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URL of this page: //medlineplus.gov/ency/article/003639.htm

Hemoglobin electrophoresis

Hemoglobin is a protein that carries oxygen in the blood. It is present inside the red blood cells. Hemoglobin electrophoresis measures the levels of the different types of this protein in the blood.

How the Test is Performed

A blood sample is needed.

In the lab, the technician places the blood sample on special paper and applies an electric current. The hemoglobins move on the paper and form bands that show the amount of each type of hemoglobin.

How to Prepare for the Test

No special preparation is necessary for this test.

How the Test will Feel

When the needle is inserted to draw blood, some people feel moderate pain. Others feel only a prick or stinging sensation. Afterward, there may be some throbbing or a slight bruise. This soon goes away.

Why the Test is Performed

You may have this test if your health care provider suspects that you have a disorder caused by abnormal forms of hemoglobin (hemoglobinopathy).

Many different types of hemoglobin (Hb) exist. The most common ones are HbA, HbA2, HbE, HbF, HbS, HbC, HbH, and HbM. Healthy adults only have significant levels of HbA and HbA2.

Some people may also have small amounts of HbF. This is the main type of hemoglobin in an unborn baby's body. Certain diseases are associated with high HbF levels (when HbF is more than 2% of the total hemoglobin).

HbS is an abnormal form of hemoglobin associated with sickle cell anemia. In people with this condition, the red blood cells sometimes have a crescent or sickle shape. These cells easily break down or can block small blood vessels.

HbC is an abnormal form of hemoglobin associated with excessive red blood cell destruction and hemolytic anemia. The symptoms are much milder than they are in sickle cell anemia.

Other, less common, abnormal Hb molecules cause other types of anemia.

Normal Results

In adults, these are normal percentages of different hemoglobin molecules:

- HbA: 95% to 98% (0.95 to 0.98)
- HbA2: 2% to 3% (0.02 to 0.03)
- HbE: Absent
- HbF: 0.8% to 2% (0.008 to 0.02)
- HbS: Absent
- HbC: Absent

In infants and children, these are normal percentage of HbF molecules:

- HbF (newborn): 50% to 80% (0.5 to 0.8)
- HbF (6 months): 8%
- HbF (over 6 months): 1% to 2%

Normal value ranges may vary slightly among different laboratories. Some labs use different measurements or may test different samples. Talk to your provider about the meaning of your specific test results.

What Abnormal Results Mean

Significant levels of abnormal hemoglobins may indicate:

- Hemoglobin C disease
- Inherited blood disorder in which the body makes an abnormal amount of some hemoglobin molecules (thalassemia)
- Rare hemoglobinopathy
- Sickle cell anemia

You may have false normal or abnormal results if you have had a blood transfusion within 12 weeks of this test.

Risks

There is very little risk involved with having your blood taken. Veins and arteries vary in size from one person to another and from one side of the body to the other. Taking blood from some people may be more difficult than from others.

Other risks associated with having blood drawn are slight but may include:

- Excessive bleeding
- Fainting or feeling lightheaded
- Hematoma (blood buildup under the skin)
- Infection (a slight risk any time the skin is broken)

Alternative Names

Hb electrophoresis; Hgb electrophoresis; Electrophoresis - hemoglobin; Thalassemia - electrophoresis; Sickle cell - electrophoresis; Hemoglobinopathy - electrophoresis

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Review Date 3/11/2024

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06/01/2028

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