How does NIFTY® work?
The NIFTY® test requires taking a small maternal blood sample of 10ml. cDNA in the maternal blood is then analysed to detect for chromosomal abnormalities. If an aneuploidy is present, small excesses or deficits in counts of the selected chromosome will be detected.

NIFTY® effectively resolves the difficulty in measuring the small increments in the specific chromosome DNA concentration through use of massively parallel sequencing technology (MPS). This means NIFTY® sequences millions of fragments of both fetal and maternal DNA from each sample. Using whole genome sequencing technology and four different proprietary bioinformatics analysis pipelines, the NIFTY® test is able to analyse data across the entire genome and compare chromosomes in the tested sample against optimal reference chromosomes to accurately determine the presence of a genetic abnormality.

As opposed to the ‘targeted sequencing’ methods employed by some other NIPS tests, the NIFTY® methodology allows for highly accurate results irrespective of the clinical symptoms of the patient, and a broader range of testing options including testing for trisomy, sex chromosomal aneuploidy and deletion syndromes.

Indications
Prior to undergoing the NIFTY® test, a pregnant woman should receive comprehensive information regarding non-invasive screening and non-directive advice on human genetics. The NIFTY® test is available from the 10th week of pregnancy.

Clinical Validation
Large scale validation of the NIFTY® test
The NIFTY® test has been validated by the world’s largest study on the clinical performance of NIPS to date, Non-Invasive Prenatal Testing For Trisomy 21, 18 and 13 – Clinical Experience from 146,958 Pregnancies.

Clinical Validation

<table>
<thead>
<tr>
<th>Trisomy</th>
<th>TP</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>T21</td>
<td>720</td>
<td>99.17%</td>
<td>99.99%</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>T18</td>
<td>107</td>
<td>98.24%</td>
<td>99.99%</td>
<td>99.99%</td>
<td></td>
</tr>
<tr>
<td>T13</td>
<td>22</td>
<td>98%</td>
<td>99.99%</td>
<td>92.19%</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>953</td>
<td>99.12%</td>
<td>99.80%</td>
<td>92.27%</td>
<td></td>
</tr>
</tbody>
</table>

Samples were collected between Jan 2011 and Aug 2013. The study was published in the Journal of Ultrasound in Obstetrics and Gynecology. Wei Wang et al, Journal of Ultrasound in Obstetrics and Gynecology, was published in the Journal of Ultrasound in Obstetrics and Gynecology.

Based in Brisbane, within the Royal Brisbane Hospital Precinct, our partner laboratory utilises next generation sequencing to perform whole genome sequencing for Non-invasive Prenatal Screening (NIPS). Combining this state-of-the-art technology with the world’s leading database from BGI Health, ensures the highest accuracy for the NIFTY® test.

A collection service is available in our Brisbane Clinic and through a national network of collection facilities. Contact us for collection sites or visit our website.

We are able to offer referral to a Genetic Counselor if required.

Please call our Toll Free number 1300 482 165 to make an appointment for blood collection.

Toll Free: 1300 482 165  Fax: 02 9475 4330
Email: info@gtldna.com.au
Web: www.gtldna.com.au
During the last decade, developments in the science of genetics and enormous advances in genetic technologies have altered our world. The NIFTY® test has revolutionized prenatal testing, transforming the first trimester diagnostic landscape. As of 2016, over 1,00,000 NIFTY® tests have been performed worldwide. The NIFTY® Plus test, introduced in 2010, was the first to start NIPT testing for Down syndrome (trisomy 21), the first generation of non-invasive screening methods.

Introduction to Genetic Testing by NIFTY®

Trisomies

A trisomy is a type of aneuploidy in which there are three chromosomes instead of the usual pair. Trisomy 21 (Down syndrome), and Trisomy 18 ( Edwards syndrome), and Trisomy 13 (Patau syndrome) are the three most common occurring autosomal chromosome aneuploidies in live births. These chromosomal conditions are caused by the presence of an extra copy or partial copy of chromosome 21, 18 or 13 respectively. The additional genetic material can cause dysmorphic features, congenital malformation and different degrees of intellectual disability. We also include testing for Trisomy 9, 16 and 22 as part of the NIFTY Plus test.

