

**MEDICAL GENOMICS LABORATORY**720 Twentieth Street South, Suite 330
Birmingham, Alabama 35294-0005Phone: (205) 934-5562
Fax: (205) 996-2929www.uab.edu/medicine/genetics/medical-genomics-laboratoryUAB MGL
Accession

For MGL Lab Use Only		Received:	Reviewed:	Accession:	Billing:	Other:
	Initials:					
	Date:					
	Comment:					

Important Notes

-This form must accompany all specimens received
-Billing information (page 5) must be included

-All specimens received must include **two** patient identifiers and **collection date**
-Testing must be ordered by a qualified clinician

Additional information is available online at www.uab.edu/medicine/genetics/medical-genomics-laboratory**Test Requisition Form**

Patient Information:			Ordering Physician:		
Sample Collected: (MM/DD/YY)			☐ Please check box if physician should receive report directly		
Name: (First) (MI) (Last)			Name:		NPI:
			Institution:		
DOB: (MM/DD/YY)		MRN:	Address:		
Address:			City:	State:	Zip:
City:	State:	Zip:	Country:	Phone:	
Gender:	SSN:		Please check preferred result delivery:	☐ Fax:	
Parent or Guardian name (if minor):			☐ Email:		
Referring Lab/Hospital:			Additional Reports to:		
☐ Please check box if lab/hospital should receive report directly			Name:		
Name:			Institution:		
Institution:			Address:		
Address:			City:	State:	Zip:
City:	State:	Zip:	Country:	Phone:	
Country:	Phone:		Please check preferred result delivery:	☐ Fax:	
Please check preferred result delivery:	☐ Fax:		☐ Email:		
☐ Email:					

Previous Testing History

Check all that apply:	☐ Patient or family member is pregnant. LMP:	☐ Patient has had chemotherapy in the past 6 months
	☐ Patient has had a bone marrow transplant	☐ Infectious diseases (AIDS, Hepatitis, etc.)
Has this patient or relatives had previous testing? ☐ Yes ☐ No		
Name/Relationship to patient:		Test/Variant/Lab:
Name/Relationship to patient:		Test/Variant/Lab:

Informed Consent

Provider's statement: I acknowledge the risks, benefits, limitations, and implications of genetic testing as outlined on the complete informed consent handout; and I have discussed the test(s) requested with the patient/guardian and I have answered his/her questions regarding testing. Informed consent has been obtained from the patient/guardian and the hard copy will be maintained.

Provider's Signature: _____





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Name: (First) (MI) (Last)

DOB: (MM/DD/YY)

Lymphocyte/White Blood Cell-based Comprehensive Testing via Next-Gen Sequencing

☐ **RUSH Analysis:** Testing completed within **15 working days** of receipt of sample
(Additional **\$600 RUSH fee** applied; only available for tests on this page)

NF1/Legius syndrome and Other RASopathy Related Conditions

- ☐ **NF1-NG:** NGS and Del/Dup: *NF1* only
- ☐ **NFSP-NG:** NGS and Del/Dup: *NF1* and *SPRED1*
- ☐ **NNP-NG:** NGS: 17 genes (**no NF1**): *BRAF, CBL, HRAS, KRAS, LZTR1, MAP2K1, MAP2K2, NRAS, PPP1CB, PTPN11, RAF1, RASA2, RIT1, SHOC2, SOS1, SOS2, and SPRED1*; and Del/Dup: *SPRED1* and *LZTR1*
- ☐ **RAS-NG:** NGS: 18 genes: *BRAF, CBL, HRAS, KRAS, LZTR1, MAP2K1, MAP2K2, NF1, NRAS, PPP1CB, PTPN11, RAF1, RASA2, RIT1, SHOC2, SOS1, SOS2, and SPRED1*; and Del/Dup: *NF1, SPRED1, and LZTR1*
- ☐ **CST-NG:** NGS: *HRAS* only

NF2/Schwannomatosis/Meningiomatosis

- ☐ **NF2-NG:** NGS and Del/Dup: *NF2* only
- ☐ **SCH-NG:** NGS: 3 genes: *LZTR1, NF2, and SMARCB1*; and Del/Dup: *NF2, LZTR1, and SMARCB1*
- ☐ **MEN-NG:** NGS: 4 genes: *NF2, SMARCB1, SMARCE1, and SUFU*; and Del/Dup: *NF2 and SMARCB1*

