LABORATORY AND X-RAY TESTS

Children who come to the Arthritis/Rheumatology Clinic might need laboratory and X-ray tests done for one of three important reasons:

- To help determine the cause/type of arthritis (“diagnostic tests”).
- To monitor how “active” or severe a disease is, which helps us decide whether the right treatments have been recommended (“monitoring tests”).
- To watch for and avoid side effects from medicines before they become noticeable or cause a problem (“monitoring tests”).

Below we have listed some of the most common tests which would be done for each of the three reasons above. The numbers listed as “normal values” below are only guidelines; other laboratories might do the tests differently and use different numbers to define what is “normal.”

DIAGNOSTIC TESTS

Rheumatoid Factor (RF)
The RF test is a blood test that measures whether your immune system is making proteins (antibodies) that attack other antibodies in your blood. A normal result is often reported as “less than 20” and means that you do not make RF. RF may be seen in children with a less common subtype of juvenile idiopathic arthritis (JIA) that is similar to adult rheumatoid arthritis. Patients who have a positive RF have a more severe arthritis than is typical of most other patients with JIA who have a negative RF test. If JIA or a related condition is suspected, then a RF test might be done. If RF is detected in someone with JIA, then stronger medicines that can prevent damage to joints might be recommended earlier. RF sometimes will appear at a later time, so this test might be repeated periodically.

ANA (Antinuclear Antibodies)
The ANA is a blood test that measures whether your immune system is making proteins (antibodies) that attack your own cells’ nuclei. A normal result is reported as “less than 1” by one method (EIA) or as “less than 1:40 titer” (said: one to forty) by another method (IFA). This means that you do not make ANA. An elevation (greater than “1” or greater than “1:40 titer”) may occur transiently after an infection, or may persist and be seen in JIA, systemic lupus erythematosus, or other related diseases. If these problems are suspected, then an ANA will be checked. If abnormal, then it might be repeated later to see whether it has returned to normal. Children with JIA who have a positive ANA test are at higher risk for inflammation in the eyes (called uveitis). All children with JIA require routine eye exams to detect and treat this problem, but those with a positive ANA test need more frequent screening than those with a negative test.

ASO Titer, DNase B Titer
The ASO and DNase B titer are blood tests that measures whether your immune system is making proteins (antibodies) that attack parts of the streptococcus bacterium. If you have not been infected with Strep recently, then the titer will be less than 170. If you have been infected, then the ASO or DNase B titer (or both) will begin to rise one week after the strep infection, peak by four weeks, and return to normal in 6-12 months (unless another infection or complication develops). Strep infections may lead to joint pains (arthralgias) or inflammation (arthritis),
rheumatic fever, or nephritis (kidney disease). If these problems are suspected, then an ASO or DNase B titer will be checked. If abnormal, then additional tests and treatments might be recommended, and the ASO or DNase B titer might be repeated later to see whether result has returned to normal.

Lyme Test
The Lyme test is a blood test that measures whether your immune system is making proteins (antibodies) that attack the bacterium that causes Lyme disease. If you have not been infected with this bacterium, then the test will be negative. An abnormal result may occur with Lyme disease, including those patients who get Lyme arthritis. If Lyme disease is the suspected cause of your joint problems, then a Lyme test will be checked. If your illness or test suggests Lyme disease is likely, then treatment with antibiotics will be recommended to get rid of the bacterium that causes Lyme disease.

HLA-B27 (Human Leukocyte Antigen-B27) Tissue Typing
The HLA-B27 test is a blood test that checks whether you inherited a particular form of the HLA-B gene from one of your parents (the B27 form). The test reports whether you have HLA-B27 (“antigen detected”) or do not have HLA-B27 (“not detected”). Six to eight percent of people have B27 form of the HLA-B gene, and most of them are perfectly healthy. However, in patients with some types arthritis known as the spondyloarthropathies, this gene is very common (up to 90% might have it). If one of these types of arthritis is suspected, then a HLA-B27 test might be checked to see whether you inherited this gene.

