

Guide to Understanding Laboratory Tests

Laboratory tests are ordered by your doctor to:

1. check how severe is your disease
2. check how well medications are working to control your disease
3. check for any side effects of the medications you are taking
4. help confirm a diagnosis



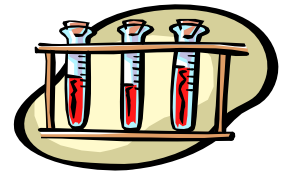
Laboratory tests do have limitations & are only part of your assessment.

1. Normal laboratory values will often vary slightly from lab to lab.
2. Some people may
 - show negative tests even when the person has the disease being tested for. In the early stages of rheumatoid arthritis, only 1 in 5 people test positive for rheumatoid factor.
 - have positive tests and may never develop the disease.
 - have normal tests, even though the body has symptoms of very active disease. For example, someone may have a normal ESR (measure of inflammation in the body) and have many swollen & tender joints.
 - have high blood test results and show no signs of inflammation (swelling, warmth, pain) in the body when examined by the doctor.

Common Laboratory Tests

Hemoglobin (Hgb)

- Hemoglobin is a protein found in the red blood cells whose job is to carry oxygen from your lungs to all parts of the body. If your hemoglobin is low, it may mean that your body is not getting enough oxygen to produce the energy required, and you may feel very tired.
- Anemia (low hemoglobin or red blood cells) can be caused by a number of factors:
 - inflammation (swelling, warmth, pain) that lasts for a short or long period of time



- blood loss from an injury such as surgery or a car accident
- blood loss from a side effect of a medication. An example is bleeding in your stomach or bowels from taking aspirin or other similar medications for pain.
- medications that lower the immune system
- low iron storage in the body
- low vitamin B12 and B9 (folic acid) in the body
- hemolytic anemia, a condition that causes the body's antibodies to attack the red blood cells
- Normal range for women is about: 115 to 160 g/L
for men about: 140 to 180 g/L

White Blood Cell Count (WBC)

- White blood cells help your body fight bacterial & viral infections.
- A blood test showing a low number of WBC may suggest that your medication is lowering your supply of WBC and your body's chances of fighting infection.
- WBC may be low when you have Lupus or "Felty's Syndrome", a complication of Rheumatoid Arthritis in which the spleen becomes enlarged.
- WBC may be high when you have an infection or a lot of joint or tissue swelling or when you take cortisone medication such as prednisone.
- Normal range is about 4 to 11 giga/L



Platelet Count

- Measures the number of platelet cells that help the blood to clot.
- A low number of platelet cells could mean that you bruise easily and bleeding could be difficult to stop.
- Platelet counts are often high in chronic conditions such as inflammatory arthritis.
- Normal range is about 150 to 400 giga/L



Liver Tests (AST, ALT, alkaline phosphatase, bilirubin, albumin)

- These blood tests help the doctor decide if certain medications are causing any changes in your liver.
- Some medications that may increase the AST & ALT liver enzymes are Methotrexate and Leflunomide (Arava). These medications are broken down by the liver. Alcohol is also broken down by the liver so it is important to not drink while taking these medications.

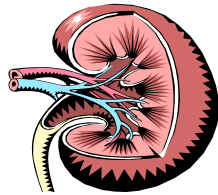


- Normal range is about:
 - AST: 10 to 40 U/L
 - ALT: 20 to 65 U/L
 - Alkaline phosphatase: 40 to 120 U/L
 - Albumin: 34 to 50 g/L
 - Total bilirubin: < 17 umol/L

Kidney Tests

Creatinine

- This blood test tells your doctor how well your kidneys are working by measuring how much creatinine is in the body. Creatinine is a normal waste product released by the muscles.
- A high level of creatinine in the blood, suggests that the kidneys are not working well enough to remove waste products from the body.
- This test is used to check how well the kidneys are working in people with lupus, diabetes and many other health conditions. It is also checked in people who are taking certain medications (such as cyclosporine or blood pressure medications) that may affect the kidney.
- Normal range is about 40 to 95 umol/L

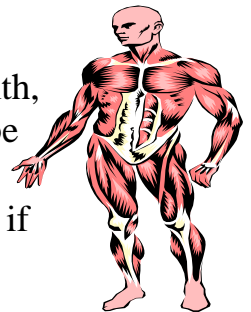


Urinalysis

- A urine test is done to check for the side effects of gold injections, or to see if there is any protein, blood, glucose, or bacteria in the urine.

Muscle Enzyme Tests (CK & LDH)

- Muscles that have been damaged by inflammation (swelling, warmth, pain) release certain enzymes into the blood. These enzymes can be detected by a blood test.
- These tests can measure the amount of muscle that is damaged and if a medication is helping to reduce the inflammation (swelling) that caused the muscle damage.
- Normal range is about: CK: 20 to 230 U/L
LDH: < 220 U/L





Tests that Measure How Much Inflammation is in the Body:

Erythrocyte Sedimentation Rate (ESR or sed rate)

- It is a simple test that measures general inflammation in the body. This test tends to go up or down slowly as changes in how much inflammation (swelling, warmth, pain) occurs in the body.
- The higher the ESR, the greater the amount of inflammation in your body.
- The ESR can also be higher in people with anemia (low hemoglobin), cancer, pregnancy and old age.
- The normal range is about: women: 0 – 20 mm/hr
men: 0 – 15 mm/hr

C-Reactive Protein (CRP)

- CRP is a protein made in & released by the liver when there are inflammatory chemical messengers (cytokines) present in the body. In RA, these messengers are produced in inflamed (swollen) joints.
- CRP is also measured to assess the risk of cardiovascular disease.
- CRP concentration in the blood is a more specific measure of inflammation than the ESR. The CRP changes much quicker than the ESR when how much inflammation in the body changes.
- Anemia (low hemoglobin) can cause a high ESR, but normal CRP.
- The normal range is about 0 to 6 mg/L.



