

INFANT Study Gene List and Test Description

Gene List Version 1

Effective Date: January 2026

Version 1 of this gene list corresponds to all test versions V1.X

GLOSSARY OF TERMS

INHERITANCE

The way, or pattern, by which a genetic condition is passed down through families across generations. There are some genes associated with multiple different diseases and/or inheritance patterns. All conditions associated with the genes listed below have been assessed to determine if they meet the inclusion criteria for the INFANT study. In some cases, multiple conditions associated with a gene are reportable for the INFANT study, and multiple inheritance patterns may be listed below. In other cases, only one condition and/or inheritance pattern is included. Common inheritance patterns include:

Autosomal Recessive (AR)

A genetic condition that occurs only when an individual inherits two altered copies of a gene, typically one from each parent. When a person has one copy of the altered gene, they are considered a carrier, as they are not affected by the condition but their copy of the altered gene can be passed down to their offspring. Carrier status is not reported by the INFANT study.

Autosomal Dominant (AD)

A genetic condition that occurs when an individual inherits one altered copy of a gene. An affected person has a 50% chance of passing it to their children.

X-linked (XL)

A genetic condition caused by an alteration on the X chromosome. Males are more often affected because they have only one X chromosome, while females may be carriers or have milder symptoms as they have 2 copies of the X chromosome.

INFANT Study Gene List

Gene List Version 1

See footnotes below for more details

Gene	Condition Name	Clinical Category	Inheritance pattern ^{1,2,3}
ABCC6	Generalized arterial calcification of infancy	Cardiac	AR
ABCC8	Hyperinsulinemic hypoglycemia	Endocrine	AR
ABCD1	Adrenoleukodystrophy	Metabolic	XL
ABCD4	Methylmalonic aciduria and homocystinuria	Metabolic	AR
ACADM	Medium chain acyl-CoA dehydrogenase (MCAD) deficiency	Metabolic	AR
ACADVL	Very long chain acyl-CoA dehydrogenase (VLCAD) deficiency	Metabolic	AR
ACAT1	Beta-ketothiolase deficiency	Metabolic	AR
ACVR1	Fibrodysplasia ossificans progressiva	Bone/Connective tissue	AD
ADA	Severe combined immunodeficiency	Immunology	AR
ADAMTS1	Congenital thrombotic thrombocytopenic purpura	Hematology	AR
AGL	Cori disease (GSD type 2)	Metabolic	AR
AGXT	Primary hyperoxaluria	Metabolic	AR
AKR1D1	Congenital bile acid synthesis defect	Metabolic	AR
ALDH7A1	Pyridoxine-dependent epilepsy	Metabolic	AR
ALDOB	Hereditary fructose intolerance	Metabolic	AR
ALPL	Hypophosphatasia	Metabolic	AR
AQP2	Nephrogenic diabetes insipidus	Endocrine	AD/AR
ARG1	Hyperargininemia	Metabolic	AR

<i>ARSA</i>	Metachromatic leukodystrophy	Metabolic	AR
<i>ARSB</i>	Maroteaux-Lamy syndrome (MPS type 6)	Metabolic	AR
<i>ASL</i>	Argininosuccinic aciduria	Metabolic	AR
<i>ASS1</i>	Citrullinemia	Metabolic	AR
<i>ATM</i>	Ataxia-telangiectasia	Neurology/Neuromuscular	AR
<i>ATP6V0A4</i>	Distal renal tubular acidosis	Metabolic	AR
<i>ATP6V1B1</i>	Distal renal tubular acidosis	Metabolic	AR
<i>AVPR2</i>	Nephrogenic diabetes insipidus	Endocrine	XL
<i>BCKDHA</i>	Maple syrup urine disease	Metabolic	AR
<i>BCKDHB</i>	Maple syrup urine disease	Metabolic	AR
<i>BTBD</i>	Biotinidase deficiency	Metabolic	AR
<i>BTK</i>	Agammaglobulinemia	Immunology	XL
<i>CALM1</i>	Long QT syndrome / Catecholaminergic polymorphic ventricular tachycardia	Cardiac	AD
<i>CALM2</i>	Long QT syndrome / Catecholaminergic polymorphic ventricular tachycardia	Cardiac	AD
<i>CALM3</i>	Long QT syndrome / Catecholaminergic polymorphic ventricular tachycardia	Cardiac	AD
<i>CASR</i>	Neonatal hyperparathyroidism / Hypocalcemia	Endocrine	AD/AR
<i>CBLIF</i>	Congenital intrinsic factor deficiency	Hematology	AR
<i>CBS</i>	Classic homocystinuria	Metabolic	AR
<i>CD3D</i>	Severe combined immunodeficiency	Immunology	AR
<i>CD3E</i>	Severe combined immunodeficiency	Immunology	AR
<i>CD40LG</i>	Hyper IgM syndrome	Immunology	XL

