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Prenatal determination of fœtal *RhD* genotyping from maternal blood

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Fœto-maternal allo-immunisation is the production of maternal antibodies (Ab) to erythrocytic antigens carried by fœtal red blood cells. It may cause haemolysis inducing **anemia** of variable severity. The most serious consequences are the **hydrops fetalis** or **severe neonatal jaundice** that can lead to **encephalopathy**.

Treatment is complicated and may require in utero transfusion or exchange transfusion. Among the antigens involved, the D antigen causes most fœtal-maternal incompatibilities.

Epidemiology

Currently, approximately 130,000 women with the RH:-1 phenotype become pregnant each year in France, of 60% of whom (approximately 80,000) carries a RH:1 foetus and, therefore, are potentially susceptible to developing anti-RH1 allo-immunisation.

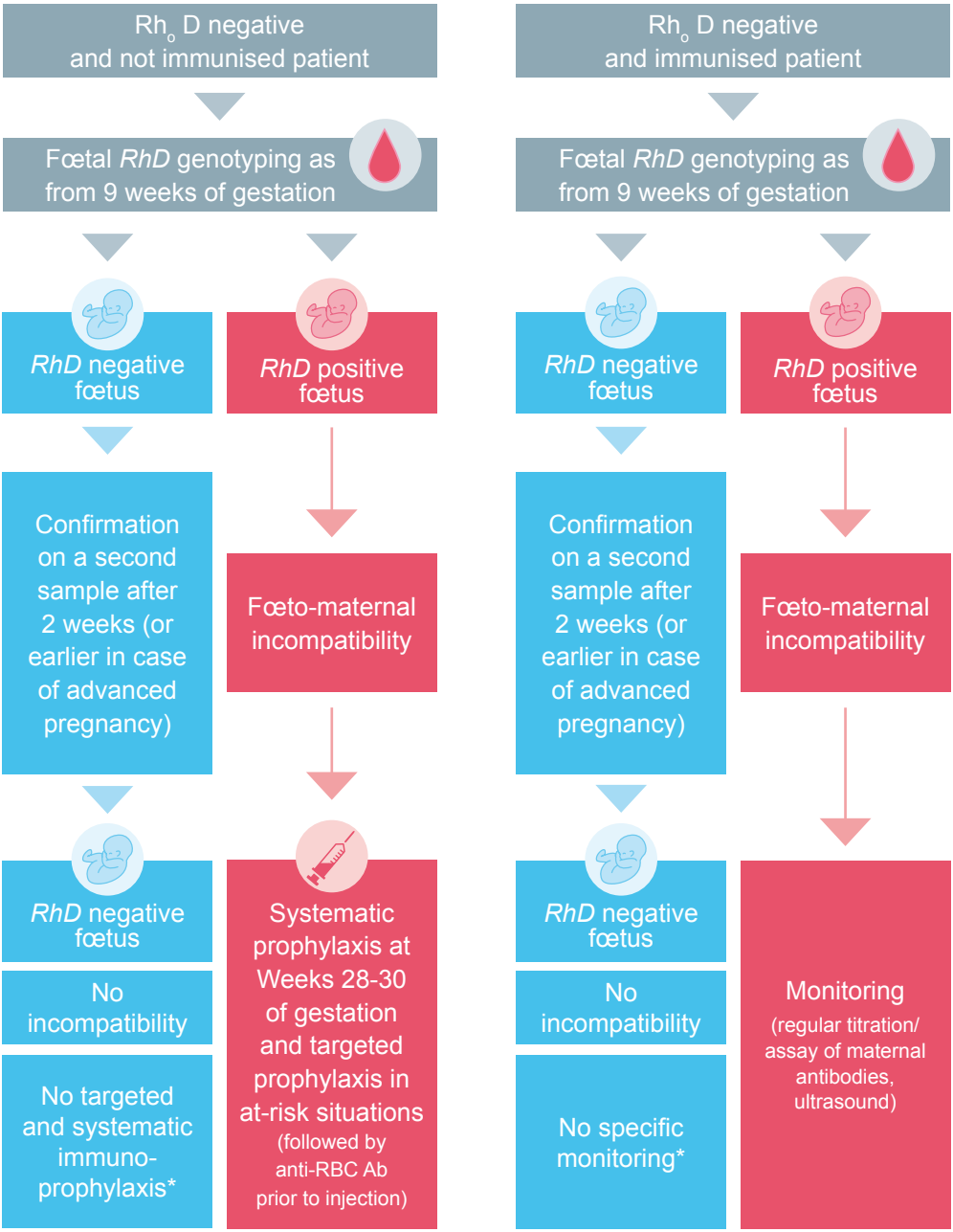
D-negative is prevalent in Caucasians (15%), but less common in black Africans (3-5%) and Asians (less than 0.1%).

