CGT Exome v3.1.2

Patient Information		Sample Information		Clinic Information	
Unique pat id.:	0070978 - 15426995	**Sample type:**	Blood	**Clinic:**	WeFIV
Patient name:		**Date of draw:**	25/01/2022	**Doctor:**	FLORENCIA DATRI
Patient DOB:		**Date of receipt:**	27/01/2022		
Ethnic group:	Caucasian	**Report date/time:**	28/02/2026		
Indication:	No family history				

TEST RESULTS

POSITIVE

The individual is carrier of:

Alpha-1 antitrypsin deficiency

Gene :	SERPINA1	**Allele:**	Het
DNA Change:	NM_000295.4:c.863A>T	**Inheritance:**	AR
Protein change:	p.Glu288Val	**OMIM phenotype:**	613490
Variant classification:	Pathogenic		

Ciliary dyskinesia, primary, type 18

Gene :	DNAAF5	**Allele:**	Het
DNA Change:	NM_017802.3:c.781G>A	**Inheritance:**	AR
Protein change:	p.Val261Ile	**OMIM phenotype:**	614874
Variant classification:	Pathogenic		

Ciliary dyskinesia, primary, type 9, with or without situs inversus

Gene :	DNAI2	**Allele:**	Het
DNA Change:	NM_023036.4:c.1494+1G>A	**Inheritance:**	AR
Protein change:	-	**OMIM phenotype:**	612444
Variant classification:	Pathogenic		

Ichthyosis, congenital, autosomal recessive, type 5

Gene :	CYP4F22	**Allele:**	Het
DNA Change:	NM_173483.3:c.1303C>T	**Inheritance:**	AR
Protein change:	p.His435Tyr	**OMIM phenotype:**	604777
Variant classification:	Pathogenic		

Methylmalonic aciduria, vitamin B12-responsive

Gene :	MMAA	**Allele:**	Het
DNA Change:	NM_172250.2:c.358C>T	**Inheritance:**	AR
Protein change:	p.Gln120*	**OMIM phenotype:**	251100
Variant classification:	Pathogenic		

INTERPRETATION OF TEST RESULTS

En general, este resultado positivo no supone implicaciones clínicas para la persona portadora, ya que existe otra copia normal de los genes recesivos indicados en la tabla que aporta información suficiente para una correcta función biológica. De cara a la descendencia, la probabilidad de transmisión de esta/s variante/s es del 50% de forma independiente para cada una de ellas. Para reducir el riesgo de tener descendencia afectada, la pareja o donante de gametos debe ser negativa para los genes incluidos en la tabla. Esta información podría ser clínicamente relevante para sus familiares directos y para su descendencia.
Si un paciente y su pareja reproductiva son portadores de una mutación en el mismo gen asociado a herencia recesiva, existe un 25% de riesgo de descendencia afectada.
El riesgo de tener hijos afectados por enfermedades causadas por aquellos genes analizados en el test y en los que no se ha identificado mutación disminuye de forma significativa respecto al de la población general, incluso aunque la pareja, o donante de gametos, sea portador/a de mutaciones en dichos genes. No obstante, debido a las limitaciones asociadas a cualquier prueba genética el riesgo no es cero (ver apartado de limitaciones del presente informe y del consentimiento informado).

LOW COVERAGE VARIANTS

There are no low coverage variants.

TEST DESCRIPTION

The Carrier Genetic Test (CGT) is a preconception DNA screening test that aims to identify individuals and couples at increased risk of conceiving children affected by a monogenic disease. Knowledge of this risk may influence a couple's decision to conceive or encourage the couple to adopt preventive measures, including preimplantation genetic testing for the at risk disease (PGT-M) prenatal genetic testing, or to use donated gametes. The multigene CGT interrogates thousands of DNA variants using a high-throughput technology (Next Generation Sequencing, NGS).

COMMENTS

Request for a report in English.

TEST METHODOLOGY

1.DNA extraction from the biological sample. 2. Next Generation Sequencing of gene regions where known mutations are located (list available at https://cgt.igenomix.com/diseases-list/). 3. Raw data analysis using bioinformatics. QC parameters require that more than 99.7% of the tested variants have coverage greater than the minimum read depth (10x). 4. Complementary testing by other techniques for: a) SMN1 gene: exon 7 deletion; exon 7-8 deletion; b) CYP21A2 gene: frequent mutations (https://cgt.igenomix.com/diseases-list/); c) HBA1/HBA2 genes: frequent deletions (https://cgt.igenomix.com/diseases-list/); d) FMR1 gene: CGG repeat sizing (females only); e) DMD gene: frequent deletions and duplications (females only); f) F8 gene: intron 22 inversion (females only).

