April 30, 2013

Seattle Sperm Bank
4915 25th Ave Ne Ste 204
SEATTLE, WA 98105

Test Results of: 9601, DONOR
DOB: [redacted] Age: 34.9 Y Sex: M
Collected on: 04/25/2013
Received on: 04/25/2013
Reported on: 04/30/2013

Branch Number: WAB55
Account Number: [redacted]
Specimen Number: 115-129-0686-0
Specimen Type: Blood

Patient ID#:

Physician: 3479899

Test: Cystic Fibrosis, DNA Analysis

RESULTS: Negative for 32 mutations analyzed

INTERPRETATION:
This individual is negative for the mutations analyzed. This negative result may need further interpretation depending on the clinical indication. This result reduces but does not eliminate the risk to be a CF carrier.

COMMENTS:
The detection rate varies with ethnicity and is listed below. The presence of an undetected mutation in the CF gene cannot be ruled out. In the absence of family history, the remaining risk that a person with a negative result could have at least one CF mutation is listed in the table. If there is a family history of CF, these risk figures do not apply. As detailed information regarding this individual's family history would permit a more accurate assessment of this individual's risk to be a carrier of cystic fibrosis, please contact LabCorp-Esoterix at (888) 690-3935 for a revised report.

Mutation Detection Rates among Ethnic Groups

Detection rates are based on mutation frequencies in patients affected with cystic fibrosis. Among individuals with an atypical or mild presentation (e.g. congenital absence of the vas deferens, pancreatitis) detection rates may vary from those provided here:

Ethnicity	Carrier risk reduction when no family history	Detection Rate
Ashkenazi Jewish	1/26 to 1/834	97%
Caucasian (non-Hispanic)	1/25 to 1/240	90%
African-American	1/65 to 1/207	69%
Hispanic	1/46 to 1/168	73%
Asian	1/94 to 1/208	55%

This interpretation is based on the clinical and family relationship information provided and the current understanding of the molecular genetics of this condition.

MUTATIONS ANALYZED:

G85E	A455E	S549N	R1162X	711+1 G→T	2184delA	3876delA
R117H	ΔI507	S549R	W1282X	1078delT	2789+5 G→A	3905insT
R334W	ΔF508	G551D	N1303K	1717-1 G→A	3120+1 G→A	
R347H	V520F	R553X	394delTT	1898+1 G→A	3659delC	
R347P	G542X	R560T	621+1 G→T	2183AA→G	3849+10kb C→T	

METHODS/LIMITATIONS:
DNA is isolated from the sample and tested for the 32 CF mutations on the Universal Array Platform (Luminex). Regions of the *CFTR* gene are amplified enzymatically and subjected to a solution-phase multiplex allele-specific primer extension with subsequent hybridization to a bead array and fluorescence detection. Polymorphisms F508C, I506V, and I507V are included in this panel to rule out false positive deltaF508 homozygotes. Reflex testing of 5T is included in the panel for R117H interpretation. False positive or negative results may occur for reasons that include genetic variants, blood transfusions, bone marrow transplantation, erroneous representation of family relationships or contamination of a fetal sample with maternal cells. The assay provides information intended to be used for carrier screening in adults of reproductive age, as an aid in newborn screening, and as a confirmatory test for another medically established diagnosis in newborns and children. The test is not intended for use in fetal diagnostic testing, pre-implantation screening, or for any stand-alone diagnostic purposes without confirmation by another medically established diagnostic product or procedure.

REFERENCES:

1. Updates on Carrier Screening for Cystic Fibrosis, (2011) Am J Ob Gynecol 117(4):1028-1031.
2. Watson, et al. (2004) *Genet Med* 6:387-91
3. Richards, et al. (2002) *Genet Med* 4:379-391
4. Preconception and prenatal carrier screening for cystic fibrosis: (2001)ACOG.ACMG publication

Results Released By: Samuel H. Pepkowitz, M.D., Medical Director
Report Released By: Samuel H. Pepkowitz, M.D., Medical Director

Samuel H. Pepkowitz, MD
Medical Director, Esoterix

LabCorp - Esoterix
4301 Lost Hills Road, Calabasas Hills, CA, 91301 (888) 690-3935

Integrated GENETICS
LabCorp Specialty Testing Group

SMN1 Copy Number Analysis

Patient Name: Donor 9601
DOB: [redacted] Age: 34 yrs
SSN #: Gender: Male

803037 / 803038
Seattle Sperm Bank
4915 25th Avenue East
Suite 204W
Seattle, WA 98105
USA

Specimen #: 62378334-1
Case #: 62268732 Patient ID #: 61967043
Date Collected: 04/25/2013 Date Received: 04/26/2013

Referring Physician: Jeffrey Olliffe
Genetic Counselor:

Client Lab ID #:
Hospital ID #:
Specimen ID #:

Specimen Type: Peripheral blood
Specimen(s) Received: 1 - Yellow (ACD) 7 ml round bottom tube(s)

Clinical Data: Not Provided
Ethnicity: Caucasian

RESULTS: SMN1 copy number: 2 (Reduced Carrier Risk)

INTERPRETATION:
This individual has an SMN1 copy number of two. This result reduces but does not eliminate the risk to be a carrier of SMA. Information regarding clinical indication may provide a more detailed interpretation.

