NHS
Blood and Transplant

Platelet antigens and antibodies in pregnancy

This leaflet explains the blood test results that you have been given and what this means to you and your baby. It contains information about the significance of platelet antigens and antibodies in a condition known as Neonatal Alloimmune Thrombocytopenia (NAIT).

What are platelets?

Platelets are the smallest type of cells that circulate in the blood and are important in preventing and stopping bleeding. Sometimes, blood contains fewer platelets than normal, a condition known as Thrombocytopenia.

What is a platelet antigen?

Every platelet has natural proteins on its surface and incorporated into these are the human platelet antigens (HPA). As of 2019, there are 34 known HPAs (e.g. HPA-1, HPA-2, HPA-3, etc.) but scientists are discovering new ones all the time. The HPAs are similar to, but distinct from, the antigens on red cells. Some readers will have encountered red cell antigens already – these are also known as blood group antigens. All HPAs exist in two forms; a high frequency form designated 'a' and a low frequency form designated 'b', e.g. HPA-1a and HPA-1b.

How platelet antigens are inherited

HPAs are inherited characteristics and each child inherits half of their HPAs from each parent. For example, a child may inherit HPA-1a from the mother and HPA-1b from the father and their type would be HPA-1a1b. Alternatively, the child might inherit HPA-1a from both the mother and the father and would be HPA-1a1a.

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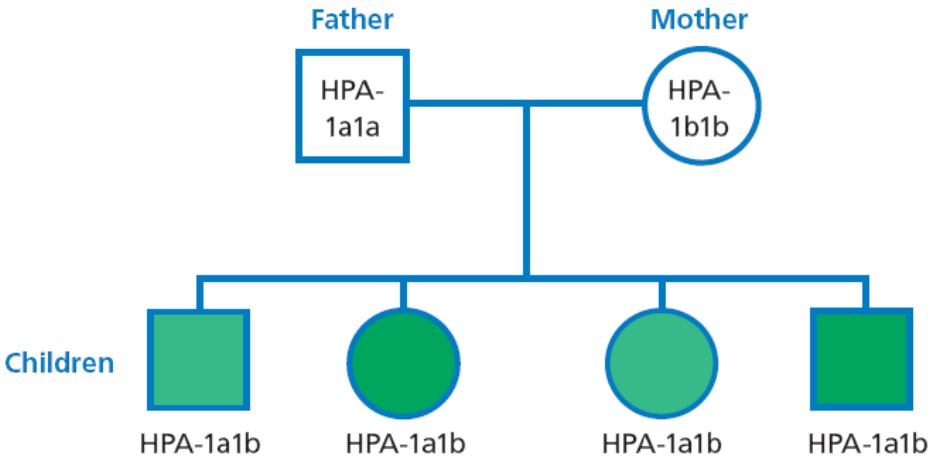
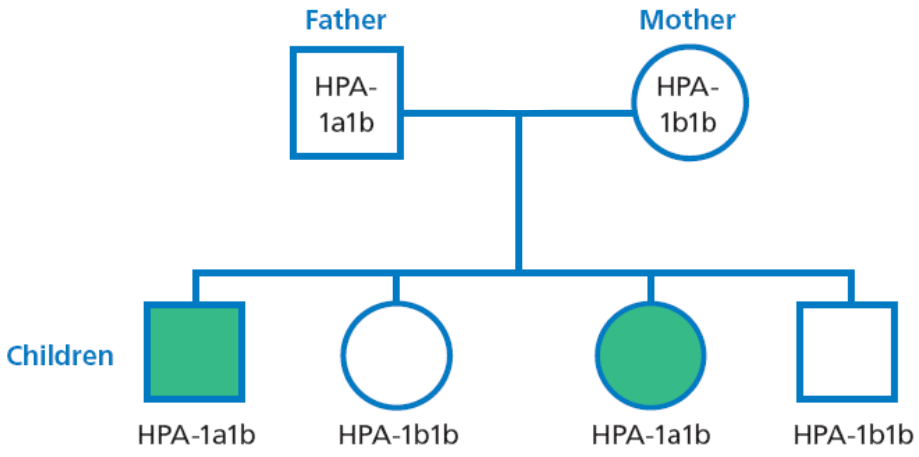
The diagrams below illustrate how HPA-1 is inherited. The square boxes indicate males; circles indicate females. The green shaded boxes indicate potentially affected children; clear boxes indicate unaffected children.