<i>CDH23</i>	Usher syndrome	Syndromic hearing loss	AR
<i>CFTR</i>	Cystic Fibrosis	Respiratory	AR
<i>COL4A3</i>	Alport syndrome	Multisystem/Syndromic	AR
<i>COL4A4</i>	Alport syndrome	Multisystem/Syndromic	AR
<i>COL4A5</i>	Alport syndrome	Multisystem/Syndromic	XL
<i>CPS1</i>	Carbamoyl phosphate synthetase I (CPS1) deficiency	Metabolic	AR
<i>CPT1A</i>	Carnitine palmitoyltransferase 1A (CPT1A) deficiency	Metabolic	AR
<i>CPT2</i>	Carnitine palmitoyltransferase II (CPT2) deficiency	Metabolic	AR
<i>CTNS</i>	Cystinosis	Metabolic	AR
<i>CYBA</i>	Chronic granulomatous disease	Immunology	AR
<i>CYBB</i>	Chronic granulomatous disease	Immunology	XL
<i>CYP11B1</i>	Congenital adrenal hyperplasia	Endocrine	AR
<i>CYP17A1</i>	Congenital adrenal hyperplasia	Endocrine	AR
<i>CYP27A1</i>	Cerebrotendinous xanthomatosis	Metabolic	AR
<i>CYP27B1</i>	Vitamin D-dependent rickets	Endocrine	AR
<i>DBT</i>	Maple syrup urine disease	Metabolic	AR
<i>DCLRE1C</i>	Severe combined immunodeficiency / Omenn syndrome	Immunology	AR
<i>DICER1</i>	DICER1 tumour predisposition syndrome	Cancer predisposition syndrome	AD
<i>DMD</i>	Duchenne muscular dystrophy	Neurology/Neuromuscular	XL
<i>DOCK8</i>	Hyper IgE syndrome	Immunology	AR
<i>DOK7</i>	Congenital myasthenic syndrome	Neurology/Neuromuscular	AR

<i>DUOXA2</i>	Thyroid dyshormonogenesis	Endocrine	AR
<i>ELANE</i>	Severe congenital neutropenia	Immunology	AD
<i>ENPP1</i>	Generalized arterial calcification of infancy	Cardiac	AR
<i>ETFA</i>	Glutaric acidemia	Metabolic	AR
<i>ETFB</i>	Glutaric acidemia	Metabolic	AR
<i>ETFDH</i>	Glutaric acidemia	Metabolic	AR
<i>F8</i>	Hemophilia A	Hematology	XL
<i>F9</i>	Hemophilia B	Hematology	XL
<i>FAH</i>	Tyrosinemia	Metabolic	AR
<i>FBP1</i>	Fructose-1,6-bisphosphatase deficiency	Metabolic	AR
<i>FOLR1</i>	Neurodegenerative syndrome	Neurology/Neuromuscular	AR
<i>FZD4</i>	Exudative vitreoretinopathy	Vision loss	AD
<i>G6PC1</i>	Von Gierke disease (GSD type 1A)	Metabolic	AR
<i>G6PC3</i>	Severe congenital neutropenia / Dursun Syndrome	Immunology	AR
<i>GAA</i>	Pompe disease (GSD type 2)	Metabolic	AR
<i>GALE</i>	Galactose epimerase deficiency	Metabolic	AR
<i>GALNS</i>	Morquio syndrome (MPS type 4A)	Metabolic	AR
<i>GALT</i>	Galactosemia	Metabolic	AR
<i>GAMT</i>	Guanidinoacetate methyltransferase (GAMT) deficiency	Metabolic	AR
<i>GATA3</i>	Hypoparathyroidism, sensorineural deafness, and renal dysplasia	Syndromic hearing loss	AD
<i>GATM</i>	Cerebral creatine deficiency syndrome	Metabolic	AR

