WES - XL Request Form - Proband

Greenwood Genetic Center
106 Gregor Mendel Circle • Greenwood, SC 29646
Toll Free: (800) 473-9411 • Fax: (864) 941-8141
Website: www.ggc.org Highlighted boxes are required

LAB USE ONLY

Patient Information (Please Print):

Last Name First MI		Address	
Race/Ethnicity	Sex ☐ M ☐ F	DOB MM/DD/YYYY	City, State, Zip
Specimen Collection Date MM/DD/YYYY	Type of specimen*	Numeric Identifier (Medical record # or SSN)	Home telephone

*DNA samples only: Please identify where DNA extraction was performed.
☐ **CAP/CLIA Accredited Lab:** _____ ☐ **Research Lab:** _____ ☐ **Unknown**

Referring Physician:

Name	Address	
Institution	City, State, Zip	
NPI#	Telephone	Fax
Email Address:	Preferred Method to Receive Results: ☐ Secure Email ☐ Fax ☐ Regular Mail	

Additional report to: ☐ **Genetic Counselor** ☐ **Institution** ☐ **Care Coordinator** ☐ **Other:**

Name	Address		
Telephone	Fax	Email:	City, State, Zip

Additional report to: ☐ **Genetic Counselor** ☐ **Institution** ☐ **Care Coordinator** ☐ **Other:**

Name	Address		
Telephone	Fax	Email:	City, State, Zip

Billing: Select how the test(s) will be billed & complete the billing information on the next page. The BILLING FORM on page 2 is required.

☐ **Institutional Billing: Complete section 1 on the separate BILLING FORM (page 2)**
☐ **Insurance: Complete section 2 on the BILLING FORM (page 2). No out-of-state (non-SC) insurance or Medicaid will be accepted.**
☐ **Self-pay: Complete section 3 on the separate BILLING FORM (page 2).**

Indication for Study

☐ Symptomatic
☐ Family History **(please attach a copy of the pedigree.)**

Please complete the required *Clinical Information Form* (page 3) OR submit phenotype via Face2Gene.

☐ Clinical information submitted via Face2Gene. Case Number:_____

Parental & Family Member testing Are family member samples being submitted along with proband sample? ☐ Yes ☐ No

Please note that a separate requisition form is required for each family member's sample submitted.

If yes, which sample(s) is/are being submitted?

☐ Mother:_____ ☐ Father:_____ ☐ Other family members:_____

☐ **Whole Exome Sequencing - XL (proband only)**
☐ **Whole Exome Sequencing – XL (DUO analysis)**
☐ **Whole Exome Sequencing – XL (TRIO analysis)**

Ordering Checklist: Test requisition form, informed consent for proband, copy of pedigree, clinical information page, family member requisition and consent for family member samples being submitted.

Specimen Requirements: 3-5 ml of peripheral blood collected in an EDTA (lavender top) Vacutainer tube is the preferred and recommended specimen. The specimen should be kept at room temperature and delivered via overnight shipping. Extracted DNA from blood is also accepted. Saliva can be accepted as an alternative, but may not yield sufficient quality DNA for testing.

LAB USE ONLY Accessioned By: Event Codes: FedEx Eagle UPS DHL WC Other:

EDTA	Na Hep	Plasma / Serum	Urine	Flasks / Tissue	DBS / DNA	Saliva / Swab Buccal	PAX	ACD
RT / R / F	RT / R / F	RT / R / F	RT / R / F	RT / R / F	RT / R / F	RT / R / F	RT / R / F	RT / R / F

Greenwood Genetic Center

Diagnostic Laboratory Billing Form

This page is required to process any test requests.

LAB USE ONLY

- **Out of State (non-SC) commercial insurance can only be filed for NGS Panels.**
- **No out of state Medicaid will be accepted for any tests.**
- **The following items are needed in order to bill the patient's insurance directly. We will not be able to file the claim if we are missing information.**
  - ☐ **This form must be completed with ALL requested information.**
  - ☐ **A legible copy of both sides of the insurance card**
  - ☐ **Authorization number, authorization letter, or letter of agreement from insurance company**

Patient Information:

Last Name First MI		Address	
Numeric Identifier (Medical record # or SSN)	DOB MM/DD/YYYY	City, State, Zip	Telephone
ICD10 Code(s)			

Section 1: Institutional Billing

Complete section below with institution information. *New clients must complete an INSTITUTIONAL ACCOUNT REQUEST FORM when submitting the order.* Please contact the GGC Billing Office at 864-941-8117 or billing@ggc.org with any questions about your account.

