



MOLECULAR REQUISITION

SHIP SAMPLES TO: **NSO SPECIMEN HUB**

415 Smyth Road Ottawa, ON K1H 8M8

Lab Use Only

PATIENT INFORMATION

Health Card Number

Sex Assigned at Birth

☐ Male ☐ Female

☐ Ambiguous ☐ Unknown

Gender Identity (Optional)

☐ Male ☐ Female ☐ Non-binary/X/U

Date of Birth (yyyy/mm/dd)

MRN/Hospital

Patient's Last Name

Patient's First Name

Patient's Address

Patient's Telephone Contact Number

Ancestry: _____

☐ Fetal Sample

For STAT requests please indicate how a shorter TAT will change patient management:

☐ Ongoing pregnancy; result needed for decision making within 6wks (i.e. termination or birth)
Estimated due date: _____

☐ Positive newborn screens where molecular results are essential for treatment decisions

☐ Expedited results will directly impact management decisions

For inquiries please contact nsomolecular@cheo.on.ca

***Note: We are no longer able to accept STAT requests for the mitochondrial disease panels**

ORDERING PROVIDER

Name

Email

Phone

Fax

Institution

Copy results to clinician/practitioner:

Name

Phone

Fax

Copy results to clinician/practitioner:

Phone

Fax

TEST REQUESTED *see FAQ section on NSO website for more information*

☐ Targets of Newborn Screening – targeted panel (complete Section 1)

☐ Mitochondrial Diseases – augmented exome slice (complete Section 2; whole blood or DNA)

☐ TREC (DBS only; for out-of-province newborn screening samples only)

☐ SMA - ddPCR/MLPA (*SMN1* and *SMN2* copy number only)

☐ *CFTR* common mutation panel (for carrier testing and CF newborn screen positive only)

☐ Familial Variant Testing (complete table below)

☐ Maternal Cell Contamination (MCC) studies (for prenatal and umbilical cord blood testing)

☐ Variant reinterpretation (must attach NSO report issued ≥ 1 year ago)

SPECIMEN TYPE

☐ Whole Blood (room temp, EDTA tubes)

Adult 1x5mL, Children 1x4mL, Infant ≤ 2 yo 1x3mL

☐ Umbilical Cord blood (maternal sample for MCC studies required) ☐ EDTA blood ☐ DBS

☐ DNA (>5 μ g with at least [50ng/ μ L])

Source: _____

☐ DBS (Dried bloodspot - Whatman 903)

☐ Other: _____

Contact NSO prior to sending

SPECIMEN COLLECTION

Date of collection (YYYY/MM/DD)

Time of Collection (24HR)

Tubes (if applicable)

Specimen ID

Please contact us if this is a precious sample. For more information on precious samples and our sample retention policy, please visit our website.

AUTHORISATION

I certify that the patient and/or legal guardian has been informed of the nature of the genetic test requested, including benefits, risks, possible results, limitations and possible implications for himself/herself and his/her family. I have answered this person's questions and have obtained informed consent for this testing.

Signature of the ordering healthcare provider: _____

TESTING FOR KNOWN FAMILIAL VARIANT(S)

☐ Please provide proband's report or NSO report number and family history

Proband's Name / DOB: _____

Relationship to Proband: _____

Gene and Variant(s): _____

Transcript (NM number) required if report not attached

Personal History: ☐ Asymptomatic ☐ Symptomatic:

Family History: _____

Name(s) and DOB of other submitted family members: _____

Complete NSO's billing form if patient is not covered by OHIP; attach subsequent pages/sections as needed



MOLECULAR REQUISITION

SHIP SAMPLES TO: NSO SPECIMEN HUB

415 Smyth Road Ottawa, ON K1H 8M8

SECTION 1: MOLECULAR TESTING FOR DISEASES TARGETED BY NEWBORN SCREENING ONTARIO

Disease Targeted:

Gene (or choose from list below); If a multi-gene panel is being requested, please indicate if you are suspicious of a specific gene(s):

Clinical Indication:

Family History (please attach all relevant documents related to previous test results and clinical diagnosis):

