

# Oxford Molecular Genetics Laboratory

Genetics Laboratories, Churchill Hospital, Old Road, Headington, Oxford, OX3 7LE  
www.ouh.nhs.uk/geneticslab



## LEBER HEREDITARY OPTIC NEUROPATHY - OMIM #535000

### INTRODUCTION

Leber hereditary optic neuropathy (LHON), also known as Leber optic atrophy, typically presents as acute or subacute bilateral painless central visual loss. LHON is due to mutation in the mitochondrial DNA (mtDNA), which is present in multiple copies in the mitochondria and is maternally transmitted. LHON is clinically similar to dominant optic atrophy 1 (due to *OPA1* mutation, for which testing is available via our optic nerve disease gene panel). Males are 4 to 5 times more likely to be affected than females. A minority of patients have significant visual improvement following the acute phase. Idebenone treatment may benefit patients who are at an early stage of the disease process. The causative mtDNA mutation is homoplasmic in the majority of cases. 3 common mtDNA mutations account for approximately 90% of families. The standard primary genetic test is for these 3 mutations and this is charged in the same way as other routine genetic tests. Additional testing for rare LHON mutations is NHS Highly Specialised Services (HSS) funded for NHS referrals from England and Scotland.

We also provide a diagnostic service for other [mitochondrial DNA disorders](#), [mtDNA maintenance disorders](#), and for [reversible respiratory chain deficiency \(due to mtDNA mutation or TRMU mutation\)](#).

### TESTING

Diagnostic:	Clinically affected patients
Carrier or Presymptomatic:	Relatives of clinically affected patients

### SAMPLE REQUIREMENTS

- Blood (5ml in EDTA) or extracted DNA.
- For carrier/presymptomatic tests in heteroplasmic individuals, other sample types may also be appropriate. Please contact the lab to discuss.

### REFERRALS

- From Hospital Consultants, mainly Ophthalmology, Neurology, Clinical Genetics.

### STRATEGY

- Analysis for 3 common mtDNA point mutations accounting for approximately 90% of LHON: m.3460G>A, m.11778G>A & m.14484T>C
- Further testing: analysis for rare mtDNA point mutations by whole mtDNA sequencing can then be undertaken if LHON is strongly suspected (typically only once *OPA1* mutations have also been excluded).

### TECHNICAL INFORMATION

- Pyrosequencing for the specific mtDNA point mutations (m.3460G>A, m.11778G>A & m.14484T>C)
- Next generation sequencing (NGS) of the whole mitochondrial genome, by long-range PCR, Illumina NextEra library preparation and Illumina MiSeq sequencing.

### TARGET REPORTING TIMES

Diagnostic tests (3 common mutations):	14 calendar days
Carrier/Presymptomatic tests:	14 calendar days

N.B. Details are correct for the date of printing only – last updated 14/07/2016