Short Stature

Precision Panel

Overview

Short stature is the common term applied to a child whose height is 2 standard deviations or more below the mean for children of that sex and age. Although short stature can be a variant of normal growth, it can also be caused by a disease. Typically, 80% or more of the variation in height can be explained by genetic factors; however, environmental factors also play a pivotal role. The most common causes of short stature beyond the first two years of life are familial (genetic) short stature and constitutional short stature, which are normal non-pathologic variants of growth. In these cases, patients show normal results for endocrine screening tests, including those for growth hormone deficiency.

The Igenomix Short Stature Precision Panel can be used to make an accurate and directed diagnosis as well as a differential diagnosis of short stature, in order to tell this phenotype from other real and syndromic diseases and find a possible treatment if needed. It provides a comprehensive analysis of the genes involved in this condition using next-generation sequencing (NGS) to fully understand the spectrum of relevant genes involved.

Indications

The Igenomix Short Stature Precision Panel is indicated for those patients presenting a height below the 2.3rd percentile (2 standard deviations or more below the mean height from individuals of the same sex and age). It can be a useful tool to perform a differential diagnosis of idiopathic short stature and associated disorders, and dismiss possible syndromes.

Clinical Utility

The clinical utility of this panel is:

- The genetic and molecular confirmation for an accurate clinical diagnosis of a patient presenting short stature.
- Early initiation of multidisciplinary treatment including growth hormone supplying in case the patient proves to suffer a chronic GH deficiency. Occupational therapy might be needed in case short stature is a symptom of a specific syndrome. Either way, medical care depends on the etiology of the short stature.
- Risk assessment and genetic counselling of other family members according to the possible causes of this condition.

- Improvement of delineation of genotype-phenotype correlation.

Genes & Diseases

GENE	OMIM DISEASES	INHERITANCE*	% GENE COVERAGE (20X)	HGMD**
ACAN	Osteochondritis Dissecans, Short Stature, Early-Onset Osteoarthritis, Spondyloepimetaphyseal Dysplasia, Spondyloepiphyseal Dysplasia	AD,AR	86.19	63 of 65
ACTB	Baraitser-Winter Syndrome, Developmental Malformations	AD	100	40 of 40
