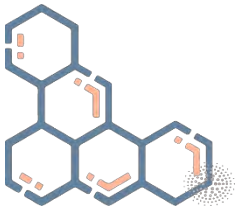
Leigh Syndrome and Mitochondrial Encephalopathy

Precision Panel



Overview

Leigh syndrome (subacute necrotizing encephalomyelopathy) is a severe neurological disorder that generally presents in infancy or early childhood, although it can appear during late childhood and even adulthood. It is characterized by developmental delay or psychomotor regression, ataxia, dystonia, external ophthalmoplegia, seizures, vomiting and weakness. The phenotype of Leigh syndrome is caused by alterations of mitochondrial metabolism from a variety of mechanisms including pyruvate dehydrogenase complex and respiratory chain dysfunction due to either nuclear or mitochondrial DNA mutations. This, in turn, results in brain lesions and damage of myelin sheaths coating the nerves. Leigh syndrome can have different inheritance patterns but it is most commonly inherited in an autosomal recessive pattern.

The Igenomix Leigh Syndrome and Mitochondrial Encephalopathy Precision Panel can be used to make an accurate and directed diagnosis ultimately leading to a better management and prognosis of the disease. It provides a comprehensive analysis of the genes involved in this disease using next-generation sequencing (NGS) to fully understand the spectrum of relevant genes involved.

Indications

The Igenomix Leigh Syndrome and Mitochondrial Encephalopathy Precision Panel is indicated for those patients with a clinical suspicion or diagnosis with or without the following manifestations during the newborn period:

- Psychomotor regression
- Ataxia
- Dystonia
- Hypotonia
- External Ophthalmoplegia
- Seizures
- Lactic acidosis
- Vomiting
- Weakness
- Delayed growth development

Clinical Utility

The clinical utility of this panel is:

- The genetic and molecular confirmation for an accurate clinical diagnosis of a symptomatic patient.
- Early initiation of multidisciplinary treatment including supplements, vitamins, pyruvate, dichloroacetate and a ketogenic diet. Consider immunomodulatory therapies if necessary.
- Risk assessment and genetic counselling of asymptomatic family members according to the mode of inheritance.
- Improvement of delineation of genotype-phenotype correlation.

Genes & Diseases

GENE	OMIM DISEASES	INHERITANCE*	% GENE COVERAGE (20X)	HGMD**
AIFM1	Oxidative Phosphorylation Deficiency, Cowchock Syndrome, Deafness, Spondyloepimetaphyseal Dysplasia, Leukoencephalopathy, Mitochondrial Encephalomyopathy, Charcot-Marie-Tooth Disease	X,XR,G	100	-
ATP6	Leber Optic Atrophy, Neuropathy, Ataxia, Retinitis Pigmentosa, Striatal Necrosis, Optic Neuropathy, Leigh Syndrome, Spastic Paraplegia, Narp Syndrome	MI	-	-
BCS1L	Bjornstad Syndrome, Gracile Syndrome, Leigh Syndrome, Mitochondrial Complex III Deficiency	AR,MI	99.96	40 of 42
CLCNKB	Bartter Syndrome, Gitelman Syndrome	AR	99.86	145 of 145
COQ2	Coenzyme Q10 Deficiency, Multiple System Atrophy, Leigh Syndrome, Nephrotic Syndrome	AD,AR	99.61	37 of 38
COX1	Leber Optic Neuropathy, MELAS (Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, Stroke-Like Episodes)	MI	-	-
COX10	Leigh Syndrome, Mitochondrial Complex Iv Deficiency	AR,MI	100	13 of 13
COX15	Cardioencephalomyopathy, Cytochrome C Oxidase Deficiency, Leigh Syndrome, Leukodystrophy	AR,MI	100	5 of 5
COX2	MELAS (Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, And Stroke-Like Episodes)	MI	-	-
COX3	Leber Optic Atrophy, Leber Hereditary Optic Neuropathy, MELAS (Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, And Stroke-Like Episodes)	MI	-	-
CYTB	Leber Optic Atrophy, Histiocytoid Cardiomyopathy, MELAS (Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, And Stroke-Like Episodes)	MI	98.8	-
DLD	Dihydrolipoamide Dehydrogenase Deficiency, Pyruvate Dehydrogenase E3 Deficiency	AR	100	26 of 26
DNM1L	Encephalopathy, Optic Atrophy	AD,AR	100	29 of 29
ECHS1	Enoyl-Coa Hydratase 1 Deficiency, Leigh Syndrome, Leukodystrophy	AR	100	39 of 39
FBXL4	Mitochondrial DNA Depletion Syndrome	AR	99.26	46 of 51
FDX2	Mitochondrial Myopathy, Optic Atrophy, Leukoencephalopathy	AR,MI	100	-
FOXRED1	Mitochondrial Complex I Deficiency, Leigh Syndrome, Leukodystrophy	AR	100	13 of 13
LIPT1	Lipoyltransferase 1 Deficiency, Leigh Syndrome, Leukodystrophy	AR	97.25	10 of 10
LRPPRC	Leigh Syndrome	AR	98.94	18 of 18
MFF	Encephalopathy	AR	99.98	4 of 4
MTFMT	Combined Oxidative Phosphorylation Deficiency, Mitochondrial Complex I Deficiency, Leigh Syndrome, Leukodystrophy	AR	99.52	18 of 18
ND1	Leber Optic Atrophy, Complex I Deficiency, Leigh Syndrome, MELAS (Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, And Stroke-Like Episodes)	MI	-	-
ND2	Leber Optic Atrophy, Complex I Deficiency, Leigh Syndrome	MI	85.56	-
ND3	Complex I Deficiency, Leigh Syndrome	-	99.99	-
ND4	Leber Optic Atrophy, Leigh Syndrome, MELAS (Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, And Stroke-Like Episodes)	MI	-	-

