



## Donor 5189

### Genetic Testing Summary

Fairfax Cryobank recommends reviewing this genetic testing summary with your healthcare provider to determine suitability.

Last Updated: 09/06/18

Donor Reported Ancestry: German

Jewish Ancestry: No

Genetic Test*	Result	Comments/Donor's Residual Risk**
Chromosome analysis (karyotype)	Normal male karyotype	No evidence of clinically significant chromosome abnormalities
Hemoglobin evaluation	Normal hemoglobin fractionation and MCV/MCH results	Reduced risk to be a carrier for beta thalassemia, alpha thalassemia trait (aa/-- and a-/a-) and other hemoglobinopathies
Cystic Fibrosis (CF) carrier screening	Negative by gene sequencing in the CFTR gene	1/1250
Spinal Muscular Atrophy (SMA) carrier screening	Negative for deletions of exon 7 in the SMN1 gene	1/632
Expanded genetic disease testing attached- 289 diseases by gene sequencing	<b>Carrier: Usher Syndrome Type 3 (CLRN1)</b> Negative for other genes sequenced	Carrier testing recommended for those using this donor

\*No single test can screen for all genetic disorders. A negative screening result significantly reduces, but cannot eliminate, the risk for these conditions in a pregnancy.

\*\*Donor residual risk is the chance the donor is still a carrier after testing negative.

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**Ordering Practice:**

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Practice Code: [REDACTED]

[REDACTED]  
[REDACTED],  
[REDACTED]

Physician: [REDACTED]

Report Generated: 2018-01-05

Report Updated: 2018-01-05

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**Donor 5189**

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DOB: [REDACTED]

Gender: Male

Ethnicity: European

Procedure ID: 109739

Kit Barcode: [REDACTED]

Specimen: Blood, #111705

Specimen Collection: 2017-12-14

Specimen Received: 2017-12-15

Specimen Analyzed: 2018-01-05

**TEST INFORMATION**Test: CarrierMap<sup>SEQ</sup> (Genotyping & Sequencing)

Panel: CarrierMap Expanded v3 - Sequencing

Diseases Tested: 289

Genes Tested: 278

Genes Sequenced: 273

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**Partner Not Tested**

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**SUMMARY OF RESULTS: MUTATION(S) IDENTIFIED****Disease****Donor 5189****Partner Not Tested**

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**Usher Syndrome: Type 3 (CLRN1)** High Impact

Carrier (1 abnormal copy)

Mutation: c.434-2A&gt;T


Method: Sequencing

**Reproductive Risk & Next Steps:** Reproductive risk detected. Consider partner testing.

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No other pathogenic mutations were identified in the genes tested, reducing but not eliminating the chance to be a carrier for the associated genetic diseases. CarrierMap assesses carrier status for genetic disease via molecular methods including targeted mutation analysis and/or next-generation sequencing; other methodologies such as CBC and hemoglobin electrophoresis for hemoglobinopathies and enzyme analysis for Tay-Sachs disease may further refine risks for these conditions. Results should be interpreted in the context of clinical findings, family history, and/or other testing. A list of all the diseases and mutations screened for is included at the end of the report. This test does not screen for every possible genetic disease.

For additional disease information, please visit [recombine.com/diseases](http://recombine.com/diseases). To speak with a Genetic Counselor, call [855.OUR.GENES](tel:855.OUR.GENES).

Assay performed by   
**Reprogenetics**

CLIA ID: 31D1054821

3 Regent Street, Livingston, NJ 07039

Lab Technician: Bo Chu

Recombine CLIA # 31D2100763

Reviewed by Pere Colls, PhD, HCLD, Lab Director

### ADDITIONAL RESULTS: NO INCREASED REPRODUCTIVE RISK

The following results are not associated with an increased reproductive risk.

Disease (Gene)	Donor 5189	Partner Not Tested
Spinal Muscular Atrophy: SMN1 Linked (SMN1)*	SMN1 Copy Number: 2 or more copies Method: dPCR & Genotyping	

#### \* SMA Risk Information for Individuals with No Family History of SMA

	Detection Rate	Pre-Test Carrier Risk	Post-Test Carrier Risk (2 SMN1 copies)	Post-Test Carrier Risk (3 SMN1 copies)
European	95%	1/35	1/632	1/3,500
Ashkenazi Jewish	90%	1/41	1/350	1/4,000
Asian	93%	1/53	1/628	1/5,000
African American	71%	1/66	1/121	1/3,000
Hispanic	91%	1/117	1/1,061	1/11,000

For other unspecified ethnicities, post-test carrier risk is assumed to be <1%. For individuals with multiple ethnicities, it is recommended to use the most conservative risk estimate.

## Usher Syndrome: Type 3 (CLRN1)

Usher syndrome type 3 causes progressive hearing and vision loss. In this disease, the CLRN1 gene responsible for nerve cell communication in the inner ear and retina is defective. Patients affected are born with normal vision and hearing, which deteriorate in the first few decades of life. Hearing loss typically begins after development of speech and progresses over time. Affected individuals also develop an eye disease called retinitis pigmentosa, which affects the light-sensitive tissue (retina) at the back of the eye, and causes night blindness and loss of peripheral and central vision. Affected individuals may also experience difficulty with balance and coordination due to abnormalities in the inner ear.

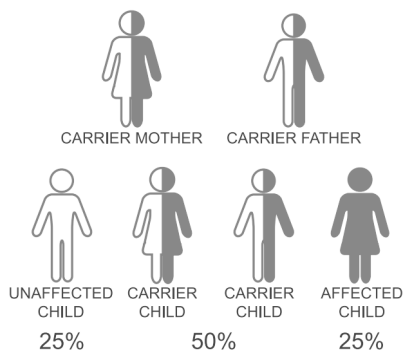
### High Impact

These diseases have a significant impact on life expectancy and quality of life.

### Clinical Information

- ✓ Physical Impairment
- Cognitive Impairment
- Shortened Lifespan
- Effective Treatment

### Inheritance: Autosomal Recessive



### Prognosis

Prognosis for hearing and vision loss is generally unfavorable. Though affected individuals are born with normal hearing and vision, they experience progressive hearing and vision decline. Vision loss typically begins with night blindness, followed by loss of peripheral vision and eventually, loss of central vision. By middle age, most affected individuals have moderate to severe hearing loss and are legally blind. However, the rate of hearing and vision decline as well as the severity can vary among affected individuals. Usher syndrome type 3 does not cause other health problems and does not affect intelligence or life expectancy.

### Treatment

There is no cure for Usher syndrome type 3. Treatments for hearing loss can include sign language, hearing aids and specialized instruction for the family on coping with hearing loss. Treatments for vision loss can include use of low vision aids and specialized instruction for the individual and family on coping with vision loss. Experimental therapies for retinitis pigmentosa, such as vitamin A palmitate supplements and lutein supplements can also be considered.

### Risk Information

Ethnicity	Detection Rate	Pre-Test Risk	Post-Test Risk
Ashkenazi Jewish	>99%	1/120	1/12000
Finnish	>99%	1/134	1/13400

For other unspecified ethnicities, post-test carrier risk is assumed to be <1%. For individuals with multiple ethnicities, it is recommended to use the most conservative risk estimate.

To learn more, visit [recombine.com/diseases/usher-syndrome-type-3](https://recombine.com/diseases/usher-syndrome-type-3)

## Methods and Limitations

**Genotyping:** Genotyping is performed using the Illumina Infinium Custom HD Genotyping assay to identify mutations in the genes tested. The assay is not validated for homozygous mutations, and it is possible that individuals affected with disease may not be accurately genotyped.

**Sequencing:** Sequencing is performed using a custom next-generation sequencing (NGS) platform. Only the described exons for each gene listed are sequenced. Variants outside of these regions may not be identified. Some splicing mutations may not be identified. Triplet repeat expansions, intronic mutations, and large insertions and deletions may not be detected. All identified variants are curated, and determination of the likelihood of their pathogenicity is made based on examining allele frequency, segregation studies, predicted effect, functional studies, case/control studies, and other analyses. All variants identified via sequencing that are reported to cause disease in the primary scientific literature will be reported. Variants considered to be benign and variants of unknown significance (VUS) are NOT reported. In the sequencing process, interval drop-out may occur, leading to intervals of insufficient coverage. Intervals of insufficient coverage will be reported if they occur.

**Spinal Muscular Atrophy:** Carrier status for SMA is assessed via copy number analysis by dPCR and via genotyping. Some individuals with a normal number of SMN1 copies (2 copies) may carry both copies of the gene on the same allele/chromosome; this analysis is not able to detect these individuals. Thus, a normal SMN1 result significantly reduces but does not eliminate the risk of being a carrier. Additionally, SMA may be caused by non-deletion mutations in the SMN1 gene; CarrierMap tests for some, but not all, of these mutations. Some SMA cases arise as the result of de novo mutation events which will not be detected by carrier testing.

**Limitations:** In some cases, genetic variations other than that which is being assayed may interfere with mutation detection, resulting in false-negative or false-positive results. Additional sources of error include, but are not limited to: sample contamination, sample mix-up, bone marrow transplantation, blood transfusions, and technical errors. The test does not test for all forms of genetic disease, birth defects, and intellectual disability. All results should be interpreted in the context of family history; additional evaluation may be indicated based on a history of these conditions. Additional testing may be necessary to determine mutation phase in individuals identified to carry more than one mutation in the same gene. All mutations included within the genes assayed may not be detected, and additional testing may be appropriate for some individuals.

This test was developed and its performance determined by Recombine, Inc., and it has not been cleared or approved by the U.S. Food and Drug Administration (FDA). The FDA has determined that such clearance or approval is not necessary.