Institution/Organization	Contact Name:	Email:
Billing Address	City, State, Zip	
Account Number:	Telephone	Fax

Section 2: Insurance Information

MUST INCLUDE LEGIBLE COPY OF INSURANCE CARD (FRONT & BACK)
All information required to file insurance claims.

Primary

Insured/Policy Holder Name:	Policy Holder DOB:	Policy Holder Gender ☐ Male ☐ Female
Relationship to Patient ☐ Self ☐ Spouse ☐ Dependent ☐ Other:	Policy #	
Insurance Company Name:	Insurance ID #:	
Group #:	Insurance Address	
Authorization Number: (attach copy of authorization letter)	Insurance City, State, Zip	Phone

Secondary

Insured/Policy Holder Name:	Policy Holder DOB:	Policy Holder Gender ☐ Male ☐ Female
Relationship to Patient ☐ Self ☐ Spouse ☐ Dependent ☐ Other:	Policy #	
Insurance Company Name:	Insurance ID #:	
Group #:	Insurance Address	
Authorization Number (attach copy of authorization letter)	Insurance City, State, Zip	Phone

I authorize Greenwood Genetic Center (GGC) Diagnostic Laboratories to furnish any medical information requested of me, or my covered dependents. In consideration of services rendered, I transfer and assign any benefits of insurance to GGC Diagnostic Laboratories. I understand I am responsible for any co-pay, deductibles, non-authorized, or non-covered services and remaining balances after insurance reimbursement. I understand I am fully responsible for payment of my account if the GGC Diagnostic Laboratories is not a participant with my health plan, or my health plan does not fully reimburse my medical services due to lack of authorization for medical necessity.

Printed Name:_____ Signature:_____ Date (MM/DD/YY):_____

Section 3: Self-pay

We accept check/Visa/MasterCard. All information required to process credit card payments.
Payments will be processed prior to initiation of testing.

Payment Method: ☐ Check ☐ Visa ☐ MasterCard	Credit Card Number:	
Amount: (with discount applied if applicable)	Exp. Date	CVV
Cardholder Name(print as it appears on the card):	Cardholder Signature:	Date
Billing address	City, State, Zip	Telephone

Greenwood Genetic Center

WES - XL Clinical Information Form

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Website: www.ggc.org

LAB USE ONLY

Last Name	First	MI	DOB	Numeric Identifier (MRN or SSN)

Please provide the following clinical information regarding the proband being tested. This clinical information is crucial for an accurate interpretation of results. Check all that apply. If a feature is selected, please provide an additional description of the finding. Use blank space on right to provide other relevant details.

Growth

- ☐ Failure to thrive_____
- ☐ Microcephaly (OFC <3rd centile) _____
- ☐ Macrocephaly (OFC >97th centile) _____
- ☐ Short stature (Ht <3rd centile) _____
- ☐ Tall stature (Ht >97th centile) _____
- ☐ Obesity/Overgrowth _____

Neurological/Muscular

- ☐ Spasticity/Hyperreflexia _____
- ☐ Ataxia _____
- ☐ Tremors _____
- ☐ Hypotonia _____
- ☐ Seizures _____
- ☐ Abnormal movements _____

Development, Physical & Cognitive

- ☐ Delayed motor milestones _____
- ☐ Intellectual disability _____
- ☐ Speech/Language delay _____
- ☐ Developmental regression _____

Craniofacial, Opthalmalogic, Auditory

- ☐ Vision Loss _____
- ☐ Hearing loss/Deafness _____
- ☐ Dysmorphic facies _____
- ☐ Eye anomalies _____
- ☐ Ear anomalies _____

Skeletal & Limb Anomalies

- ☐ Limb malformation _____
- ☐ Joint contractures _____
- ☐ Craniosynostosis _____
- ☐ Hyperextensibility _____

Congenital Anomalies

- ☐ Heart malformations _____
- ☐ Kidney abnormalities _____
- ☐ Genital abnormality _____
- ☐ Brain malformations _____
- ☐ Gastrointestinal anomalies _____
- ☐ Other _____

