

You, Your Baby & The RhD Factor



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Bio Products Laboratory

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It's in the blood

Everybody's different

And that goes for our blood as well. But, broadly speaking, everybody's blood falls into a number of categories, or blood groups as they are called. Indeed, you may have already heard of the four main blood groups: Group A, Group O, Group B, Group AB which are carried on the red blood cells. Red blood cells are the commonest cells in the blood system and their job is to carry the oxygen you breathe around your body.

Usually when a mother and her baby have different blood groups, there is no problem.

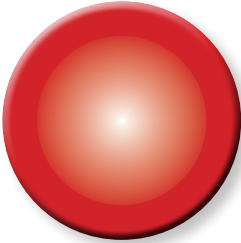
However, sometimes the blood of mother and baby differ in a more important way. This difference is known as the RhD Factor, sometimes called the Rhesus D Factor.

The RhD Factor is the name given to a special protein attached to the red blood cells in the blood.

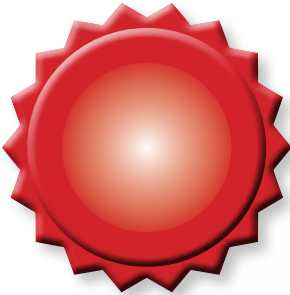
About 85% of people have the RhD Factor, and the other 15% do not. People whose red blood cells carry the RhD Factor are called 'RhD Positive' and those without are called 'RhD Negative'.

Two red blood cells, one with the RhD Factor and one without

RhD Negative red blood cell



RhD Positive red blood cell



RhD proteins covering surface of red blood cell



Mothers & babies

Sometimes during pregnancy a small amount of the baby's blood crosses over into the mother's blood-stream. There are a number of ways by which this can happen including during normal birth, by abdominal injury, Caesarean section, or when an amniocentesis is undertaken.

This is quite usual and causes no harm because the mother's immune system recognises the baby's blood as being different from her own and quickly cleans it out of her system.

To do this, the mother's immune system produces special proteins, called antibodies. These attach themselves to the baby's red blood cells which are in her bloodstream and destroy them. This immune response occurs in a similar way when any microbe or foreign body enters the circulation.

From then on, the immune system remembers that it has been in contact with the baby's red blood cells. So, if the same situation occurs again, the mother's immune system will be ready to act swiftly and eliminate them.

However, when a mother who does not have the RhD Factor (so she is RhD Negative) is carrying a baby who does have the RhD Factor (so the baby is RhD Positive), there is a small chance that a problem might arise.

Reasons why baby's blood can cross over into the mother's bloodstream

Amniocentesis*

Chorionic villus sampling*

Injury to the abdomen (such as seat-belt injury)

Vaginal bleeding during pregnancy

Miscarriage

Termination of pregnancy

Child birth

Caesarean birth

*Procedures sometimes carried out on pregnant women







Giving birth

Let's say that an RhD Negative mother gives birth to a normal, healthy but RhD Positive baby. During the birth, as often happens, a small amount of baby's blood crosses over into the mother's blood circulation. The mother's immune system gradually responds and destroys the RhD Positive blood.

From now on the mother's blood will always 'remember' RhD Positive blood cells.

Now, let's suppose the mother becomes pregnant with a second child who is also RhD Positive. There is a real risk that RhD Factor antibodies from the mother can cross the placenta and enter the baby's blood stream.

These antibodies, which were produced in the first place to protect the mother, now have the opposite effect on the baby. They can damage the baby's red blood cells. If this happens, the baby can suffer a number of life-threatening conditions, collectively known as 'Haemolytic Disease of the Fetus and Newborn' or 'HDN' for short.

Protection for the baby

Nowadays, Doctors, Nurses and Midwives are very aware of the problems that may occur when an RhD Negative mother is carrying an RhD Positive baby and they can act to prevent any problems occurring before the baby comes to any harm. In May 2002 Anti-D prophylaxis during pregnancy was recommended by NICE (National Institute for Clinical Excellence)¹. NICE guidelines were updated in 2008 continuing to recommend Anti-D prophylaxis during pregnancy². Anti-D prophylaxis means giving Anti-D immunoglobulin to prevent a woman producing antibodies against RhD positive blood cells and so to prevent the development of HDN in an unborn baby.

1. During Pregnancy

When an RhD Negative mother is pregnant, the hospital staff can inject a small amount of ready-made RhD antibodies routinely during pregnancy. Then, if any of the baby's RhD Positive blood were to enter the mother's blood system during pregnancy, the injected antibodies would be there ready to remove the RhD Factor immediately. This injection is often referred to by medical staff as 'Anti-D'. Anti-D immunoglobulin is made from a part of the blood called plasma that is collected from donors. The production of Anti-D immunoglobulin is very strictly controlled to ensure that the chance of a known virus being passed from the donor to the person receiving the Anti-D immunoglobulin is very low- it has been estimated to be 1 in 10,000 million doses.

