

## 31. Factor V Leiden: Laboratory tests

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**Q1: "Why do some test results for factor V Leiden (FVL) come back "normal"? It seems to reason that test results should come back either positive or negative for FVL. Since there continues to be confusion between factor V Leiden and factor V deficiency, is the latter at times tested in place of testing for FVL? Since the test results came back "normal" for 2 of my relatives, could they have been tested for factor V deficiency? If not, what is a person to conclude upon discovering their test results are "normal"?"**

A1: It is incorrect and confusing terminology to say that the factor V Leiden test was "normal". The wrong test can, indeed, have been performed. The patient needs to ask her/his physician to clarify the issue.

**Q2: "I had an abnormal APC resistance test. Does this mean I have factor V Leiden? Should I still get the genetic test"?"**

A2: To have an abnormal APC resistance test does not necessarily mean that you have factor V Leiden. There are other causes for an abnormal APC resistance test. Yes, the patient should still get the genetic test.

The diagnosis of FV Leiden is either made by

- genetic testing, called PCR (= polymerase chain reaction) or,
- by APC-resistance assay (= activated protein C resistance assay). There are important limitations to this latter test.

When performing the genetic test for factor V Leiden, the lab should report that the patient either:

1. does not have factor V Leiden, or
2. is heterozygous for factor V Leiden, or
3. is homozygous for factor V Leiden

The same unambiguous terminology should be used by the physician who passes the test results on to the patient. When performing the APC-resistance test, the lab should report that the patient either

- has a normal APC resistance test, or
- abnormal test suggesting that the patient may be heterozygous for factor V Leiden, or
- abnormal test suggesting that the patient may be homozygous for factor V Leiden

Since abnormal APC resistance tests can be due to other reasons than factor V Leiden (such as antiphospholipid antibodies and other, yet unknown, reasons), an abnormal test does not prove that the patient has factor V Leiden. An abnormal APC resistance test result should always be followed by the genetic factor V Leiden test to confirm that the patient does, indeed, have factor V Leiden. Up to 37 % of patients with an abnormal APC resistance test do not have factor V Leiden [references 1 and 2]. On the other hand, a normal APC resistance test means that the patient does not have factor V Leiden and a confirmatory genetic test is not necessary.

The phrase that the "factor V Leiden test was normal" is unfortunately used by some physicians, often with the meaning that the factor V Leiden mutation was not discovered on genetic testing, i.e. that the patient does not have factor V Leiden. However, the terminology "normal" is inaccurate and confusing, particularly because at times the wrong test (factor V activity test) is ordered instead of the genetic test. A normal factor V activity test means that the patient does not have factor V deficiency, but does not exclude factor V Leiden. The issue is further discussed in Q/A 7. What is a person to conclude upon being told their test result is "normal"? The person should ask her/his physician what test was really done. If it was the genetic test, then the patient should ask: "Do I have factor V Leiden, am I heterozygous, or am I homozygous?" If the APC resistance test was performed and was normal, then the patient does not have factor V Leiden; if it was abnormal, the patient should ask for the confirmatory genetic test to be done. If the factor V activity test was performed, then the wrong test was done. The best thing would be for the patient to ask for a copy of the lab report and keep it with her/his own medical records.

References:

1. Journal of Vascular Surgery 1998;28:624-629;
2. Clinical & Laboratory Haematology 1997;19:67-71