AMINO ACID DISORDERS (requesting a panel is equivalent to requesting all related subpanels)

x	PANEL	x	SUBPANEL	GENES
☐	Homocystinuria	☐	Hypermethioninemia	ADK, AHCY, CBS, GNMT, MAT1A, SLC25A13
		☐	Hypomethioninemia	MTHFR, MTR, MTRR
☐	Phenylketonuria	☐	PAH Deficiency	PAH (sequencing + reflex MLPA as needed)
		☐	Bioppterin Deficiencies	DNAJC12, GCH1, PCBD1, PTS, QDPR, SPR
☐	Tyrosinemia	☐	Elevated Succinylacetone	FAH, GSTZ1
		☐	Elevated Tyrosine	HPD, TAT
		☐	High citrulline	ASS1, SLC25A13
☐	Urea Cycle Diseases	☐	High ASA	ASL
		☐	Low citrulline	CPS1, NAGS, OTC
		☐	Other	ARG1, C5A, GLUL, GLUD1, OAT, SLC7A7, SLC25A2, SLC25A15
☐	Maple Syrup Urine Disease			BCKDHA, BCKDHB, DBT, DLD

ORGANIC ACID DISORDERS (requesting a panel is equivalent to requesting all related subpanels)

x	PANEL	x	SUBPANEL	GENES
☐	Multiple carboxylase Deficiency	☐	Biotinidase Deficiency	BTBD
		☐	Other	C5A, HLCS
☐	Propionic / Methylmalonic acidemias	☐	PA	PCCA, PCCB
		☐	MMA	ACSF3, ALDH6A1, MCEE, MLYCD, MMAA, MMAB, MMUT, SUCLA2, SUCLG1
		☐	MMA + Homocysteinemia	ABCD4, AMN, CBLIF, CD320, CUBN, HCF1, LMBRD1, MMACHC, MMADHC, TCN1, TCN2
☐	Isovaleric acidemia			ACADSB, FLAD1, IVD
☐	Glutaric aciduria Type 1			GCDH
☐	Isobutyryl-CoA dehydrogenase deficiency			ACAD8
☐	Succinic semialdehyde dehydrogenase deficiency			ALDH5A1
☐	b-ketothiolase deficiency			ACAT1
☐	Guanidinoacetate Methyltransferase Deficiency			GAMT

FATTY ACID OXIDATION DISORDERS ☐ Check here to request ALL genes noted below

x	PANEL	GENES
☐	Carnitine Uptake Deficiency	SLC22A5
☐	SCAD Deficiency	ACADS
☐	MCAD Deficiency	ACADM (sequencing + reflex MLPA as needed)
☐	LCHAD/MTP Deficiency	HADHA, HADHB
☐	VLCAD Deficiency	ACADVL
☐	MADD/Glutaric Aciduria Type2	ETFA, ETFB, ETFDH, FLAD1, SLC52A1, SLC52A2, SLC52A3
☐	CPT2 Deficiency	CPT2
☐	CACT Deficiency	SLC25A20
☐	CPT1 Deficiency	CPT1A
☐	ECHS1 Deficiency	ECHS1

CONGENITAL ADRENAL HYPERPLASIA (if both requested, CYP21A2 will be performed first and reflex to panel)

☐	21-Hydroxylase Deficiency	CYP21A2 (includes MLPA and long-range PCR analyses for CNVs and common rearrangements)
☐	Other	ARMC5, CYP11B1, CYP11B2, CYP17A1, HSD3B2, POR, PRKAR1A, STAR

GALACTOSEMIA

☐	GALT Deficiency	GALT
☐	Other	GALK1, GALE, GALT

PEROXISOMAL STORAGE DISORDERS ☐ Check here to request ALL genes noted below

☐	XL-Adrenoleukodystrophy	ABCD1
☐	Zellweger Spectrum	ACBD5, ACOX1, HSD17B4, PEX1, PEX10, PEX11B, PEX12, PEX13, PEX14, PEX16, PEX19, PEX2, PEX26, PEX3, PEX5, PEX6, PEX7

SEVERE COMBINED IMMUNE DEFICIENCIES

☐	Adenosine deaminase deficiency	ADA
☐	PNP deficiency	PNP



MOLECULAR REQUISITION

SHIP SAMPLES TO: **NSO SPECIMEN HUB**
415 Smyth Road Ottawa, ON K1H 8M8

SECTION 2: MOLECULAR TESTING FOR MITOCHONDRIAL DISEASES

Criteria for testing requires selections from at least one classic presentation OR at least one pathologic/lab feature OR at least one biochemical feature OR (at least one sign in CNS/heart/eyes/muscles AND one "other")