TEST LIMITATIONS

The CGT test only includes analysis of the specific variants included into the list at https://cgt.igenomix.com/diseases-list/, and no others. Therefore, the CGT test does not cover all monogenic diseases nor 100% of disease-causing mutations for each tested gene. The test does not include the analysis of conditions associated with mitochondrial DNA, multifactorial, digenic or dominant inheritance. The test does not detect large rearrangements (inversions, deletions and duplications more than 15 nucleotides), mutations located in regulatory regions or intronic regions outside the +/-3bp cut off or in low sequence coverage areas. DNA changes caused by trinucleotide repeat expansions are not detected, except those indicated in the methodology section. Finally, if our assessment of a variant fails to meet our QC parameters due to low coverage, a result for the variant(s) will not be issued. The analytical detection rate is higher than 99%. The clinical sensitivity varies among conditions (e.g.: for HEXB gene, 30% of affected patients are carriers of a 16 kb deletion that is not included in the test). The sensitivity for SMN1 is approximately 96% because point mutations or small ins/del are not analyzed and, for a normal result (2 copies detected), it is not possible to be certain that the two copies are each in one of the two alleles (non-carrier) or if both are in the same allele (cis) and no copies in the other (carrier).
A negative result for the variants included in CGT does not exclude the possibility of being a carrier. The presence of pseudogenes and/or rare polymorphisms and/or homopolymers may lead to false negative or false positive results. A negative result for the CGT variants does not exclude the possibility of a de novo mutation being present in the offspring. Germline mosaicism or low-level somatic mosaicism cannot be detected. As with any laboratory test, there is a small chance that this result may be inaccurate for a procedural reason such as an error during sample collection, labelling, processing, data collection or interpretation. Please note that the classification of variants can change over time. To check whether there have been any changes to the classification of reported variants, please contact IGENOMIX.

LEGAL/QUALITY

IGENOMIX ARGENTINA S.A will only release the report once a completed test requisition form is received. The clinic/clinician/certified health professional requesting the test is responsible for obtaining and taking custody of "Informed Consent" from the patient as depicted by national guidelines and/or legislation. This test was developed, and its performance characteristics determined by IGENOMIX SPAIN LAB, SLU. It has not been cleared or approved by the US Food and Drug Administration. The test is used as a laboratory developed test for clinical purposes.

Part of this test has been outsourced to a reference laboratory whose Quality Management System is based on high Quality Standards, periodically monitored by Igenomix SPAIN* and audited by independent external groups.

*IGENOMIX SPAIN holds CLIA Certificate of Compliance: #99D2146167.

EXEMPTION CLAUSE OF DIAGNOSTIC LIABILITY

The genetic diagnosis services carried out by IGENOMIX ARGENTINA S.A are exclusively intended to be interpreted by qualified/certified health professionals.

The result obtained by this test and the information that could be derived from it, cannot be considered in any case as substitute of genetic counselling or medical treatment by a trained professional neither represent itself a medical enquiry. We recommend that you consult your physician for genetic testing & counselling upon reception of your results.

Any result should be interpreted in the context of all available clinical findings, within the general context of a medical investigation, which must be conducted by clinically trained professionals. IGENOMIX ARGENTINA S.A is not responsible for any decisions made or actions undertaken by the contracting party based on the results provided by IGENOMIX ARGENTINA S.A or otherwise., nor the harmful temporary consequences diverted by its use, making specific discretion of taking appropriate legal measures assuming an improper use of those mentioned studies and analysis.

SIGNED	COUNTERSIGNED
	
Camila Ayala Lira da Cruz 113163 Diagnostic Coordinator LATAM	**Sofia Villanueva** Embryologist

This test or part of this test has been outsourced to a referral Laboratory. Lab CLIA No.: 99D2146167

Alpha-1 antitrypsin deficiency

What is Alpha-1 antitrypsin deficiency?

Alpha-1-antitrypsin deficiency is an autosomal recessive disorder caused by mutation in the SERPINA1 gene (107400). The most common manifestation is emphysema (difficulty breathing, a hacking cough, and a barrel-shaped chest), which becomes evident by the third to fourth decade. A less common manifestation of the deficiency is liver disease, which occurs in children and adults, and may result in cirrhosis and liver failure. In rare cases, people with alpha-1 antitrypsin deficiency develop a skin condition called panniculitis, which is characterized by hardened skin with painful lumps or patches. Panniculitis varies in severity and can occur at any age. Environmental factors, particularly cigarette smoking, greatly increase the risk of emphysema at an earlier age (Crystal, 1990). This disorder affects about 1 in 1,500 to 3,500 individuals with European ancestry.

What is the next step if I am a carrier of Alpha-1 antitrypsin deficiency?

If you are a carrier of Alpha-1 antitrypsin deficiency it is important that your partner (or gamete donor) is tested to determine if she/he is also a carrier of this condition.

What if my partner isn't a carrier?

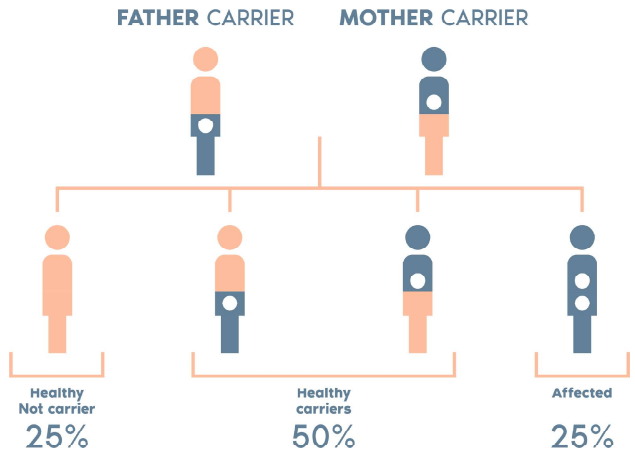
If your partner tests negative for Alpha-1 antitrypsin deficiency, the possibility of having an affected child is very low, significantly lower than the incidence of disease in the general population. However, there is not a test capable of detecting all existing pathogenic variants. Therefore, a residual risk remains of having unknown or undetectable pathogenic variants using current technology.

