane of blood cells called platelets, which are an essential component of blood clots. In response to an injury that causes bleeding, the GPVI protein begins clot formation by attaching (binding) to another protein called collagen that is found on blood vessel walls. The binding of GPVI to collagen also signals additional platelets to come together to increase the size of the clot.

GP6 gene mutations can lead to the production of no GPVI protein; an abnormally short, nonfunctional GPVI protein; or a protein that is less able to bind to collagen. Without GPVI binding to collagen, platelets cannot come together efficiently to form a clot, leading to the bleeding problems associated with glycoprotein VI deficiency.

Some cases of glycoprotein VI deficiency are not caused by *GP6* gene mutations; instead these cases are acquired, which means they do not appear to be caused by inherited gene mutations. These acquired cases of

glycoprotein VI deficiency are associated with autoimmune disorders such as immune thrombocytopenia purpura, Graves disease, or systemic lupus erythematosus (SLE). Autoimmune disorders occur when the immune system malfunctions and attacks the body's own cells and tissues. Some individuals with these autoimmune disorders produce immune proteins called antibodies that attack and destroy the GPVI protein. As a result, there is a shortage (deficiency) of functional GPVI protein on the surface of platelets, which leads to bleeding problems characteristic of glycoprotein VI deficiency.

3.1. The gene associated with Glycoprotein VI deficiency

- GP6

4. Inheritance

When this condition is caused by mutations in the *GP6* gene, it is inherited in an autosomal recessive pattern, which means both copies of the gene in each cell have mutations. The parents of an individual with an autosomal recessive condition each carry one copy of the mutated gene, but they typically do not show signs and symptoms of the condition.

5. Other Names for This Condition

- BDPLT11
- bleeding diathesis due to a collagen receptor defect
- bleeding disorder, platelet-type, 11
- GP VI deficiency

References

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