Other Features

- ☐ Prematurity _____
- ☐ Intrauterine growth restriction _____
- ☐ Autism/Autism Spectrum Disorders _____
- ☐ Metabolic abnormalities _____
- ☐ Mitochondrial abnormalities _____
- ☐ Pigmentary abnormalities _____
- ☐ Other skin findings _____
- ☐ Organomegaly _____
- ☐ Cancer/tumor formation_____

Additional Information

Greenwood Genetic Center

WES – XL Patient Consent Form

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LAB USE ONLY

Last Name	First	MI	DOB	Numeric Identifier (MRN or SSN)

The purpose of this document is to provide information about the *Whole Exome Sequencing XL Test.* Due to the complexity of this testing, genetic counseling is required prior to ordering the testing to discuss the possible outcomes and after the testing is completed to discuss the results.

ABOUT THE WHOLE EXOME SEQUENCING XL TEST

The goal of this test is to identify the underlying genetic cause of intellectual or other developmental disabilities, birth defects, or unexplained medical concerns. Whole Exome Sequencing XL, (abbreviated WES-XL) is a comprehensive and complex genetic test. A sample of blood or saliva sample will be collected from the patient and, when necessary, from his/her parents or other appropriate family members. DNA will be isolated from the blood or saliva for genetic testing.

The whole ***genome*** is made up of DNA and includes the entire set of human genes (approximately 20,000) and other genetic material contained in the human chromosomes. The genes make up only a small fraction of the genome and are segments of DNA that serve as the "code" (i.e. the "recipe" or "blueprints") for the body by telling the cells of the body how to make proteins that have certain jobs. The segments of genes that help to make proteins are called *exons***,** and the full collection of the exons from all of the genes is called the whole *exome*. The exome is only part of the genome. The exome is the part of the genome that we have the most information and understand the best.

The WES-XL is a single genetic test designed to analyze most of a person's genetic information simultaneously. WES-XL is able to detect both small changes such as spelling mistakes in the DNA as well as larger changes such as missing or extra pieces of genetic information, called deletions or duplications. While this test can analyze most of the genome, there are some regions of the genome that we are still learning about.

POTENTIAL OUTCOMES OF WES-XL

- DIAGNOSTIC – there may be a change identified as the cause of the patient's concerns. These types of changes are mutations and would be the most helpful in understanding the underlying genetic diagnosis for the patient.
- VARIANT OF UNCERTAIN CLINICAL SIGNIFICANCE – there may be a change identified that we cannot be certain about what it means for the patient. It may or may not be related to the patient's concerns.
- NORMAL – there may not be any changes identified with this test that are important to report. This does not mean that the patient does not have a genetic condition since WES-XL is not able to detect all types of genetic mutations and does not analyze every part of every gene.
- SECONDARY FINDINGS – there may be unanticipated changes identified in genes that are not related to the patient's current concerns but are medically important for the patient's health or the family's health.
- PARENTAL BLOOD RELATIONSHIP OR MISTAKEN PARENTAGE – WES-XL could reveal a potential blood relationship between the parents and could also detect mistaken parentage. These findings will typically not be reported unless it is necessary for understanding the patient's results.

OTHER IMPORTANT INFORMATION

- This test is not able to detect all types of genetic mutations such as expanded triplet repeats. WES-XL test may not detect changes in the mitochondrial DNA, which is separate from the chromosomal DNA. Therefore, there may be genetic changes that will not be identified by this test.
- There are certain changes that will not be reported including changes that are benign or do not cause disease, even if the change could be important for future reproductive decisions (carrier status). Changes that may cause a slight increased risk for common and easily diagnosable conditions such as diabetes and high blood pressure, or changes that can give information about drug metabolism (pharmacogenetics) will not be reported.

- Secondary or incidental findings in genes that cause certain adult onset conditions that cannot be prevented (such as Alzheimer disease or Parkinson disease) and are not related to the patient's current medical conditions will not be reported.
- Genetic information often changes because information about all genes is not complete at this time. Therefore, although a variant may be found by doing this test, it may not be reported if the function of the gene is currently unknown.