**Leber Congenital Amaurosis: LCA5 Related (LCA5):** Mutations (3): ♂ Genotyping | c.835C>T (p.Q279X), c.1476\_1477insA (p.P493TfsX1), c.1151delC Sequencing | NM\_001122769:2-8

**Leber Congenital Amaurosis: RDH12 Related (RDH12):** Mutations (6): ♂ Genotyping | c.565C>T (p.Q189X), c.184C>T (p.R62X), c.464C>T (p.T1551), c.677A>G (p.Y226C), c.146C>T (p.T49M), c.295C>A (p.L99I) Sequencing | NM\_152443:3-9

**Leigh Syndrome: French-Canadian (LRPPRC):** Mutations (1): ♂ Genotyping | c.1061C>T (p.A354V) Sequencing | NM\_133259:1-38

**Leukoencephalopathy with Vanishing White Matter: EIF2B5 Related (EIF2B5):** Mutations (9): ♂ Genotyping | c.338G>A (p.R113H), c.271A>G (p.T91A), c.1882T>C (p.W628R), c.1157G>T (p.G386V), c.584G>A (p.R195H), c.925G>C (p.V309L), c.944G>A (p.R315H), c.166T>G (p.F56V), c.167T>G (p.F56C) Sequencing | NM\_003907:1-16

**Leydig Cell Hypoplasia (Luteinizing Hormone Resistance) (LHCR):** Mutations (13): ♂ Genotyping | c.1822\_1827delCTGGTT (p.608\_609delLV), c.1777G>C (p.A593P), c.1660C>T (p.R554X), c.1060G>A (p.E354K), c.1635C>A (p.C545X), c.391T>C (p.C131R), c.1027T>A (p.C343S), c.1627T>C (p.C543R), c.1505T>C (p.L502P), c.430G>T (p.V144F), c.1847C>A (p.S616Y), c.455T>C (p.I152T), c.537\_3C>A Sequencing | NM\_000233:1-11

**Limb-Girdle Muscular Dystrophy: Type 2A (CAPN3):** Mutations (3): ♂ Genotyping | c.1715G>A (p.R572Q), c.1469G>A (p.R490Q), c.550delA (p.T184fs), c.2306G>A (p.R769Q), c.2362\_2363delAGinsTCATCT (p.R788fs), c.1525G>T (p.V509F) Sequencing | NM\_000070:1-24

**Limb-Girdle Muscular Dystrophy: Type 2B (DYSF):** Mutations (5): ♂ Genotyping | c.4989\_4993delGCCCGinsCCCC (p.E1663fs), c.2833delG (p.A945fs), c.5830C>T (p.R1944X), c.2271C>A (p.Y758X), c.5174+5G>A Sequencing | NM\_001130987:1-56

**Limb-Girdle Muscular Dystrophy: Type 2C (SGCG):** Mutations (4): ♂ Genotyping | c.848G>A (p.C283Y), c.787G>A (p.E263K), c.525delT (p.F175fsX), c.87\_88insT (p.G30fs) Sequencing | NM\_000231:2-8

**Limb-Girdle Muscular Dystrophy: Type 2D (SGCA):** Mutations (1): ♂ Genotyping | c.229C>T (p.R77C) Sequencing | NM\_000023:1-9

**Limb-Girdle Muscular Dystrophy: Type 2E (SGCB):** Mutations (6): ♂ Genotyping | c.341C>T (p.S114F), c.452C>G (p.T151R), c.272G>C (p.R91P), c.272G>T (p.R91L), c.299T>A (p.M100K), c.323T>G (p.L108R) Sequencing | NM\_000232:2-6

**Limb-Girdle Muscular Dystrophy: Type 2F (SGCD):** Mutations (5): ♂ Genotyping | c.493C>T (p.R165X), c.89G>A (p.W30X), c.784G>A (p.E262K), c.391G>C (p.A131P), c.653delC (p.A218fs) Sequencing | NM\_001128209:2-8

**Limb-Girdle Muscular Dystrophy: Type 2I (FKRP):** Mutations (1): ♂ Genotyping | c.826C>A (p.L276I) Sequencing | NM\_001039885:1-4

**Lipoprotein Lipase Deficiency (LPL):** Mutations (1): ♂ Genotyping | c.644G>A (p.G215E) Sequencing | NM\_000237:1-10

**Long-Chain 3-Hydroxyacyl-CoA Dehydrogenase Deficiency (HADHA):** Mutations (2): ♂ Genotyping | c.1132C>T (p.Q378X), c.1528G>C (p.E510Q) Sequencing | NM\_000182:1-20

**Lysinuric Protein Intolerance (SLC7A7):** Mutations (4): ♂ Genotyping | c.1228C>T (p.R410X), c.726G>A (p.W242X), c.1384\_1385insATCA (p.R462fs), c.895\_2A>T Sequencing | NM\_001126105:3-11

**MTHFR Deficiency: Severe (MTHFR):** Mutations (6): ♂ Genotyping | c.1721T>G (p.V574G), c.1408G>T (p.E470X), c.1166G>A (p.W389X), c.652G>T (p.V218L), c.523G>A (p.A175T), c.474A>T (p.G158G) Sequencing | NM\_005957:2-12

**Malonyl-CoA Decarboxylase Deficiency (MLYDC):** Mutations (5): ♂ Genotyping | c.560C>G (p.S187X), c.8G>A (p.G3D), c.1064\_1065delIT (p.F355fs), c.949\_14A>G, c.638\_641delGTGA (p.S213fs) Sequencing | NM\_012213:1-5

**Maple Syrup Urine Disease: Type 1A (BCKDHA):** Mutations (4): ♂ Genotyping | c.860\_867delGAGGCCCC, c.868G>A (p.G290R), c.1312T>A (p.Y438N), c.288+1G>A Sequencing | NM\_000709:1-9

**Maple Syrup Urine Disease: Type 1B (BCKDHB):** Mutations (6): ♂ Genotyping | c.1114G>T (p.E372X), c.548G>C (p.R183P), c.832G>A (p.G278S), c.970C>T (p.R324X), c.487G>T (p.E163X), c.853C>T (p.R285X) Sequencing | NM\_183050:1-10

**Maple Syrup Urine Disease: Type 2 (DBT):** Mutations (15): ♂ Genotyping | c.670G>T (p.E224X), c.581C>G (p.S194X), c.1355A>G (p.H452R), c.294C>G (p.I98M), c.1448G>T (p.X483L), c.75\_76delAT (p.C26Wfs), c.901C>T (p.R301C), c.363\_364delCT (p.Y122Lfs), c.1193T>C (p.L398P), c.1169A>G (p.D390G), c.1209+5G>C (IVS9+5G>C), c.1232C>A (p.P411Q), c.939G>C (p.K313N), c.788T>G (p.M263R), c.1202T>C (p.I401T) Sequencing | NM\_001918:1-11

**Maple Syrup Urine Disease: Type 3 (DLD):** Mutations (8): ♂ Genotyping | c.104\_105insA, c.685G>T (p.G229C), c.214A>G (p.K72E), c.1081A>G (p.M361V), c.1123G>A (p.E375K), c.1178T>C (p.I393T), c.1463C>T (p.P488L), c.1483A>G (p.R495G) Sequencing | NM\_000108:1-14

**Maroteaux-Lamy Syndrome (ARSB):** Mutations (6): ♂ Genotyping | c.629A>G (p.Y210C), c.1178A>C (p.H393P), c.284G>A (p.R95Q), c.944G>A (p.R315Q), c.1143-8T>G, c.1143-1G>C Sequencing | NM\_000046:1-8

**Meckel Syndrome: Type 1 (MKS1):** Mutations (5): ♂ Genotyping | c.1408-35\_1408-7del29 (p.G470fs), c.80+2T>C (IVS1+2T>C), c.1024+1G>A (IVS11+1G>A), c.417G>A (p.E139X), c.50insCCGGG (p.D19AfsX) Sequencing | NM\_017777:1-18

**Medium-Chain Acyl-CoA Dehydrogenase Deficiency (ACADM):** Mutations (8): ♂ Genotyping | c.985A>G (p.K329E), c.362C>T (p.T121I), c.583G>A (p.G195R), c.799G>A (p.G267R), c.199T>C (p.Y67H), c.262C>T (p.L188F), c.616C>T (p.R206C), c.617G>A (p.C206H) Sequencing | NM\_001127328:1-12

**Megalencephalic Leukoencephalopathy (MLC1):** Mutations (6): ♂ Genotyping | c.176G>A (p.G59E), c.278C>T (p.S93I), c.135\_136insC (p.C46fsX), c.908\_918delTGCTGCTGCTGinsGCA (p.V303GfsX96), c.880C>T (p.P294S), c.178-10T>A Sequencing | NM\_139202:2-12

**Metachromatic Leukodystrophy (ARSA):** Mutations (18): ♂ Genotyping | c.1210+1G>A, c.465+1G>A (IVS2+1G>A), c.862A>C (p.T288P), c.1136C>T (p.P379L), c.1283C>T (p.P428L), c.827C>T (p.T276M), c.542T>G (p.I181S), c.1232C>T (p.T411I), c.769G>C (p.D257H), c.739G>A (p.G247R), c.641C>T (p.A214V), c.302G>A (p.G101D), c.293C>T (p.S98F), c.257G>A (p.R86Q), c.263G>A (p.G88D), c.1114C>T (p.R372W), c.292\_293delTlRinsCT (p.S98L), c.302G>T (p.G101V) Sequencing | NM\_001085425:2-9

**Methylmalonic Acidemia: MMAA Related (MMAA):** Mutations (14): ♂ Genotyping | c.64C>T (p.R22X), c.161G>A (p.W54X), c.266T>C (p.L89P), c.283C>T (p.Q95X), c.358C>T (p.Q120X), c.397C>T (p.Q133X), c.433C>T (p.R145X), c.503delC (p.T168MfsX9), c.562G>C (p.G188R), c.650T>A (p.L217X), c.653G>A (p.G218E), c.733+1G>A, c.988C>T (p.R330X), c.1076G>A (p.R359G) Sequencing | NM\_172250:2-7

**Methylmalonic Acidemia: MMAB Related (MMAB):** Mutations (11): ♂ Genotyping | c.700C>T (p.Q234X), c.656A>G (p.Y219C), c.572G>A (p.R191Q), c.571C>T (p.R191W), c.569G>A (p.R190H), c.568C>T (p.R190C), c.556C>T (p.R186W), c.403G>A (p.A135T), c.291-1G>A, c.287T>C (p.I96T), c.197-1G>T Sequencing | NM\_052845:1-9

**Methylmalonic Acidemia: MUT Related (MUT):** Mutations (23): ♂ Genotyping | c.2150G>T (p.G717V), c.2099T>A (p.M700K), c.2080C>T (p.R694W), c.2054T>G (p.L685R), c.1867G>A (p.G623R), c.1280G>A (p.G427D), c.1106G>A (p.R369H), c.1105C>T (p.R369C), c.1097A>G (p.N366S), c.935G>T (p.G312V), c.691T>A (p.Y231N), c.655A>T (p.N219Y), c.643G>A (p.G215S), c.607G>A (p.G203R), c.572C>A (p.A191E), c.521T>C (p.F174S), c.322C>T (p.R108C), c.313T>C (p.W105R), c.299A>G (p.Y100C), c.284C>G (p.P95R), c.281G>T (p.G94V), c.278G>A (p.R93H), c.643G>T (p.G215C) Sequencing | NM\_000255:2-13

**Methylmalonic Aciduria and Homocystinuria: Type cbIC (MMACHC):** Mutations (5): ♂ Genotyping | c.271\_272insA (p.R91KfsX14), c.331C>T (p.R111X), c.394C>T (p.R132X), c.482G>A (p.R161Q), c.609G>A (p.W203X) Sequencing | NM\_015506:1-4

**Mitochondrial Complex I Deficiency: NDUFS6 Related (NDUFS6):** Mutations (1): ♂ Genotyping | c.344G>A (p.C115Y) Sequencing | NM\_004553:1-4

**Mitochondrial DNA Depletion Syndrome: MNGIE Type (TYMP):** Mutations (6): ♂ Genotyping | c.866A>C (p.E289A), c.433G>A (p.G145R), c.665A>G (p.K222R), c.457G>A (p.G153S), c.516+2T>C (IVS4+2T>C), c.1425\_1426insC (p.S476Lfs) Sequencing | NM\_001257989:2-8,10

**Mitochondrial Myopathy and Sideroblastic Anemia (PUS1):** Mutations (2): ♂ Genotyping | c.430C>T (p.R144W), c.658G>T (p.E220X) Sequencing | NM\_025215:1-6