<i>GCDH</i>	Glutaric aciduria	Metabolic	AR
<i>GCH1</i>	GTP cyclohydrolase I (GCH1) deficiency	Neurology/Neuromuscular	AD/AR
<i>GCK</i>	Permanent neonatal diabetes mellitus	Endocrine	AR
<i>GJB2</i>	Non-syndromic genetic hearing loss	Isolated hearing loss	AR
<i>GLUD1</i>	Hyperinsulinism hyperammonemia	Metabolic	AD
<i>GRHPR</i>	Primary hyperoxaluria	Metabolic	AR
<i>GUSB</i>	Sly syndrome (MPS type 7)	Metabolic	AR
<i>HADH</i>	Short chain 3-hydroxyacyl-CoA dehydrogenase (SCHAD) deficiency	Metabolic	AR
<i>HADHA</i>	Long chain 3-hydroxyacyl-CoA dehydrogenase (LCHAD) deficiency	Metabolic	AR
<i>HADHB</i>	Mitochondrial trifunctional protein deficiency	Metabolic	AR
<i>HAX1</i>	Severe congenital neutropenia / Kostmann disease	Immunology	AR
<i>HBB</i>	Hemoglobinopathy / Sickle Cell Disease / Beta Thalassemia	Hematology	AR
<i>HLCS</i>	Holocarboxylase synthetase (HLCS) deficiency	Metabolic	AR
<i>HMGCL</i>	Hydroxymethylglutaric aciduria	Metabolic	AR
<i>HRAS</i>	Costello syndrome	Multisystem/Syndromic	AD
<i>HSD11B2</i>	Apparent mineralocorticoid excess	Endocrine	AR
<i>HSD3B2</i>	Congenital adrenal hyperplasia	Endocrine	AR
<i>HSD3B7</i>	Congenital bile acid synthesis defect	Metabolic	AR
<i>IDS</i>	Hunter syndrome (MPS type 2)	Metabolic	XL
<i>IDUA</i>	Hurler syndrome (MPS type 1)	Metabolic	AR
<i>IFNAR2</i>	Immunodeficiency	Immunology	AR

<i>IGSF1</i>	Central congenital hypothyroidism	Endocrine	XL
<i>IL2RG</i>	Severe combined immunodeficiency	Immunology	XL
<i>IL7R</i>	Severe combined immunodeficiency	Immunology	AR
<i>INS</i>	Permanent neonatal diabetes mellitus	Endocrine	AD
<i>IRS4</i>	Central congenital hypothyroidism	Endocrine	XL
<i>IVD</i>	Isovaleric acidemia	Metabolic	AR
<i>JAG1</i>	Alagille syndrome	Multisystem/Syndromic	AD
<i>JAK3</i>	Severe combined immunodeficiency	Immunology	AR
<i>KCNH2</i>	Long QT syndrome	Cardiac	AD
<i>KCNJ11</i>	Transient neonatal diabetes mellitus	Endocrine	AD
<i>KCNQ1</i>	Long QT syndrome / Jervell and Lange-Nielsen syndrome	Cardiac	AD/AR
<i>LDLR</i>	Familial hypercholesterolemia	Metabolic	AR
<i>LHX3</i>	Combined pituitary hormone deficiency	Endocrine	AR
<i>LIG4</i>	Severe combined immunodeficiency / LIG4 syndrome	Immunology	AR
<i>LIPA</i>	Wolman disease	Metabolic	AR
<i>LMBRD1</i>	Methylmalonic aciduria and homocystinuria	Metabolic	AR
<i>LPL</i>	Lipoprotein lipase (LPL) deficiency	Metabolic	AR
<i>LYST</i>	Chediak-Higashi syndrome	Multisystem/Syndromic	AR
<i>MC2R</i>	Glucocorticoid deficiency	Endocrine	AR
<i>MLYCD</i>	Malonic aciduria	Metabolic	AR
<i>MMAA</i>	Methylmalonic aciduria, vitamin B12-responsive	Metabolic	AR