ACTG1	Baraitser-Winter Syndrome, Deafness	AD	98.59	55 of 55
ADAMTS10	Weill-Marchesani Syndrome	AR	99.94	12 of 12
AMMECR1	Midface Hypoplasia, Hearing Impairment, Elliptocytosis, Nephrocalcinosis, Alport Syndrome, Intellectual Disability, Midface Hypoplasia-Elliptocytosis Syndrome	X,XR,G	99.81	-
ANKRD11	Kbg Syndrome, 16q24.3 Microdeletion Syndrome, Kbg Syndrome	AD	99.6	119 of 124
ARCN1	Short Stature, Rhizomelic, With Microcephaly, Micrognathia, Developmental Delay	AD	99.91	4 of 4
ATR	Seckel Syndrome	AD,AR	99.98	39 of 40
B3GAT3	Multiple Joint Dislocations, Short Stature, Craniofacial Dysmorphism	AR	99.86	15 of 15
BCS1L	Bjornstad Syndrome, Gracile Syndrome, Leigh Syndrome, Mitochondrial Complex Iii Deficiency	AR,MI	99.96	40 of 42
BRAF	Cardiofaciocutaneous Syndrome, Leopard Syndrome, Noonan Syndrome, Craniopharyngioma	AD	100	80 of 80
CBL	Juvenile Myelomonocytic Leukemia, Noonan Syndrome, Systemic Mastocytosis	AD	100	46 of 47
CCDC8	3m Syndrome	AR	99.81	3 of 3
CDC45	Meier-Gorlin Syndrome, Short Stature	AR	99.99	19 of 19
CDC6	Meier-Gorlin Syndrome, Short Stature	AR	100	2 of 2
CDT1	Meier-Gorlin Syndrome, Short Stature	AR	97.43	12 of 12
CENPJ	Microcephaly, Seckel Syndrome	AR	99.97	13 of 13
CEP152	Microcephaly, Seckel Syndrome	AR	97.73	21 of 24
CEP63	Seckel Syndrome, Microcephaly	AR	100	3 of 3
CHD7	Charge Syndrome, Hypogonadotropic Hypogonadism, Kallmann Syndrome, Omenn Syndrome	AD	96.25	823 of 896
COL10A1	Metaphyseal Chondrodysplasia	AD	96.18	55 of 55
COL27A1	Steel Syndrome	AR	99.04	12 of 12
COL2A1	Achondrogenesis, Avascular Necrosis Of Femoral Head, Czech Dysplasia, Epiphyseal Dysplasia, Kniest Dysplasia, Legg-Calve-Perthes Disease, Osteoarthritis, Spondyloepimetaphyseal Dysplasia, Spondyloepiphyseal Dysplasia, Stickler Syndrome, Platyspondylic Dysplasia	AD,MU	100	583 of 583
COL9A1	Epiphyseal Dysplasia, Stickler Syndrome	AD,AR	99.98	8 of 8
COL9A2	Epiphyseal Dysplasia, Stickler Syndrome	AD,AR	100	16 of 16
COMP	Epiphyseal Dysplasia, Pseudoachondroplasia	AD	99.71	189 of 189
CREBBP	Menke-Hennekam Syndrome, Rubinstein-Taybi Syndrome	AD	100	318 of 318
CUL7	3m Syndrome	AR	99.94	92 of 92
DHCR7	Smith-Lemli-Opitz Syndrome	AR	100	217 of 217
DONSON	Microcephaly, Short Stature, Limb Abnormalities	AR	98.14	26 of 27
EP300	Colorectal Cancer, Menke-Hennekam Syndrome, Rubinstein-Taybi Syndrome	AD	100	109 of 109
FBN1	Acromicric Dysplasia, Ectopia Lentis, Geleophysic Dysplasia, Marfan Syndrome, Mass Syndrome, Stiff Skin Syndrome, Weill-Marchesani	AD	100	2836 of 2845