Interview with Genetic Counsellor about NIFTY®

“ISPC recognises that NIPS can be used as a screening test for women who are at high risk of Trisomy 21, with suitable genetic counselling. A positive test should be confirmed through invasive testing.”

Source: ISPC International Society of Prenatal Diagnosis

Deletion Syndromes

Deletion syndromes are defined as a group of clinically recognizable disorders characterised by a small deletion of a chromosomal segment. The size and position of the deletion determine which clinical features are manifested and how severe they are.

Clinical features of deletions can include developmental delays and intellectual disability, growth differences, behavioural problems, feeding difficulties, low muscle tone, seizures, dysmorphic features and a pattern of varying malformations. The following syndromes are included in our testing: Cri-du-chat Syndrome, 1p36.2, 22q11.1, Prader-Willi/Angelman Syndrome, 15q11.2, Jacobsen Syndrome, 11q23, DiGeorge Syndrome 4 (10p14-p13), 16p12, Van der Woude Syndrome (1q22.2) as part of the NIFTY® Plus test.

Sex Chromosomal Aneuploidies

Sex chromosome aneuploidy is defined as a numeric abnormality of an X or Y chromosome, with addition or loss of an entire X or Y chromosome. Although most cases of sex chromosome aneuploidies are generally mild without intellectual disability, some have a well-established phenotype that can include physical abnormalities, learning delays and infertility. Testing includes, Turner Syndrome, Klinefelter Syndrome, XXX, XYY.

Advantages

- Whole genome sequencing and high coverage improving accuracy. NIFTY® price competitive against all other NIPT providers.
- The option to perform an expanded NIPT with the largest range of testing for microdeletion syndromes and additional trisomies.
- Most validated NIPT on the market with a published study based on the outcomes of approximately 147,000 pregnancies and over 1 million NIFTY® tests performed worldwide to date.

NIFTY® was the first NIPT test to be implemented into clinical use.

Why Non-Invasive Prenatal Screening?

Many prenatal screening options already exist. However, compared to non-invasive prenatal screening (NIPS), traditional screening methods suffer from lower accuracy and higher false positive rates. Invasive diagnostic tests such as amniocentesis or chorionic villus sampling (CVS) are accurate but carry a 0.5-1% risk of miscarriage.

How does NIFTY® compare to traditional screening methods?

NIFTY® has introduced a highly accurate screening strategy for fetal aneuploidy. The NIFTY® test used technology and bioinformatics to enter clinical testing in 2010 and was launched in Europe in 2011. Since then, over 1 million NIFTY® tests have been performed worldwide.

A Comparison of Detection Rates

| Test | Sensitivity
|---|---
| NIFTY® | >99%
| Integrated Screening | >95%
| Serum Integrated Screening | >90%
| First Trimester Screening | >85%

A Comparison of False Positive Rates (FPR)

| Test | FPR
|---|---
| NIFTY® | <1%
| Integrated Screening | <5%
| Serum Integrated Screening | <7%
| First Trimester Screening | <10%

How does NIFTY® work?

Cell-free DNA fragments (cDNA) are short fragments of DNA which can be found circulating in the blood. During pregnancy, cell-free DNA (cffDNA) is present only as a minority component of the total cfDNA in maternal plasma. Cell-free DNA is present in the blood as a result of cell death, which may occur as part of normal physiological processes or in response to pathological conditions.

NIFTY® Methodology

Cell-Free DNA and Cell-Free Fetal DNA

Cell-free DNA fragments (cfDNA) are short fragments of DNA which can be found circulating in the blood. During pregnancy, cfDNA fragments originating from both the mother and fetus are present in maternal blood circulation. Cell-free fetal DNA (cfDNA) is present only as a minority component of the total cfDNA in maternal plasma, which poses a significant technical challenge for some NIPT detection methods.