



Prenatal Diagnostic Laboratory, Tsan Yuk Hospital

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Information on Prenatal Chromosomal Microarray (CMA) Testing

What are the objectives and benefits of prenatal CMA testing?

- Traditionally, chromosomes are examined under microscopy by a technique called karyotyping. Chromosomal microarray (CMA) is a special test which finds differences in the amount of genetic material in an individual. It looks for areas of the chromosomes that have gains or losses of genetic material.
- CMA test is much more sensitive than karyotyping. CMA has the potential to find smaller chromosome gains or losses even if testing of the chromosomes by karyotyping shows normal results.
- These smaller imbalances, possible gains or losses of genetic material, are called ‘submicroscopic imbalances’ because they cannot be seen through the microscope. They may cause birth defects, delays in development, and genetic syndromes.
- CMA which contains SNP probes can detect regions of absence of heterozygosity (AOH). AOH is usually caused by an abnormal inheritance pattern (Uniparental Disomy, UPD) of having a pair of chromosomes from just one parent (mother or father). In some instances, UPD may result in a genetic disorder and increase chance of having recessive genetic disease due to AOH.
- It is a fast test. The result can be available in 7 working days. In contrast, conventional chromosome testing by karyotyping takes 3 weeks to provide a result.
- An early prenatal diagnosis of a gain or loss of genetic material on a specific chromosome can provide additional information that may enable your doctors to manage your pregnancy better and also may enable you and your doctors to know what to expect after delivery.

Why has chromosomal microarray (CMA) been offered to you?

- CMA is offered to women who are at increased risk of having babies with congenital abnormalities. Common reasons include abnormal ultrasound findings of the fetus, previous history of an abnormal baby, family history of a genetic disorder, or if Down syndrome screening or Non-Invasive Prenatal Test (NIPT) indicates an increased risk for a chromosome abnormality. Women with stillbirth and second trimester miscarriage would also benefit from the test to evaluate the cause of fetal death.

What types of samples are required for this test?

- Amniotic fluid or chorionic villi obtained at amniocentesis or chorionic villus sampling (CVS), fetal blood obtained at cordocentesis, placental tissue or skin biopsy from stillbirth.
- 3 mL blood from both biological parents*, wherever possible, at the time of fetal sample collection.

*CMA is a very sensitive test which may identify genetic changes inherited from either parent of the baby and may not affect the baby’s health. Therefore, it is important that both biological parents provide a blood sample for analysis and interpretation. Parental samples will not be further processed if the CMA result for the fetal sample is normal, and hence there will be no parental report.

How is the test done?

- DNA of the fetus is extracted from the aforementioned sample. Rapid chromosome testing will then be performed to look for trisomy 13, 18 and 21, monosomy X and triploidy. If none of these are found, CMA will subsequently be performed.

When will the results be available?

- If the sample is adequate and the result is normal, the fetal test result will be reported in 7 working days.
- If a chromosomal problem is suspected, further tests are necessary to confirm these findings. Depending on the complexity of the problem, it will take 2-3 weeks or even longer for the reports to be available.



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How do I get to know the results?

- The test result will be reported to your doctor, who will explain the result to you.
- You and your family members may be referred to clinical geneticist for further counselling if there are pathogenic or uncertain clinical significance findings.

What are the possible test results?

The interpretation of results is based on information available at the time of reporting.

There are three possible test results:

1. **Normal** : no clinically significant gains or losses of genetic material are detected in the fetal genome.
2. **Pathogenic** : a gain or loss of genetic material is detected in the fetal genome. The clinical features associated with these results depend on the specific genetic material that is gained or lost.
3. **Uncertain clinical significance** : a gain or loss of genetic material is detected in the fetal genome but the effect on the fetus is uncertain.

What are the limitations of this test?

- Cannot detect balanced structural arrangement of chromosomes
- Cannot detect individual gene changes and regions where no probes have reached
- Cannot identify uniparental heterodisomy or small region of absence of heterozygosity
- Cannot detect low level mosaicism (presence of cells with different chromosomal makeup in the fetus or the placenta)
- A normal test result cannot exclude all abnormalities

What are the other important considerations in choosing this test?

- It is possible that a diagnosis unrelated to the reason of testing may be found. There is a small chance of finding a genetic condition affecting the health of yourself or other family members including predisposition to mental retardation, autism, cancer, late-onset diseases or other medical conditions. The test result may be of uncertain clinical significance. The above may impose psychological distress.
- You shall sign a consent form and indicate what information you would not like to know from the test.
- Certain low penetrance neuro-susceptibility copy number variants are not reported in accordance to UK Royal College of Pathologists 2015 recommendation. This includes proximal 1q21.1 duplications, 15q11.2 BP1-BP2 deletions or duplications, 16p13.11 deletions or duplications, 16p12.2 deletions, Xp22.31 duplications and Xp22.33 deletions

I acknowledge that the above information have been discussed with me by medical staff and I fully understand it. I have been given the opportunities to ask questions pertinent to the test and satisfactory answers have been provided by medical staff.

GUM LABEL

Signature _____

Date _____