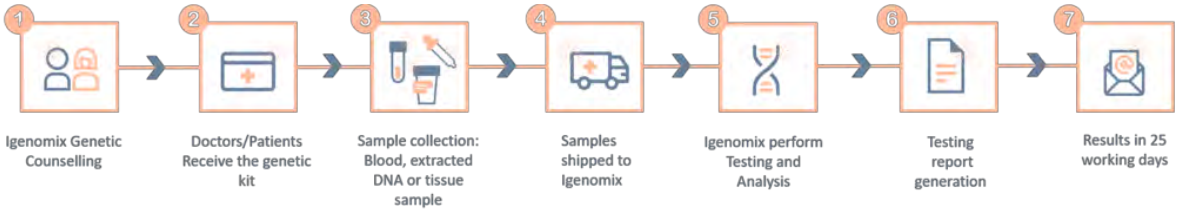
	Syndrome, Short Stature, Neonatal Marfan Syndrome, Shprintzen-Goldberg Syndrome			
FGD1	Aarskog-Scott Syndrome	X,XR,G	98.95	-
FGF8	Hypogonadotropic Hypogonadism, Kallmann Syndrome, Holoprosencephaly	AD	98.36	38 of 38
FGFR1	Encephalocraniocutaneous Lipomatosis, Jackson-Weiss Syndrome, Pfeiffer Syndrome, Trigonocephaly, Hartsfield Syndrome, Kallmann Syndrome, Holoprosencephaly, Hypogonadotropic Hypogonadism, Osteoglosphonic Dysplasia	AD	100	279 of 280
FGFR3	Achondroplasia, Developmental Delay, Crouzon Syndrome, Lacrimoauriculodentodigital Syndrome, Muenke Syndrome, Thanatophoric Dysplasia, Scoliosis, Plagiocephaly, Saethre-Chotzen Syndrome	AD,AR	99.89	77 of 78
FN1	Fibronectin Glomerulopathy, Spondylometaphyseal Dysplasia	AD	100	34 of 34
GH1	Growth Hormone Deficiency, Pituitary Dwarfism	AD,AR	100	82 of 84
GHR	Growth Hormone Insensitivity Syndrome, Hypercholesterolemia, Short Stature, Laron Syndrome	AD,AR	99.53	105 of 109
GHRHR	Growth Hormone Deficiency	AR	100	69 of 71
GHSR	Growth Hormone Deficiency, Short Stature	AD,AR	99.61	15 of 15
GLI2	Holoprosencephaly, Pallister-Hall Syndrome, Pituitary Hormone Deficiency	AD	98.38	83 of 88
GLI3	Greig Cephalopolysyndactyly Syndrome, Hypothalamic Hamartoma Syndrome, Pallister-Hall Syndrome, Polydactyly, Acrocallosal Syndrome	AD,AR	100	231 of 231
GNAS	Adrenal Hyperplasia, Mccune-Albright Syndrome, Osseous Heteroplasia, Pseudohypoparathyroidism, Cushing Syndrome, Mazabraud Syndrome	AD	99.95	263 of 273
HDAC8	Cornelia De Lange Syndrome, Wilson-Turner Syndrome	X,XD,G	99.78	-
HESX1	Septo-Optic Dysplasia, Pituitary Hormone Deficiency, Hypothyroidism, Kallmann Syndrome	AD,AR	100	26 of 26
HRAS	Costello Syndrome, Giant Pigmented Hairy Nevus, Schimmelpenning-Feuerstein-Mims Syndrome, Thyroid Cancer	AD	100	34 of 34
IDUA	Hurler Syndrome, Scheie Syndrome	AR	99.73	287 of 292
IGF1	Growth Factor Deficiency	AR	100	7 of 8
IGF1R	Growth Factor Resistance	AD,AR	100	72 of 73
IGF2	Beckwith-Wiedemann Syndrome, Growth Restriction, Silver-Russell Syndrome, Hemihyperplasia	AD,X,XR,G	100	9 of 9
IGFALS	Acid-Labile Subunit Deficiency, Short Stature	-	96.95	37 of 37
IHH	Acrocapitofemoral Dysplasia, Brachydactyly	AD,AR	99.39	28 of 29
INSR	Donohue Syndrome, Hyperinsulinemic Hypoglycemia, Pineal Hyperplasia, Somatic Abnormalities, Hyperinsulinism, Insulin-Resistance Syndrome, Leprechaunism, Rabson-Mendenhall Syndrome	AD,AR	98.03	181 of 184
IRS1	Diabetes Mellitus	AD	99.91	17 of 17
KRAS	Aplasia Cutis Congenita, Arteriovenous Malformation Of The Brain, Cardiofaciocutaneous Syndrome, Noonan Syndrome, Schimmelpenning-Feuerstein-Mims Syndrome, Lynch Syndrome, Toriello-Lacassie-Droste Syndrome	AD	100	38 of 38
LARP7	Alazami Syndrome, Microcephalic Primordial Dwarfism	AR	96.28	10 of 13
LFNG	Spondylocostal Dysostosis	AR	84.38	9 of 11
LHX3	Deafness, Pituitary Dwarfism, Hypothyroidism, Pituitary Hormone Deficiency	AR	99.97	18 of 19
LHX4	Pituitary Hormone Deficiency, Hypothyroidism, Pituitary Stalk Interruption Syndrome	AD	99.95	21 of 22
LZTR1	Noonan Syndrome, Schwannomatosis	AD	99.99	136 of 136
MAP2K1	Cardiofaciocutaneous Syndrome, Melorheostosis, Noonan Syndrome	AD	100	31 of 31
MAP2K2	Cardiofaciocutaneous Syndrome, Neurofibromatosis, Noonan Syndrome	AD	100	37 of 37
NIPBL	Cornelia De Lange Syndrome	AD	99.32	409 of 426
NOTCH2	Alagille Syndrome, Acroosteolysis	AD	99.88	91 of 91

