LifeLabs GENETICS™

Whole Exome Sequencing

Deepen your diagnostic accuracy for complex genetic disorders

Complex phenotypes lead to challenging diagnoses

Whole Exome Sequencing (WES) analyzes thousands of genes simultaneously to investigate the molecular basis of genetic disorders, shortening the diagnostic odyssey often associated with single-gene tests or multi-gene panels.

WES is recommended for patients with:

✓ Heterogeneous phenotypes, such as:

Intellectual disability	Epilepsy	Bone and connective tissue disorders	Complex dysmorphic features
Developmental delay	Muscular dystrophy	Immunodeficiency	Neuropathy
Deafness	Retinitis pigmentosa	Cardiomyopathy	Metabolic disorders

✓ Atypical or complex findings that may represent a new or rare syndrome

✓ A suspected genetic disorder where previous testing has been uninformative

Flexible Test Options Tailored to Clinical Indication and Family History

Features	
Methodology	Agilent SureSelect Human All Exon V6 capture kit (~60mb)
Coverage*	97-98% of targeted bases covered at minimum 10x
Genomic Regions Covered	Exons, deep intronic mutations, 10bp exon/intron boundaries
Read Depth	100x average read depth
Turn-around Time**	4-6 weeks
Deletion/Duplication via aCGH (>25kb for copy number gain and >200kb for copy number loss)	Available as an add-on
Mitochondrial genome (>1000x read depth)	Available as an add-on
Prenatal Testing**	Available with rapid turn-around time
Available as Singleton (solo) or Trio***	Yes
Availability of Research Report	Available on request
Availability of Raw Data****	Yes

* Exomes do not target all exons within the human genome and ~2-3% of the targeted exons may not be well covered due to various technical reasons (Choi M, et al. (2009) Proc Natl Acad Sci; Yang Y, et al. (2013) N Engl J Med). These missing regions are not backfilled by Sanger, however, we will provide coverage statistics about targeted genes. ** Rapid turn-around time of 2-3 weeks for prenatal testing is available at an additional cost. *** The chance of identifying a causative mutation is maximized when exome testing is performed for both the index patient and parents or other first-degree relatives. This trio approach improves the diagnostic rate by facilitating variant analysis. ****.fastq and .bam files are available for 30 days after report delivery and .vcf files are available indefinitely.
Current as of May 2018. As technology improves and is clinically validated, so does our methodology. Please contact us for more details.

Each diagnostic report is:

Validated by a team of renowned and experienced clinical specialists

Cross-checked against CentoMD®, an extensive and evolving database of known mutations, as well as HGMD and ClinVar

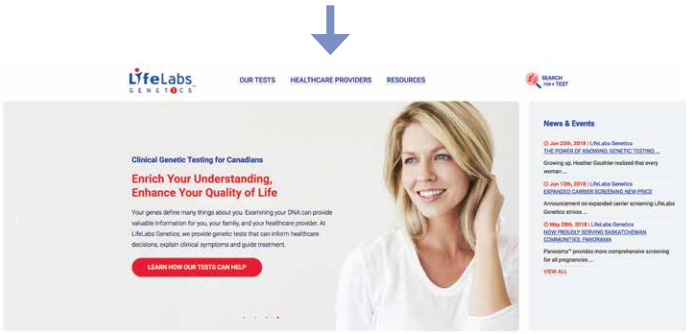
Comprehensive and includes a description of the testing method and a full explanation of results & recommendations

Visit www.lifelabsgenetics.com to learn more about exome sequencing.
Contact us Ask.Genetics@LifeLabs.com | 1-84-GENEHELP (1-844-363-4357)

Whole Exome Sequencing

Ordering instructions

1 **Download the hereditary testing requisition form** under the Healthcare Providers tab at LifeLabsGenetics.com



2 The ordering checklist on **page 1** can be used to ensure you've completed all the necessary pages of the requisition.