**Mitochondrial Trifunctional Protein Deficiency: HADHB Related (HADHB):** Mutations (7): ♂ Genotyping | c.182G>A (p.R61H), c.788A>G (p.D263G), c.740G>A (p.R247H), c.1331G>A (p.R444K), c.1364T>G (p.V455G), c.776\_777insT (p.G259fs), c.1175C>T (p.A392V) Sequencing | NM\_000183:2-16

**Morquio Syndrome: Type A (GALNS):** Mutations (6): ♂ Genotyping | c.205T>G (p.F69V), c.485C>T (p.S162F), c.1156C>T (p.R386C), c.901G>T (p.G301C), c.337A>T (p.I113F), c.178G>A (p.D60N) Sequencing | NM\_000512:2-14

**Morquio Syndrome: Type B (GLB1):** Mutations (8): ♂ Genotyping | c.1527G>T (p.W509C), c.1313G>A (p.G438E), c.1445G>A (p.R482H), c.247T>C (p.Y83H), c.1444C>T (p.R482C), c.1498A>G (p.T500A), c.1223A>C (p.Q408P), c.817\_818delTlRinsCT (p.W273L) Sequencing | NM\_000404:1-16

**Mucopolidosis: Type II/III (GNPTAB):** Mutations (3): ♂ Genotyping | c.3503\_3504delITC (p.L1168QfsX5), c.3565C>T (p.R1189X), c.1120T>C (p.F374L) Sequencing | NM\_024312:1-21

**Mucopolidosis: Type IV (MCOLN1):** Mutations (5): ♂ Genotyping | c.1015\_788del6433, c.406-2A>G, c.1084G>T (p.D362Y), c.304C>T (p.R102X), c.244delC (p.L82fsX) Sequencing | NM\_020533:1-14

**Multiple Pterygium Syndrome (CHRNA3):** Mutations (6): ♂ Genotyping | c.715C>T (p.R239C), c.13C>T (p.Q5X), c.320T>G (p.V107G), c.401\_402delCT (p.P134fs), c.1408C>T (p.R470X), c.136C>T (p.R46X) Sequencing | NM\_005199:1-12

**Multiple Sulfatase Deficiency (SUMF1):** Mutations (1): ♂ Genotyping | c.463T>C (p.S155P) Sequencing | NM\_182760:1-9

**Muscle-Eye-Brain Disease (POMGN1):** Mutations (3): ♂ Genotyping | c.1539+1G>A, c.1324C>T (p.R442C), c.1478C>G (p.P493R) Sequencing | NM\_001243766:2-23

**Navajo Neurohepatopathy (MPV17):** Mutations (1): ♂ Genotyping | c.149G>A (p.R50Q) Sequencing | NM\_002437:2-8

**Nemaline Myopathy: NEB Related (NEB):** Mutations (2): ♂ Genotyping | c.7434\_7536del2502bp, c.8890-2A>G (IVS63-2A>G) Sequencing | NM\_001164508:63-66,86,95-96,103,105,143,168-172, NM\_004543:3-149

**Nephrotic Syndrome: Type 1 (NPHS1):** Mutations (5): ♂ Genotyping | c.121\_122delCT (p.L41Dfs), c.1481delC, c.3325C>T (p.R1109X), c.3478C>T (p.R1160X), c.2335-1G>A





c.508C>T (p.R170W), c.409C>T (p.R137X), c.380T>G (p.L127R), c.346+1G>C, c.116T>G (p.L139R), c.78G>A (p.W26X), c.1A>G (p.M1V), c.1495C>T (p.R499C), c.459+5G>A (IVS4+5G>A), c.1422-2A>G, c.535C>T (p.H179Y), c.1141delG (p.V381fs), c.796T>G (p.W266G), c.155C>A (p.S52X), c.426delT (p.F142fs), c.413-2A>G, c.570+3A>G, c.536A>G (p.H179R), c.1146+1G>A, c.736G>A (p.A246T), c.1302C>G (p.F434L), c.778C>T (p.P260S), c.1008G>T (p.Q336H), c.1385A>T (p.E462V), c.964G>A (p.D322N), c.340G>A (p.E114K), c.1432G>A (p.G478R), c.1178G>C (p.R393P), c.805+1G>C, c.1426A>T (p.R476X), c.623A>T (p.D208V), c.1537C>T (p.Q513X), c.1511G>T (p.R504L), c.1307\_1308delTA (p.1436fs), c.571-8A>G, c.624\_627delTCT (p.D208fs), c.1211\_1212delTG (p.L404fs), c.621T>G (p.D207E), c.1511G>A (p.R504H), c.1177C>T (p.R393X), c.2T>C (p.M1T), c.1292G>A (p.W431X), c.947\_948insA (p.Y316fs), c.607T>G (p.W203G), c.1061\_1063delTCT (p.F354\_Y355delinsX), c.615delG (p.L205fs), c.805+2T>C, c.1123delG (p.E375fs), c.1121A>G (p.Q374R), c.1043\_1046delTCAA (p.F348fs), c.1510delC (p.R504fs), c.1451T>C (p.L484P), c.964G>T (p.D322Y), c.1351C>G (p.L451V), c.571-2A>G (IVS5-2A>G) Sequencing | NM\_000520:1-14

**Trichohepatoenteric Syndrome: Type 1 (TTC37):** Mutations (9): ♂ Genotyping | c.3847G>A (p.D1283N), c.751G>A (p.G251R), c.2251C>T (p.Q751X), c.439C>T (p.Q147X), c.2808G>A (p.W936X), c.2515+1G>C, c.4620+1G>C, c.1632+1delG, c.2578-7delTTTTT Sequencing | NM\_014639:4-43

**Tyrosine Hydroxylase Deficiency (TH):** Mutations (1): ♂ Genotyping | c.698G>A (p.R233H) Sequencing | NM\_199292:1-14

**Tyrosinemia: Type I (FAH):** Mutations (10): ♂ Genotyping | c.1062+5G>A, c.554-1G>T, c.607-6T>G, c.707-1G>C, c.782C>T (p.P261L), c.1069G>T (p.E357X), c.786G>A (p.W262X), c.698A>T (p.D233V), c.1009G>A (p.G337S), c.192G>T (p.Q64H) Sequencing | NM\_000137:1-14

**Tyrosinemia: Type II (TAT):** Mutations (5): ♂ Genotyping | c.169C>T (p.R57X), c.668C>G (p.S223X), c.1249C>T (p.R417X), c.1085G>T (p.G362V), c.236-5A>G Sequencing | NM\_000353:2-12

**Usher Syndrome: Type 1B (MYO7A):** Mutations (13): ♂ Genotyping | c.93C>A (p.C31X), c.448C>T (p.R150X), c.634C>T (p.R212C), c.635G>A (p.R212H), c.700C>T (p.Q234X), c.1797G>A (p.M599I), c.1996C>T (p.R666X), c.2476G>A (p.A826T), c.3719G>A (p.R1240Q), c.5581C>T (p.R1861X), c.6025delG (p.A2009fs), c.640G>A (p.G214R), c.1190C>A (p.A397D) Sequencing | NM\_000260:2-49

**Usher Syndrome: Type 1C (USH1C):** Mutations (5): ♂ Genotyping | c.IVS5+1G>A, c.238\_239insC, c.216G>A (p.V72fs), c.91C>T (p.R31X), c.36+1G>T Sequencing | NM\_153676:1-27

**Usher Syndrome: Type 1D (CDH23):** Mutations (15): ♂ Genotyping | c.172C>T (p.Q58X), c.3367C>T (p.Q1123X), c.3617C>G (p.P1206R), c.3713\_3714delCT (p.S1238fs), c.3880C>T (p.Q1294X), c.4069C>T (p.Q1357X), c.4488G>C (p.Q1496H), c.4504C>T (p.R1502X), c.5237G>A (p.R1746Q), c.5985C>A (p.Y1995X), c.6307G>T (p.E2103X), c.7549A>G (p.S2517G), c.8230G>A (p.G2744S), c.8497C>G (p.R2833G), c.9524G>A (p.R3175H) Sequencing | NM\_022124:2-68

**Usher Syndrome: Type 1F (PCDH15):** Mutations (7): ♂ Genotyping | c.733C>T (p.R245X), c.2067C>A (p.Y684X), c.7C>T (p.R3X), c.1942C>T (p.R648X), c.1101delT (p.A367fsX), c.2800C>T (p.R934X), c.4272delA (p.L1425fs) Sequencing | NM\_001142763:2-35

**Usher Syndrome: Type 2A (USH2A):** Mutations (22): ♂ Genotyping | c.14020A>G (p.R4674G), c.12067-2A>G, c.4338\_4339delCT (p.C1447fs), c.2299delG (p.E7675fsX21), c.2209C>T (p.R737X), c.1256G>T (p.C419F), c.1000C>T (p.R334W), c.923\_924insGCCA (p.H308fs), c.12708T>A (p.C4236X), c.13576C>T (p.R4526X), c.1840+1G>A, c.11328T>G (p.Y3776X), c.5329C>T (p.R1777W), c.9165\_9168delCTA (p.I3055MfsX2), c.9469C>T (p.Q3157X), c.1876C>T (p.R626X), c.7123delG (p.G2375fs), c.9492\_9498delTGATGAG (p.D3165fs), c.6235A>T (p.K2079X), c.14403C>G (p.Y4801X), c.3788G>A (p.W1263X), c.11328T>A (p.Y3776X) Sequencing | NM\_206933:2-72

**Usher Syndrome: Type 3 (CLRN1):** Mutations (5): ♂ Genotyping | c.144T>G (p.N48K), c.131T>A (p.M120K), c.567T>G (p.Y189X), c.634C>T (p.Q212X), c.221T>C (p.L74P) Sequencing | NM\_001195794:1-4

**Very Long-Chain Acyl-CoA Dehydrogenase Deficiency (ACADVL):** Mutations (29): ♂ Genotyping | c.779C>T (p.T260M), c.848T>C (p.V283A), c.1144A>C (p.K382Q), c.1226C>T (p.T409M), c.1322G>A (p.G441D), c.1372T>C (p.F458L), c.1405C>T (p.R469W), c.1837C>T (p.R613W), c.553G>A (p.G185S), c.739A>C (p.K247Q), c.37C>T (p.Q13X), c.265C>T (p.P89S), c.272C>A (p.P91Q), c.364A>G (p.N122D), c.388\_391delGAGA (p.E130fs), c.520G>A (p.V174M), c.856A>G (p.R286G), c.1606\_1609delGCAG (p.A536fs), c.1531C>T (p.R511W), c.1512G>T (p.E504D), c.664G>A (p.G222R), c.685C>T (p.R229X), c.577G>C (p.G193R), c.881G>A (p.G294E), c.753-2A>C (IVS8-2A>C), c.1349G>A (p.R450H), c.1358G>A (p.R453Q), c.790A>G (p.K264E), c.1246G>A (p.A416T) Sequencing | NM\_000018:1-20

**Walker-Warburg Syndrome (FKTN):** Mutations (5): ♂ Genotyping | c.1167insA (p.F390fs), c.139C>T (p.R47X), c.748T>G (p.C250G), c.648-1243G>T (IVS5-1243G>T), c.515A>G (p.H172R) Sequencing | NM\_006731:2-10