What if both parents are carriers of Alpha-1 antitrypsin deficiency?

When both parents are carriers of Alpha-1 antitrypsin deficiency, the probability of having a child with the disease is 25% in each pregnancy. (See graph)

What if I am going to use gamete donation?

In this case it is advisable to use the same assay (CGT) to test candidate donors and choose one that is negative for the same condition.



If both are carriers of the disease contact your doctor or genetic counselor for information on genetic options for family planning.

Ciliary dyskinesia, primary, type 18

What is Ciliary dyskinesia, primary, type 18?

Ciliary dyskinesia, primary, type 18 (CILD18) is an autosomal recessive disorder characterized by early infantile onset of recurrent sinopulmonary infections due to ciliary dysfunction and impaired airway clearance. Males are infertile and about half of patients have situs inversus. Electron microscopy of cilia shows a defect of the outer and inner dynein arms and impaired ciliary function (Horani et al., 2012).

What is the next step if I am a carrier of Ciliary dyskinesia, primary, type 18?

If you are a carrier of Ciliary dyskinesia, primary, type 18 it is important that your partner (or gamete donor) is tested to determine if she/he is also a carrier of this condition.

What if my partner isn't a carrier?

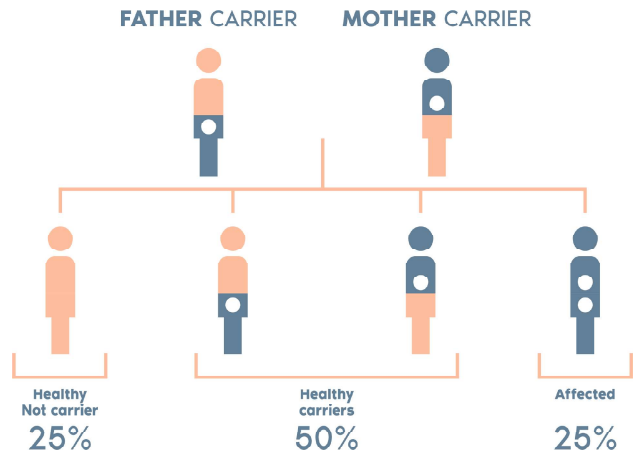
If your partner tests negative for Ciliary dyskinesia, primary, type 18, the possibility of having an affected child is very low, significantly lower than the incidence of disease in the general population. However, there is not a test capable of detecting all existing pathogenic variants. Therefore, a residual risk remains of having unknown or undetectable pathogenic variants using current technology.

What if both parents are carriers of Ciliary dyskinesia, primary, type 18?

When both parents are carriers of Ciliary dyskinesia, primary, type 18, the probability of having a child with the disease is 25% in each pregnancy. (See graph)

What if I am going to use gamete donation?

In this case it is advisable to use the same assay (CGT) to test candidate donors and choose one that is negative for the same condition.



If both are carriers of the disease contact your doctor or genetic counselor for information on genetic options for family planning.

Ciliary dyskinesia, primary, type 9, with or without situs inversus

What is Ciliary dyskinesia, primary, type 9, with or without situs inversus?

Ciliary dyskinesia, primary, type 9 (CILD9) is an autosomal recessive disorder resulting from loss of normal ciliary function. Kartagener (pronounced KART-agayner) syndrome is characterized by the combination of primary ciliary dyskinesia and situs inversus, and occurs in approximately half of patients with ciliary dyskinesia. Since normal nodal ciliary movement in the embryo is required for normal visceral asymmetry, absence of normal ciliary movement results in a lack of definitive patterning; thus, random chance alone appears to determine whether the viscera take up the normal or reversed left-right position during embryogenesis. This explains why approximately 50% of patients, even within the same family, have situs inversus (Afzelius, 1976; El Zein et al., 2003).

What is the next step if I am a carrier of Ciliary dyskinesia, primary, type 9, with or without situs inversus?

If you are a carrier of Ciliary dyskinesia, primary, type 9, with or without situs inversus it is important that your partner (or gamete donor) is tested to determine if she/he is also a carrier of this condition.

What if my partner isn't a carrier?

