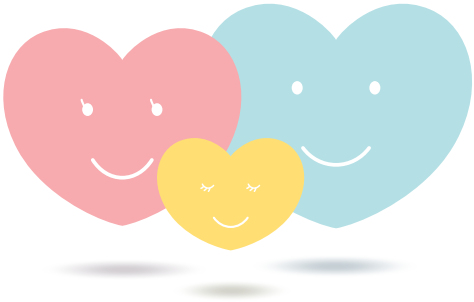
To those who are considering prenatal genetic tests

There are types of baby tests that are not included in regular checkups.



Supervised by

The Jikei University School of Medicine Department of Obstetrics and Gynecology

Professor: **Osamu Samura**

Introduction

Congratulation on your pregnancy

What type of baby will be born? What kind of child will you have? You are excited and have various expectations when you think about the baby that will be born. At the same time, you may have concerns, such as about childbirth and the fetal body.

Giving childbirth and raising a baby are very important events. In order to assuage concerns about childbirth to as great an extent as possible, prenatal genetic tests have recently expanded.

You are able to acquire information on your baby through prenatal genetic tests. These tests includes some examinations not included in an ordinary prenatal check-up. The mother, her partner, and other family members can opt to choose such tests after consultation.

This brochure summarizes prenatal genetic tests and provides specific information concerning these tests. We would be pleased if you would take this as an opportunity to consult with the people around you as well as medical personnel without facing childbirth and baby-related concerns alone.

The Jikei University School of Medicine Department of Obstetrics and Gynecology
Professor: **Osamu Samura**

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Purpose of prenatal genetic tests

The purpose of prenatal genetic tests is to reduce **anxiety about the mother and fetal body as much as possible**.

Prenatal genetic tests are performed together with genetic counseling. You can consult about the mother and fetus based on test results.

Column

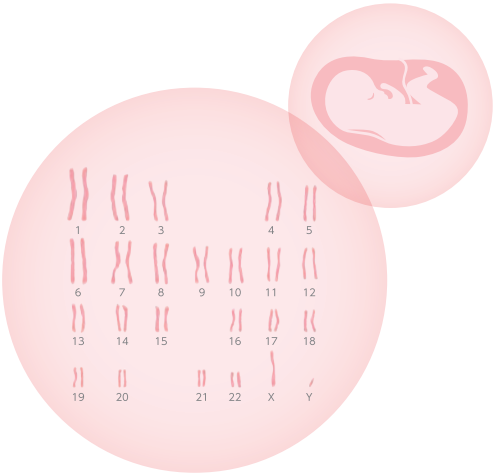
What is genetic counseling?

We support those who have issues, anxiety, and questions about genetics by providing them with accurate and easily understandable medical information based on science. After that, after we have sufficiently listened to what you want to say, we will provide you with phycological and social assistance so that you are able to make use of medical technologies and information to resolve your issues on your own.
A genetic specialist and a Genetic Counselor offer genetic counseling.

What are prenatal genetic tests?

Prenatal genetic tests examine whether or not a baby suffers from any congenital disorders before the birth.

Prenatal genetic tests comprise genetic tests, ultrasonographic examination, and other procedures. In this document, we explain genetic tests in detail.



It is important for a couple to engage in genetic counseling as well as prenatal genetic tests. This is because the way of thinking about prenatal genetic tests may vary depending upon the two partners involved. Therefore, it is necessary to for a couple to consult with each other to reach a decision on what to do. A genetic specialist and a Genetic Counselor help sort out fears so that the couple can make the best decisions.

Genetic counseling

Genetic counseling before testing

- When we start the genetic counseling before prenatal genetic tests, we would like the couple to first understand about the genetic information.
- The next step would be to decide whether to take the test or not, and finally, at the end we would choose the examination test type.

We request that the couple deeply think about what, to what extent, when, and how they want to know about the baby. Each examination varies in terms of what is to be discovered and what will remain unknown. Therefore, based on information provided through genetic counseling, we suggest that the couple consult carefully with us about all pertinent matters.

Of course, you may choose not to undergo prenatal genetic tests.

Genetic counseling after testing

Even after actual testing, genetic counseling will take place.
In this process, you will consult with us about what action to take depending upon the test results.

If tests results are “positive” , you will receive an explanation about the results and will learn whether or not further examinations are necessary.

Even if tests results are “negative,” you should know what this means.

There may be times when test results show neither positive nor negative, which is called “non-reportable˝.
This happens rare but when there´s not enough DNA amount in the blood, or when you are undergoing a certain medication treatment, there is a possibility that this result may occur.
In non-reportable cases, you may consider to take retests.