<i>MMAB</i>	Methylmalonic aciduria, vitamin B12-responsive	Metabolic	AR
<i>MMACHC</i>	Methylmalonic aciduria and homocystinuria	Metabolic	AR
<i>MMADHC</i>	Methylmalonic aciduria and homocystinuria	Metabolic	AR
<i>MMUT</i>	Methylmalonic aciduria	Metabolic	AR
<i>MPI</i>	Congenital disorder of glycosylation	Metabolic	AR
<i>MTR</i>	Homocystinuria-megaloblastic anemia	Metabolic	AR
<i>MTRR</i>	Homocystinuria-megaloblastic anemia	Metabolic	AR
<i>MYBPC3</i>	Cardiomyopathies	Cardiac	AR
<i>MYH7</i>	Cardiomyopathies	Cardiac	AD/AR
<i>MYO7A</i>	Usher syndrome	Syndromic hearing loss	AR
<i>NAGS</i>	Hyperammonemia	Metabolic	AR
<i>NCF2</i>	Chronic granulomatous disease	Immunology	AR
<i>NDP</i>	Norrie disease / Exudative vitreoretinopathy	Vision loss	XL
<i>NHEJ1</i>	Severe combined immunodeficiency	Immunology	AR
<i>NOTCH2⁴</i>	Alagille syndrome	Multisystem/Syndromic	AD
<i>NROB1</i>	Congenital adrenal hypoplasia	Endocrine	XL
<i>OTC</i>	Ornithine transcarbamylase (OTC) deficiency	Metabolic	XL
<i>OTOF</i>	Non-syndromic genetic hearing loss	Isolated hearing loss	AR
<i>PAH</i>	Classic phenylketonuria	Metabolic	AR
<i>PAX8</i>	Congenital hypothyroidism, dysgenesis or hypoplasia	Endocrine	AD
<i>PCBD1</i>	Hyperphenylalaninemia, BH4-deficient	Metabolic	AR

<i>PCCA</i>	Propionic acidemia	Metabolic	AR
<i>PCCB</i>	Propionic acidemia	Metabolic	AR
<i>PCDH15</i>	Usher syndrome	Syndromic hearing loss	AR
<i>PHEX</i>	Hypophosphatemia	Endocrine	XL
<i>PHKB</i>	Phosphorylase kinase b (PHKB) deficiency (GSD type 9b)	Metabolic	AR
<i>PNPO</i>	Neonatal epileptic encephalopathy	Neurology/Neuromuscular	AR
<i>POU1F1</i>	Combined or isolated pituitary hormone deficiency	Endocrine	AR
<i>PRF1</i>	Hemophagocytic lymphohistiocytosis	Immunology	AR
<i>PROP1</i>	Combined pituitary hormone deficiency	Endocrine	AR
<i>PTPRC</i>	Severe combined immunodeficiency	Immunology	AR
<i>PTS</i>	Hyperphenylalaninemia, BH4-deficient	Metabolic	AR
<i>PYGL</i>	Hers disease (GSD type 6)	Metabolic	AR
<i>QDPR</i>	Hyperphenylalaninemia, BH4-deficient	Metabolic	AR
<i>RAG1</i>	Severe combined immunodeficiency	Immunology	AR
<i>RAG2</i>	Severe combined immunodeficiency	Immunology	AR
<i>RB1</i>	Retinoblastoma	Cancer predisposition syndrome	AD
<i>RET⁵</i>	Multiple endocrine neoplasia	Cancer predisposition syndrome	AD
<i>RFXANK</i>	MHC class II deficiency	Immunology	AR
<i>RPE65</i>	Leber congenital amaurosis	Vision loss	AR
<i>RPL11</i>	Diamond-Blackfan anemia	Hematology	AD
<i>RPL15</i>	Diamond-Blackfan anemia	Hematology	AD