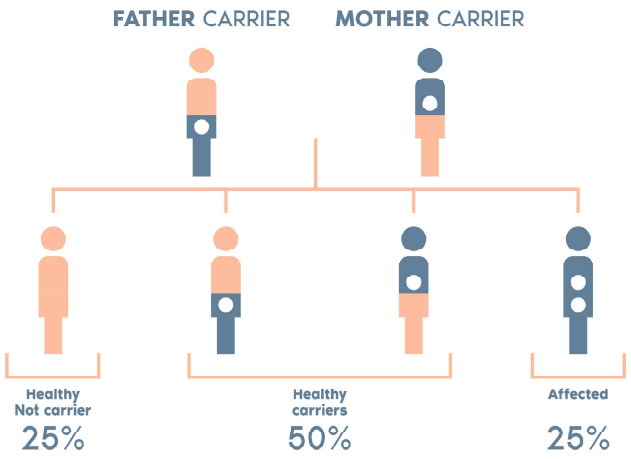
If your partner tests negative for Ciliary dyskinesia, primary, type 9, with or without situs inversus, the possibility of having an affected child is very low, significantly lower than the incidence of disease in the general population. However, there is not a test capable of detecting all existing pathogenic variants. Therefore, a residual risk remains of having unknown or undetectable pathogenic variants using current technology.

What if both parents are carriers of Ciliary dyskinesia, primary, type 9, with or without situs inversus?

When both parents are carriers of Ciliary dyskinesia, primary, type 9, with or without situs inversus, the probability of having a child with the disease is 25% in each pregnancy. (See graph)

What if I am going to use gamete donation?

In this case it is advisable to use the same assay (CGT) to test candidate donors and choose one that is negative for the same condition.



If both are carriers of the disease contact your doctor or genetic counselor for information on genetic options for family planning.

Ichthyosis, congenital, autosomal recessive, type 5

What is Ichthyosis, congenital, autosomal recessive, type 5?

Autosomal recessive congenital ichthyosis (ARCI) is a heterogeneous group of disorders of keratinization characterized primarily by abnormal skin scaling over the whole body. These disorders are limited to skin, with approximately two-thirds of patients presenting severe symptoms. The main skin phenotypes are lamellar ichthyosis (LI) and nonbullous congenital ichthyosiform erythroderma (NCIE), although phenotypic overlap within the same patient or among patients from the same family can occur (Fischer, 2009). Neither histopathologic findings nor ultrastructural features clearly distinguish between NCIE and LI. In addition, mutations in several genes have been shown to cause both lamellar and nonbullous ichthyosiform erythrodermal phenotypes (Akiyama et al., 2003). At the First Ichthyosis Consensus Conference in Soreze in 2009, the term 'autosomal recessive congenital ichthyosis' (ARCI) was designated to encompass LI, NCIE, and harlequin ichthyosis (ARCI4B; 242500) (Oji et al., 2010).NCIE is characterized by prominent erythroderma and fine white, superficial, semiadherent scales. Most patients present with collodion membrane at birth and have palmoplantar keratoderma, often with painful fissures, digital contractures, and loss of pulp volume. In half of the cases, a nail dystrophy including ridging, subungual hyperkeratosis, or hypoplasia has been described. Ectropion, eclabium, scalp involvement, and loss of eyebrows and lashes seem to be more frequent in NCIE than in lamellar ichthyosis (Fischer et al., 2000). In LI, the scales are large, adherent, dark, and pigmented with no skin erythema. Overlapping phenotypes may depend on the age of the patient and the region of the body. The terminal differentiation of the epidermis is perturbed in both forms, leading to a reduced barrier function and defects of lipid composition in the stratum corneum (Lefevre et al., 2006).In later life, the skin in ARCI may have scales that cover the entire body surface, including the flexural folds, and the scales are highly variable in size and color. Erythema may be very mild and almost invisible. Some affected persons exhibit scarring alopecia, and many have secondary anhidrosis (Eckl et al., 2005).

What is the next step if I am a carrier of Ichthyosis, congenital, autosomal recessive, type 5?

If you are a carrier of Ichthyosis, congenital, autosomal recessive, type 5 it is important that your partner (or gamete donor) is tested to determine if she/he is also a carrier of this condition.

What if my partner isn't a carrier?

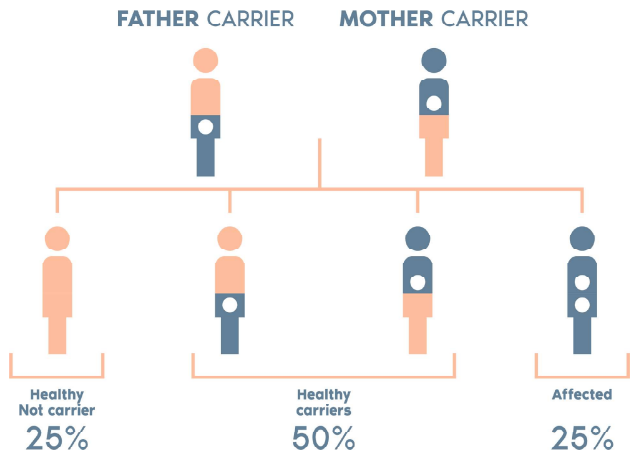
If your partner tests negative for Ichthyosis, congenital, autosomal recessive, type 5, the possibility of having an affected child is very low, significantly lower than the incidence of disease in the general population. However, there is not a test capable of detecting all existing pathogenic variants. Therefore, a residual risk remains of having unknown or undetectable pathogenic variants using current technology.

What if both parents are carriers of Ichthyosis, congenital, autosomal recessive, type 5?

When both parents are carriers of Ichthyosis, congenital, autosomal recessive, type 5, the probability of having a child with the disease is 25% in each pregnancy. (See graph)

What if I am going to use gamete donation?