Regardless of the results, it is important to take genetic counseling after tests.

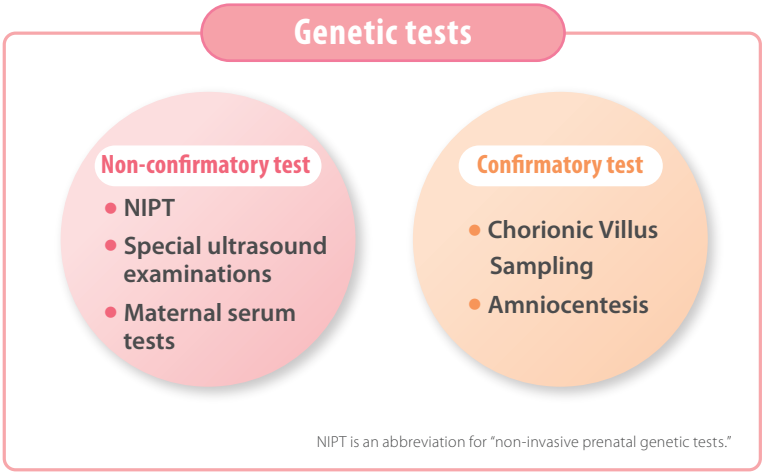
It will take one to two weeks until you obtain the results.[*1] During this period, you may change your mind about the situation.
We suggest that you make the right choice for yourself through use of genetic counseling.

*1 The situation may vary depending upon medical institution.

Genetic tests

The pregnant woman and partner can undergo genetic tests if they want.

There are two types of tests: (a) a Non-confirmatory test that is not sufficient for confirming results when used alone; and (b) a Confirmatory test that can be used alone to confirm results.



Each test varies depending upon the following factors and the like.

- **Period in which the examination is possible.**
- **Type of chromosomal disorder(s) targeted**
- **Accuracy**[*1]
- **Risk**

Together with your partner, you will decide whether or not an examination should be taken and what examinations are to be taken if any.

*1 There are several indexes for tests accuracy, such as sensitivity and positive predictive value.

Type of genetic tests

Non-confirmatory test

	NIPT	Special ultrasound examinations	Maternal serum tests
Implementation period (Gestation period)	The 9th week of pregnancy and thereafter	From the 11th to the 13th weeks of pregnancy	From the 15th to the 18th weeks of pregnancy
Target of tests	Down syndrome Trisomy 18 Trisomy 13	Down syndrome Trisomy 18	Down syndrome Trisomy 18 Neural tube defects
Sensitivity*2	99%	83%	80%
How long it takes to get results*3	1 to 2 weeks	About 2 weeks	
Risk/points to note	There are no risks. When the results are positive, a Confirmatory test is required to confirm the results.*4		

Confirmatory test

	Chorionic Villus Sampling	Amniocentesis
Implementation period (Gestation period)	From the 11th to the 14th weeks of pregnancy	The 15th week of pregnancy and thereafter
Target of tests	General chromosomal disorders	
Sensitivity*2	99.9%	
How long it takes to get results*3	2 to 3 weeks	
Risk/points to note	Miscarriage/stillbirth (1 out of about 100 persons for Chorionic Villus Sampling and 1 out of about 500 persons for Amniocentesis)	

On the next page, we will explain NIPT in detail. This is a new tests method, and it is a form of chromosome examination.

*2 This is the value for Down syndrome (excluding mosaic Down syndrome). The sensitivity represents the percentage of cases in which a baby with chromosomal disorders can be detected in a test with a "positive" outcome.
*3 The situation may vary depending upon medical institution.
*4 Blood drawing risks are excluded.

What is NIPT?

NIPT is a type of prenatal genetic tests that does not place an excessive burden on the expectant mother. It has been in use since 2013. Examining the mother's blood allows three baby chromosomal abnormalities to be checked (i.e., Down syndrome, trisomy 18, and trisomy 13).

NIPT is **highly accurate compared with** existing Non-confirmatory test (i.e., Special ultrasound examinations and Maternal serum tests), and it can be conducted at **an early stage** of the gestation period. NIPT can be performed through blood drawing only, and therefore, NIPT is beneficial because it **does not present any risks of miscarriage or stillbirth.**

NIPT procedures

Step 1
Genetic counselling

A couple who has made a reservation for testing receives genetic counseling from a genetic specialist and a Genetic Counselor in advance.

