

**lupus**  **FACT SHEET**

Lupus Canada

## Blood Disorders in lupus and lab tests that detect them

**B**lood disorders are common in systemic lupus erythematosus (SLE or lupus). Many of the clinical and laboratory manifestations of lupus concern the cells and clotting factors that circulate in the blood. Some important blood issues in lupus include low hemoglobin or red blood cells (anemia), low platelet counts (thrombocytopenia), and excess blood clotting (thrombosis). It is worth noting that problems in the blood (and other types of lupus activity, such as inflammation of the kidneys) can happen without any outward symptoms.

There is no single test for lupus, but the presence of certain antibodies in the blood can help confirm a lupus diagnosis. Antibodies are proteins that recognize and bind to other proteins in the body. Instead of combatting an unwanted foreign agent, such as bacteria or viruses (which is what normal antibodies do), the antibodies in lupus may be produced against our own proteins and cells, and may interfere with the normal function of body organs or tissue. Such antibodies may be detected by lab tests.

### Components of the blood

Blood is made up of cells and serum, a liquid full of protein that also contains antibodies. The cells include:

- red cells (erythrocytes), which contain the oxygen-carrying molecule hemoglobin
- white cells (leukocytes), which fight infection and can be subdivided into several types (neutrophils and lymphocytes being particularly important)
- platelets, which are involved in blood clotting (special

proteins, called clotting factors, are also important) A full blood count test measures the amount of red cells and hemoglobin, white cells and platelets circulating in the blood. There are also special tests for assessing the clotting properties of blood.

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### Anemia

A relatively common blood disorder in lupus is anemia, which may affect about half of all people with active disease. Anemia means that there are fewer red cells — and therefore less hemoglobin to carry oxygen — in the blood than there should be. Hemoglobin is the protein

inside red cells that carries oxygen from the lungs to all the tissues of the body. Low red cell counts and the associated low level of hemoglobin in the blood can be the result of antibodies attacking the red cells and causing their destruction, a process called hemolytic anemia. It is more common, though, to have anemia due to poor production of red cells in the bone marrow. This usually occurs as a side effect of general inflammation in the body due to lupus. Anemia is rarely caused by drugs, although this is possible.

Whatever the underlying cause of anemia, the end result is fatigue — a very common lupus symptom — and generally the first and most common symptom of anemia. In more severe cases, the person may become short of breath, even in the absence of lung disease, because there is not enough oxygen in the blood.

### Leukopenia

A lower-than-normal white blood cell count, or leukope-

## High doses of certain drugs can also lower production of white blood cells, and this may decrease the body's ability to fight infection. Cyclophosphamide, which is sometimes used to treat more severe conditions of lupus, such as kidney disease, can have this effect.

nia, is found on the full blood count in about 95 percent of lupus patients. This is due to the presence of antibodies that destroy white blood cells. Fortunately, this rarely causes a clinical problem because more white blood cells are made by the bone marrow. This means that there are enough of them to fight infection, especially those due to such viruses as influenza.

High doses of certain drugs can also lower production of white blood cells, and this may decrease the body's ability to fight infection. Cyclophosphamide, which is sometimes used to treat more severe conditions of lupus, such as kidney disease, can have this effect. As a result, people taking cyclophosphamide need to have their white cell count checked regularly so that the drug dose can be adjusted if necessary. This is also true for drugs such as azathioprine, mycophenolate mofetil and methotrexate, although the bone marrow toxicity of these agents at the doses usually used in lupus is lower than that of cyclophosphamide. Regular blood tests give your doctor the chance to prevent this complication by adjusting the drug dose.

### **Thrombocytopenia**

Low platelets, or thrombocytopenia, in people with lupus is usually due to antibodies and less commonly the result

of drug side effects. When the count is very low, there is an increased risk of bruising and bleeding.

### **Bloods tests**

#### **Antinuclear antibody (ANA)**

A screening test for ANA is standard in assessing lupus because it is positive in almost all patients and is an important diagnostic criterion, though it may become negative in some patients over the course of their disease. False-positive results are fairly common in the general population, and the sensitivity and specificity of ANA depends on the technique used. Thus many people with a positive ANA test do not have lupus.

#### **Anti-Sm**

Anti-Sm is an antibody against a protein found in the nucleus of cells. This test is highly specific for lupus – that is, it is generally only positive in someone with lupus, not in someone without lupus. However, only about 30 percent of people with lupus have a positive anti-Sm test.