In this case it is advisable to use the same assay (CGT) to test candidate donors and choose one that is negative for the same condition.



If both are carriers of the disease contact your doctor or genetic counselor for information on genetic options for family planning.

Methylmalonic aciduria, vitamin B12-responsive

What is Methylmalonic aciduria, vitamin B12-responsive?

Vitamin B12-responsive methylmalonic acidemia type cblA follows an autosomal recessive pattern of inheritance and is caused by pathogenic variants in the MMAA gene located on chromosomal region 4q31.21. The age of onset is early infantile. This disease is characterized by developmentally delayed with other features that include hypotonia, seizures, hypoglycaemia, metabolic acidosis, cardiomyopathy and diarrhoea. The prevalence is <1:1,000,000.

What is the next step if I am a carrier of Methylmalonic aciduria, vitamin B12-responsive?

If you are a carrier of Methylmalonic aciduria, vitamin B12-responsive it is important that your partner (or gamete donor) is tested to determine if she/he is also a carrier of this condition.

What if my partner isn't a carrier?

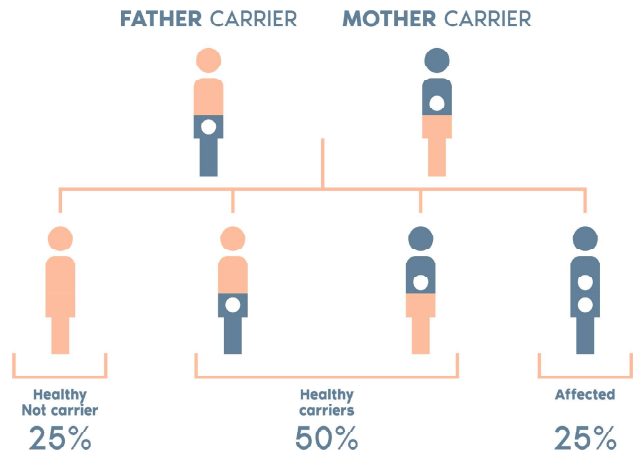
If your partner tests negative for Methylmalonic aciduria, vitamin B12-responsive, the possibility of having an affected child is very low, significantly lower than the incidence of disease in the general population. However, there is not a test capable of detecting all existing pathogenic variants. Therefore, a residual risk remains of having unknown or undetectable pathogenic variants using current technology.

What if both parents are carriers of Methylmalonic aciduria, vitamin B12-responsive?

When both parents are carriers of Methylmalonic aciduria, vitamin B12-responsive, the probability of having a child with the disease is 25% in each pregnancy. (See graph)

What if I am going to use gamete donation?

In this case it is advisable to use the same assay (CGT) to test candidate donors and choose one that is negative for the same condition.



If both are carriers of the disease contact your doctor or genetic counselor for information on genetic options for family planning.

