NIPD-RhD – Rhesus test
Fact sheet

- Non-invasive prenatal RhD genotyping from maternal blood
- For RhD negative pregnant women with singleton pregnancy
- Between gestational weeks 11 + 0 and 25 + 0 (recommended)
- CE-marked IVD[1,2] – reimbursed in France
- Test performed by Eurofins Biomnis, France
- Delivery time 10 working days per analysis (Monday to Friday, without holidays)

100%[3]	95.1%[3]
Sensitivity	Specificity

Limitations

- False-positive results are possible in case of a rare genotype, non-functional RhD variant[4] or bone marrow donation[5]
- A test result cannot be reported if the mother is carrier of the RhD gene
- In general, false-negative results are possible[6,7]

Exemplary diagnostic strategy for RhD negative pregnant women

Non-immunised patient

Blood sampling & express delivery
(responsible doctor)

Test result
(generally 10 working days)

RhD positive or inconclusive*
Anti-D prophylaxis is indicated

RhD negative

Repeat analysis
2 weeks later & after week 18 + 0

RhD positive or inconclusive*
Anti-D prophylaxis is indicated ←

RhD negative
Anti-D prophylaxis is not indicated ←

Immunised patient

Blood sampling & express delivery
(responsible doctor)

Test result
(generally 10 working days)

RhD positive or inconclusive*
Specific monitoring

RhD negative

Repeat analysis
2 weeks later & after week 18 + 0

RhD positive or inconclusive* ←
Specific monitoring

RhD negative ←
Standard monitoring & relief of the patient

Timeframe for blood sampling

We recommend blood sampling latest in gestational week 25 + 0. This will ensure a test result latest in gestational week 29 – including a repetition, if necessary.

Repeat analysis to confirm a negative test result

- You will receive a special blood collection set for the repeat analysis.
- Fill both blood tubes
- Tick „repeat blood sample (if 1st analysis failed)“ on the form
- Send both blood samples together with the completed form

* due to biological limitations

1 Rouillac-Le Sciellour C et al. (2007). Noninvasive fetal RHD genotyping from maternal plasma. Use of a new developed Free DNA Fetal Kit RhDR. Transfus Clin Biol, 2007 Dec;14(6):572-7. doi: 10.1016/j.tracli.2008.01.003.
2 Mackie FL et al. (2017). The accuracy of cell-free fetal DNA-based non-invasive prenatal testing in singleton pregnancies: a systematic review and bivariate meta-analysis. BJOG, 2017 Jan;124(1): 32-46. doi: 10.1111/1471-0528.14050.
3 Instruction manual: Institut de Biotechnologies Jaques Boy. Free DNA Fetal KitR RhD. Noninvasive fetal RHD genotyping from free fetal DNA in maternal RhD-Negative pregnant women blood (Real-Time PCR). Product identification: 502080233. Manual version 16/03/2018.
4 Flegel WA (2007). Genetik des Rhesus-Blutgruppensystems. Dtsch Arztebl 2007, 104(10): A-651-657/B-573/C-549.
5 Thurik FF et al. (2016). Fetal RHD genotyping after bone marrow transplantation. Transfusion, 56: 2122-2126. doi:10.1111/trf.13669.
6 Clausen FB et al. (2014). Routine noninvasive prenatal screening for fetal RHD in plasma of RhD-negative pregnant women – 2 years of screening experience from Denmark. Prenat Diagn, 34:1000-1005. doi: 10.1002/pd.4419.
7 de Haas, M et al. (2012). A nation-wide fetal RHD screening programme for targeted antenatal and postnatal anti-D. ISBT Science Series, 7: 164-167. doi:10.1111/j.1751-2824.2012.01600.x.

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22q11.2 microdeletion Fact sheet

- Microdeletion (loss of genetic information) of about 3 million bases (3 megabases) on the long arm of chromosome 22 in position 11
- Associated with DiGeorge syndrome and velo-cardio-facial syndrome
- Occurs spontaneously in more than 90% of those affected, can also be inherited in 6% – 28%[1] of the cases
- Clinical abnormalities, particularly heart defects, may have different manifestations, depending on the severity of the disease

Determination of a 22q11.2 microdeletion

Non-invasive prenatal test to exclude or detect a 22q11.2 microdeletion[2] for singleton pregnancy (using the proprietary & CE-marked *dmap* software)

NEW – can be selected **in combination with both PrenaTest® options 2 and 3**

Test result provided only with **cffDNA level ≥ 11%** in addition to other quality criteria

If quality criteria are not met: no repetition/no invoicing

NEW – **post analysis possible** with PrenaTest® data ≤ 3 months; without new blood sample

Test results require 2 additional working days[3] after analysis of test options 2/3 – to be invoiced separately

Test accuracy of the PrenaTest® for the determination of the 22q11.2 microdeletion

Phase 1 – A total of 469 samples were tested, of which 175 (37.3%) met the quality criteria. Three positive samples with a 22q11.2 microdeletion were correctly determined (3/3, 100%). All negative samples were correctly classified (172/172, 100%). There were no false-positive or false-negative results.

Phase 2 – In a final internal blinded study, 20 samples from Phase 1 were examined. All samples were classified correctly. Due to the low number of cases a concrete test sensitivity and specificity cannot be derived.

Limitations

cffDNA level

The detection or exclusion of a 22q11.2 microdeletion is currently only possible for specimens which have a cffDNA level of at least 11% (in addition to other quality criteria).

Mother is the carrier of the microdeletion

It is possible that the mother is the carrier of the 22q11.2 microdeletion. This can lead to discordant (false-positive) test results.

Size of the microdeletion

In more than 85% of affected persons, the deletion includes a region measuring approx. 2.5 megabases in the 22q11.2 region of chromosome 22. This region is investigated with the PrenaTest®. A small percentage of affected persons has an even smaller deletion or point mutation in the affected region which cannot be detected with the PrenaTest®. This can lead to discordant (false-negative) test results.

Microduplication in the investigated gene region

In the investigated gene region of chromosome 22, microduplications can also occur. These are not determined with the PrenaTest®.

Reasons for the genetic examination

This examination is particularly useful in cases of abnormalities on ultrasound, for example during organ screening, which may correlate with a DiGeorge or velo-cardio-facial syndrome:

- Congenital heart defect
- Detection of an aberrant subclavian artery
- Kidney malformation
- Growth retardation
- Cleft lip and palate
- Increased nuchal translucency
- Small thymus

Clinical lab routine

- Over 1,000 tests successfully performed since June 2016
- So far no discordant results based on feedback from doctors
- But: false-negative or false-positive results cannot be excluded

Please note:

The cffDNA level is highly individual and increases in later gestational weeks. Therefore it is possible that due to a cffDNA level that is too low, no test result can be achieved. A new blood sample is not requested provided the cffDNA level is sufficient for determining fetal trisomies 13, 18, 21 as well as gonosomal aneuploidies.

	Week 12 – 14	Week 19 – 23
Samples with cffDNA ≥ 11%	47.25%	52.78%
Samples with cffDNA < 11%	53.75%	47.22%

Correlation between cffDNA level and gestational week based on data of lab routine (12/2018 – 03/2019)

1 Fernández L et al. Higher frequency of uncommon 1.5-2 Mb deletions found in familial cases of 22q11.2 deletion syndrome. Am J Med Genet A. 2005 Jul 1;136(1):71-5.
2 OMIM# of the disease: 188400 (DGS), 192430 (VCFS)
3 Monday to Friday, except holidays

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