Step 2
Blood drawing

A blood sample is taken from an expectant mother.

Step 3
Analysis

Baby chromosome irregularities are tested for using blood drawn from the expectant mother.

Step 4
Genetic counselling

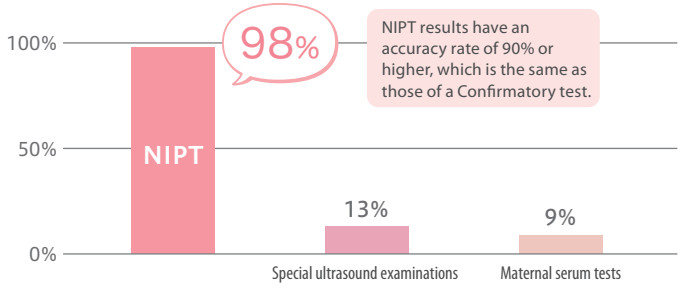
The couple undergoes genetic counseling with a genetic specialist and a Genetic Counselor concerning the test results.

*1 Blood drawing risks are excluded.

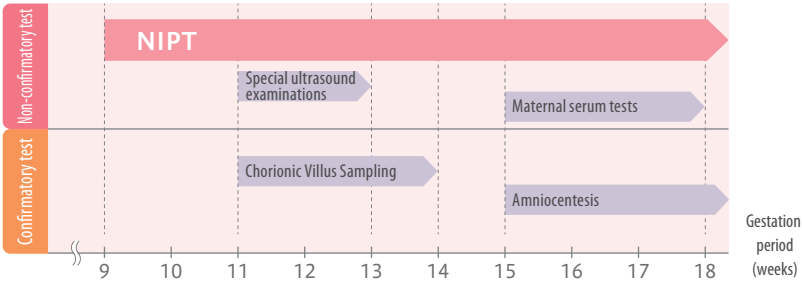
NIPT merits

1 NIPT is more accurate than conventional Non-confirmatory test.

Testing accuracy (positive predictive value)*2



2 NIPT can be conducted at an early stage of the gestation period (i.e., from the 9th week of pregnancy).



3 NIPT can be conducted through blood drawing alone. Therefore, there are no risks of miscarriage or stillbirth.*1

NIPT: Points to note

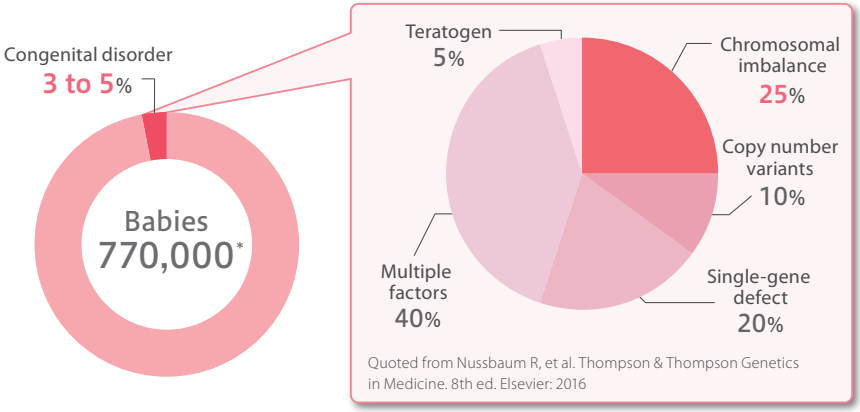
NIPT is not a Confirmatory test. If tests results are positive, the diagnosis will be confirmed in a Confirmatory test such as Chorionic Villus Sampling or Amniocentesis. It is necessary to take genetic counseling before and after NIPT.

*2 This is a value for Down syndrome for an expectant mother aged 40 years. A positive predictive value represents the probability of correct tests results when such results are positive.

Q&A

Q1 What percentage of births involve congenital disorders? What are the causes?

A1 It is said that 3% to 5% of newborn babies tend to have congenital disorders. Not all congenital disorders are life threatening, and there are various causes for them. They say that 25% of congenital disorders are caused by chromosomal abnormalities.