LIST OF ANALYZED GENES

Gene mean coverage >100x CHRNA1, CHRNB1, CHRND, CHRNE, CHRNG, ACO2, APRT, ACTA1, ADK, AMPD1, AMPD2, SLC25A4, FDXR, AGRN, ALB, ALDOA, AFP, NAGA, SLC3A1, ACY1, AGT, AGTR1, ACE, CD19, SERPINC1, ALDH7A1, SERPINA1, IFNGR1, AQP2, RARS1, CYP19A1, DDC, ASNS, ATP2A1, ATP6V1E1, NPR2, SLC4A1, CD40, B2M, BLVRA, CD79A, BMP1, DST, COL17A1, CAD, CDH3, CAST, CACNA1D, CAPN1, CAPN3, CASQ2, CA5A, CAT, TYRP1, CTSD, CP, HSPD1, CLCN1, CYP11A1, COL4A3, COL7A1, COL4A4, COL1A2, COL9A1, COL6A1, COL6A2, COL6A3, COL9A2, COL11A1, COL11A2, COL18A1, COL13A1, MMP2, DCC, C1S, CR2, C3, C5, C8B, GJB2, GJA1, CRYAA, CRYAB, CRYBB3, CNGA1, PPIB, CTPS1, IL10RB, CYC1, POR, CYP11B2, COX6B1, CD55, ALAD, DSP, DES, DSG1, CYP24A1, PCBD1, ERCC2, SLC26A3, EGR2, NT5E, ETFB, TYMP, EDN3, EDNRB, ENO3, ERCC3, ERCC4, ERCC5, SLC1A1, CFH, F13A1, F13B, FTL, FGA, FGB, FGG, FLG, FMO3, FOLR1, FSHR, FSHB, FH, ABAT, GGCX, TACSTD2, MPV17, GCK, SLC2A1, GOT2, SLC2A2, GRIK2, GRIN1, ALDH18A1, GFPT1, EPRS1, GPX4, GLRA1, GLRB, GYS1, GYS2, GNRHR, GRN, CSF3R, GHRHR, GH1, GNAT1, GNAT2, HBA2, HBB, HGF, HSPG2, HK1, HARS1, HOXA1, VSX2, HADHB, IL7R, IGLL1, ADAR, CD79B, ITPR1, IGF1R, IGF1, SOD1, ITGA6, ITGB4, ITGB6, ISG15, INSR, IL1RN, IL2RA, KRT5, KRT14, KRT10, LDHA, LAMB1, LAMC2, LAMB3, LAMA1, LAMB2, LMNA, LARS1, LIFR, PTPRC, LIPE, LHB, LHCGR, LCK, PLOD1, LIM2, MAK, MGP, LAMA2, MARS1, MTR, MITF, MAPT, MTTP, MPZ, MAG, MPL, MYH2, MYO5A, MYBPC1, NDUFV1, IL12B, NEB, NGF, PCSK1, NEFL, TAC3, PNP, LEP, SPINK1, PTH, PTH1R, TAP1, PRF1, PEX2, ABCB4, ALPL, PGM1, GPI, MTHFD1, PHKG2, PSPH, PHKB, SERPINF1, POU1F1, JUP, ENPP1, PLG, SERPINE1, ITGB3, POLE, POLG, KCNE1, INS, PRDX1, PSAP, PROS1, F2, TYK2, ZAP70, PRKCD, PSMB8, EPB42, BCHE, PYCR1, PDHB, RDX, PRPH2, RAG1, RAG2, REN, RD3, RPE65, PDE6A, PDE6B, RLBP1, RARB, RBP4, RBP3, RHO, ROM1, RYR1, AHCY, SAG, STIL, SPR, SLC34A1, SLC5A1, SLC5A2, SPTA1, CSTA, EPCAM, SURF1, CD27, CD3D, CD3E, ITK, TERT, TK2, TG, TSHB, TTN, TFRC, ERBB3, THRB, TGM1, SLC25A1, TNNT1, TH, NTRK1, UQCRC2, UCHL1, DPAGT1, UNG, UGT1A1, ATP6V1B1, VARS1, XRCC4, ZP1, BBS1, CFI, C6, C7, KLKB1, ETFDH, PCCA, PCCB, GLDC, AMT, GCSH, DLD, INVS, DBT, BCKDHB, MVK, IDUA, F11, TBXAS1, PRSS1, MYO7A, ATP7A, ATRX, DKC1, ARSL, IL1RAPL1, HSD17B10, UPF3B, BTK, CUL4B, DMD, EMD, CD40LG, WAS, THOC2, MTM1, OTC, PQBP1, CYBB, SH2D1A, PDHA1, OCRL, FGD1, BRWD3, PHF8, GLA, F9, RP2, GPR143, F8, COL4A5, G6PD, HPRT1, IL2RG, L1CAM, FMR1, PRPS1, RPGR, SYN1, KDM5C, ZNF711, LBR, ABCA1, CNGA3, ITGB2, LRP2, MMP13, SGCA, JAK3, GUCY2D, GCH1, SCNN1A, HMGCS2, CENPF, PEX19, PI4KA, ACADSB, RGR, KCNJ1, BBS4, PEX5, TTPA, NT5C2, GCNT2, IGHMBP2, ABCC8, RELN, AUH, NDUFV2, ITGA7, HSPA9, STAT1, STAT2, NRXN1, CLCN2, LZTR1, PTPRO, STAR, CPT2, CHUK, SLC16A1, IARS1, PPT1, CNGB1, SCNN1B, SCNN1G, TAF13, LAMA3, PLCB4, DDB2, MRE11, PDE6C, INPPL1, SLC12A1, SDHA, AIMP2, MSH3, HADHA, SGCB, CRYBB1, IL11RA, SERPINH1, DHPS, GHR, AMHR2, SLC12A3, MYO6, DMP1, GSS, NPC2, AARS1, PMP22, CTSK, ABCC2, CSTB, GDF6, DDX11, PDE6H, ATR, BIN1, KIF1A, AMBN, C1QBP, PLEC, HINT1, GUCY2C, MOGS, TUSC3, SGCD, KARS1, OXCT1, RNU4ATAC, CFL2, NDUFB9, DGUOK, NCF4, IGFALS, PEX6, ALX1, SQSTM1, PROP1, LMAN1, RAPSN, IL12RB1, HADH, ABCA3, RDH5, ACOX2, HPGD, ABCA4, STXBP2, PIGC, ATIC, SMARCD2, GALNT3, PEX7, PEX12, VDR, CYP1B1, PMM2, PEX13, PEX14, LIG4, SLC5A5, HSD17B4, RFXAP, RFX5, PLOD2, GHSR, ORC1, PKP1, CLCNKB, CLCNKA, PHYH, EML1, TALDO1, LTBP3, LTBP2, MATN3, DIAPH1, COX10, PEX1, NDUFA2, NDUFS8, PLCD1, AP3B2, VRK1, HTRA1, RAB18, KCNJ10, MIPEP, DNASE1L3, TULP1, SC5D, TRIM32, ECHS1, AP4M1, HR, ROR2, CNTNAP1, GATM, GRID2, DNM2, PLD1, TUFM, ATP8B1, CFTR, OPTN, POP1, PARK7, RAB3GAP1, PRKN, MTRR, TECTA, MGAT2, MCM4, TNFSF11, TNFRSF11B, NTHL1, MYO15A, NBN, SLC37A4, NDUFS4, KATNB1, ADAM9, NPHS1, CLCN7, GNPAT, KRT85, DLL3, RAD51C, SPG7, ADGRV1, DHCR7, BUB1B, IGFBP7, GDF1, DNMT3B, RORC, TAF6, FANCG, NDUFS2, CUBN, PAPSS2, DYSF, COLQ, GPAA1, AGPS, DCHS1, PLOD3, DARS1, AGPAT2, DOCK2, PMPCB, PEX3, ALDH6A1, PNPLA6, RFXANK, ABCB11, LCT, KCNJ13, ABCD4, ABCC6, BMPR1B, IKBKB, PNPO, KERA, MCM3AP, DYNC2H1, 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Gene mean coverage 50x-100x AK1, AK2, APOE, BCAT2, CALCRL, CHAT, MME, C1QA, C1QB, C1QC, DHFR, DHODH, ERCC1, SLC6A3, DAG1, EPB41, EDN1, EGFR, CFD, B4GALT1, GPT2, GLUL, GPD1, GSC, CSF2RB, HMOX1, HPCA, IL10RA, ITPA, IFNGR2, MDH2, MPI, NDUFS1, RMRP, TACR3, CHMP1A, FGF3, TAP2, ACP5, PGM3, CD36, GP9, POMC, SFTPB, PDE6G, GRK1, SPARC, SLC9A3, CD3G, CD247, CD81, TRHR, TPI1, TPM3, DDR2, VLDLR, FLI1, HCFC1, SLC6A8, SLC16A2, OPHN1, DLG3, ABCD1, ARX, CHM, PLP1, NR0B1, FTSJ1, ZDHHC9, NDP, RS1, GJB1, PGK1, CDH11, SLC1A4, SLC18A3, SLC25A3, AKR1C2, ALDH1A3, P2RY12, MASP1, SLC11A2, CPT1A, LHX3, ASPH, NECTIN1, IHH, CEBPE, FOXN1, NDST1, LSS, KCNJ11, AMH, TNXB, LEPR, SLC6A9, CLPP, GDF5, CASR, GAMT, TOP3A, SLC10A2, MUSK, SLCO2A1, MYO1E, IRF8, UBE3A, SERPINB8, HESX1, NDUFS7, B4GALNT1, RAX, WNT10B, ARHGDIA, TAPBP, IMPA1, ESRRB, MYD88, ECM1, SCARB2, LAT, WIPF1, CTSC, FUT8, CDSN, PEX10, ORC4, KIF1C, CAVIN1, TRDN, CRADD, TNFRSF11A, BCL10, DPH1, AP1S1, CTSF, DPM2, AIMP1, COX15, CYP7B1, SGPL1, MED17, NDUFA10, PEX11B, GOSR2, GRM6, TBX15, DNAJB2, SLC6A5, KISS1R, STAT5B, AGXT, BLOC1S6, B4GALT7, LAMC3, ST3GAL5, PLPBP, SP110, GRM1, ZNHIT3, BLNK, ZNF423, WARS2, MALT1, MKKS, DGAT1, BRF1, STK4, SPTBN2, CORO1A, STX11, SPINT2, GAS8, MESP2, CHST6, IL21R, ALX4, ABCG8, B4GAT1, CDT1, ATF6, CIB2, CLDN14, PCDH12, PRX, SOST, DCDC2, NUP62, TMC6, TMC8, SLC35C1, ALG1, STIM1, DPM3, DCLRE1C, MBOAT7, PIP5K1C, SLC19A3, IRX5, SLC45A2, SIX6, ESPN, ANTXR1, STRC, EIF2B2, NHP2, CD320, LZTFL1, SFRP4, OPA3, SP7, UPB1, HEXA, JAM3, COG8, ATP6V1A, LIAS, CLN3, HYAL1, MTHFR, MCPH1, ALG12, FYCO1, PTF1A, TMIE, SRD5A2, AIRE, LIPH, DYM, HPS6, EPM2A, ARSA, ADA2, COLEC10, CCNO, HSD3B7, MCFD2, GNPTG, RCBTB1, SLC52A2, ASPA, NHLRC1, CLN5, PUS1, XYLT2, TTC8, EXT1, CHSY1, ADSL, NEU1, LGI4, CHST14, SMOC1, NCF1, GTPBP3, GLIS2, GRHL2, GLDN, PTRH2, PSMC3IP, SLC39A8, SLC39A13, SLC39A14, TSEN15, SLC5A7, GJC2, ARL6, LRIG2, SLC6A19, ARL13B, CABP4, MRPS16, WDR45B, LPAR6, SLC25A22, TTC7A, REEP6, ERCC8, ERCC6, MAP3K20, NECTIN4, NAGLU, CRB2, MARS2, NEK9, MMACHC, RNF216, COL25A1, CLDN19, DNAL1, PRMT7, MCM9, B3GALNT2, MED25, PIGV, PIGW, ORAI1, DOK7, SLC6A17, LINS1, TRAPPC6B, GLYCTK, UBA5, UFM1, PDSS2, MARVELD2, FLAD1, PRCD, GINS1, PDE10A, PIGY, CYP2U1, HYLS1, CNPY3, HYDIN, SLC25A46, RBCK1, FTO, OBSL1, TRMT5, SLC25A26, RUSC2, FAM20C, FAM20A, SLC30A10, FARS2, ERLIN1, ARV1, PGAP1, TBC1D20, LMF1, MTFMT, NKX2-6, PGAP3, ISCU, B9D2, TRAPPC9, MRPS34, OTUD6B, IYD, ZNF469, PNPLA1, ADAMTSL2, CILK1, NDUFAF5, FECH, RSPH9, TBC1D7, DSTYK, RNF168, GPIHBP1, SDHAF1, COQ4, TRNT1, NDUFAF3, SERPINF2, SMG9, CYB5R3, PPP1R15B, MOCOS, USB1, ZC3H14, FEZF1, KIAA1549, SLC52A3, TPRN, HPSE2, SCARF2, ALG11, SOBP, GZF1, BPGM, SPATA5, ZBTB24, MCIDAS, TRIM2, CCDC8, WDR81, HSD11B2, ACSF3, C19orf12, NUP93, ATAD1, BRAT1, LRMDA, KANK2, UVSSA, MPC1, COA6, SNX10, POMGNT2, DHTKD1, TECPR2, DDHD2, POMK, METTL23, CERS3, ADAT3, ANKS6, ARL2BP, TIMMDC1, COQ8B, CEP19, CDIN1, ERCC6L2, NADK2, VPS53, JAGN1, TRMT10A, ELP2, SPRTN, FAR1, LMOD3, TMEM107, LEMD2, PYCR2, ARHGEF18, PRDM12, TMEM199, TANGO2, TBCK, DNAJC21, PYROXD1, TECRL, PRUNE1, CLDN10, ALPK3, ARMC9, MSTO1, IQCE, TRIT1