<i>RPL35A</i>	Diamond-Blackfan anemia	Hematology	AD
<i>RPL5</i>	Diamond-Blackfan anemia	Hematology	AD
<i>RPS10</i>	Diamond-Blackfan anemia	Hematology	AD
<i>RPS17</i>	Diamond-Blackfan anemia	Hematology	AD
<i>RPS19</i>	Diamond-Blackfan anemia	Hematology	AD
<i>RPS24</i>	Diamond-blackfan anemia	Hematology	AD
<i>RPS26</i>	Diamond-Blackfan anemia	Hematology	AD
<i>RPS29</i>	Diamond-Blackfan anemia	Hematology	AD
<i>RPS7</i>	Diamond-Blackfan anemia	Hematology	AD
<i>RYR2</i>	Catecholaminergic polymorphic ventricular tachycardia	Cardiac	AD
<i>SCN5A</i>	Long QT syndrome	Cardiac	AD
<i>SCNN1A</i>	Pseudohypoaldosteronism	Endocrine	AR
<i>SCNN1B</i>	Pseudohypoaldosteronism / Liddle Syndrome	Endocrine	AR
<i>SCNN1G</i>	Pseudohypoaldosteronism / Liddle Syndrome	Endocrine	AR
<i>SH2D1A</i>	Lymphoproliferative syndrome	Immunology	XL
<i>SLC22A5</i>	Systemic primary carnitine deficiency	Metabolic	AR
<i>SLC25A13</i>	Citrin deficiency	Metabolic	AR
<i>SLC25A15</i>	Hyperornithinemia hyperammonemia homocitrullinemia (HHH) syndrome	Metabolic	AR
<i>SLC25A20</i>	Carnitine-acylcarnitine translocase deficiency	Metabolic	AR
<i>SLC26A3</i>	Congenital secretory chloride diarrhea	Gastrointestinal	AR
<i>SLC26A4</i>	Pendred syndrome	Syndromic hearing loss	AR

<i>SLC2A1</i>	GLUT1 deficiency syndrome	Metabolic	AD/AR
<i>SLC37A4</i>	Glucose-6-phosphate transport defect (GSD type 1b)	Metabolic	AR
<i>SLC39A4</i>	Acrodermatitis enteropathica	Metabolic	AR
<i>SLC52A2</i>	Brown-Vialetto-Van Laere syndrome	Neurology/Neuromuscular	AR
<i>SLC52A3</i>	Brown-Vialetto-Van Laere syndrome	Neurology/Neuromuscular	AR
<i>SLC5A5</i>	Thyroid dysmorphogenesis	Endocrine	AR
<i>SLC6A8</i>	Cerebral creatine deficiency syndrome	Metabolic	XL
<i>SLC7A7</i>	Lysinuric protein intolerance	Metabolic	AR
<i>SMARCB1</i>	Rhabdoid tumour predisposition syndrome	Cancer predisposition syndrome	AD
<i>SMN1</i> ⁶	Spinal muscular atrophy	Neurology/Neuromuscular	AR
<i>SPI1</i>	Agammaglobulinemia	Immunology	AD
<i>SPR</i>	Dopa-responsive dystonia	Neurology/Neuromuscular	AR
<i>STAR</i>	Congenital lipoid adrenal hyperplasia	Endocrine	AR
<i>STX11</i>	Hemophagocytic lymphohistiocytosis	Immunology	AR
<i>STXBP2</i>	Hemophagocytic lymphohistiocytosis	Immunology	AR
<i>TAFAZZIN</i>	Barth syndrome	Metabolic	XL
<i>TAT</i>	Tyrosinemia	Metabolic	AR
<i>TBL1X</i>	Central congenital hypothyroidism	Endocrine	XL
<i>TCIRG1</i>	Osteopetrosis	Bone/Connective tissue	AR
<i>TCN2</i>	Transcobalamin II deficiency	Metabolic	AR
<i>TG</i>	Thyroid dysmorphogenesis	Endocrine	AR