**Werner Syndrome (WRN):** Mutations (8): ♂ Genotyping | c.3139-1G>C (IVS25-1G>C), c.3913C>T (p.R1305X), c.3493C>T (p.Q1165X), c.1730A>T (p.K577M), c.1336C>T (p.R368X), c.3686A>T (p.Q1229L), c.3915\_3916insA (p.R1306fs), c.2089-3024A>G Sequencing | NM\_000553:2-35

**Wilson Disease (ATP7B):** Mutations (17): ♂ Genotyping | c.1340\_1343delAAAC, c.2304delC (p.M769Cfs), c.2332C>G (p.R778G), c.3207C>A (p.H1069Q), c.2333G>T (p.R778L), c.2336G>A (p.W779X), c.2337G>A (p.W779X), c.2906G>A (p.R969Q), c.1934T>G

(p.M645R), c.2123T>C (p.L708P), c.-370\_-394delTGGCCGAGACCGCGG, c.3191A>C (p.E1064A), c.845delT (p.L282Pfs), c.3817C>T (p.P1273S), c.3683G>C (p.R1228T), c.3809A>G (p.N1270S), c.2293G>A (p.D765N) Sequencing | NM\_000053:1-21

**Wolcott-Rallison Syndrome (EIF2AK3):** Mutations (5): ♂ Genotyping | c.1409C>G (p.S470X), c.1262delA (p.N421fs), c.1570delGAAA (p.E524fsX), c.478delG (p.A160fs), c.1047\_1060delAGTCCATCCATCA (p.V350Sfs) Sequencing | NM\_004836:1-17

**Wolman Disease (LIPA):** Mutations (3): ♂ Genotyping | c.964C>T (p.Q322X), c.419G>A (p.W140X), c.260G>T (p.G87V) Sequencing | NM\_001127605:2-10

**Xeroderma Pigmentosum: Group A (XPA):** Mutations (7): ♂ Genotyping | c.172+2T>G, c.323G>T (p.C108F), c.374delC (p.T125fs), c.682C>T (p.R228X), c.619C>T (p.R207X), c.348T>A (p.Y116X), c.390-1G>C Sequencing | NM\_000380:1-6

**Xeroderma Pigmentosum: Group C (XPC):** Mutations (5): ♂ Genotyping | c.1735C>T (p.R579X), c.566\_567delAT (p.Y189fs), c.413-9T>A, c.413-24A>G, c.1643\_1644delTG (p.V548fs) Sequencing | NM\_004628:1-16

**Zellweger Spectrum Disorders: PEX1 Related (PEX1):** Mutations (3): ♂ Genotyping | c.2528G>A (p.G843D), c.2916delA (p.G973fs), c.2097insT (p.I700fs) Sequencing | NM\_000466:1-24

**Zellweger Spectrum Disorders: PEX10 Related (PEX10):** Mutations (2): ♂ Genotyping | c.764\_765insA, c.874\_875delCT Sequencing | NM\_153818:2-6

**Zellweger Spectrum Disorders: PEX2 Related (PEX2):** Mutations (1): ♂ Genotyping | c.355C>T (p.R119X) Sequencing | NM\_001172087:1-3

**Zellweger Spectrum Disorders: PEX6 Related (PEX6):** Mutations (8): ♂ Genotyping | c.1130+1G>A (IVS3+1G>A), c.1688+1G>A (IVS7+1G>A), c.1962-1G>A (p.L655fsX3), c.1301delC (p.S434fs), c.1601T>C (p.L534P), c.511insT (p.G171Wfs), c.802\_815delGACGGACTGGCGCT (p.D268Cfs), c.1715C>T (p.T572I) Sequencing | NM\_000287:1-17

## Residual Risk Information

Detection rates are calculated from the primary literature and may not be available for all ethnic populations. The values listed below are for genotyping. Sequencing provides higher detection rates and lower residual risks for each disease. More precise values for sequencing may become available in the future.

Disease	Carrier Rate	Detection Rate	Residual Risk
11-Beta-Hydroxylase-Deficient Congenital Adrenal Hyperplasia	♂ Moroccan Jewish: 1/39	91.67%	1/468
17-Alpha-Hydroxylase Deficiency	♂ Brazilian: Unknown	54.55%	Unknown
	♂ Japanese: Unknown	45.45%	Unknown
17-Beta-Hydroxysteroid Dehydrogenase Deficiency	♂ Arab: 1/8	>99%	<1/800
	♂ Dutch: 1/192	13.89%	1/223
21-Hydroxylase-Deficient Classical Congenital Adrenal Hyperplasia	♂ European: 1/62	27.65%	1/86
	♂ General: 1/62	29.34%	1/88
21-Hydroxylase-Deficient Nonclassical Congenital Adrenal Hyperplasia	♂ Argentinian: 1/4	<10%	1/4
	♂ European: 1/16	<10%	1/16
3-Beta-Hydroxysteroid Dehydrogenase Deficiency	♂ General: Unknown	16.13%	Unknown
3-Methylcrotonyl-CoA Carboxylase Deficiency: MCCA Related	♂ European: 1/146	26.32%	1/198
	♂ General: 1/112	37.50%	1/179
3-Methylcrotonyl-CoA Carboxylase Deficiency: MCCB Related	♂ General: 1/112	35.29%	1/173
	♂ Japanese: 1/112	33.33%	1/168
	♂ Korean: 1/141	66.67%	1/423
	♂ Turkish: 1/112	24.07%	1/148
3-Methylglutaconic Aciduria: Type 3	♂ Iraqi Jewish: 1/10	>99%	<1/1,000
3-Phosphoglycerate Dehydrogenase Deficiency	♂ Ashkenazi Jewish: 1/400	>99%	<1/40,000
5-Alpha Reductase Deficiency	♂ Dominican: Unknown	>99%	Unknown
	♂ Mexican: Unknown	68.75%	Unknown
6-Pyruvoyl-Tetrahydropterin Synthase Deficiency	♂ Chinese: 1/183	78.95%	1/869
	♂ East Asian: 1/180	64.20%	1/503
ARSACS	♂ French Canadian: 1/22	95.45%	1/484
Abetalipoproteinemia	♂ Ashkenazi Jewish: 1/131	>99%	<1/13,100
Acrodermatitis Enteropathica	♂ Arab: Unknown	40.00%	Unknown
	♂ Egyptian: Unknown	33.33%	Unknown
	♂ French: Unknown	27.78%	Unknown
	♂ Tunisian: Unknown	77.78%	Unknown
Acute Infantile Liver Failure: TRMU Related	♂ Yemenite Jewish: 1/40	71.43%	1/140
Acyl-CoA Oxidase I Deficiency	♂ General: Unknown	35.00%	Unknown
	♂ Japanese: Unknown	42.86%	Unknown
Adenosine Deaminase Deficiency	♂ General: 1/388	36.96%	1/615

Disease	Carrier Rate	Detection Rate	Residual Risk
Alkaptonuria	♂ Dominican: Unknown	>99%	Unknown
	♂ Finnish: 1/251	60.00%	1/628
	♂ Slovak: 1/69	59.38%	1/170
Alpha Thalassemia	♂ General: 1/48	50.67%	1/97
Alpha-1-Antitrypsin Deficiency	♂ European: 1/35	95.00%	1/700
	♂ General: Unknown	95.00%	Unknown
Alpha-Mannosidosis	♂ European: 1/354	30.23%	1/507
	♂ General: 1/354	35.19%	1/546
Alport Syndrome: COL4A3 Related	♂ Dutch: 1/409	22.73%	1/529
Alport Syndrome: COL4A4 Related	♂ General: 1/409	26.67%	1/558
Amegakaryocytic Thrombocytopenia	♂ Ashkenazi Jewish: 1/76	>99%	<1/7,600
	♂ General: Unknown	64.81%	Unknown
Andermann Syndrome	♂ French Canadian: 1/24	99.38%	1/3,888
Antley-Bixler Syndrome	♂ General: Unknown	45.65%	Unknown
	♂ Japanese: Unknown	60.47%	Unknown
Argininemia	♂ Chinese: Unknown	40.00%	Unknown
	♂ French Canadian: Unknown	75.00%	Unknown
	♂ Japanese: Unknown	>99%	Unknown
Argininosuccinate Lyase Deficiency	♂ European: 1/133	57.41%	1/312
	♂ Saudi Arabian: 1/80	51.72%	1/166
Aromatase Deficiency	♂ General: Unknown	25.00%	Unknown
Arthrogryposis, Mental Retardation, & Seizures	♂ Ashkenazi Jewish: 1/205	>99%	<1/20,500
Asparagine Synthetase Deficiency	♂ Iranian Jewish: 1/80	>99%	<1/8,000
Aspartylglycosaminuria	♂ Finnish: 1/69	96.12%	1/1,780
Ataxia with Vitamin E Deficiency	♂ European: 1/274	80.00%	1/1,370
	♂ Italian: 1/224	97.73%	1/9,856
	♂ North African: 1/159	>99%	<1/15,900
Ataxia-Telangiectasia	♂ Costa Rican: 1/100	68.52%	1/318
	♂ North African Jewish: 1/81	96.97%	1/2,673
	♂ Norwegian: 1/197	50.00%	1/394
	♂ Sardinians: Unknown	85.71%	Unknown
	♂ US Amish: Unknown	>99%	Unknown
Autosomal Recessive Polycystic Kidney Disease	♂ Finnish: 1/45	84.21%	1/285
	♂ French: 1/71	62.50%	1/189
	♂ General: 1/71	37.11%	1/113
Bardet-Biedl Syndrome: BBS1 Related	♂ General: 1/376	70.27%	1/1,265
	♂ Northern European: 1/376	85.90%	1/2,666
	♂ Puerto Rican: Unknown	90.00%	Unknown
Bardet-Biedl Syndrome: BBS10 Related	♂ General: 1/404	47.79%	1/774
Bardet-Biedl Syndrome: BBS11 Related	♂ Bedouin: 1/59	>99%	<1/5,900
Bardet-Biedl Syndrome: BBS12 Related	♂ General: Unknown	50.00%	Unknown