X-rays
X-rays may help identify whether you have arthritis or another disease or injury that causes problems resembling arthritis. With arthritis, X-rays may be normal, show extra fluid in a joint, weakening of the bones, or destruction of the bones or cartilage. If arthritis is suspected, then X-rays of the involved joints will usually be done. If you have arthritis, X-rays of involved joints may be recommended periodically to monitor whether any damage has occurred and to determine what treatment might be most helpful.

MONITORING TESTS

The tests listed below may help us determine whether you have arthritis, but most importantly help us determine how “active” or severe it is, and whether you are having any side effects from your medicines. For most medicines, labs to monitor for side effects (CBC, creatinine, urinalysis, liver enzymes) are done a month or so after starting or significantly increasing the dose of a medicine, and then every 3-6 months after that. For some medicines, more frequent monitoring is done.

Complete Blood Count (CBC)
The CBC is a blood test that measures whether you have the correct numbers of red blood cells, white blood cells, and platelets. This test is done periodically to monitor both the activity of your disease and to check for any side effects of your medicines.

Hemoglobin
The hemoglobin test measures whether you have the correct number and quality of red blood
cells. Normal values are different at different ages and for boys and girls, but usually the hemoglobin should be over 11 for young children and closer to 13-15 for teenagers. Some common reasons why the hemoglobin might be abnormally low are because red blood cells are not being made normally because of lack of iron (iron deficiency anemia), because of illness (anemia of chronic disease), or because red blood cells are being lost (bleeding) or destroyed (hemolytic anemia). If your hemoglobin is abnormal, further testing to determine the cause might be recommended.

White Blood Cells (WBC)
The WBC count measures the number and subtypes of white blood cells (leukocytes) in your blood. These cells are part of your immune system, the system that protects you from infections but sometimes mistakenly attacks your own body (as in arthritis). Normal values for the total WBC count are different at different ages, but are generally 4,500 - 10,000. Abnormally high or low numbers may occur with infections or with arthritis. Certain medicines may also cause abnormally low numbers. If your WBC count is abnormal, further testing might be recommended or temporarily stopping certain medicines may be recommended.

Platelets
The platelet count measures the number of platelets in your blood. The normal number is 150,000–350,000. Inflammation (from infection or arthritis) and iron deficiency can make the number go up, and certain diseases and medicines can make the number go down. Because these cells help the blood to clot, abnormally low numbers can make you bruise or bleed easily, and extremely high numbers can cause unwanted clots. If your platelet count is abnormal, further testing to determine the cause might be recommended.

Erythrocyte Sedimentation Rate (ESR) and C-Reactive Protein (CRP)
The ESR and CRP are blood tests that measure how much inflammation is present in your body. A normal ESR is less than 20, and a normal CRP is less than 0.8. With inflammation (from arthritis or infection), the ESR and CRP will often be unusually high, although some people with arthritis will have a normal ESR and CRP. One of these tests will be checked periodically to help assess how much inflammation is present and what treatment is needed to keep it under control.

Creatinine
Creatinine is a blood test that measures how well your kidneys are working. Normal values for the creatinine vary with the size of an individual, but are generally 0.3-1.5 for the creatinine. If the kidneys are not working normally, then the creatinine will be unusually high. These tests are done periodically to check for any side effects from your medicines or, in some cases, to check for any damage to your kidneys from your disease (as may happen in systemic lupus erythematosus). If your creatinine is abnormally high, further testing or temporarily stopping certain medicines might be recommended.

Urinalysis
A urinalysis consists of several urine tests that measure how well your kidneys are working. A urinalysis is done periodically to check for any side effects from your medicines or, in some cases, to check for any damage to your kidneys from your disease (as may happen in systemic lupus erythematosus). Abnormal results may also occur with infections. If your urinalysis is abnormal, further testing or temporarily stopping certain medicines might be recommended.

Liver Enzyme Tests (ALT, AST)
Liver enzyme tests are blood tests that tell whether there has been any damage to the liver. Normal results depend on the laboratory where the tests are completed but are commonly less than 40-80. An abnormal result may be caused by your disease or as a side effect of certain medicines. Abnormal results may also occur with infections. If one of these tests is 3 or more times the upper limit of normal, further testing or temporarily stopping certain medicines might be recommended.