MITOCHONDRIAL VARIANT REPORTING

WES-XL analysis also captures sequence data from the mitochondrial genome. You may choose to include this information as part of the analysis. Please note that only variants currently known to be associated with mitochondrial disorders will be reported, and copy number status of the mitochondrial genome is not included.

_____☐_____ Yes I ***do*** choose to have mitochondrial variant analysis included in the results report
_____☐_____ No I ***do not*** choose to have mitochondrial variant analysis included in the results report

SECONDARY FINDINGS REPORTING

Secondary or incidental findings are changes in genes that are not related or not thought to be related to the patient's concerns. The purpose of the WES-XL is not to detect incidental findings but rather to identify the cause of the patient's current condition. However, the American College of Medical Genetics and Genomics (ACMG) recommends that all laboratories performing exome or genome sequencing report mutations identified in a specific set of genes. These genes were chosen because they are considered medically important for the health of the patient or the patient's family members. Our laboratory may also feel compelled to report secondary findings in additional genes not included in the set of genes recommended by the ACMG. Secondary findings will only be reported for the patient, and only mutations or variants that are expected to harm the function of the gene will be reported. It is important to remember that a normal result for these genes does not mean that there is no mutation present, since not all of these genes are being completely analyzed simply due to the nature of WES-XL. In addition, a normal result for the patient does not mean that the parents, or other family members tested, would also have a normal result. The patient and/or parent has the option to receive or *not* to receive information about the patient's changes that are considered secondary findings by initialing below.

_____☐_____ Yes I ***do*** choose to have secondary findings included in the results report
_____☐_____ No I ***do not*** choose to have secondary findings included in the results report

REANALYSIS

Since our understanding of genes, variants, and all genetic information changes constantly, it can be helpful to go back and review the patient's genetic data again when new information may be available. This is called a reanalysis. The reanalysis of the patient's genetic information is <u>not</u> done automatically and typically can only be requested at least one year after the initial this test has been reported. Usually the healthcare provider will initiate the reanalysis by contacting the lab to request the patient's data be reviewed again and will provide the lab with any new medical information. Sometimes when we learn about a new gene, the lab will review patients' genetic information for mutations in that specific gene in case it could be related to their health concerns. If any genetic changes are identified that are thought to be the cause of the patient's concerns, this information will be stated in an updated report from the lab. One of the genetics healthcare providers will contact the patient with this new information.

By signing below, I give consent to the Greenwood Genetic Center to conduct whole exome sequencing XL for my child or myself as recommended by my physician.

Signature:_____ Date:_____
Printed Name:_____ Relationship to Patient:_____

Physician/Counselor Statement: I have provided genetic counseling to this individual/this individual's family regarding the clinical whole exome sequencing test. We have discussed the potential genetic findings, implications of the genetic test results, including secondary findings, and limitations as outlined in this consent document. I have answered his/her/their questions about this testing.

Physician/Counselor Signature:_____ Date:_____

Greenwood Genetic Center

WES - XL – Family Member

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Patient Information (Please Print):

Last Name First MI			Address
Race/Ethnicity	Sex ☐ M ☐ F	DOB MM/DD/YYYY	City, State, Zip
Specimen Collection Date MM/DD/YYYY	Type of specimen	ICD10 Code	Numeric Identifier (Medical record # SS #) / Home telephone

Referring Physician:

Name	Address
Institution	City, State, Zip
NPI#	Telephone / Fax
Email Address:	Preferred Method to Receive Results: ☐ Secure Email ☐ Fax ☐ Regular Mail

Additional report to: ☐ **Genetic Counselor** ☐ **Institution** ☐ **Care Coordinator** ☐ **Other:**

Name	Address
Telephone / Fax / Email:	City, State, Zip

Additional report to: ☐ **Genetic Counselor** ☐ **Institution** ☐ **Care Coordinator** ☐ **Other:**

Name	Address
Telephone / Fax / Email:	City, State, Zip

Indication for Study

Proband Name:_____ Proband DOB:_____

Relationship of family member to the proband: _____

☐ Unaffected – *Clinic Information Form* is not needed

☐ Affected – **Please complete the required *Clinical Information Form* (page 7)**

☐ **Whole Exome Sequencing – XL Duo Analysis**

☐ **Whole Exome Sequencing – XL Trio Analysis**

☐ **Whole Exome Sequencing - XL Other**

☐ **Targeted Analysis for Known Mutation** (submit first page only – no consent needed)