Disease	Carrier Rate	Detection Rate	Residual Risk
Bardet-Biedl Syndrome: BBS2 Related	♂ Ashkenazi Jewish: Unknown	>99%	Unknown
	♂ General: 1/638	38.46%	1/1,037
	♂ Middle Eastern: Unknown	>99%	Unknown
Bare Lymphocyte Syndrome: Type II	♂ General: Unknown	66.67%	Unknown
Barter Syndrome: Type 4A	♂ General: 1/457	81.82%	1/2,514
Beta Thalassemia	♂ African American: 1/75	84.21%	1/475
	♂ Indian: 1/24	74.12%	1/93
	♂ Sardinians: 1/23	97.14%	1/804
	♂ Spaniard: 1/51	93.10%	1/739
Beta-Hexosaminidase Pseudodeficiency	♂ Ashkenazi Jewish: Unknown	>99%	Unknown
	♂ General: Unknown	>99%	Unknown
Beta-Ketothiolase Deficiency	♂ Japanese: Unknown	58.33%	Unknown
	♂ Spaniard: Unknown	90.00%	Unknown
Biotinidase Deficiency	♂ General: 1/123	78.32%	1/567
Bloom Syndrome	♂ Ashkenazi Jewish: 1/134	96.67%	1/4,020
	♂ European: Unknown	66.22%	Unknown
	♂ Japanese: Unknown	50.00%	Unknown
Canavan Disease	♂ Ashkenazi Jewish: 1/55	98.86%	1/4,840
	♂ European: Unknown	53.23%	Unknown
Carnitine Palmitoyltransferase IA Deficiency	♂ General: Unknown	38.89%	Unknown
	♂ Hutterite: 1/16	>99%	<1/1,600
	♂ Japanese: 1/101	66.67%	1/303
Carnitine Palmitoyltransferase II Deficiency	♂ Ashkenazi Jewish: Unknown	>99%	Unknown
	♂ General: Unknown	71.43%	Unknown
Carnitine-Acylcarnitine Translocase Deficiency	♂ Asian: Unknown	95.45%	Unknown
	♂ General: Unknown	18.75%	Unknown
Carpenter Syndrome	♂ Brazilian: Unknown	40.00%	Unknown
	♂ Northern European: Unknown	85.00%	Unknown
Cartilage-Hair Hypoplasia	♂ Finnish: 1/76	93.33%	1/1,140
	♂ US Amish: 1/19	>99%	<1/1,900
Cerebrotendinous Xanthomatosis	♂ Dutch: Unknown	78.57%	Unknown
	♂ Italian: Unknown	45.95%	Unknown
	♂ Japanese: Unknown	92.86%	Unknown
	♂ Moroccan Jewish: 1/6	87.50%	1/48
Chediak-Higashi Syndrome	♂ General: Unknown	19.64%	Unknown
Cholesteryl Ester Storage Disease	♂ General: 1/101	68.97%	1/325
Choreoacanthocytosis	♂ Ashkenazi Jewish: Unknown	66.67%	Unknown
Chronic Granulomatous Disease: CYBA Related	♂ Iranian: Unknown	71.43%	Unknown
	♂ Japanese: 1/274	>99%	<1/27,400
	♂ Korean: 1/105	>99%	<1/10,500

Disease	Carrier Rate	Detection Rate	Residual Risk
	♂ Moroccan Jewish: 1/234	>99%	<1/23,400
Citrin Deficiency	♂ Japanese: 1/70	>99%	<1/7,000
Citrullinemia: Type I	♂ European: 1/120	18.18%	1/147
	♂ General: 1/120	52.27%	1/251
	♂ Japanese: Unknown	64.71%	Unknown
Classical Galactosemia	♂ Mediterranean: 1/120	50.00%	1/240
	♂ African American: 1/78	73.13%	1/290
	♂ Ashkenazi Jewish: 1/127	>99%	<1/12,700
	♂ Dutch: 1/91	75.47%	1/371
	♂ European: 1/112	88.33%	1/960
	♂ General: 1/125	80.00%	1/625
	♂ Irish: 1/76	91.30%	1/874
	♂ Irish Travellers: 1/14	>99%	<1/1,400
Cockayne Syndrome: Type A	♂ Christian Arab: Unknown	50.00%	Unknown
Cockayne Syndrome: Type B	♂ General: 1/378	19.30%	1/468
Cohen Syndrome	♂ European: Unknown	19.05%	Unknown
	♂ Finnish: 1/140	67.24%	1/427
	♂ US Amish: 1/12	>99%	<1/1,200
	♂ European: 1/45	93.29%	1/671
Congenital Disorder of Glycosylation: Type 1A: PMM2 Related	♂ General: 1/45	82.35%	1/255
	♂ Danish: 1/71	90.00%	1/710
	♂ Dutch: 1/68	39.29%	1/112
Congenital Disorder of Glycosylation: Type 1B: MPI Related	♂ European: 1/71	55.33%	1/159
	♂ French: Unknown	54.17%	Unknown
Congenital Disorder of Glycosylation: Type 1C: ALG6 Related	♂ French: Unknown	59.09%	Unknown
	♂ General: Unknown	86.21%	Unknown
Congenital Ichthyosis: ABCA12 Related	♂ North African: Unknown	>99%	Unknown
	♂ South Asian: Unknown	66.67%	Unknown
Congenital Insensitivity to Pain with Anhidrosis	♂ Japanese: Unknown	56.52%	Unknown
	♂ Moroccan Jewish: Unknown	>99%	Unknown
Congenital Lipoid Adrenal Hyperplasia	♂ Japanese: 1/201	51.11%	1/411
	♂ Korean: 1/251	63.64%	1/690
Congenital Myasthenic Syndrome: CHRNE Related	♂ European Gypsy: 1/26	>99%	<1/2,600
	♂ North African: Unknown	60.87%	Unknown
Congenital Myasthenic Syndrome: DOK7 Related	♂ European: 1/472	19.05%	1/583
	♂ General: 1/472	18.75%	1/581
Congenital Myasthenic Syndrome: RAPSN Related	♂ General: 1/437	88.57%	1/3,824
	♂ Non-Ashkenazi Jewish: Unknown	>99%	Unknown

Disease	Carrier Rate	Detection Rate	Residual Risk	Disease	Carrier Rate	Detection Rate	Residual Risk	
Congenital Neutropenia: Recessive	♂ English: Unknown	11.76%	Unknown	Familial Dysautonomia	♂ Saudi Arabian: 1/38	>99%	<1/3,800	
	♂ Japanese: Unknown	22.22%	Unknown		♂ Ashkenazi Jewish: 1/31	>99%	<1/3,100	
	♂ Turkish: Unknown	89.47%	Unknown		Familial Hyperinsulinism: Type 1: ABCC8 Related	♂ Ashkenazi Jewish: 1/52	98.75%	1/4,160
Corneal Dystrophy and Perceptive Deafness	♂ General: Unknown	71.43%	Unknown	♂ Finnish: 1/101		45.16%	1/184	
	Corticosterone Methylxidase Deficiency	♂ Iranian Jewish: 1/32	>99%	<1/3,200	Familial Hyperinsulinism: Type 2: KCNJ11 Related	♂ Arab: Unknown	40.00%	Unknown
Crigler-Najjar Syndrome		♂ Sardinians: Unknown	80.00%	Unknown		Familial Mediterranean Fever	♂ Arab: 1/4	51.27%
	♂ Tunisian: Unknown	>99%	Unknown	♂ Armenian: 1/5	94.51%		1/91	
Cystic Fibrosis	♂ African American: 1/62	69.99%	1/207	♂ Ashkenazi Jewish: 1/81	40.95%	1/137		
	♂ Ashkenazi Jewish: 1/23	96.81%	1/721	♂ Iraqi Jewish: 1/4	76.92%	1/17		
	♂ Asian: 1/94	65.42%	1/272	♂ Israeli Jewish: 1/5	62.67%	1/13		
	♂ European: 1/25	94.96%	1/496	♂ Lebanese: 1/6	91.67%	1/72		
	♂ Hispanic American: 1/48	77.32%	1/212	♂ North African Jewish: 1/5	95.69%	1/116		
	♂ Native American: 1/53	84.34%	1/338	♂ Syrian: 1/6	85.14%	1/40		
	Cystinosis	♂ Dutch: 1/194	73.08%	1/721	♂ Turkish: 1/5	74.43%	1/20	
Cystinuria: Non-Type I		♂ French Canadian: 1/40	75.00%	1/160	Fanconi Anemia: Type A	♂ Moroccan Jewish: 1/100	>99%	<1/10,000
		♂ General: 1/194	54.51%	1/426		♂ Spanish Gypsy: 1/67	>99%	<1/6,700
Cystinuria: Type I	♂ European: 1/42	61.11%	1/108	Fanconi Anemia: Type C	♂ Ashkenazi Jewish: 1/101	>99%	<1/10,100	
	♂ General: 1/42	37.50%	1/67		♂ General: Unknown	30.00%	Unknown	
	♂ Libyan Jewish: 1/26	93.48%	1/399	Fanconi Anemia: Type G	♂ Black South African: 1/101	81.82%	1/556	
♂ United States: 1/42	56.25%	1/96	♂ French Canadian: Unknown		87.50%	Unknown		
D-Bifunctional Protein Deficiency	♂ General: 1/159	38.64%	1/259	♂ Japanese: Unknown	75.00%	Unknown		
		♂ Korean: Unknown	66.67%	Unknown				
Diabetes: Recessive Permanent Neonatal	♂ General: Unknown	25.00%	Unknown	Fanconi Anemia: Type J	♂ General: Unknown	86.36%	Unknown	
Du Pan Syndrome	♂ Pakistani: Unknown	>99%	Unknown		Fumarase Deficiency	♂ General: Unknown	30.00%	Unknown
Dyskeratosis Congenita: RTEL1 Related	♂ Ashkenazi Jewish: 1/203	>99%	<1/20,300	GM1-Gangliosidosis	♂ Eurodescent Brazilian: 1/66	62.15%	1/174	
	♂ General: 1/501	50.00%	1/1,002		♂ European: 1/194	50.00%	1/388	
Dystrophic Epidermolysis Bullosa: Recessive	♂ Italian: Unknown	45.00%	Unknown	♂ General: 1/194	20.00%	1/243		
	♂ Mexican American: 1/345	56.25%	1/789	♂ Hispanic American: 1/194	58.33%	1/466		
Ehlers-Danlos Syndrome: Type VIIC	♂ Ashkenazi Jewish: Unknown	>99%	Unknown	♂ Japanese: Unknown	62.82%	Unknown		
Ellis-van Creveld Syndrome: EVC Related	♂ General: 1/123	32.14%	1/181	GRACILE Syndrome	♂ Finnish: 1/109	97.22%	1/3,924	
Ellis-van Creveld Syndrome: EVC2 Related	♂ General: Unknown	<10%	Unknown	Galactokinase Deficiency	♂ Japanese: 1/501	50.00%	1/1,002	
Enhanced S-Cone	♂ Ashkenazi Jewish: Unknown	90.48%	Unknown	Gaucher Disease	♂ Roma: 1/51	>99%	<1/5,100	
	♂ General: Unknown	52.50%	Unknown		♂ Ashkenazi Jewish: 1/15	87.16%	1/117	
Ethylmalonic Aciduria	♂ Arab/Mediterranean: Unknown	29.17%	Unknown	♂ General: 1/112	31.60%	1/164		
	♂ General: Unknown	38.24%	Unknown	♂ Spaniard: Unknown	44.29%	Unknown		
Familial Chloride Diarrhea	♂ Finnish: 1/51	>99%	<1/5,100	♂ Turkish: 1/236	59.38%	1/581		
	♂ Kuwaiti: 1/38	90.00%	1/380	Gitelman Syndrome	♂ European: 1/100	35.00%	1/154	
	♂ Polish: 1/224	45.24%	1/409		♂ European Gypsy: Unknown	>99%	Unknown	
				♂ General: 1/101	30.00%	1/144		
				♂ Taiwanese: Unknown	64.29%	Unknown		