Peripheral Nerve Sheath Tumor Testing

- ☐ **PNT-NG:** NGS: 6 genes: *NF1, NF2, KRAS, LZTR1, PTPN11* and *SMARCB1*; and Del/Dup: *NF1, NF2, LZTR1, and SMARCB1*

McCune-Albright Syndrome

- ☐ **GNAS-NG:** NGS: *GNAS* exons 8 and 9 only

Rhabdoid Tumor Predisposition Syndrome

- ☐ **RT-NG:** NGS: *SMARCB1* and *SMARCA4*; and Del/Dup: *SMARCB1* only

Tuberous Sclerosis Complex

- ☐ **TSCP-NG:** NGS and Del/Dup: *TSC1* and *TSC2*

Capillary Malformation Arteriovenous Malformation Syndrome

- ☐ **RASA-NG:** NGS: *RASA1* and *EPHB4*; and Del/Dup: *RASA1* only

Additional Information

Test Description Key:

Next Generation Sequencing (NGS)
Deletion/Duplication analysis (Del/Dup)

For additional testing options via **tumor/biopsy**, please see **page 3** of this order form.
Please contact the lab via phone (205) 934-5562 or via email at medgenomics@uabmc.edu if you have any questions when completing this form.
For additional information, visit our website at www.uab.edu/medicine/genetics/medical-genomics-laboratory

Important points of consideration for testing

The average coverage for all of our panels is >1800x. Specifically for the *NF1* gene, the NGS approach covers >98.5% of the *NF1* coding region at ≥350X and 99.9% ≥200X, allowing detection of very low level mosaicism, down to 3-5% variant allele fraction respectively. For all other genes on our panels, the NGS approach covers an average of 99% at ≥200X. Remaining regions are covered at ≥30X. However, for patients with segmental/mosaic presentation, deep coverage in lymphocyte cells may be insufficient to identify the underlying gene change. Testing the affected tissue(s) may be necessary to confirm a diagnosis. Please see page 3 for our tumor/biopsy-based testing options.

Please note: For patients with an ongoing pregnancy who require comprehensive NF1 testing, "NF1-R" is recommended due to the sensitivity and fast turnaround time of this test (please see page 4 for this option).

Specimen Requirements

Accepted Specimens

Specimen requirements vary based on test requested; please see our website for more details.

- Blood:** 3-6ml EDTA (receipt within one week of collection)
- Saliva:** OGR-575 DNA Genotek (kits are provided upon request)
- DNA:** extracted from lymphocyte cells, a minimum of 25ul at 3μg, O.D. value at 260:280nm ≥1.6 (must be extracted in a CLIA or equivalent certified lab)
- Fibroblast cells**

Specimen Information:

- ☐ Peripheral Blood (EDTA); # Tubes: _____
- ☐ Extracted DNA; Source: _____
- ☐ Saliva (kit must be provided by MGL)
- ☐ Other, please describe: _____

Please note: failure to provide a date of collection can delay release of results

Sample Collected Date (required): _____





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Name: (First) (MI) (Last)

DOB: (MM/DD/YY)

Sanger Testing from Blood/Saliva/DNA**NF1/Legius syndrome and Other RASopathy Related Conditions**☐ NF1-R: Sanger and Del/Dup: *NF1 (RNA)*☐ NFSP-R: Sanger and Del/Dup: *NF1 (RNA)* and *SPRED1 (gDNA)***Von Hippel-Lindau**☐ VHL1: Sanger and Del/Dup: *VHL***PTEN-Related Disorders**☐ PTEN1: Sanger and Del/Dup: *PTEN***Fragile X syndrome**☐ FRX: PCR and, if needed, reflexive confirmatory testing by Southern blot analysis: *FMR1***Medium Chain Acyl-CoA Dehydrogenase Deficiency (MCADD)**☐ MCD1: Targeted analysis of exon 11 and, if needed, reflexive full gene sequencing by Sanger: *ACADM***Autosomal Recessive Polycystic Kidney Disease**☐ PKDL: Linkage Analysis for informativity☐ PKDPL: Prenatal Linkage (see Prenatal Specimen Requirements)

FATHER: Name and DOB (mm/dd/yyyy)