PANEL SELECTION

- ☐ Full Mitochondrial Nuclear Gene Panel (437 gene augmented exome slice), please visit our [website](#) for full list of genes

SUBPANELS

- ☐ Mitochondrial Encephalopathy / Leigh Disease (117 genes)
- ☐ mtDNA Depletion and Deletion (19 genes)
- ☐ Progressive External Ophthalmoplegia (PEO) / Optic Atrophy (77 genes)
- ☐ Pyruvate Dehydrogenase Complex Deficiency (16 genes)
- ☐ Hydroxyglutaric Aciduria (4 genes)

Please contact laboratory to request another subset of the full nuclear gene panel

CLINICAL DETAILS

Please provide detailed information regarding patient's phenotype, age of onset of symptoms, previous tests completed, and family history:

- Age of onset:
- Family history:
- Other:

CLASSIC PRESENTATIONS

- | | |
|--|---|
| ☐ Alpers disease | ☐ Mitochondrial encephalomyopathy, lactic acidosis, and stroke-like episodes (MELAS) |
| ☐ Chronic progressive external ophthalmoplegia (CPEO) | ☐ Mitochondrial neuro-gastro-intestinal encephalomyopathy (MNGIE) |
| ☐ Gentamicin-related sensorineural hearing loss | ☐ Multiple symmetric lipomatosis |
| ☐ Kearns-Sayre syndrome | ☐ Myoclonic epilepsy with ragged-red fibers (MERRF) |
| ☐ Leber's hereditary optic neuropathy (LHON) | ☐ Neuropathy, ataxia, and retinitis pigmentosa (NARP) |
| ☐ Leigh disease | ☐ Pearson syndrome |
| | ☐ Primary lactic acidosis |
| | ☐ Sensory-ataxia, neuropathy, dysarthria and ophthalmoparesis (SANDO) |
| | ☐ Other (indicate if you are suspicious of a specific gene): |

PATHOLOGIC/LABORATORY FEATURES

- ☐ Ragged red fibers: _____ %
- ☐ COX-negative fibers: _____ %
- ☐ Ultrastructurally abnormal mitochondria by electron microscopy
- ☐ Muscle biopsy consistent with mitochondriopathy (affix report)

BIOCHEMICAL FEATURES

- ☐ Persistent hyperalaninemia
- ☐ Persistent abnormal excretion of lactate, pyruvate or TCA intermediates in urine
- ☐ Evidence of mtDNA depletion or multiple mtDNA deletions (affix results)
- ☐ <30% activity of any RC complex in tissue or cell line
- ☐ Increased lactate pyruvate ratio (>25) in skin fibroblasts

CLINICAL FEATURES

CENTRAL NERVOUS SYSTEM (CNS)

- ☐ Developmental delay
- ☐ Regression
- ☐ Movement disorder
- ☐ Seizures
- ☐ Hemiplegic or complicated migraine
- ☐ Peripheral neuropathy
- ☐ Sensorineural hearing loss

HEART

- ☐ Arrhythmias
- ☐ Cardiomyopathy
- ☐ Conduction block

EYES

- ☐ Optic atrophy
- ☐ Pigmentary retinopathy

MUSCLES

- ☐ Hypotonia
- ☐ Rhabdomyolysis
- ☐ Fixed weakness of skeletal muscle
- ☐ Ataxia

OTHER

- | | |
|--|--|
| ☐ Clinical progression with stepwise exacerbation of symptoms | ☐ Proximal renal tubulopathy (Fanconi syndrome) |
| ☐ Elevated alanine (PAA) | ☐ Sideroblastic anemia |
| ☐ Elevated 3-methylglutaconic acid (UOA) | ☐ Short stature (<2 SD below normal) |
| ☐ GI tract: pseudoobstruction | ☐ Type 2 diabetes mellitus |
| ☐ GI tract: hepatopathy | ☐ Unexplained failure to thrive |
| ☐ Lactic acidosis (in non-acute illness setting) | |