Disease	Carrier Rate	Detection Rate	Residual Risk	Disease	Carrier Rate	Detection Rate	Residual Risk
Globoid Cell Leukodystrophy	♂ Dutch: 1/137	60.98%	1/351	Hemochromatosis: Type 2A: HFE2 Related	♂ European: Unknown	69.23%	Unknown
	♂ European: 1/150	26.47%	1/204		♂ Mediterranean: Unknown	72.73%	Unknown
	♂ Japanese: 1/150	36.00%	1/234		♂ Italian: Unknown	73.21%	Unknown
Glutaric Acidemia: Type I	♂ European: 1/164	57.78%	1/388	Hemochromatosis: Type 3: TFR2 Related	♂ Italian: Unknown	73.21%	Unknown
	♂ General: 1/164	25.51%	1/220	Hemoglobinopathy: Hb C	♂ African American: 1/51	>99%	<1/5,100
	♂ US Amish: 1/12	>99%	<1/1,200	Hemoglobinopathy: Hb D	♂ Canadian: 1/64	>99%	<1/6,400
Glutaric Acidemia: Type IIA	♂ General: Unknown	71.43%	Unknown	♂ Indian: 1/16	>99%	<1/1,600	
Glutaric Acidemia: Type IIB	♂ General: Unknown	33.33%	Unknown	♂ Iranian: 1/11	>99%	<1/1,100	
Glutaric Acidemia: Type IIC	♂ Taiwanese: Unknown	>99%	Unknown	Hemoglobinopathy: Hb E	♂ Cambodia: 1/4	>99%	<1/400
	♂ Turkish: Unknown	80.00%	Unknown	♂ Chinese: 1/13	>99%	<1/1,300	
Glycine Encephalopathy: AMT Related	♂ General: Unknown	40.91%	Unknown	♂ Indian: 1/10	>99%	<1/1,000	
Glycine Encephalopathy: GLDC Related	♂ Finnish: 1/118	78.00%	1/536	♂ Thai: 1/9	>99%	<1/900	
	♂ General: 1/280	12.50%	1/320	Hemoglobinopathy: Hb O	♂ African American: 1/87	>99%	<1/8,700
Glycogen Storage Disease: Type IA	♂ Ashkenazi Jewish: 1/71	>99%	<1/7,100	♂ Middle Eastern: Unknown	>99%	Unknown	
	♂ Chinese: 1/159	80.00%	1/795	Hereditary Fructose Intolerance	♂ European: 1/81	72.73%	1/297
	♂ European: 1/177	76.88%	1/765	♂ Italian: 1/81	90.91%	1/891	
	♂ Hispanic American: 1/177	27.78%	1/245	♂ Slavic: 1/81	>99%	<1/8,100	
	♂ Japanese: 1/177	89.22%	1/1,641	Hereditary Spastic Paraplegia: TECPR2 Related	♂ Bukharan Jewish: 1/75	>99%	<1/7,500
Glycogen Storage Disease: Type IB	♂ Australian: 1/354	50.00%	1/708	Herlitz Junctional Epidermolysis Bullosa: LAMA3 Related	♂ Pakistani: Unknown	>99%	Unknown
	♂ European: 1/354	45.74%	1/652	Herlitz Junctional Epidermolysis Bullosa: LAMB3 Related	♂ European: Unknown	70.00%	Unknown
	♂ Japanese: 1/354	39.13%	1/582	♂ General: 1/781	52.27%	1/1,636	
Glycogen Storage Disease: Type II	♂ African American: 1/60	45.83%	1/111	Herlitz Junctional Epidermolysis Bullosa: LAMC2 Related	♂ Italian: Unknown	28.57%	Unknown
	♂ Chinese: 1/112	72.00%	1/400	Hermansky-Pudlak Syndrome: Type 1	♂ Puerto Rican: 1/22	94.95%	1/436
	♂ European: 1/97	51.76%	1/201	Hermansky-Pudlak Syndrome: Type 3	♂ Ashkenazi Jewish: 1/235	>99%	<1/23,500
	♂ North African: Unknown	60.00%	Unknown	♂ European: 1/434	12.50%	1/496	
Glycogen Storage Disease: Type III	♂ Faroese: 1/30	>99%	<1/3,000	Hermansky-Pudlak Syndrome: Type 4	♂ European: Unknown	54.17%	Unknown
	♂ General: 1/159	39.81%	1/264	Holocarboxylase Synthetase Deficiency	♂ European: 1/148	83.33%	1/888
	♂ North African Jewish: 1/35	>99%	<1/3,500	♂ Japanese: 1/159	76.92%	1/689	
Glycogen Storage Disease: Type IV	♂ Ashkenazi Jewish: 1/35	>99%	<1/3,500	Homocystinuria Caused by CBS Deficiency	♂ European: 1/224	64.29%	1/627
	♂ General: 1/461	18.60%	1/566	♂ Irish: 1/128	70.59%	1/435	
Glycogen Storage Disease: Type V	♂ Caucasus Jewish: Unknown	>99%	Unknown	♂ Italian: 1/224	35.71%	1/348	
	♂ European: 1/159	60.71%	1/405	♂ Norwegian: 1/41	84.38%	1/262	
	♂ General: Unknown	74.10%	Unknown	♂ Qatari: 1/22	>99%	<1/2,200	
	♂ Spaniard: 1/159	67.11%	1/483	♂ Saudi Arabian: Unknown	92.31%	Unknown	
	♂ Yemenite Jewish: Unknown	75.00%	Unknown	Hurler Syndrome	♂ Czech: 1/190	52.50%	1/400
Glycogen Storage Disease: Type VII	♂ Ashkenazi Jewish: 1/250	>99%	<1/25,000	♂ European: 1/194	81.71%	1/1,061	
Guanidinoacetate Methyltransferase Deficiency	♂ General: Unknown	29.41%	Unknown	♂ General: 1/194	62.50%	1/517	
HMG-CoA Lyase Deficiency	♂ General: 1/159	40.00%	1/265	♂ Italian: 1/194	61.11%	1/499	
	♂ Japanese: Unknown	30.00%	Unknown	♂ Japanese: 1/194	23.68%	1/254	
	♂ Portuguese: Unknown	86.36%	Unknown	♂ Moroccan Jewish: 1/194	92.31%	1/2,522	
	♂ Saudi Arabian: Unknown	93.33%	Unknown	♂ Scandinavian: 1/194	79.41%	1/942	

Disease	Carrier Rate	Detection Rate	Residual Risk	Disease	Carrier Rate	Detection Rate	Residual Risk
Hypophosphatasia	♂ Spaniard: 1/194	52.50%	1/408	Limb-Girdle Muscular Dystrophy: Type 2E	♂ Brazilian: Unknown	57.14%	Unknown
	♂ Canadian Amish: 1/26	>99%	<1/2,600		♂ European: 1/539	25.00%	1/719
	♂ European: 1/159	19.23%	1/197		♂ General: Unknown	12.50%	Unknown
Inclusion Body Myopathy: Type 2	♂ Japanese: Unknown	54.55%	Unknown	♂ US Amish: Unknown	>99%	Unknown	
	♂ General: Unknown	85.83%	Unknown	Limb-Girdle Muscular Dystrophy: Type 2F	♂ Brazilian: Unknown	>99%	Unknown
	♂ Iranian Jewish: 1/16	>99%	<1/1,600		♂ General: Unknown	83.33%	Unknown
	♂ Japanese: Unknown	71.88%	Unknown	Limb-Girdle Muscular Dystrophy: Type 2I	♂ Brazilian: Unknown	34.62%	Unknown
♂ Korean: Unknown	72.50%	Unknown	♂ Danish: 1/100		85.53%	1/691	
Infantile Cerebral and Cerebellar Atrophy	♂ Caucasus Jewish: 1/20	>99%	<1/2,000	♂ General: Unknown	43.18%	Unknown	
Isolated Microphthalmia: VSX2 Related	♂ Middle Eastern: Unknown	71.43%	Unknown	♂ German: 1/300	82.50%	1/1,714	
Isovaleric Acidemia	♂ General: 1/251	47.37%	1/477	Lipoprotein Lipase Deficiency	♂ French Canadian: 1/44	28.95%	1/62
Joubert Syndrome	♂ Ashkenazi Jewish: 1/92	>99%	<1/9,200		♂ General: Unknown	20.00%	Unknown
Lamellar Ichthyosis: Type 1	♂ Norwegian: 1/151	81.40%	1/812	Long-Chain 3-Hydroxyacyl-CoA Dehydrogenase Deficiency	♂ European: 1/126	88.98%	1/1,144
Laryngoonychocutaneous Syndrome	♂ Pakistani: Unknown	>99%	Unknown		♂ General: 1/126	56.25%	1/288
Leber Congenital Amaurosis: CEP290 Related	♂ European: 1/251	47.32%	1/476	Lysinuric Protein Intolerance	♂ Finnish: 1/123	>99%	<1/12,300
Leber Congenital Amaurosis: GUCY2D Related	♂ Finnish: Unknown	>99%	Unknown		♂ Italian: 1/120	45.45%	1/220
Leber Congenital Amaurosis: LCA5 Related	♂ Pakistani: Unknown	83.33%	Unknown	♂ Japanese: 1/115	37.93%	1/185	
Leber Congenital Amaurosis: RDH12 Related	♂ General: 1/560	38.37%	1/909	♂ North African: Unknown	>99%	Unknown	
Leigh Syndrome: French-Canadian	♂ French Canadian: 1/23	95.45%	1/506	MTHFR Deficiency: Severe	♂ Bukharan Jewish: 1/39	>99%	<1/3,900
Leukoencephalopathy with Vanishing White Matter: EIF2B5 Related	♂ Cree: Unknown	>99%	Unknown	Malonyl-CoA Decarboxylase Deficiency	♂ General: Unknown	33.33%	Unknown
Leydig Cell Hypoplasia (Luteinizing Hormone Resistance)	♂ European: Unknown	65.22%	Unknown	Maple Syrup Urine Disease: Type 1A	♂ US Amish: 1/10	97.73%	1/440
	♂ Brazilian: Unknown	>99%	Unknown	Maple Syrup Urine Disease: Type 1B	♂ Ashkenazi Jewish: 1/97	>99%	<1/9,700
Limb-Girdle Muscular Dystrophy: Type 2A	♂ Basque: 1/61	61.46%	1/158	Maple Syrup Urine Disease: Type 2	♂ General: 1/481	42.31%	1/834
	♂ Croatian: 1/133	76.00%	1/554	♂ Norwegian: 1/481	50.00%	1/962	
	♂ European: 1/103	17.23%	1/124	♂ Turkish: 1/112	58.33%	1/269	
	♂ General: 1/103	26.47%	1/140	Maple Syrup Urine Disease: Type 3	♂ Ashkenazi Jewish: 1/94	>99%	<1/9,400
	♂ Italian: 1/162	35.71%	1/252		♂ General: Unknown	68.75%	Unknown
	♂ Russian: 1/103	53.33%	1/221	Maroteaux-Lamy Syndrome	♂ Argentinian: 1/274	75.00%	1/1,096
	♂ US Amish: Unknown	>99%	Unknown		♂ General: 1/388	61.54%	1/1,009
Limb-Girdle Muscular Dystrophy: Type 2B	♂ Caucasus Jewish: 1/25	>99%	<1/2,500	♂ Spaniard: 1/274	29.17%	1/387	
	♂ Libyan Jewish: 1/19	>99%	<1/1,900	Meckel Syndrome: Type 1	♂ European: 1/212	72.22%	1/763
Limb-Girdle Muscular Dystrophy: Type 2C	♂ European Gypsy: 1/50	>99%	<1/5,000	♂ Finnish: 1/48	>99%	<1/4,800	
	♂ General: Unknown	60.00%	Unknown	Medium-Chain Acyl-CoA Dehydrogenase Deficiency	♂ European: 1/50	90.91%	1/550
	♂ Tunisian: Unknown	>99%	Unknown		♂ Saudi Arabian: 1/68	95.00%	1/1,360
	♂ Brazilian: Unknown	64.29%	Unknown	♂ United Kingdom: 1/51	90.00%	1/510	
Limb-Girdle Muscular Dystrophy: Type 2D	♂ European: 1/288	22.22%	1/370	Megalencephalic Leukoencephalopathy	♂ Japanese: Unknown	50.00%	Unknown
	♂ Finnish: 1/150	95.45%	1/3,300		♂ Libyan Jewish: 1/40	>99%	<1/4,000
	♂ General: Unknown	26.09%	Unknown	♂ Turkish: Unknown	20.00%	Unknown	
				Metachromatic Leukodystrophy	♂ European: 1/150	43.88%	1/267
					♂ Habbanite Jewish: 1/5	50.00%	1/10