Gene mean coverage < 50x LRPAP1, CD59, CA8, PCYT1A, ESR1, KDSR, H6PD, GP1BB, HOXB1, HOXC13, HMX1, NRL, WNT1, WNT3, PAX7, PRRX1, ZBTB16, PDXK, CD8A, TF, UQCRB, MECP2, POU3F4, DCX, PAK3, EDA, AP1S2, IDS, AR, CIITA, MEOX1, SCN1B, SMN1, PDX1, GFER, FOXE3, GPR68, DGKE, WNT7A, SOX18, ENTPD1, NKX3-2, EMP2, FADD, FOXE1, PHOX2A, OCLN, CA12, SCO1, SLC33A1, CLDN1, NDUFA9, GYG1, RNASEH1, GNB5, FRRS1L, CRIPT, NEUROG3, CPLX1, S1PR2, KYNU, CYP26B1, RBM8A, GAN, DHH, SLC35A3, FBXL4, KY, EXTL3, NKX6-2, ALX3, PANK2, STAMBP, BSND, MPIG6B, FKRP, MLYCD, AP4S1, TIMM50, TWIST2, CLCF1, SAR1B, CNNM2, CLN8, HES7, XYLT1, CYP26C1, PEX26, TP53RK, NMNAT1, GTF2H5, BTD, MPLKIP, IER3IP1, L2HGDH, GLRX5, BLOC1S3, SLC24A4, ATOH7, KREMEN1, VPS37A, PIGM, DCPS, RSPO4, SLC35D1, SYT14, ISCA1, PPM1K, NHEJ1, CISD2, TXNL4A, ERLIN2, CLMP, NDUFAF6, NDUFA11, RNASET2, CYB5A, POLR1D, MSRB3, CCDC115, TMCO1, B9D1, FKBP14, DDHD1, MTO1, COX20, TMEM231, B3GALT6, IBA57, ISCA2, BHLHA9, OTULIN, SLC7A14, LYRM7, RSPH3, WDR73, CLPB, CEP78, LIPT2