#### **Anti-nDNA**

Another highly specific test for lupus, anti-nDNA is an antibody specifically against double-stranded DNA. Like the test for the Anti-Sm antibody, this test is generally only positive in someone with lupus, not in someone without

the disease. Sixty to 80 percent of people with active lupus have a positive anti-nDNA test, and the result can be a useful measure of disease activity. The presence of anti-nDNA is associated with a greater risk of lupus nephritis (inflammation of the kidney).

## Anti-Ro and Anti-La

These antibodies, seen in about 15-30 percent of people with lupus, are commonly found together. Anti-Ro is found in 30 percent of people with lupus. However, they may be seen in other autoimmune diseases, including the majority of people with primary Sjögren's syndrome. Anti-Ro is associated with photosensitivity, and both are associated with neonatal lupus (a condition occurring rarely in babies born to women with lupus).

## Complement

Complement proteins and their components are markers for inflammation – that is, they help your doctor gauge the level of disease activity. The most commonly measured components are C3 and C4. These tests are particularly useful in evaluating kidney involvement in lupus and in monitoring the disease over time.

## Erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP)

These are non-specific tests to detect generalized inflammation. Levels may be increased in people with active lupus and decline when corticosteroids or NSAIDs are used to reduce inflammation.

## Antiphospholipid antibodies and lupus anticoagulant

These antibodies are present in 30 to 40 percent of people with lupus and may cause increased blood clotting (thrombosis). The antibodies can be detected by a specific test for the type of antibody, or by abnormali-

ties in conventional clotting tests.

The increased clotting tendency caused by the antiphospholipid antibody or lupus anticoagulant can lead to clots in veins (deep vein thromboses) or in the major arteries (resulting in heart attack or stroke); deep vein thromboses can sometimes travel to the lungs, causing vessel blockage known as “pulmonary thromboemboli.” In women, the antibodies may also be associated with recurrent miscarriages (itself likely related to placental thromboses).

A positive antiphospholipid antibody or lupus anticoagulant test plus the presence of blood clots, blood vessel blockage (pulmonary thromboembolism), recurrent miscarriages or decreased platelets (thrombocytopenia) is called antiphospholipid antibody syndrome. Low platelet counts may also be a feature. This syndrome affects about a

third of people with antiphospholipid antibody (10 to 15 percent of all people with lupus).

## Tests for kidney disease

### Urinalysis

Tests of urine (urinalysis) can indicate kidney disease. For example, excess protein in the urine (proteinuria) can be an important indicator of kidney disease. The presence of red blood cells and white blood cells in the urine also may indicate kidney disease; alternately, white blood cells in the urine may indicate a urinary tract infection.

### Serum creatinine

Creatinine is a waste product that is excreted by the kidney. Loss of kidney function increases blood levels of creatinine. The concentration of creatinine in the blood

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can be used to assess the degree of kidney impairment.

### 24-hour urine collection

Your kidneys filter the blood and eliminate waste products, including creatinine. A measure of how efficiently your kidneys are working may be done by analyzing the urine collected over a 24-hour period and calculating the rate of creatinine clearance from the body. Impairment of kidney function by chronic or acute inflammation of the kidney (nephritis) due to lupus results in reduced creatinine clearance. The 24-hour urine test is also used to obtain an accurate measure of protein in the urine.



### FOR MORE INFORMATION

- Lupus Canada: [www.lupuscanada.org](http://www.lupuscanada.org). This site includes electronic versions of the *Living Well with Lupus* fact sheets.
- *Lupus: The Disease with a Thousand Faces*, edited by Dr. Sasha Bernatsky and Dr. Jean-Luc Senécal, Key Porter Books (2004) ISBN 1-55263-603-8. Contact Lupus Canada to order this book.
- The Arthritis Foundation: [www.arthritis.ca](http://www.arthritis.ca)
- Lupus Foundation of America: [www.lupus.org](http://www.lupus.org)
- National Institute of Arthritis and Musculoskeletal and Skin Disease: Handout on Health: Systemic Lupus Erythematosus: <http://www.niams.nih.gov/hi/topics/lupus/slehandout/index.htm>
- MedlinePlus Health Information: Blood and Blood Disorders: [www.nlm.nih.gov/medlineplus/bloodandblooddisorders.html](http://www.nlm.nih.gov/medlineplus/bloodandblooddisorders.html)

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#### Disclaimer

*Systemic lupus erythematosus is an autoimmune disease that affects thousands of Canadians, mostly women in their childbearing years. Symptoms vary greatly from person to person and treatment is highly individualized. Patients are urged to contact their physician or healthcare professional with any questions or concerns they might have.*

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