MOTHER: Name and DOB (mm/dd/yyyy)

Known Variant Testing☐ KT2: Targeted detection of a specific, previously identified known variant in any gene that is available at our lab by Sanger sequence, MLPA, and/or FISH analysis (Complete Previous Testing History: Page 1)☐ KT2-NG: Targeted testing for a known variant with deep coverage of the alleles and detection of mosaicism for a variant present in at least 3% of alleles (Complete Previous Testing History: Page 1)☐ RT2: Targeted RNA-based testing for VOUS found during Next Generation Sequencing (Complete Previous Testing History: Page 1)☐ PT2: Prenatal testing (see Prenatal Specimen Requirements; Complete Previous Testing History: Page 1)☐ MCC: Blood specimen for mother provided for maternal cell contamination studies (required if not previously tested)☐ **Other (unlisted options, please indicate below)******Please contact lab before selecting this option******Additional Information****Test Description Key:**

Next Generation Sequencing (NG)

Sanger Sequencing (Sanger)

Deletion/Duplication analysis (Del/Dup)

Please contact the lab via phone (205) 934-5562 or via email at medgenomics@uabmc.edu if you have any questions when completing this form.
For additional information, visit our website at www.uab.edu/medicine/genetics/medical-genomics-laboratory**Specimen Requirements****Accepted Prenatal Specimens**

Specimen requirements vary based on test requested; please see our website for more details.

-Direct CVS: minimum 10 mg cleaned villi

-Direct amniotic fluid: minimum 10 ml fluid

-Cultured CVS: Two T25 flasks (>70% confluent)

-Cultured amniocytes: Two T25 flasks (>70% confluent)

Prenatal Specimen Information:☐ Amniotic Fluid☐ Direct CVS (cleaned)☐ Cultured Amniocytes☐ Cultured Villus Cells

Location of back-up culture (required):

Sample Collected Date (required):

Accepted Specimens

Specimen requirements vary based on test requested; please see our website for more details.

-Blood: 3-6ml EDTA (must arrive within 60-72 hours of collection for RNA-based tests)

-DNA: extracted from lymphocyte cells, a minimum of 25ul at 3µg, O.D. value at 260:280nm ≥1.6 (must be extracted in a CLIA or equivalent certified lab)

-Sperm (for KT2-NG only): Fresh, sterile semen collection using a local sperm bank/cryobank facility

Specimen Information:☐ Peripheral Blood (EDTA); # Tubes: _____☐ Extracted DNA; Source: _____☐ Other, please describe: _____**Please note: failure to provide a date of collection can delay release of results**

Sample Collected Date (required): _____



Name:	(First)	(MI)	(Last)	DOB: (MM/DD/YY)
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Billing

☐ Please hold sample until further notice from the ordering facility.

Important Information

By completing this form, you **agree** that you have discussed the MGL's billing policies with your patient. Credit card information **MUST** be provided with sample submission for self-pay clients. **Please note:** If you are paying via self-payment or requesting a benefits investigation, there will be a **3-5 working day delay** on the initiation of your test. Requests for **cancellation** of ongoing testing must be submitted to the laboratory **within three working days of specimen arrival**. Individuals or institutions submitting requests after the three working day window may still incur charges for the cost of testing. Full information on the billing policies is available at www.uab.edu/medicine/genetics/medical-genomics-laboratory

☐ Institutional Bill

☐ Please check box if billing institution should receive report directly

Institution:	PO# (if applicable):
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Address:		
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City:	State:	Zip:
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Contact (Name and Title):	Preferred method of contact: ☐ Email ☐ Phone
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Email:	Phone:	Fax:
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☐ Self-Payment Enclosed

☐ Visa ☐ MasterCard ☐ Discover ☐ American Express

Name as it appears on card:

Card Number:	Expiration: (MM/YY)	3-digit Security Code:
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Cardholder's Signature:	Preferred method of contact: ☐ Email ☐ Phone
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Email:	Phone:
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☐ Bill Third Party Insurance Company

Please include a copy of the pre-approval statement or provide the approval number if payment has been pre-authorized in advance of shipment.

Insurance pre-verification/authorization previously performed? ☐ Yes ☐ No If yes, approval number is required:

☐ Please check box if you would **not** like insurance pre-verification/authorization to be performed by the MGL.