GLOSSARY

TYPES OF INHERITANCE:

- AR: Autosomal recessive

  Inherited conditions that require two pathogenic variants (one from each parent) in a given gene to display symptoms.

- XR: X-linked recessive

  The gene is located on the X chromosome. Men with a pathogenic variant have the disease. Women with a pathogenic variant are carriers and generally asymptomatic or may mild symptoms.

- Digenic inheritance

  In some diseases, the symptoms could be explained by the coexistence of pathogenic variants in two different genes related with the disease instead of two pathogenic variants in the same gene.

ALLELES:

Pathogenic variants present in the two copies of a gene.

- Homozygous pathogenic variant (Hom.):

  Each copy of the gene has the same pathogenic variant. Generally, this is associated with clinical symptoms.

- Compound heterozygous (Het.):

  Each copy of the gene has a different pathogenic variant. Generally, this is associated with clinical symptoms. This situation is referred as having variants "in trans".

Pathogenic variant present in one copy of a gene.

- Heterozygous pathogenic variant (Het.):
  Only one copy of a gene has a pathogenic variant. There is another normal gene copy.

Note: Sometimes an individual has two pathogenic variants in the same gene copy. This situation is referred as having variants in cis and it is considered as a single pathogenic variant.

CNV:

Refers to copy number variation (deletion or duplication), i.e., the number of copies of a particular gene (or gene region) is different from the usual two copies.

LARGE GENE CONVERSION:

Refers to pathogenic variants caused by gene sequence exchange or replacement between a normal functional gene and a quasi-identical non-functional gene (pseudogene).