Tests To Help Confirm A Diagnosis:

Rheumatoid Factor (RF)

- Rheumatoid factor is an antibody. An antibody is a protein produced by the body's immune system that recognizes & helps fight infections & other foreign substances in the body.
- About 5% of normal healthy people have a positive RF.
- About 70% of people with Rheumatoid Arthritis have a positive RF
- About 30% of people with Rheumatoid Arthritis have a negative RF.
- The rheumatoid factor is not used to diagnose Rheumatoid Arthritis. It is helpful in predicting how severe the disease in a person with Rheumatoid Arthritis may become. The higher the RF, the greater the chance of having more severe disease of the joints & other parts of the body (example: rheumatoid nodules, or inflammation of eyes & lungs)
- A high positive RF in a young person may be more significant than the same result in an older person.

- Rheumatoid Factor is also found in Sjogren's Syndrome (50 – 60%) and Systemic Lupus Erythematosus (20%) & chronic hepatitis.
- Normal value is about 0 – 20 IU/ml or kU/L.

Cyclic Citrullinated Peptide Antibody (CCP Antibody)

- Is an antibody that is checked in someone with early signs of joint swelling to help the doctor make a diagnosis. A high or positive CCP antibody blood test strongly suggests that the person may have Rheumatoid Arthritis.
- Normal value is 0 – 5 U/ml

Antinuclear Antibody (ANA)

- ANA is a group of antibodies that is commonly found in the blood of people with lupus, and often in people with inflammatory muscle disease (Polymyositis or Dermatomyositis), Sjogren's syndrome, Scleroderma or Rheumatoid Arthritis.
- An ANA of ≥ 160 is a positive test and may represent an autoimmune disorder and often further testing is done.

HLA Tissue Typing

- This blood test can detect the presence of certain genetic markers (HLA-B27) in the blood. HLA-B27 is often present in people with Ankylosing Spondylitis (a disease that causes inflammation of the spine joints) or Reiter's Syndrome (a disease that causes inflammation of the urethra, eyes and joints).

Uric Acid

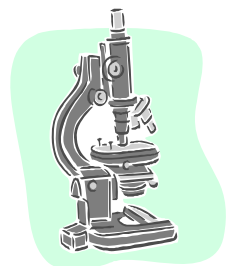
- The level of uric acid in the blood helps doctors to diagnose gout. Gout is a condition that occurs when too much uric acid crystallizes and forms deposits in the joints and other tissues causing redness, swelling and severe pain.

Joint Fluid

- In this test a doctor uses a needle to draw fluid from a joint space.
- The fluid is examined for uric acid crystals to see if the person has gout, or for a bacterial infection that is causing the joint to swell.

Skin Biopsy

- Taking small samples of skin and looking at them under a microscope can help doctors diagnose forms of arthritis that involve the skin, such



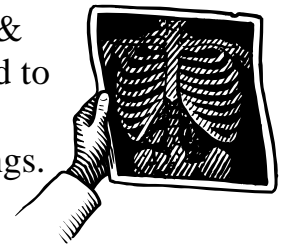
as Lupus, Vasculitis (inflammation of blood vessels) and Psoriatic Arthritis.

Muscle Biopsy

- A surgeon takes a sample of muscle tissue to look for signs of damage to muscle fibres. Findings can confirm a diagnosis of Polymyositis (inflammation of muscles) or Vasculitis (inflammation of blood vessels).

X-rays

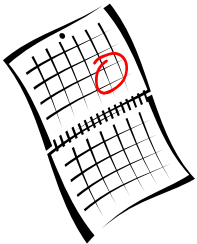
- With arthritis and other related conditions, pictures of the bones & joints are done regularly to determine if any damage has occurred to the joints, spaces between the bones, or the surrounding bones.
- Chest x-rays may also be done to check the condition of your lungs.



General Considerations:

How often must I do laboratory (blood/urine) tests?

- Your physician/nurse will tell you on how often laboratory tests need to be done to check for side effects of your medication.
- It is your responsibility to do these tests as advised by your doctor.
- Laboratory tests are done every 1 to 4 weeks initially after starting a new medication. Once you are on the same dose of medication for a period of time, the tests may be done every 4 to 8 weeks.



What if my laboratory tests are above or below the normal range?

- Lab test results will be watched closely by your physician and/or nurse. You will be called if any test results are not within the normal number range and changes are needed in your care.
- Depending on the problem, your doctor may:
 - increase how often the blood/urine tests are done and
 - hold the medication until the test returns to the normal range and restart the medication at a lower dosage or
 - lower the amount of medication being taken or
 - stop the medication & try a new one.

Keep a record of your medications, lab & x-ray test results

- Ask about all test results when you visit your physician/nurse to better understand your condition & how well your medications are working.