<i>TH</i>	Dopa-responsive dystonia	Neurology/Neuromuscular	AR
<i>THRA</i>	Non-goitrous congenital hypothyroidism	Endocrine	AD
<i>TPO</i>	Thyroid dyshormonogenesis	Endocrine	AR
<i>TPP1</i>	Neuronal ceroid lipofuscinosis	Neurology/Neuromuscular	AR
<i>TRHR</i>	Central congenital hypothyroidism	Endocrine	AR
<i>TSHB</i>	Central congenital hypothyroidism	Endocrine	AR
<i>TSHR</i>	Central congenital hypothyroidism	Endocrine	AR
<i>TSPAN12</i>	Exudative vitreoretinopathy	Vision loss	AD
<i>TPA</i>	Ataxia with isolated vitamin E deficiency	Metabolic	AR
<i>UNC13D</i>	Hemophagocytic lymphohistiocytosis	Immunology	AR
<i>USH1C</i>	Usher syndrome	Syndromic hearing loss	AR
<i>USH1G</i>	Usher syndrome	Syndromic hearing loss	AR
<i>VDR</i>	Hypocalcemic vitamin D-resistant rickets	Endocrine	AR
<i>WAS</i>	Wiskott Aldrich Syndrome (WAS) / WAS-related disorders	Hematology	XL
<i>WT1</i>	Wilms tumor / Denys-Drash syndrome	Cancer predisposition syndrome	AD
<i>ZAP70</i>	Combined immunodeficiency	Immunology	AR

Total: 223 genes

IMPORTANT NOTES

¹ For most X-Linked (XL) conditions on this gene list, only pathogenic/likely pathogenic variants identified in male patients will be reported because of the expected risk of disease. The sole exception is the *PHEX* gene, condition: Hypophosphatemia, where males and females will be reported.

² For conditions listed as autosomal recessive (AR), only homozygous or multiple heterozygous pathogenic/likely pathogenic variants will be reported.

³For conditions reported as AD/AR, heterozygous, homozygous and multiple heterozygous genotypes with pathogenic/likely pathogenic variants will be reported.

⁴ Pathogenic/likely pathogenic variants in exon 34 of the *NOTCH2* gene are excluded, as they are known to cause Hajdu-Cheney Syndrome, a condition that does not meet the INFANT inclusion criteria.

⁵ **Only the following variants in the *RET* gene are being reported:** c.2753T>C, p.(Met918Thr); c.1900T>C, (p.Cys634Arg); c.1900T>A, (p.Cys634Ser); c.1900T>G, (p.Cys634Gly); c.1901G>C, (p.Cys634Ser); c.1901G>A, (p.Cys634Tyr); c.1901G>T, (p.Cys634Phe); c.1902C>G, (p.Cys634Trp); c.2647_2648delinsTT, p.(Ala883Phe)

⁶ The analysis of the *SMN1* gene is limited to copy number at the common *SMN1* deletion site; sequence variants and other CNVs in this gene are not assessed.

SCREEN DESCRIPTION

Whole Genome Next-Generation Sequencing: Genomic DNA is extracted from the dried blood spot using Illumina Lysis Reagent kit. DNA is prepared for sequencing using Illumina DNA PCR-Free Library Prep kit followed by sequencing on an Illumina NovaSeqX+ instrument using 10B or 25B flow cells (2x150bp paired reads).

Variant Assessment and Reporting Process: Sequencing data are analysed automatically using a custom filtering algorithm; only those cases with putative pathogenic or likely pathogenic variants in a pattern consistent with the mode of inheritance for the gene's associated INFANT condition(s) are manually reviewed. Variant curation and classification use the most recent ACMG standards and guidelines for the interpretation of sequence variants. Only variants classified as pathogenic or likely pathogenic are reported. Carrier status is not reported. All reports are reviewed and interpreted by a certified genetic counsellor and molecular laboratory director.

SCREEN LIMITATIONS

These results are generated under a research protocol and should not be used to direct treatment and/or clinical management until these findings are confirmed on a diagnostic sample in an accredited diagnostic laboratory. Familial segregation may also be required to confirm variant phasing and risk of disease.

Analysis and reporting are limited to the coding regions in the targeted gene list +/- 15 basepairs, with the inclusion of some extragenic regions with established pathogenic variants reported in Clinvar. This assay was validated and optimized to achieve a read depth $\geq 35\times$ with $\geq 90\%$ completeness over genome, with $>99.9\%$ sensitivity and precision for SNVs and $>99.5\%$ for indels, with a minimum of 10 reads in reportable regions; however, there may be variation between genes and samples whereby reduced coverage may lead to decreased test sensitivity for some regions. A detailed report of any regions with insufficient coverage is available upon request. The detection of large copy number variants and structural rearrangements has not been fully validated, and consequently reduced sensitivity is expected for these types of variants.