Ordering Checklist	
Known variant Single gene	**Must complete pages 1, 2, & 3** □ Physician, patient, & test information (p1-2) □ Informed consent (p3)
Fx Panels Ex Panels ProGx Panels	**Must complete pages 1-5** □ Physician, patient, & test information (p1-2) □ Informed consent (p3-4) □ Clinical features checklist (p5)
Whole Exome Sequencing (WES) Whole Genome Sequencing (WGS)	**Must complete pages 1-8** (if applicable) □ Physician, patient, & test information (p1-2) □ Informed consent (p3-4) □ Clinical features checklist (p5) □ Parental 1 & 2 requisitions (p6-7) *(If Trio selected)* □ Additional Family Member requisition (p8) *(If TrioPlus selected OR Parental samples unavailable)*

Sample Type	LL TC	Mnemonic
❑ **Blood-Adult** (2 x 4ml EDTA)	4005	ACG
❑ **Blood-Pediatric** (1 x 2ml EDTA)	4008	CEN
❑ **Purified DNA** (single genes: 1-10ug, Panels: 10-100ug)	4014	OCG
❑ **Filter card***	4014	OCG
❑ **Other:**** _____	4014	OCG

* Available by request. Please contact LifeLabs Genetics.
** Other sample types are permitted. Please contact LifeLabs Genetics for details.

Please contact LifeLabs Genetics before shipping prenatal samples. Samples should be shipped directly to Centogene.

Date Sample Collected:	M M D D Y Y Y Y	Time Collected:	H H M M	Collector Name:	

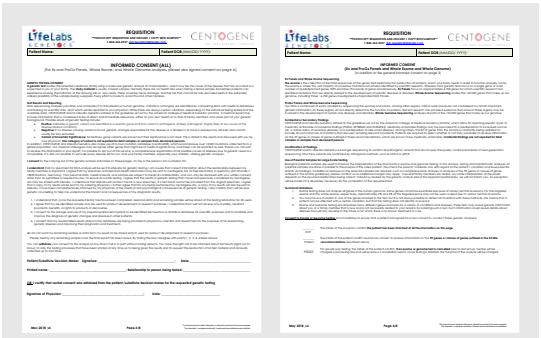
3 In the Whole Exome Sequencing (WES) section on **page 2** of the requisition form, indicate:

- Gold or Platinum testing
- The number of samples
- Any additional analyses
- A request for raw data

Whole Exome Sequencing (WES)	❑ **Gold** 100x average read depth 97-98% of targeted bases covered >10X Turnaround time is 4-6 weeks No prenatal testing available ❑ **Platinum** 100x average read depth 97-98% of targeted bases covered >10X Turnaround time is 2-3 weeks Prenatal testing is available	**Number of samples** select ONE of the following options: ❑ **Solo** Solo implies analysis of index patient only; we recommend Trio analysis for enhanced diagnostic accuracy. ❑ **Trio** Trio implies analysis of index patient, along with the parents. ❑ **Trio Plus** "Trio plus" indicates "Trio" plus additional relatives. All Trio samples have to be received simultaneously to start testing. If not, each sample from the same family will be charged as a solo.	**Additional analyses** available as add-on testing with additional cost ❑ **Del/Dup** (aCGH for proband sample only) ❑ **Repeat expansion** ❑ **Maternal Mitochondrial** (Proband and maternal sample; >1000x read depth) ❑ **None** **Reporting and data exchange** ❑ **.fastq** ❑ **.bam** ❑ **.vcf** Raw data (.fastq and .bam files) are available only for a limited time and must be downloaded from the server within 1 month after the customer is informed of the completion of the analysis or after the final medical report has been issued. ❑ ***Data selected above with annotated and filtered variant report (Excel table)*** ☑**Research Report** (Includes potential disease-causing variants in candidate genes for which there is not yet sufficient published evidence)
Whole Genome Sequencing (WGS)	❑ **WGS** 30x average read depth ~99% of targeted bases covered at >10x Turn-around time is 4-6 weeks Prenatal testing is available **Del/Dup included**		

4 **Both pages of the Informed Consent are required to be signed.**

Whole Exome Sequencing analyzes the coding regions of >20,000 genes and might identify findings outside of the primary reason for genetic testing.



! For all testing, we strongly encourage you to provide the patient's in-depth medical history to ensure the most comprehensive analysis and interpretation of the genetic testing results. This can be done through any of the following three ways:

- Writing in the Relevant Medical and Family History section on **page 1**
- Completing the checkboxes on **page 5**
- Providing the patient's hospital charts