Please send a **legible copy** of the patient's insurance card, front and back.

ICD-10 Codes (required):

Important Considerations for Insurance Billing

For a list of contracted insurance companies, please visit our website or call our billing coordinator at 205-934-5523. As insurance prices are not listed, please call the billing coordinator to request a quote, if needed. The MGL will contact the insurance provider to inquire regarding the CPT code coverage for all samples submitted for insurance payment. The healthcare provider will be contacted with the copay/deductible and also in cases where the insurance provider denies coverage of the requested codes or supporting documents are required from the provider to confirm coverage. **This service is not offered for prenatal samples.** **Please note: An insurance verification is not a guarantee of payment. Out of State Medicaid is not accepted under any circumstances. All RUSH fees must be paid up front.** By completing this form, you agree that you have discussed the MGL's billing policies with your patient.



Informed Consent for Genetic Testing

****This form does not need to be returned to the Medical Genomics Laboratory if Informed Consent portion of the Test Request form has been signed.****

I hereby consent for:

Name:	DOB:	Gender:
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To participate in genetic testing for the following RNA/DNA-based cascade of tests ordered by my physician at the University of Alabama at Birmingham (UAB) Medical Genomics Laboratory (MGL):

Genetic Tests:

I understand that:

1. Any biological samples submitted for genetic testing (e.g., blood, cheek cells, saliva, amniotic fluid, chorionic villi, tumor, and/or tissue) will be removed from me and/or my minor child(ren) using standard techniques which carry their associated risks.

2. Any samples obtained will be used for the purpose of attempting to determine if I and/or members of my family carry genetic changes in the disease genes ordered by my physician.

3. The genetic tests performed at the MGL are the most sensitive developed and are highly specific. However, sensitivity and specificity are test-dependent. Additional testing details and the specific detection rates of each test can be found at www.genetics.uab.edu/medgenomics.

4. The following are possible outcomes for the specific tests listed above:

Positive	Unknown Significance	Negative
This is an indication that I may be predisposed to or have the specific disease, or condition tested. Further testing may be needed to confirm the diagnosis.	There may be a possibility that the laboratory findings will be ambiguous or of unknown significance. This may require additional testing from me or my family members. In rare circumstances, findings may be suggestive of a condition different than the diagnosis that was originally made.	There is a chance that I will still have this genetic condition even though the genetic test results are negative. Due to limitations in technology and incomplete knowledge of genes, some changes in RNA/DNA or protein products that cause disease may not be detected by this test.

5. In other cases, the RNA/DNA test is unable to identify an abnormality although the abnormality may still exist. This event may be due to incomplete knowledge of the gene structure or an inability of current technology to identify certain types of mutations in the gene. When clinically necessary, the MGL may use a method called linkage analysis. This method is not a direct test, but will report the probability that you and/or family members have an inherited disease or disorder. In some families, the markers used in linkage analysis may be uninformative. If so, linkage testing cannot provide results for the family members in question.

6. The RNA/DNA analysis performed by the MGL is specific for the genetic test listed above and in no way guarantees my health or the health of my living or unborn children. The MGL cannot be responsible for an erroneous clinic diagnosis made elsewhere.

7. The tests performed at the MGL are expanded and improved continuously. The tests offered are not considered research but are considered the best and newest laboratory service that can be offered. Genetic testing is complex and utilizes specialized materials so there is always some very small possibility that the test will not work properly or that an error will occur. There is a low error rate (perhaps 1 in 1000 samples) even in the best laboratories. Additionally, in very rare instances, this test may reveal an important genetic change that is not directly related to the clinical reason for ordering this test. This would be considered an incidental finding. The MGL reserves the right to report these incidental findings if they are clinically relevant to the patients and/or their families. In such instances, these results will be discussed with my healthcare provider and additional testing may be recommended. My signature acknowledges my voluntary participation in this test, but in no way releases the laboratory and staff from the MGL from their professional or ethical responsibility to me.

8. The MGL does not return DNA samples to individuals or physicians. While the MGL is not a specimen banking facility, in some cases it may be possible for the laboratory to reanalyze my remaining DNA upon request. The request for additional studies must be ordered by my referring physician/counselor and there will be an additional fee.