Disease	Carrier Rate	Detection Rate	Residual Risk
Methylmalonic Acidemia: MMAA Related	♂ General: 1/274	63.51%	1/751
Methylmalonic Acidemia: MMAB Related	♂ General: 1/396	71.25%	1/1,377
Methylmalonic Acidemia: MUT Related	♂ General: 1/177	43.62%	1/314
Methylmalonic Aciduria and Homocystinuria: Type cblC	♂ Chinese: Unknown	61.39%	Unknown
	♂ General: 1/159	65.74%	1/464
	♂ Italian: Unknown	75.00%	Unknown
Mitochondrial Complex I Deficiency: NDUFS6 Related	♂ Portuguese: Unknown	91.18%	Unknown
	♂ Caucasus Jewish: 1/24	>99%	<1/2,400
Mitochondrial DNA Depletion Syndrome: MNGIE Type	♂ Ashkenazi Jewish: Unknown	>99%	Unknown
	♂ General: Unknown	47.37%	Unknown
	♂ Iranian Jewish: Unknown	>99%	Unknown
Mitochondrial Myopathy and Sideroblastic Anemia	♂ Iranian Jewish: Unknown	>99%	Unknown
Mitochondrial Trifunctional Protein Deficiency: HADHB Related	♂ Japanese: Unknown	60.00%	Unknown
Morquio Syndrome: Type A	♂ Colombian: 1/257	85.00%	1/1,713
	♂ European: 1/257	20.97%	1/325
	♂ Finnish: 1/257	50.00%	1/514
	♂ Latin American: 1/257	36.11%	1/402
Morquio Syndrome: Type B	♂ European: Unknown	83.33%	Unknown
Mucopolipidosis: Type II/III	♂ General: 1/158	24.60%	1/210
	♂ Japanese: 1/252	51.25%	1/517
	♂ Korean: Unknown	30.00%	Unknown
	♂ Portuguese: 1/176	50.00%	1/352
Mucopolipidosis: Type IV	♂ Ashkenazi Jewish: 1/97	96.15%	1/2,522
Multiple Pterygium Syndrome	♂ European: Unknown	41.67%	Unknown
	♂ Middle Eastern: Unknown	60.00%	Unknown
Multiple Sulfatase Deficiency	♂ Pakistani: Unknown	50.00%	Unknown
	♂ Ashkenazi Jewish: 1/320	95.00%	1/6,400
	♂ General: 1/501	18.18%	1/612
Muscle-Eye-Brain Disease	♂ European: Unknown	54.17%	Unknown
	♂ Finnish: 1/112	97.37%	1/4,256
	♂ General: Unknown	23.53%	Unknown
	♂ United States: Unknown	25.00%	Unknown
Navajo Neurohepatopathy	♂ Navajo: 1/39	>99%	<1/3,900
Nemaline Myopathy: NEB Related	♂ Ashkenazi Jewish: 1/108	>99%	<1/10,800
Nephrotic Syndrome: Type 1	♂ Finnish: 1/45	76.84%	1/194
	♂ US Amish: 1/12	50.00%	1/24
Nephrotic Syndrome: Type 2	♂ Israeli-Arab: Unknown	55.56%	Unknown
	♂ Pakistani: Unknown	20.00%	Unknown
	♂ Polish: Unknown	16.18%	Unknown
	♂ Saudi Arabian: Unknown	72.73%	Unknown

Disease	Carrier Rate	Detection Rate	Residual Risk
Neuronal Ceroid-Lipofuscinosis: CLN5 Related	♂ Finnish: 1/101	>99%	<1/10,100
Neuronal Ceroid-Lipofuscinosis: CLN6 Related	♂ European: 1/159	36.36%	1/250
	♂ General: 1/159	59.52%	1/393
	♂ Portuguese: 1/128	81.00%	1/674
Neuronal Ceroid-Lipofuscinosis: CLN8 Related	♂ Finnish: 1/135	>99%	<1/13,500
	♂ Italian: 1/212	33.33%	1/318
	♂ Turkish: Unknown	77.78%	Unknown
Neuronal Ceroid-Lipofuscinosis: MFSD8 Related	♂ General: 1/159	56.25%	1/363
Neuronal Ceroid-Lipofuscinosis: PPT1 Related	♂ Finnish: 1/58	97.62%	1/2,436
	♂ General: 1/159	72.50%	1/578
Neuronal Ceroid-Lipofuscinosis: TPP1 Related	♂ Canadian: 1/159	67.50%	1/489
	♂ European: 1/159	75.00%	1/636
	♂ General: 1/159	50.00%	1/318
	♂ Newfoundlander: 1/43	85.29%	1/292
Niemann-Pick Disease: Type A	♂ Ashkenazi Jewish: 1/101	95.00%	1/2,020
Niemann-Pick Disease: Type B	♂ Czech: 1/276	83.33%	1/1,656
	♂ General: Unknown	19.82%	Unknown
	♂ North African: Unknown	86.67%	Unknown
	♂ Spaniard: Unknown	38.10%	Unknown
Niemann-Pick Disease: Type C1	♂ Acadian: Unknown	>99%	Unknown
	♂ General: 1/194	15.60%	1/230
	♂ Japanese: Unknown	18.18%	Unknown
	♂ Portuguese: 1/194	25.00%	1/259
Niemann-Pick Disease: Type C2	♂ General: 1/194	75.00%	1/776
Nijmegen Breakage Syndrome	♂ Eastern European: 1/155	>99%	<1/15,500
Nonsyndromic Hearing Loss and Deafness: GJB2 Related	♂ Ashkenazi Jewish: 1/20	95.83%	1/480
	♂ Chinese: 1/100	82.26%	1/564
	♂ European: 1/53	82.47%	1/302
	♂ Ghanaian: Unknown	90.91%	Unknown
Nonsyndromic Hearing Loss and Deafness: LOXHD1 Related	♂ Indian: Unknown	66.98%	Unknown
	♂ Israeli: 1/16	93.10%	1/232
	♂ Japanese: 1/75	75.00%	1/300
Nonsyndromic Hearing Loss and Deafness: MYO15A Related	♂ Roma: Unknown	>99%	Unknown
	♂ United States: 1/34	45.22%	1/62
	♂ Ashkenazi Jewish: 1/180	>99%	<1/18,000
Oculocutaneous Albinism: Type 1	♂ Balinese: 1/6	>99%	<1/600
	♂ Pakistani: 1/77	24.00%	1/101
	♂ European: 1/101	26.32%	1/137
	♂ Hutterite: 1/7	>99%	<1/700
	♂ Moroccan Jewish: 1/30	71.88%	1/107

Disease	Carrier Rate	Detection Rate	Residual Risk
	♂ Puerto Rican: Unknown	91.67%	Unknown
Oculocutaneous Albinism: Type 3	♂ Black South African: 1/47	94.74%	1/893
Oculocutaneous Albinism: Type 4	♂ Japanese: 1/146	58.33%	1/350
Omenn Syndrome: DCLRE1C Related	♂ Apache: 1/29	>99%	<1/2,900
	♂ Navajo: 1/29	97.22%	1/1,044
Omenn Syndrome: RAG2 Related	♂ Arab: Unknown	40.00%	Unknown
	♂ Non-Ashkenazi Jewish: Unknown	70.00%	Unknown
Ornithine Translocase Deficiency	♂ French Canadian: 1/20	95.00%	1/400
	♂ Italian: Unknown	18.75%	Unknown
	♂ Japanese: Unknown	60.00%	Unknown
Osteopetrosis: TCIRG1 Related	♂ Ashkenazi Jewish: 1/350	>99%	<1/35,000
	♂ Costa Rican: Unknown	>99%	Unknown
	♂ General: 1/251	25.00%	1/335
POLG Related Disorders: Autosomal Recessive	♂ Belgian: Unknown	85.00%	Unknown
	♂ Finnish: 1/140	>99%	<1/14,000
	♂ General: Unknown	93.10%	Unknown
	♂ Norwegian: Unknown	>99%	Unknown
Papillon-Lefevre Syndrome	♂ General: Unknown	35.29%	Unknown
	♂ Indian Jewish: Unknown	>99%	Unknown
	♂ Turkish: Unknown	50.00%	Unknown
Pendred Syndrome	♂ European: 1/58	42.11%	1/100
	♂ Japanese: Unknown	45.83%	Unknown
	♂ Pakistani: Unknown	29.82%	Unknown
Persistent Mullerian Duct Syndrome: Type I	♂ General: Unknown	28.12%	Unknown
Persistent Mullerian Duct Syndrome: Type II	♂ General: Unknown	78.12%	Unknown
Phenylalanine Hydroxylase Deficiency	♂ Arab: Unknown	46.08%	Unknown
	♂ Ashkenazi Jewish: 1/224	44.44%	1/403
	♂ Brazilian: 1/71	56.41%	1/163
	♂ Chinese: 1/51	76.57%	1/218
	♂ Cuban: 1/71	69.64%	1/234
	♂ European: 1/51	73.00%	1/189
	♂ French Canadian: 1/80	76.27%	1/337
	♂ Iranian: 1/31	66.94%	1/94
	♂ Korean: 1/51	57.58%	1/120
	♂ Non-Ashkenazi Jewish: Unknown	63.64%	Unknown
	♂ Slovakian Gypsy: 1/39	>99%	<1/3,900
	♂ Spanish Gypsy: 1/4	93.75%	1/64
	♂ Taiwanese: Unknown	83.10%	Unknown
	♂ US Amish: 1/16	86.84%	1/122
Polyglandular Autoimmune Syndrome: Type I	♂ Finnish: 1/80	90.48%	1/840
	♂ Iranian Jewish: 1/48	>99%	<1/4,800

