

## Blood Testing

Blood tests alone will not diagnose JIA, but they are an important part of diagnosis. A number of blood tests can show either signs of JIA or clues to other potential causes for your child's symptoms.

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A blood sample will often be taken and a number of tests are performed on these which include those listed below. In young children, blood is often taken from the back of the hand and a numbing cream or cold spray is put onto their hand in advance so that they will not feel pain when the needle goes in. It is very helpful to hold your child comfortably as advised by the clinical team and to help them to remain calm with distraction and encouragement.

It's important to note though, abnormal blood tests do not make a diagnosis of arthritis but simply add to the 'picture' the doctor is forming of the whole problem. By the same token your child can still have arthritis in the presence of normal blood tests.

## Full Blood Count:

Haemoglobin (Hb) can be low if your child is anaemic. Anaemia commonly occurs through lack of iron in the diet. It can also occur in arthritis or in other long term conditions where there is ongoing inflammation (see ESR and CRP).

White blood cell count (WBC). White blood cells help your body to fight infection and if there is infection your WBC is often raised. In some forms of childhood arthritis (eg. systemic onset JIA) the WBC count can also be raised.

Platelet count. Platelets help your blood to clot and the platelet count can go up when there is general inflammation. This can occur after infections and in arthritis (particularly systemic onset or polyarticular types of JIA).

Signs of inflammation (or Acute Phase Reactants).

Inflammation simply means swelling, heat, redness, pain – and can occur anywhere in the body and be caused by a vast number of problems. Arthritis is simply inflammation occurring in a joint.

Erythrocyte Sedimentation Rate (ESR). If your blood is put into a glass test tube and left for some time, the red blood cells will all settle at the bottom, with the yellowish fluid (called 'plasma') on top. The ESR measures the time it takes for the red blood cells to settle. If there is inflammation in the body somewhere which has been there for at least a few days the time it takes for the red blood cells to settle to the bottom is prolonged. A raised ESR does not tell you where the inflammation is or what is causing it. There are many, many illnesses that can cause a rise in the ESR, including simple infections (colds, viruses and bacteria) and conditions such as arthritis. Once the ESR is raised it takes a few days or weeks to settle.

C-Reactive Protein (CRP) when raised in the blood is raised in response to infections and inflammation. It goes up particularly high in response to bacterial infections, but can also be raised with viral infections and with inflammation such as arthritis. It rises and returns to normal quicker than the ESR.

Ferritin is a protein which indicates the level of iron stores in the body. It is also an 'acute phase reactant' that will be raised in the presence of inflammation in the body. Ferritin rises particularly in children with systemic onset JIA. A complication of severe arthritis (Macrophage Activation Syndrome) will also result in very high ferritin levels.

## Auto-antibodies

Antibodies are proteins produced by white blood cells in response to infection (such as viruses or bacteria). They direct the immune system to fight against the infection. Auto-antibodies are the same

type of proteins, but directed against our own bodies. The immune system can become triggered to fight our own body, and this can cause a variety of illness, including some forms of childhood arthritis. A number of complex factors come in to play and as always, it is not as simple as it sounds! The auto-antibodies may be found in fit, healthy, normal individuals and diseases may be present without any auto-antibodies.

Antinuclear antibody (ANA) is the commonest type of auto-antibody found in juvenile arthritis but, it is also found in up to 15% of normal children and in a number of other conditions. In a child with arthritis it seems to be associated with an increased chance of eye inflammation (uveitis).

Anti double stranded DNA (ds-DNA). This auto-antibody is commonly associated with a condition called Systemic Lupus Erythematosus (or SLE). SLE can cause a form of childhood arthritis.

Rheumatoid Factor (RF) and anti-cyclic citrullinated protein (anti-CCP), these auto-antibodies can be found in children and young people with arthritis but it is rare. They are most often found in teenage girls with a lot of joints affected by arthritis (polyarticular).

Anti-neutrophil cytoplasmic antibody (ANCA) is very rare in childhood but can be found in association with diseases that affect the blood vessels (named 'vasculitis').

## Liver function tests

Aspartate aminotransferase (AST) is an enzyme which is found in high concentrations in organs such as the liver, heart and kidneys and also in muscles. The blood test for AST in children with suspected or confirmed JIA is often done to assess liver function prior to any medication to treat JIA. Some medications used can cause a temporary rise in this enzyme, so it is monitored if your child is taking these medications regularly.

Alkaline phosphatase (ALP) is an enzyme found in the liver, bone, intestinal tract and kidneys. Growing children have high levels of alkaline phosphatase coming from the bone due to their growth, peaking as a teenager before falling to the usual adult level. It is therefore very common and normal for the ALP level to be high in otherwise healthy children. Your doctor will not worry about this unless there are other signs of concern. For example raised liver enzymes (AST or GGT – gamma GT) which may be a sign of transient liver damage, or an abnormal 'bone profile' on additional bloods which may suggest a low vitamin D level.

Parents may find it helpful to keep a monitoring booklet to record the results of blood tests; both to see the progress of your child's blood tests and to share with healthcare professionals in different settings (GP, different hospitals) as they may not have easy access to the results. Parents should be aware it is difficult to give absolute 'normal' ranges for blood test results because test ranges can vary between laboratories and vary with age and gender. For more information about understanding these go to: [Lab Tests Online](#).

## Further reading

For further information about the different types of blood results and what they mean go to: <http://labtestsonline.org.uk/>