

MICROARRAY TESTING: A BRIEF GUIDE FOR PHYSICIANS

What is microarray testing and when to order it?

Microarray analysis is a modern technology that is orders of magnitude more sensitive than a karyotype in detecting partial chromosome deletions and/or partial chromosome duplications.

In patients who have developmental delay, intellectual disability, autism spectrum disorder, dysmorphism or multiple congenital anomalies that are not suggestive of common chromosome abnormalities, microarray analysis is recommended as the **first tier test** by the Canadian College of Medical Geneticists (CCMG).

Microarray analysis does not detect balanced structural chromosome rearrangements such as translocations and inversions, low-level mosaicism or point mutations.

What type of microarray testing is done at CHEO and how long does it take?

The CHEO Genetics Diagnostic Laboratory utilizes the Affymetrix Cytoscan HD assay. Across the genome, deletions of 200kb or greater and duplications of 500kb or greater are detected. Regions known to be clinically significant are analysed at a more detailed resolution of 50kb. Additionally, results are assessed for long contiguous stretches of homozygosity of 5Mb or greater. A full list of the clinically significant regions analyzed is available upon request.

The turn-around time for this test is approximately 6 weeks for routine samples.

What type of results can you expect?

Scientific literature and databases used for interpretation of the microarray results are continually growing; however, we currently have limited information on many regions of the genome. Thus, three broad types of results can be generated:

Abnormal result

Patients with a clearly pathogenic deletion or duplication should be referred to the CHEO Genetics clinic to receive a clinical assessment, appropriate genetic counseling and additional familial studies, when indicated.

Result of unclear significance

Further analyses are required to help in the interpretation of copy number alterations that are likely pathogenic or of unknown significance. The required samples for the proband and his/her parents will be indicated in the microarray report. It is very helpful and time saving when parental studies are preformed prior to, or concurrent with, a referral to the CHEO Genetics clinic.

Normal result

A normal result implies that the patient does not have a duplication or deletion larger than the sizes outlined above. Standard chromosomes analysis (karyotype) is **not** indicated for patients with a normal microarray result. A normal microarray does not rule out mosaicism, genetically balanced rearrangements, smaller deletions or duplications, imprinting defects, uniparental disomy, nor point mutations. A microarray does not address the possibility of a single gene condition. There are many circumstances under which a referral to the CHEO Genetics clinic is appropriate, regardless of the results of microarray.