9. An aliquot of my DNA/RNA may be used for validation, educational and/or research purposes. For some molecular genetic tests, a synopsis of clinical information and test results may be included in HIPAA-compliant, de-identified public databases as part of the National Institute of Health's effort to improve diagnostic testing and our understanding of the relationships between genetic changes and clinical symptoms. If I would like to opt out of participation, I can contact the MGL via email at medgenomics@uab.edu or calling the laboratory at 205-934-5562.

10. Because of the complexity of genetic testing and the important implications of the test results, results will only be reported to me through a physician, genetic counselor, or a certified genetics professional. The results are confidential to the extent allowed by law. They will only be released to other medical professionals or other parties with my written consent or as otherwise allowed by law. Participation in testing is completely voluntary.

11. **For Prenatal Testing:** If prenatal diagnosis is being performed, fetal cells obtained by chorionic villus sampling or amniocentesis will be used. In order to perform accurate prenatal diagnosis, biological samples are required for the fetus as well as from the affected individual in the family and from the biological mother.

12. I and/or my physician/counselor have signed the informed consent portion of the test order form indicating that we have discussed the items on this document and I will also receive a copy of this consent form.

 Subject's Signature Date

 Physician's Signature Date

 Please Print Subject's Name

 Please Print Physician's Name

 Assent of Parent Date

 Genetic Counselor's Signature Date

 Assent of Child Date

 Please Print Genetic Counselor's Name



MEDICAL GENOMICS LABORATORY: NF2 & SCHWANNOMATOSIS PHENOTYPIC CHECKLIST FORM



Patient ID: _____
 Referring Physician: _____ Date of Exam ____/____/____

DEMOGRAPHIC INFORMATION

Gender: ☐ Male ☐ Female Date of Birth: ____/____/____

Ethnicity: Mother: ☐ White ☐ Black ☐ Native American ☐ Hispanic ☐ Asian ☐ Other:
 Father: ☐ White ☐ Black ☐ Native American ☐ Hispanic ☐ Asian ☐ Other:

DIAGNOSIS

Does the patient have a clinical diagnosis of NF2? ☐ Yes ☐ No If Yes, age at diagnosis: _____

Family history: ☐ Sporadic ☐ Familial ☐ Unknown

SIGNS AND SYMPTOMS

Ear: ☐ Absent ☐ Unknown
☐ Present: ☐ Bilateral Deafness ☐ Unilateral Deafness Age of symptoms: _____
☐ Balance Dysfunction ☐ Tinnitus
☐ Audiometric Abnormality, please describe: _____
☐ Other, please describe: _____

Eyes ☐ Absent ☐ Unknown
☐ Present: ☐ Blindness Age of Symptoms: _____
☐ Lenticular opacities
☐ Lisch nodules
☐ Left ☐ Right
☐ Bilateral ☐ Unknown

Schwannomas

Vestibular schwannomas

Age of Symptoms: _____

- ☐ Bilateral
☐ Unilateral
☐ No evidence of vestibular nerve tumor by MRI (Age: ____ yrs)
☐ Lack of symptoms of vestibular nerve tumor, but no MRI done (Age: ____ yrs)
☐ Unknown

Spinal schwannomas

Age of Symptoms: _____

- ☐ Present
☐ No evidence by MRI (Age: ____ yrs)
☐ Lack of symptoms, but no MRI done (Age: ____ yrs)
☐ Unknown
 Provide location of spinal tumors: C ____ to C ____, T ____ to T ____, L ____ to L ____

Other schwannomas

Age of Symptoms: _____

- ☐ Absent ☐ Unknown
☐ Head ☐ Neck ☐ Trunk ☐ L Arm ☐ L Hand ☐ L Leg ☐ L Foot
☐ Abdomen ☐ Pelvis ☐ Genital area ☐ R Arm ☐ R Hand ☐ R Leg ☐ R Foot

Present only in an anatomically limited distribution(single limb or segment of the spine): ☐ yes or ☐ no

Result *SMARCB1*-staining on the tumor specimen: ☐ Abnormal (no *SMARCB1*-staining)
☐ Normal (*SMARCB1* staining)
☐ Not performed





Meningiomas

Age of Symptoms: _____

- ☐ Present, Location: _____
☐ No evidence by MRI (Age: ____yrs)
☐ Unknown

Other spinal tumors

Age of Symptoms: _____

- ☐ Absent by MRI ☐ Present, asymptomatic ☐ Present, symptomatic ☐ Unknown
 Pathology Known: ☐ Yes, please specify: _____ ☐ No