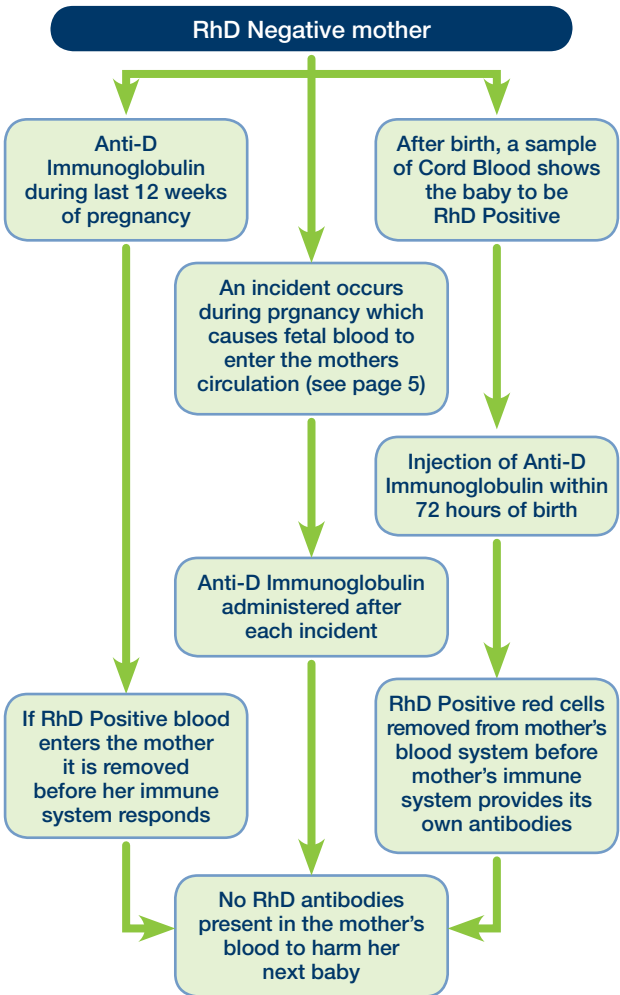
2. Incidents During Pregnancy

Sometimes an RhD Negative pregnant woman may need to be given Anti-D if there has been an incident during pregnancy that may cause a small amount of blood from the unborn baby to pass into the mother's circulation – for example a seat-belt injury or vaginal bleeding. It is important that the mother reports any such incident to her midwife as soon as it happens.

3. After Childbirth

Hospital staff will test the baby's blood after birth. If the baby is found to be RhD Positive, then the RhD Negative mother will be given another injection of Anti-D just in case any of the baby's blood passed across the placenta just before birth. This injection will remove any RhD Positive red cells from the baby that may be in the mothers' blood system. If a mother who has had these injections of Anti-D gets pregnant again, there will be no danger to her baby since her own immune system has not produced anti-RhD antibodies which might cross over and harm her unborn child.

How Haemolytic Disease of the Newborn can be prevented



If in doubt, ask

The chain of events that can lead to Haemolytic Disease of the Fetus and Newborn

RhD Negative mother is pregnant with an RhD Positive baby.

RhD Positive blood from baby enters the mother's blood system during the pregnancy or at delivery.

The mother's immune system removes the RhD Positive blood by producing antibodies and retains a 'memory' of RhD Positive blood.


The mother carries a second RhD Positive child.

The mother's antibodies can cross the placenta into the unborn baby and her antibodies damage the baby's RhD Positive red blood cells.

Your Doctor, Midwife or Nurse will be happy to tell you more about the RhD Factor and what it means to you.

Over the years, thousands of babies have been born healthy thanks to this simple injection.

If you have any questions, or if you have any doubts about the injection, don't be afraid to ask.



Useful addresses & telephone numbers

Hospital Doctor's Name:

Hospital Address:

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Telephone Number:

Midwife's Name:

Contact Address:

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Telephone Number:

GP's Name:

Practice Address:

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Telephone Number:

Reference:

1. National Institute for Clinical Excellence (2002). Guidance on the use of routine anti-D prophylaxis for RhD negative women. NICE Technology Appraisal Guidance No. 41. London: National Institute for Clinical Excellence. Available from www.nice.org.uk
2. National Institute for Clinical Excellence (NICE). Routine antenatal anti-D prophylaxis for women who are rhesus D negative – Review of NICE technology appraisal guidance 41, August 2008

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