Understanding your Diagnosis

Due to the widespread variety and severity of symptoms, diagnosing mitochondrial disease (mito) can be extremely difficult, can take months or even years, and may not be definitive.

The Mito Foundation believes it is important for patients to understand their diagnosis. This is particularly important for those interested in participating in research and clinical trials, or considering planning a family. At present, less than one third of patients who are suspected of having mito receive a definitive genetic diagnosis. Information about the benefits of a genetic diagnosis can be found here.

Categories of Diagnosis

Clinical

A clinical diagnosis of mito is based on its clinical presentation, or symptoms. You may be clinically diagnosed based on a comprehensive history of your symptoms, family history and a review of affected organs. A detailed family history may reveal a pattern of inheritance that is specific to mito. Find out about the tests used in clinical diagnosis, under 'The Diagnostic Process'.

A clinical diagnosis is often unable to determine the specific type of mito, therefore, a genetic diagnosis should be sought where possible.

Many individuals display symptoms of mito, but do not present with enough evidence to confirm a clinical diagnosis. For these individuals, regular review and assessment for worsening symptoms and new organ involvement is essential.

Biochemical

A biochemical diagnosis is confirmed when human tissue, usually taken as a muscle biopsy, is tested for abnormalities. A muscle biopsy may show "ragged red fibres", deficiencies in respiratory chain enzymes (for example Complex I deficiency) or in levels of Co-Enzyme Q_{10}. Not all individuals with mito will show abnormalities in muscle biopsies[2]. Liver, heart or skin biopsies are sometimes used for enzyme studies in specific circumstances, while blood and urine testing can provide evidence of abnormal levels of certain chemicals or biomarkers that can add to diagnostic certainty.

Genetic

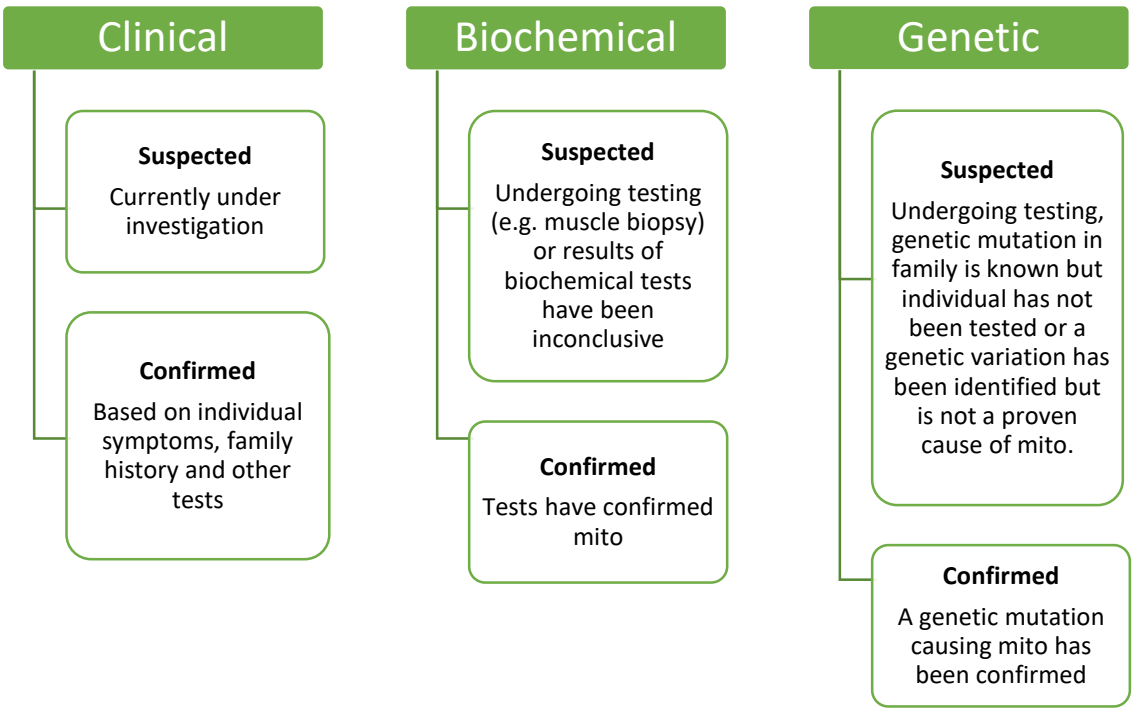
A genetic diagnosis uses genetic testing to determine the exact genetic mutation causing mito. Causative mutations can be found in any of the 37 genes located in mitochondrial DNA or in over 200 genes located in the nuclear DNA. The sample used for genetic testing

depends on the clinical suspicion. A blood sample is often used, but this can be unsuitable for some forms of mito. Hair follicles or urine may be used where the family genetic mutation is known or strongly suspected[2]. Sometimes a muscle or liver biopsy is required. For patients with a mitochondrial DNA mutation a muscle biopsy can determine the level of heteroplasmy (the ratio of healthy to unhealthy mitochondria within an individual's cells).

For some individuals, a variation in a gene may be found that has not previously shown to cause mito. In these cases, individuals may have to wait for further research to confirm whether the genetic variation is actually causing the disease.

AMDF believes that people who are suspected of having mito should have the opportunity to undergo testing to receive a formal genetic diagnosis.

Diagnosis Flow Chart



1. Gorman, G.S. et al. (2016). Mitochondrial Diseases. Nature Reviews, Disease Primers. Vol.2
2. Liang, C. & Sue, C. (2011). How to Treat: Mitochondrial Disease. Australian Doctor. pp27-34.