What does the test consist of?

The test is performed on a venous blood sample from the mother which is its main advantage compared to samples obtained by invasive techniques (amniotic fluid, fœtal blood test). The test may be carried out from 9 weeks of gestation. Circulating fœtal DNA is extracted from maternal plasma using traditional extraction techniques. The test consists of amplifications of exons 5, 7 and 10 of the *RhD* gene using three different real-time PCRs.

The quantity of fœtal DNA in the maternal blood increases during pregnancy, with test sensitivity being excellent beyond 13 weeks of gestation.

Diagnostic strategy



**This does not remove the need to monitor allo-immunisation other than anti-D: anti-KEL1, anti-RH4, etc. according to the patient's profile.*

Major advantages of the test

- Limits the number of Rh_o (D) immunoglobulin (products of human origin) to strictly necessary cases.
- Relieves the monitoring of RH:-1 pregnant women already immunised: anti-RBC Ab screening (or screening of Indirect antiglobulin Ab: anti-RH antibody), titration, micro-titration and assay of Ab, ultrasound (arduous and specialised follow-up).

Who can benefit from the test?

All RhD negative pregnant women, from 9 weeks of gestation:

- D-negative women not alloimmunised to D

  or
- D-negative women alloimmunised to D.

For optimal patient care

The Eurofins Biomnis laboratory performs on a daily basis:

- Fœtal *RhD* genotyping using maternal blood.
- Detection and identification of anti-RBC Ab, titration and micro-titration of anti-D Ab.

Using essential clinical information (geographical origin, termination date of the pregnancy, Rh_o (D) immunoglobulin injections, date and dose) and results obtained, a conclusion and counseling are provided to you so as to tailor your patient's treatment.

In practice

Sample

- 10 mL (Streck tube)
- Storage and transport: room temperature
- Transit time: 10 days maximum
- Turnaround time: 4 days

Documents required

- Specific clinical information record and certification of medical consultation and patient consent **B37-INTGB: Fœtal Rhesus D genotyping** available at **www.eurofins-biomnis.com > test guide > GRHDX**
- Medical prescription for 'fœtal RhD genotyping using maternal blood'
- Notify us in case of RhD alloimmunisation
- Photocopy of the patient's blood group card

For more information, please contact

International Division
Email: international@biomnis.com

Source:
French College of Obstetricians and Gynaecologists. Prevention of foetomaternal Rhesus-D allo-immunisation. J Gynecol Obstet Biol Reprod 2006; 35 (Suppl 1):1S81–1S135.
HAS. Antenatal determination of fœtal origin genotyping using maternal blood. January 2011.
Official Journal of the French Republic of 22 June 2017

Important facts

- Fœtal *RhD* genotyping using maternal blood affects all pregnancies of your Rh_o(D)-negative patients.
- It is performed using a simple blood sample as of 9 weeks of gestation for an initial assay.
- In case of negative (D negative fœtus) or indeterminate results, a second assay is necessary to confirm the result.
- Results are issued 4 days after receipt at Eurofins Biomnis.
- Experts are at your service. Our French-based laboratory is the European leader in specialised medical biology.

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