Provide location of spinal tumors: C ____ to C ____, T ____ to T ____, L ____ to L ____

Cranial nerve involvement

Age of Symptoms: _____

- ☐ Present, Location: _____
☐ No evidence by MRI (Age: ____yrs)
☐ Unknown

Skin

CAL spots

- ☐ 1 ☐ 2-3 ☐ 4-5 ☐ >5-10 ☐ >10

Age of Symptoms: _____

Neurofibromas

- ☐ 1-5 ☐ ≥6-99 ☐ ≥100

Age of Symptoms: _____

Skin fold freckling

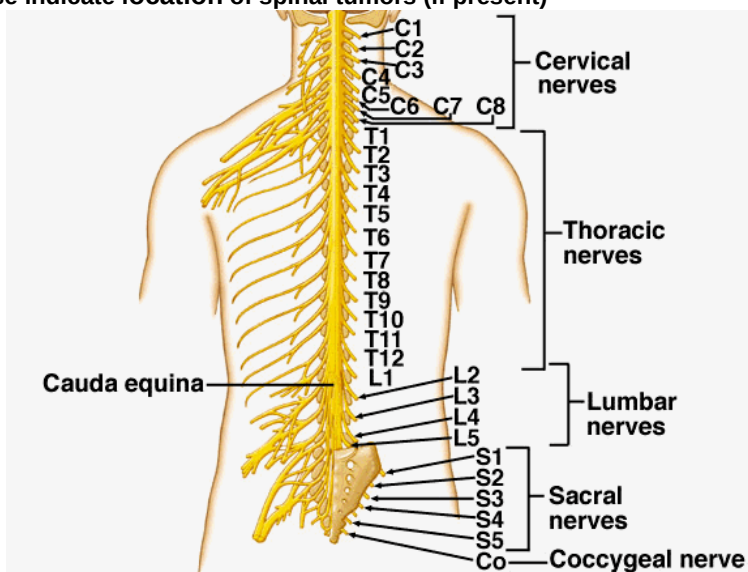
Left Right

- | | | |
|------------|--------------------------|--------------------------|
| Groin | ☐ | ☐ |
| Axilla | ☐ | ☐ |
| Submammary | ☐ | ☐ |

Age of Symptoms: _____

Please indicate location of spinal tumors (if present)

Additional comments/remarks:



Tumor Specimen Submission Checklist

The following requirements must be met in order to process tumor specimens for Neurofibromatosis type 2 and/or Schwannomatosis testing. The UAB Medical Genomics Lab now proudly offer Fresh/Frozen Tumor testing utilizing Next Generation Sequencing. Tumor blocks will still be completed using Sanger sequencing. Please confirm that the submitted tissue meets each requirement by placing a check mark next to each statement. If your pathology department is unable to confirm this information for you, please select the checkbox below. If Neurofibromatosis Type 1 is your primary concern, neurofibromas and biopsied CALs still require being collected in our media and are run via Sanger sequencing. Please contact the MGL at (205) 934-5562 to request collection media for these sample types.

For NGS Sequencing

Fresh Tumor Specimen Checklist	
☐	This tumor is a least 5mm-cubed
☐	This specimen contains at least 60% pure tumor content
☐	This specimen has been sent in basic, sterile culture media such as RPMI or PBS
Frozen Tumor Specimen Checklist	
☐	This tumor is at least 5mm-cubed
☐	This specimen contains at least 60% pure tumor content
☐	This specimen has been snap frozen and sent on dry ice

For Sanger Sequencing

Formalin-fixed paraffin embedded block	
☐	This tumor block has a surface area of a least 5mm squared <u>or</u> This specimen contains at least 3-6 loose paraffin curls (no slides) that are 30-50 microns thick
☐	This tumor specimen contains greater than 70% nucleated cells
☐	This specimen contains at least 60% pure tumor content
Notes or Special Comments	

For tumor blocks only:

☐ I agree to have the UAB Pathology Laboratory confirm the specimen requirements listed above for the specimen(s) submitted to the Medical Genomics Laboratory for genetic testing. I understand that this additional analysis will cost \$50 per tumor specimen submitted for testing (CPT code: 88399).