Disease	Carrier Rate	Detection Rate	Residual Risk
	♂ Italian: Unknown	27.78%	Unknown
	♂ Norwegian: 1/142	47.92%	1/273
	♂ Sardinians: 1/61	81.82%	1/336
	♂ United Kingdom: Unknown	70.00%	Unknown
	♂ United States: Unknown	65.62%	Unknown
Pontocerebellar Hypoplasia: EXOSC3 Related	♂ General: Unknown	83.33%	Unknown
Pontocerebellar Hypoplasia: RARS2 Related	♂ Sephardic Jewish: Unknown	>99%	Unknown
Pontocerebellar Hypoplasia: SEPSECS Related	♂ Iraqi Jewish: 1/42	>99%	<1/4,200
Pontocerebellar Hypoplasia: TSEN54 Related	♂ European: 1/250	95.65%	1/5,750
Pontocerebellar Hypoplasia: VPS53 Related	♂ Moroccan Jewish: 1/37	>99%	<1/3,700
Pontocerebellar Hypoplasia: VRK1 Related	♂ Ashkenazi Jewish: 1/225	>99%	<1/22,500
Primary Carnitine Deficiency	♂ European: 1/101	58.33%	1/242
	♂ Faroese: 1/9	53.95%	1/20
	♂ General: Unknown	20.22%	Unknown
Primary Ciliary Dyskinesia: DNAI1 Related	♂ European: 1/211	52.38%	1/443
Primary Ciliary Dyskinesia: DNAI2 Related	♂ Ashkenazi Jewish: 1/200	>99%	<1/20,000
Primary Congenital Glaucoma	♂ Moroccan: Unknown	>99%	Unknown
	♂ Saudi Arabian: 1/23	91.67%	1/276
	♂ Turkish: 1/51	70.59%	1/173
Primary Hyperoxaluria: Type 1	♂ Dutch: 1/174	62.12%	1/459
	♂ General: 1/189	52.68%	1/399
Primary Hyperoxaluria: Type 2	♂ General: Unknown	70.31%	Unknown
Primary Hyperoxaluria: Type 3	♂ Ashkenazi Jewish: Unknown	>99%	Unknown
	♂ European: Unknown	25.00%	Unknown
Progressive Familial Intrahepatic Cholestasis: Type 2	♂ European: Unknown	33.33%	Unknown
Propionic Acidemia: PCCA Related	♂ Japanese: 1/102	86.67%	1/765
Propionic Acidemia: PCCB Related	♂ General: 1/182	42.86%	1/319
	♂ Greenlandic Inuit: 1/16	58.33%	1/38
	♂ Japanese: 1/102	78.00%	1/464
	♂ Korean: Unknown	56.25%	Unknown
	♂ Latin American: 1/182	75.00%	1/728
	♂ Spaniard: 1/182	52.38%	1/382
Pseudocholinesterase Deficiency	♂ General: 1/33	65.00%	1/94
	♂ Iranian Jewish: 1/9	>99%	<1/900
Pycnodysostosis	♂ Danish: Unknown	87.50%	Unknown
Pyruvate Carboxylase Deficiency	♂ General: 1/251	62.50%	1/669
	♂ Native American: 1/10	>99%	<1/1,000
Pyruvate Dehydrogenase Deficiency	♂ General: Unknown	50.00%	Unknown

Disease	Carrier Rate	Detection Rate	Residual Risk
Renal Tubular Acidosis and Deafness	♂ Colombian (Antioquia): Unknown	92.86%	Unknown
Retinal Dystrophies: RLBP1 Related	♂ Newfoundlander: 1/106	>99%	<1/10,600
	♂ Swedish: 1/84	>99%	<1/8,400
Retinal Dystrophies: RPE65 Related	♂ Dutch: 1/32	>99%	<1/3,200
	♂ North African Jewish: Unknown	>99%	Unknown
Retinitis Pigmentosa: CERKL Related	♂ Yemenite Jewish: Unknown	>99%	Unknown
Retinitis Pigmentosa: DHDDS Related	♂ Ashkenazi Jewish: 1/91	>99%	<1/9,100
Retinitis Pigmentosa: FAM161A Related	♂ Ashkenazi Jewish: Unknown	>99%	Unknown
	♂ Non-Ashkenazi Jewish: 1/32	>99%	<1/3,200
Rhizomelic Chondrodysplasia Punctata: Type I	♂ General: 1/159	72.68%	1/582
Salla Disease	♂ European: Unknown	33.33%	Unknown
	♂ Scandinavian: 1/200	94.27%	1/3,491
Sandhoff Disease	♂ Argentinian: Unknown	95.45%	Unknown
	♂ Cypriot: 1/7	80.00%	1/35
	♂ Italian: Unknown	29.17%	Unknown
	♂ Spaniard: Unknown	64.29%	Unknown
Sanfilippo Syndrome: Type A	♂ Australasian: 1/119	44.12%	1/213
	♂ Dutch: 1/78	63.10%	1/211
	♂ European: 1/159	35.16%	1/245
	♂ United States: 1/159	32.14%	1/234
Sanfilippo Syndrome: Type B	♂ Australasian: 1/230	28.00%	1/319
	♂ Dutch: Unknown	42.31%	Unknown
	♂ European: Unknown	52.38%	Unknown
	♂ Japanese: 1/200	81.82%	1/1,100
Sanfilippo Syndrome: Type C	♂ Dutch: 1/346	75.00%	1/1,384
	♂ Greek: 1/415	25.00%	1/553
	♂ Moroccan: Unknown	80.00%	Unknown
	♂ Spaniard: Unknown	64.29%	Unknown
Sanfilippo Syndrome: Type D	♂ General: 1/501	83.33%	1/3,006
Short-Chain Acyl-CoA Dehydrogenase Deficiency	♂ Ashkenazi Jewish: 1/15	65.00%	1/43
Sickle-Cell Anemia	♂ African American: 1/10	>99%	<1/1,000
	♂ Hispanic American: 1/95	>99%	<1/9,500
Sjogren-Larsson Syndrome	♂ Dutch: Unknown	25.86%	Unknown
	♂ Swedish: 1/205	>99%	<1/20,500
Sly Syndrome	♂ General: 1/251	35.71%	1/390
Smith-Lemli-Opitz Syndrome	♂ Brazilian: 1/94	79.17%	1/451
	♂ European: 1/71	84.72%	1/465
	♂ Japanese: Unknown	71.43%	Unknown
	♂ United States: 1/70	95.00%	1/1,400
Stargardt Disease	♂ General: 1/51	17.51%	1/62
Stuve-Wiedemann Syndrome	♂ Emirati: 1/70	>99%	<1/7,000

Disease	Carrier Rate	Detection Rate	Residual Risk
	♂ General: Unknown	75.00%	Unknown
Sulfate Transporter-Related Osteochondrodysplasia	♂ Finnish: 1/51	95.83%	1/1,224
	♂ General: 1/100	70.00%	1/333
Tay-Sachs Disease	♂ Argentinian: 1/280	82.35%	1/1,587
	♂ Ashkenazi Jewish: 1/29	99.53%	1/6,177
	♂ Cajun: 1/30	>99%	<1/3,000
	♂ European: 1/280	25.35%	1/375
	♂ General: 1/280	32.09%	1/412
	♂ Indian: Unknown	85.71%	Unknown
	♂ Iraqi Jewish: 1/140	56.25%	1/320
	♂ Japanese: 1/127	82.81%	1/739
	♂ Moroccan Jewish: 1/110	22.22%	1/141
	♂ Portuguese: 1/280	92.31%	1/3,640
	♂ Spaniard: 1/280	67.65%	1/865
	♂ United Kingdom: 1/161	71.43%	1/564
Trichohepatoenteric Syndrome: Type 1	♂ European: 1/434	42.86%	1/760
	♂ South Asian: 1/434	66.67%	1/1,302
Tyrosine Hydroxylase Deficiency	♂ General: Unknown	36.11%	Unknown
Tyrosinemia: Type I	♂ Ashkenazi Jewish: 1/158	>99%	<1/15,800
	♂ European: 1/166	57.14%	1/387
	♂ Finnish: 1/123	97.22%	1/4,428
	♂ French Canadian: 1/64	96.30%	1/1,728
	♂ Pakistani: Unknown	92.86%	Unknown
Tyrosinemia: Type II	♂ General: 1/251	40.00%	1/418
Usher Syndrome: Type 1B	♂ European: 1/166	39.29%	1/273
	♂ General: 1/143	12.89%	1/164
	♂ North African: Unknown	66.67%	Unknown
	♂ Spaniard: 1/152	12.16%	1/173
Usher Syndrome: Type 1C	♂ Acadian: 1/82	98.86%	1/7,216
	♂ French Canadian: 1/227	83.33%	1/1,362
Usher Syndrome: Type 1D	♂ General: 1/296	24.39%	1/391
Usher Syndrome: Type 1F	♂ Ashkenazi Jewish: 1/126	93.75%	1/2,016
Usher Syndrome: Type 2A	♂ Chinese: Unknown	83.33%	Unknown
	♂ European: 1/136	40.00%	1/227
	♂ French Canadian: Unknown	66.67%	Unknown
	♂ General: 1/136	46.92%	1/256
	♂ Japanese: Unknown	55.56%	Unknown
	♂ Non-Ashkenazi Jewish: Unknown	61.11%	Unknown
	♂ Scandinavian: 1/125	39.22%	1/206
	♂ Spaniard: 1/133	39.02%	1/218
Usher Syndrome: Type 3	♂ Ashkenazi Jewish: 1/120	>99%	<1/12,000
	♂ Finnish: 1/134	>99%	<1/13,400

Disease	Carrier Rate	Detection Rate	Residual Risk
Very Long-Chain Acyl-CoA Dehydrogenase Deficiency	♂ General: 1/87	65.28%	1/251
Walker-Warburg Syndrome	♂ Ashkenazi Jewish: 1/150	>99%	<1/15,000
Werner Syndrome	♂ General: 1/224	31.25%	1/326
	♂ Japanese: 1/87	65.62%	1/253
Wilson Disease	♂ Ashkenazi Jewish: 1/100	>99%	<1/10,000
	♂ Canarian: 1/26	68.75%	1/83
	♂ Chinese: 1/51	55.97%	1/116
	♂ Cuban: Unknown	22.22%	Unknown
	♂ European: 1/93	41.64%	1/159
	♂ Greek: 1/90	44.94%	1/163
	♂ Korean: 1/88	51.53%	1/182
	♂ Spaniard: 1/93	38.18%	1/150
Wolcott-Rallison Syndrome	♂ Saudi Arabian: Unknown	66.67%	Unknown
Wolman Disease	♂ Iranian Jewish: 1/33	>99%	<1/3,300
Xeroderma Pigmentosum: Group A	♂ Japanese: 1/75	97.62%	1/3,150
	♂ North African: Unknown	87.50%	Unknown
	♂ Tunisian: 1/112	90.91%	1/1,232
Xeroderma Pigmentosum: Group C	♂ Moroccan: 1/71	76.19%	1/298
	♂ Tunisian: 1/51	>99%	<1/5,100
Zellweger Spectrum Disorders: PEX1 Related	♂ European: 1/139	70.27%	1/468
	♂ General: 1/139	67.84%	1/432
Zellweger Spectrum Disorders: PEX10 Related	♂ Japanese: Unknown	40.74%	Unknown
Zellweger Spectrum Disorders: PEX2 Related	♂ Ashkenazi Jewish: 1/123	>99%	<1/12,300
Zellweger Spectrum Disorders: PEX6 Related	♂ General: 1/288	30.00%	1/411