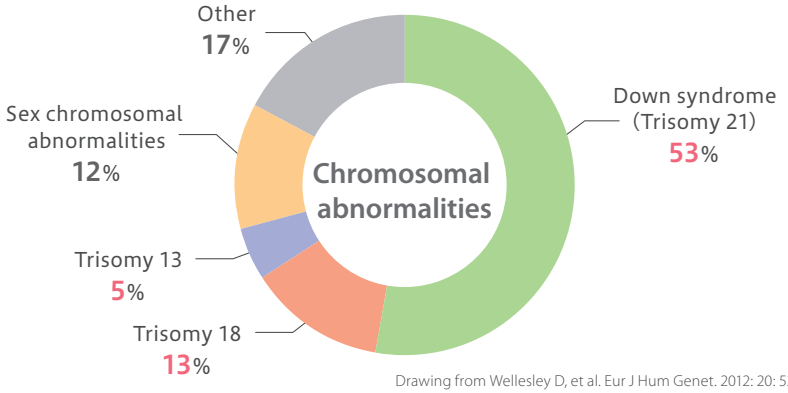


Quoted from Nussbaum R, et al. Thompson & Thompson Genetics in Medicine. 8th ed. Elsevier: 2016

* This represents the number of births per year (as of 2022).

Q2 What type of chromosomal abnormalities exist?

A2 The most common disorder is Down syndrome, accounting for about 53% of all such cases.



Drawing from Wellesley D, et al. Eur J Hum Genet. 2012: 20: 521-526

Q3 Is NIPT available everywhere? Are there any necessary conditions for taking NIPT?

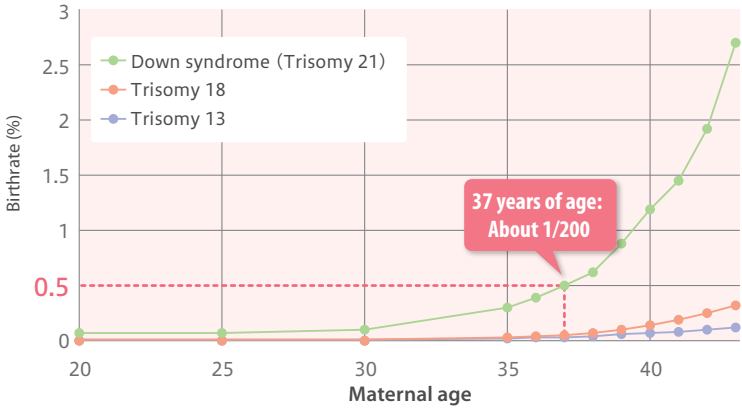
A3 It is recommended that NIPT be taken in hospitals certified by the Japanese Association of Medical Sciences. When you want to take NIPT or if you have concerns, consultation with a genetic specialist or a Genetic Counselor is highly recommended.

Steering Committee on Certification System for Prenatal Testing Website

https://jams-prenatal.jp/

Q4 Does advanced maternal age increase the possibility of chromosomal disorders?

A4 Advanced maternal age may increase the possibility of birth of a child with chromosomal disorders. For example, the possibility of the birth of a child with Down syndrome is about 1 out of 1,000 when considering childbirth of a mother of 30 years of age; however, it is about 1 out of 200 for childbirth of a mother of 37 years of age. It can be said that 199 out of 200 childbirths of mothers of 37 years of age are not children with Down syndrome.



Drawing from Gardner RJM et al. Chromosome abnormalities and genetic counseling. 4th ed. Oxford University Press: 2011

Q&A

Q5 If I undergo NIPT, is it acceptable not to take a prenatal checkups?

A5 NIPT does not cover all diseases in a baby to be born. Even if you undertake NIPT, please take a regular prenatal checkups without fail.

Q6 What should I do if the NIPT results are “positive?”

A6 NIPT is not a Confirmatory test. In order to confirm whether or not a baby suffers from chromosomal disorders, it is necessary to take a definite test (i.e., Chorionic Villus Sampling or Amniocentesis). Consulting with a genetic specialist or a Genetic Counselor is highly recommended during genetic counseling for disclosure of the NIPT results.

Q7 What should I do if I would like to know more about prenatal tests?

A7 There are various types of information available on the Internet. However, it is important to obtain correct information. The following sites contain information useful during pregnancy as well as that for prenatal genetic tests and NIPT.

Information site related to tests during pregnancy

https://prenatal.cfa.go.jp/

Source: “Information site related to tests during pregnancy”
(Project for Public Awareness of Prenatal genetic tests Certification System of the Children and Families Agency)

Memo

Please consult with medical institutions nearby about prenatal genetic tests and NIPT.
The following sites also provide relevant information.

Eurofins GeneTech, Inc. website:
https://www.genetech.co.jp

Eurofins GeneTech, Inc.
Chiyoda First Building East 12th floor, 3-8-1 Nishi-Kanda, Chiyoda-ku, Tokyo 101-0065, Japan
https://www.genetech.co.jp