ND5	Leber Optic Atrophy, Leigh Syndrome, MELAS (Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, And Stroke-Like Episodes), MERRF (Myoclonic Epilepsy And Ragged-Red Fibres)	MI	99.89	-
ND6	Leber Optic Atrophy, Leigh Syndrome, MELAS (Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, And Stroke-Like Episodes)	MI	100	-
NDUFA10	Mitochondrial Complex I Deficiency, Leigh Syndrome, Leukodystrophy	AR	100	6 of 6
NDUFA12	Mitochondrial Complex I Deficiency, Leigh Syndrome, Leukodystrophy	AR	99.97	4 of 4
NDUFA13	Mitochondrial Complex I Deficiency, Leigh Syndrome, Leukodystrophy	AR	94.91	3 of 3
NDUFA2	Mitochondrial Complex I Deficiency, Leigh Syndrome, Leukodystrophy	AR	99.84	2 of 3
NDUFA4	Leigh Syndrome, Leukodystrophy	-	100	2 of 2
NDUFA9	Mitochondrial Complex I Deficiency, Leigh Syndrome, Leukodystrophy	AR	99.98	3 of 3
NDUFAF2	Mitochondrial Complex I Deficiency, Leigh Syndrome, Leukodystrophy	AR	99.39	6 of 6
NDUFAF3	Mitochondrial Complex I Deficiency, Leigh Syndrome, Cardiomyopathy	AR	100	9 of 9
NDUFAF5	Mitochondrial Complex I Deficiency, Leigh Syndrome, Leukodystrophy	AR	100	13 of 14
NDUFAF6	Fanconi Renotubular Syndrome, Mitochondrial Complex I Deficiency, Leigh Syndrome, Leukodystrophy	AR	99.4	12 of 13
NDUFB8	Mitochondrial Complex I Deficiency, Leigh Syndrome, Cardiomyopathy	AR	100	4 of 4
NDUFS1	Mitochondrial Complex I Deficiency, Leigh Syndrome, Leukodystrophy	AR	99.98	30 of 30
NDUFS2	Mitochondrial Complex I Deficiency, Leber Optic Neuropathy, Leigh Syndrome, Cardiomyopathy, Leukodystrophy	AR	100	26 of 26
NDUFS3	Mitochondrial Complex I Deficiency, Leigh Syndrome, Leukodystrophy	AR	93.67	4 of 4
NDUFS4	Mitochondrial Complex I Deficiency, Leigh Syndrome, Leukodystrophy	AR,X,XD,MI,G	100	15 of 15
NDUFS7	Mitochondrial Complex I Deficiency, Leigh Syndrome, Leukodystrophy	AR	88	6 of 7
NDUFS8	Mitochondrial Complex I Deficiency, Leigh Syndrome, Leukodystrophy	AR	100	16 of 16
NDUFV1	Mitochondrial Complex I Deficiency, Leigh Syndrome, Leukodystrophy	AR	100	36 of 36
NDUFV2	Mitochondrial Complex I Deficiency, Leigh Syndrome, Leukodystrophy	AR	99	8 of 8
OPA1	Behr Syndrome, Mitochondrial DNA Depletion Syndrome, Optic Atrophy, Deafness, Ophthalmoplegia, Myopathy, Ataxia, Neuropathy	AD,AR	99.98	397 of 402
PDHA1	Pyruvate Decarboxylase Deficiency, Leigh Syndrome, Leukodystrophy	X,XD,G	99.02	-
PDHB	Pyruvate Dehydrogenase Deficiency	AR	100	13 of 13
PDSS2	Coenzyme Q10 Deficiency, Leigh Syndrome	AR	99.99	6 of 6
PET100	Mitochondrial Complex Iv Deficiency, Leigh Syndrome, Leukodystrophy	AR,MI	98	2 of 2
POLG	Mitochondrial DNA Depletion Syndrome, Ophthalmoplegia, Sensory Ataxic Neuropathy, Dysarthria, Ophthalmoparesis, Alpers-Huttenlocher Syndrome, Neurogastrointestinal Encephalomyopathy	AD,AR	99.92	325 of 326
RARS2	Pontocerebellar Hypoplasia	AR	99.98	39 of 40
RMND1	Oxidative Phosphorylation Deficiency	AR	99.67	15 of 16
RRM2B	Mitochondrial DNA Depletion Syndrome, Ophthalmoplegia, Kearns-Sayre Syndrome, Neurogastrointestinal Encephalomyopathy	AD,AR	92.38	46 of 46
SCO2	Cardioencephalomyopathy, Cytochrome C Oxidase Deficiency, Myopia, Charcot-Marie-Tooth Disease, Copper Metabolism Defect, Leigh Syndrome	AD,AR	100	38 of 38
SDHA	Cardiomyopathy, Leigh Syndrome, Mitochondrial Complex Ii Deficiency, Paragangliomas, Gastrointestinal Stromal Tumor, Pheochromocytoma-Paraganglioma, Succinate-Coq Reductase Deficiency, Leukodystrophy	AD,AR,MI	99.98	103 of 103
SERAC1	3-Methylglutaconic Aciduria, Deafness, Encephalopathy, Leigh Syndrome	AR	99.93	53 of 53
SLC12A3	Gitelman Syndrome	AR	100	512 of 522
SLC19A3	Basal Ganglia Disease, Psychomotor Retardation, Brain Atrophy, Leigh Syndrome, Leukodystrophy	AR	100	38 of 39
SUCLA2	Mitochondrial DNA Depletion Syndrome, Methylmalonic Aciduria	AR	100	27 of 27
SUCLG1	Mitochondrial DNA Depletion Syndrome, Methylmalonic Aciduria	AR	100	34 of 34