Specify gene(s) & variant(s): _____

Ordering Checklist:

- ☐ Test Requisition Form
- ☐ Informed consent for proband
- ☐ Copy of Pedigree
- ☐ Clinical information page

Family Member Information

- ☐ Maternal Sample & Requisition
- ☐ Paternal Sample & Requisition
- ☐ Other Family Member: _____
- ☐ Family Member Consents

Specimen Requirements: 3-5 ml of peripheral blood collected in an EDTA (lavender top) Vacutainer tube is the preferred and recommended specimen. The specimen should be kept at room temperature and delivered via overnight shipping. Extracted DNA from blood is also accepted. Saliva can be accepted as an alternative, but may not yield sufficient quality DNA for testing.

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EDTA	Na Hep	Plasma / Serum	Urine	Flasks / Tissue	DBS / DNA	Saliva / Swab Buccal	PAX	ACD
RT / R / F	RT / R / F	RT / R / F	RT / R / F	RT / R / F	RT / R / F	RT / R / F	RT / R / F	RT / R / F

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WES- XL Clinical Information Form

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Last Name	First	MI	DOB	Numeric Identifier (MRN or SSN)

Please provide the following clinical information regarding the individual being tested. This clinical information is crucial for an accurate interpretation of results. Check all that apply. If a feature is selected, please provide an additional description of the finding. Use blank space on right to provide other relevant details.

Growth

- ☐ Failure to thrive_____
- ☐ Microcephaly (OFC <3rd centile) _____
- ☐ Macrocephaly (OFC >97th centile) _____
- ☐ Short stature (Ht <3rd centile) _____
- ☐ Tall stature (Ht >97th centile) _____
- ☐ Obesity/Overgrowth _____

Neurological/Muscular

- ☐ Spasticity/Hyperreflexia _____
- ☐ Ataxia _____
- ☐ Tremors _____
- ☐ Hypotonia _____
- ☐ Seizures _____
- ☐ Abnormal movements _____

Development, Physical & Cognitive

- ☐ Delayed motor milestones _____
- ☐ Intellectual disability _____
- ☐ Speech/Language delay _____
- ☐ Developmental regression _____

Craniofacial, Opthalmalogic, Auditory

- ☐ Vision Loss _____
- ☐ Hearing loss/Deafness _____
- ☐ Dysmorphic facies _____
- ☐ Eye anomalies _____
- ☐ Ear anomalies _____

Skeletal & Limb Anomalies

- ☐ Limb malformation _____
- ☐ Joint contractures _____
- ☐ Craniosynostosis _____
- ☐ Hyperextensibility _____

Congenital Anomalies

- ☐ Heart malformations _____
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- ☐ Genital abnormality _____
- ☐ Brain malformations _____
- ☐ Gastrointestinal anomalies _____
- ☐ Other _____

Other Features

- ☐ Prematurity _____
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- ☐ Metabolic abnormalities _____
- ☐ Mitochondrial abnormalities _____
- ☐ Pigmentary abnormalities _____
- ☐ Other skin findings _____
- ☐ Organomegaly _____
- ☐ Cancer/tumor formation_____

Additional Information

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WES - XL Family Member Consent Form

LAB USE ONLY

Last Name	First	MI	DOB	Numeric Identifier (MRN or SSN)

ABOUT THE WHOLE EXOME SEQUENCING TEST

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By signing below, I give consent to the Greenwood Genetic Center to conduct whole exome sequencing XL for myself in order to help interpret the results of whole exome sequencing XL that is being performed for my child/other family member (i.e. the patient). I understand that a separate test report will not be issued for me, but that potentially significant genetic changes that are found in my DNA sample will be listed in my child's/other family member's (i.e. the patient's) test report. I understand that I will not receive information regarding secondary findings for myself.

Signature:_____ Date:_____

Healthcare Provider Statement: I have provided genetic counseling to this individual/this individual's family regarding the clinical whole exome sequencing XL test. We have discussed the potential genetic findings, implications of the genetic test results, including secondary findings, and limitations as outlined in the patient's consent document. I have answered his/her/their questions about this testing.

Physician/Counselor Signature:_____ Date:_____