Example 1. The mother is HPA-1b1b and the father is HPA-1a1a. In this case, the children from this partnership will always be HPA-1a1b and are all at risk of being affected by NAIT.



Example 2. The mother is HPA-1b1b and the father is HPA-1a1b. In this case, the children may be either HPA-1a1b or HPA-1b1b depending on whether the baby inherits HPA-1a or HPA-1b from the father. There is a 50% chance that a child will inherit HPA-1a and be at risk of NAIT.



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What are antibodies?

Antibodies are an important part of the body's immune system, which help us fight disease. They are formed when the body's immune system comes into contact with a 'foreign' substance, for example bacteria, viruses, a vaccination or, during pregnancy or transfusion, a different HPA.

How are platelet antibodies formed during pregnancy?

During pregnancy, some of the baby's platelets may pass into the mother's bloodstream. If the baby's HPA is different from the mother's HPA, her immune system may 'see' the HPA on baby's platelets as 'foreign' and make antibodies that bind to the HPA and destroy the baby's platelets. These antibodies are called HPA antibodies or anti-HPA.

In the majority of cases, differences in HPA between mother and baby do not cause the mother to make HPA antibodies and there are no problems. However, some differences in HPA are more frequently associated with antibody formation.

How do platelet antibodies affect pregnancy?

HPA antibodies made in the mother can cross the placenta and enter the baby's bloodstream. When the HPA antibodies come into contact with the baby's platelets they can damage or destroy them. This causes the number of platelets (known as the platelet count) in the baby's blood to decrease. This condition is known as Neonatal Alloimmune Thrombocytopenia or NAIT and occurs in approximately 1 in 1,000 pregnancies.

In the UK, ~80% of NAIT cases are caused by anti-HPA-1a, ~15% by anti-HPA-5b and ~5% by other HPA antibodies.

The following diagram explains this process.

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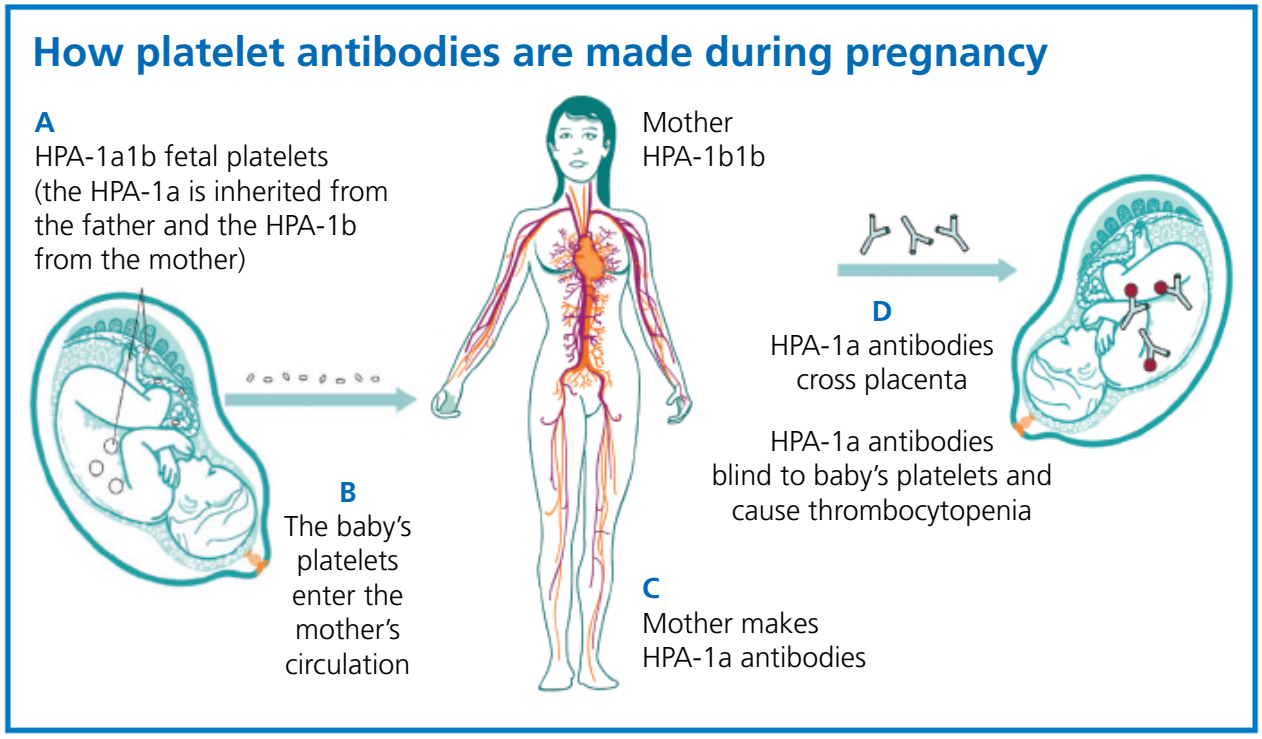