SURF1	Charcot-Marie-Tooth Disease, Leigh Syndrome, Cardiomyopathy, Leukodystrophy	AR,MI	98.59	117 of 124
TACO1	Mitochondrial Complex Iv Deficiency, Leigh Syndrome, Leukodystrophy	AR,MI	100	3 of 3
TMEM70	Mitochondrial Complex V Deficiency, Encephalocardiomyopathy	AR	100	22 of 24
TRNC	MELAS (Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, And Stroke-Like Episodes)	MI	-	-
TRNF	MELAS (Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, And Stroke-Like Episodes), MERRF (Myoclonic Epilepsy And Ragged-Red Fibres)	MI	-	-
TRNK	MELAS (Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, And Stroke-Like Episodes), MERRF (Myoclonic Epilepsy And Ragged-Red Fibres), Diabetes, Deafness, Leigh Syndrome, Cardiomyopathy	MI	-	-
TRNL1	MELAS (Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, And Stroke-Like Episodes), MERRF (Myoclonic Epilepsy And Ragged-Red Fibres), Kearns-Sayre Syndrome, Diabetes, Deafness, Leigh Syndrome, Ophthalmoplegia	MI	-	-
TRNQ	MELAS (Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, And Stroke-Like Episodes), MERRF (Myoclonic Epilepsy And Ragged-Red Fibres)	MI	-	-
TRNS1	Deafness, Mitochondrial Complex Iv Deficiency, MELAS (Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, And Stroke-Like Episodes), MERRF (Myoclonic Epilepsy And Ragged-Red Fibres), Ophthalmoplegia, Palmoplantar Keratoderma	AR,MI	-	-
TRNS2	MELAS (Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, And Stroke-Like Episodes), MERRF (Myoclonic Epilepsy And Ragged-Red Fibres), Usher Syndrome	MI	-	-
TRNV	MELAS (Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, And Stroke-Like Episodes), Leigh Syndrome	MI	-	-
TRNW	MELAS (Mitochondrial Myopathy, Encephalopathy, Lactic Acidosis, And Stroke-Like Episodes), Optic Atrophy, Leukoencephalopathy, Leigh Syndrome	AR,MI	-	-
TYMP	Mitochondrial DNA Depletion Syndrome, Neurogastrointestinal Encephalomyopathy	AR	99.72	93 of 96

*Inheritance: AD: Autosomal Dominant; AR: Autosomal Recessive; X: X linked; XLR: X linked Recessive; Mi: Mitochondrial; Mu: Multifactorial.
**Number of clinically relevant mutations according to HGMD

Methodology

Contact us

Call +34 963 905 310 or send an email to supportspain@igenomix.com for any of the following objectives:

- Get more information about the test.
- Request your kit.
- Request a pick up of the kit after collecting the sample.

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