COMMENT:
Spinal muscular atrophy (SMA) is an autosomal recessive disease of variable age of onset and severity caused by mutations (most often deletions or gene conversions) in the survival motor neuron (SMN1) gene. Molecular testing assesses the number of copies of the SMN1 gene. Individuals with one copy of the SMN1 gene are predicted to be carriers of SMA. Individuals with two or more copies have a reduced risk to be carriers. (Affected individuals have 0 copies of the SMN1 gene.)

This copy number analysis cannot detect individuals who are carriers of SMA as a result of either 2 (or very rarely 3) copies of the SMN1 gene on one chromosome and the absence of the SMN1 gene on the other chromosome or small intragenic mutations within the SMN1 gene. This analysis also will not detect germline mosaicism or mutations in genes other than SMN1. Additionally, de novo mutations have been reported in approximately 2% of SMA patients.

Carrier Frequency and Risk Reductions for Individuals with No Family History of SMA				
Ethnicity	**Detection Rate[1]**	**Prior Carrier Risk[1]**	**Reduced Carrier Risk for 2 copy result**	**Reduced Carrier Risk for 3 copy result**
Caucasian	94.8%	1:47	1:834	1:5,600
Ashkenazi Jewish	90.5%	1:67	1:611	1:5,400
Asian	93.3%	1:59	1:806	1:5,600
Hispanic	90.0%	1:68	1:579	1:5,400
African American	70.5%	1:72	1:130	1:4,200
Asian Indian	90.2%	1:52	1:443	1:5,400
Mixed or Other Ethnic Background	For counseling purposes, consider using the ethnic background with the most conservative risk estimates.			

METHOD/LIMITATIONS: Specimen DNA is isolated and amplified by real-time polymerase chain reaction (PCR) for exon 7 of the SMN1 gene and the internal standard reference genes. A mathematical algorithm is used to calculate and report SMN1 copy numbers of 0, 1, 2 and 3. Based upon this analysis, an upper limit of 3 represents the highest degree of accuracy in reporting SMN1 copy number with statistical confidence. Sequencing of the primer and probe binding sites is performed on all fetal samples and samples with one copy of SMN1 by real-time PCR to rule out the presence of sequence variants which could interfere with analysis and interpretation. False positive or negative results may occur for reasons that include genetic variants, blood transfusions, bone marrow transplantation, erroneous representation of family relationships or contamination of a fetal sample with maternal cells.

REFERENCES:
1. Sugarman EA, Nagan N, Zhu H, et al. Pan-ethnic carrier screening and prenatal diagnosis for spinal muscular atrophy: clinical laboratory analysis of >72,400 specimens. Eur J Hum Genet 2012; 20:27-32. 2. Prior TW, et al. Technical standards and guidelines for spinal muscular atrophy testing. Genet Med 2011; 13(7): 686-694.

The test was developed and its performance characteristics have been determined by Esoterix Genetic Laboratories, LLC. The laboratory is regulated under the Clinical Laboratory Improvement Amendments of 1988 (CLIA) as qualified to perform high complexity clinical testing. This test must be used in conjunction with clinical assessment, when available. Integrated Genetics is a business unit of Esoterix Genetic Laboratories, LLC, a wholly-owned subsidiary of Laboratory Corporation of America Holdings.

Electronically Signed by: Zhaoqing Zhou, Ph.D., FACMG, on 04/30/2013
Reported by: /

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LabCorp Specialty Testing Group

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4915 25th Ave Ne Ste 204
SEATTLE, WA 98105
Ph: (206)588-1484
Fax: (206) 588-1485 WAB-55

LCLS Specimen Number:	**115-129-0686-0**	Account Number:	[redacted]
Patient Name:	**9601, DONOR**	Ordering Physician:	**Dr. OLLIFFE**
Date of Birth:	[redacted]	Specimen Type:	**BLOOD**
Gender:	M	Date Collected:	04/25/2013
Patient ID:		Date Received:	04/26/2013
Lab Number:	(J13-1110 L	CoPath Number:	
Indications:	DONOR	Client Reference:	
Test:	**Chromosome, Blood, Routine**	Date Reported:	**05/03/2013**
Cells Counted:	15	Cells Karyotyped:	2
Cells Analyzed:	5	Band Resolution:	750

CYTOGENETIC RESULT: 46,XY

INTERPRETATION: NORMAL MALE KARYOTYPE

Cytogenetic analysis of PHA stimulated cultures has revealed a MALE karyotype with an apparently normal GTG banding pattern in all cells observed.

This result does not exclude the possibility of subtle rearrangements below the resolution of cytogenetics or congenital anomalies due to other etiologies.

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Indications:	DONOR

Account Number:	[redacted]
Ordering Physician:	**Dr. OLLIFFE**
Specimen Type:	**BLOOD**
Date Collected:	04/25/2013
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CoPath Number:	
Client Reference:	

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Indications: DONOR

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Specimen Type: **BLOOD**
Date Collected: 04/25/2013
Date Received: 04/26/2013
CoPath Number:
Client Reference:

Elisabeth Keitges PhD, FACMG
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