A. The baby may have different HPAs from its mother because half the baby's HPAs are inherited from its father.

B. Some of the baby's platelets cross the placenta into the mother's circulation. In some cases, the mother's immune system reacts against the baby's platelets because of the differences in HPA are seen as 'foreign'.

C. The mother makes HPA antibodies.

D. The mother's HPA antibodies cross the placenta into the baby's blood, bind to the baby's platelets and damage or destroy them causing thrombocytopenia in the baby. This condition is known as Neonatal Alloimmune Thrombocytopenia (NAIT).

How does NAIT affect my baby?

The effect on your baby depends on how many of baby's platelets are damaged or destroyed. In mild cases, it might not affect your baby at all. In severe cases the damage to your baby's platelets can cause severe bleeding, which may have serious effects to your baby's health.

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How are babies with NAIT treated?

Once the condition is recognised or suspected, your baby can be given a transfusion of platelets that have a similar HPA type to that of the mother. This is the most effective treatment, as it increases the number of platelets in your baby's blood with platelets that will not be destroyed by the HPA antibodies.

What happens afterwards?

The number of platelets that your baby has will gradually return to normal within a few days or weeks after birth. After that, your baby's blood will be entirely normal, and he or she should have no future problems.

Can platelet antibodies affect my health?

HPA antibodies will not affect the platelets in the mother's blood. They need to be taken into account, however, when selecting suitable blood if a blood transfusion is ever needed. This is why you (the mother) will receive a card, which identifies which HPA antibodies have been made. This card should be kept safely and shown to the medical staff that may be treating you.

What happens to the antibodies in my blood?

Once the antibodies are made, they may stay in the mother's blood for a long time, sometimes for life.

What about future pregnancies?

If a mother has had a baby affected by NAIT, any future pregnancies may also be at risk of NAIT and this will largely depend on the HPA type of the father. For example, if the father is HPA-1a1a, there is a 100% chance of the baby inheriting HPA-1a and being at risk of NAIT (see example 1). Alternatively, if the mother makes HPA-1a antibodies and the father is HPA-1a1b, there is a 50% chance of the baby being affected by NAIT (see example 2).

If you have had a previously affected baby and become pregnant again, you should ask your GP or obstetrician to arrange for you to be referred to a Fetal Medicine Unit (FMU). This will enable the pregnancy to be closely monitored and, if necessary, for any treatment to be given to the unborn baby.

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What tests are performed to diagnose NAIT?

The mother's, father's and child's HPA types are determined by testing for the genes that produce the different HPAs. This information helps to see if there are differences between the mother's and father's HPA types which could cause the mother to make antibodies. The infant's HPA type can be used to identify any risks, if the mother has developed HPA antibodies.

The mother's serum is also tested for any HPA antibodies.If HPA antibodies are detected this makes NAIT more likely.

If antibodies are not found, this may be because there is another cause for the baby's low platelets, or because the tests were not able to detect weak or unusual antibodies. Your doctor may then need to ask for further blood tests.

Further information and support

Can be obtained from **www.naitbabies.org** and **info@naitbabies.org**

This patient information leaflet does not replace the guidance provided by your treating clinical team. Your treating clinical team should advise you of the options for treatment, advise of any alternative treatment and associated risks. Your treating clinical team should ensure that you are aware of the material risks associated with the treatment advised.

It is the responsibility of the requester submitting your sample, to ensure informed consent has been obtained for all tests, including genetic tests in accordance with current guidance and legislation.

If you are unsure about any aspects of the treatment/care, ask your treating clinical team to explain.

NHS Blood and Transplant

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