

### What are blood clotting problems?

The blood thickens, or "clots" in response to injury. Normally, this is a good thing: blood clots stop the bleeding and allow the body to begin to heal the damaged vessel. However, in some women, the body's coagulation machinery is imbalanced, causing clots to form too easily in response to minor injury or no injury at all. This condition is known as *thrombophilia* ("throm-bo-fee-lee-uh").

Women with blood clotting problems are at risk for blood clots that form in the deep veins of the legs ( [deep vein thrombosis](#) , or DVT) and can travel to the lungs, causing a pulmonary embolism. Blood clots that form in the arteries that supply blood to the heart or brain can also cause a [heart attack](#) or [stroke](#) .

See also:

[Clotting Problems & Heart Disease Risk](#)

[Blood Clotting Problems & Stroke Risk](#)

### What causes blood clotting problems?

Blood clotting is controlled by a complex system of many different proteins (large molecules that perform numerous tasks in the human body). Defects in these proteins, or levels that are too high or too low, can cause blood clotting problems. Problems with the proteins responsible for blood clotting have two main causes:

- **Inherited conditions** caused by genes that we were born with, passed down from our parents
- **Acquired conditions** caused by our environment or lifestyle habits

This article focuses on inherited blood clotting problems caused by genes that we were born

with. Except in the most severe cases, inherited problems are not usually enough to cause a DVT or pulmonary embolism on their own. Instead, these problems contribute to a clot only when they are combined with something in the environment that activates the body's blood-clotting machinery and causes the clot to form (called a "trigger").

You can think of inherited clotting problems as resembling a loaded gun. If left untouched, the gun will not go off. Only when the loaded gun (an inherited clotting problem) is combined with a "trigger" event (something that causes the clot to form) will the bullet fire (a blood clot forms).

Conditions in the environment that can act as a "trigger" for blood clots in women who are at risk include:

- [Smoking](#)
- [Obesity](#)
- Hormones from [birth control pills](#) or [hormone replacement therapy](#)
- Cancer
- Trauma, surgery, or hospitalization
- Long periods of immobility, such as during long travel
- High levels of [homocysteine](#) ("ho-mo-sis-teen"), an amino acid (basic building block of proteins) in the blood

### **Can inherited blood clotting problems increase my risk of vein disease?**

Women with certain inherited blood clotting problems are more likely to suffer from blood clots, including deep vein thrombosis and pulmonary embolism. In one study of 1,605 patients (half were women), 1 in 4 people who suffered a DVT or PE had an inherited blood clotting problem.<sup>1</sup>

In addition to a few well-established clotting problems, researchers are constantly discovering new genes that influence our risk of blood clots. Every woman is at some risk for blood clots: rather than focusing on just one cause, it is the sum of all our risks, both genetic and environmental, that is most important. Not every woman who has an inherited blood clotting problem will suffer a DVT or PE, and most blood clots occur in women without any of these inherited factors.

Some of the most common inherited clotting problems are listed below.

### Common Blood Clotting Problems

#### Factor V Leiden

The most common inherited blood clotting problem is called *Factor V Leiden* (FVL), so-called because it affects a clotting protein called Factor V (5). About 5% of white women and men have a mutation in the FVL gene. It is less common in Hispanics, and rare in people of Asian or African descent. <sup>2</sup>

One in five people who suffer a DVT or PE have this mutation.

<sup>2,3</sup>

While a woman with an FVL mutation has a much higher-than-normal risk of suffering a DVT or PE, her overall risk remains low unless she also has other conditions that make her more likely to develop a clot.<sup>5</sup> Women who have one defective FVL gene have a 30-fold higher risk of blood clots while using birth control pills, <sup>3</sup> a 15-fold higher risk with postmenopausal hormone replacement therapy, and a 7-fold higher risk during [pregnancy](#)

compared with women without the mutation.

<sup>4</sup>

Women who carry two abnormal FVL genes have an even greater risk of developing blood clots.

<sup>6,7</sup>

Most women with two abnormal FVL genes will experience at least one blood clotting event during her lifetime.

<sup>6</sup>

#### Prothrombin Gene Mutation

This clotting problem is caused by mutations in the gene that produces *prothrombin* ("pro-throm-bin"), also called clotting Factor II. The mutation is found only in whites, and affects about 1 in 50 women in the US. Women with this mutation have nearly 3 times the normal risk of suffering a DVT or PE. Even so, only 6% of patients with a DVT or PE have a mutation in this gene.

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### **Antithrombin III, protein C, and protein S Deficiency**

Antithrombin III, protein C, and protein S act as natural blood-thinners (*anticoagulants*). When a woman has a mutation in one or more of these genes, the proteins do not work properly and her blood is more likely to clot. About 1 in 100 people have a mutation in protein C or protein S, while only 1 in 5,000 have a mutation in the antithrombin III gene.

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Although these conditions are rare and account for only a few percent of all problems caused by blood clots, a woman who has them has more than 10 times the normal risk of suffering a DVT or PE.<sup>3,6</sup>

### **Should I be tested for blood clotting problems?**

The blood clotting problems mentioned above can be diagnosed using a simple blood test. However, because they are so rare and do not usually cause blood clots unless combined with environmental factors, most women do not need to be tested for them.

Women who have had blood clotting problems in the past may have a test to see if one of the common mutations is responsible. There are no clear-cut guidelines for who should be tested, but you and your doctor may want to consider a test if you:

- Are younger than 50 and have suffered a DVT or PE that had no obvious cause
- Have a [family history](#) of blood clotting problems (see common blood clotting problems above) and suffered a DVT or PE yourself

- Have had more than one DVT or PE
- Were diagnosed with a blood clot in an unusual location, such as the veins of the abdomen or brain, and there is no obvious cause
- Had a blood clot during [pregnancy](#) or while using [birth control pills](#)
- Have had multiple miscarriages or an unexplained pregnancy loss late in pregnancy
- Had a stroke before age 50 and you smoke

### How can I prevent DVT and PE if I have a blood clotting problem?

Even if you have an inherited blood clotting problem, your overall risk of suffering a DVT or PE is probably low, unless you are exposed to other environmental factors such as surgery, pregnancy, birth control pills, or hormone replacement therapy. If you do not have a history of blood clots or a very severe type of clotting problem (such as two defective copies of the Factor V Leiden gene), no treatment is usually required. However, it is important that you take steps to reduce your risk factors and avoid situations that can trigger a blood clot.

You can reduce your risk of blood clots by:

- [Quitting smoking](#)
- Maintaining a [healthy weight](#)
- Considering switching to a non-hormonal method of birth control

See [Preventing DVT: The Basics](#) for more on how controlling your blood clot risk factors and avoiding triggers can help prevent DVT or PE.

If you have an inherited clotting problem and you have suffered a DVT or PE in the past, you may be given blood-thinning drugs (*anticoagulants*) to prevent future clots. Whether or not you should receive these drugs and how long you need to take them depends on several factors:

- What type of mutation you have (the more serious your clotting problem, the more likely you are to need medication)
- How severe your previous blood clot event was (if you had a pulmonary embolism you are

more likely to need blood-thinning drugs)

- Whether you will be exposed to situations that make clots more likely (such as surgery or pregnancy)

If you know you have a blood clotting mutation and need to undergo surgery, become pregnant, or be immobile for a long period of time (such as during travel), make sure your healthcare team knows about your high risk of clots and ask whether blood-thinning drugs and other measures can be used to prevent them.

See also: [Pregnancy & Vein Disease Risk](#)

### References

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