NPR2	Acromesomelic Dysplasia, Epiphyseal Chondrodysplasia, Short Stature, Skeletal Abnormalities	AD,AR	100	81 of 81
NRAS	Giant Pigmented Hairy Nevus, Noonan Syndrome, Schimmelpenning-Feuerstein-Mims Syndrome, Thyroid Cancer	AD	100	15 of 15
OBSL1	3m Syndrome	AR	98.58	37 of 40
ORC1	Short Stature	AR	100	12 of 12
ORC4	Meier-Gorlin Syndrome, Short Stature	AR	100	4 of 4
ORC6	Meier-Gorlin Syndrome, Short Stature	AR	100	6 of 6
OSGEP	Galloway-Mowat Syndrome	AR	99.17	19 of 19
OTX2	Microphthalmia, Pituitary Dysfunction, Pituitary Hormone Deficiency	AD	100	56 of 58
PAPSS2	Spondyloepimetaphyseal Dysplasia	AR	99.97	27 of 27
PCNT	Dwarfism, Seckel Syndrome	AR	99.92	103 of 105
PISD	Liberfarb Syndrome	AR	100	4 of 4
PITX2	Iridogoniodysgenesis, Rieger Syndrome, Ring Dermoid Of Cornea, Axenfeld-Rieger Syndrome	AD	99.97	104 of 107
POC1A	Short Stature, Facial Dysmorphism, Hypotrichosis	AR	100	10 of 10
POP1	Anauxetic Dysplasia	AR	99.88	6 of 6
POU1F1	Pituitary Hormone Deficiency, Hypothyroidism	AD,AR	100	43 of 44
PPP3CA	Arthrogryposis, Cleft Palate, Craniosynostosis, Intellectual Development, Epileptic Encephalopathy	AD	99.98	16 of 16
PRKAR1A	Acrodysostosis, Carney Complex, Myxoma, Pigmented Nodular Adrenocortical Disease	AD	95.93	165 of 171
PRMT7	Short Stature, Brachydactyly, Intellectual Developmental Disability, Seizures, Global Developmental Delay	AR	100	13 of 14
PROP1	Pituitary Dwarfism, Pituitary Hormone Deficiencies, Hypothyroidism, Panhypopituitarism	AR	100	35 of 36
PTH1R	Chondrodysplasia, Dental Noneruption, Blomstrand Lethal Chondrodysplasia, Eiken Syndrome, Ollier Disease	AD,AR	100	48 of 48
PTPN11	Juvenile Myelomonocytic Leukemia, Leopard Syndrome, Metachondromatosis, Metachondromatosis, Noonan Syndrome	AD	100	150 of 151
PUF60	Verheij Syndrome, 8q24.3 Microdeletion Syndrome, Intellectual Disability, Cardiac Anomalies, Short Stature, Joint Laxity	AD	100	30 of 30
RAD21	Cornelia De Lange Syndrome, Mungan Syndrome	AD,AR	99.8	16 of 17
RAF1	Cardiomyopathy, Leopard Syndrome, Noonan Syndrome	AD	100	64 of 64
RALA	Osteogenesis Imperfecta	-	99.94	7 of 7
RASA2	Noonan Syndrome	-	99.82	5 of 5
RBBP8	Jawad Syndrome, Seckel Syndrome	AR	96.02	6 of 6
RIT1	Noonan Syndrome	AD	99.85	27 of 27
RNU4ATAC	Lowry-Wood Syndrome, Microcephalic Osteodysplastic Primordial Dwarfism, Roifman Syndrome	AR	-	-
RRAS	Noonan Syndrome	-	95.86	3 of 3
RTTN	Microcephaly, Short Stature, Polymicrogyria, Seizures, Dwarfism	AR	99.94	28 of 29
SGMS2	Calvarial Doughnut Lesions, Bone Fragility	AD	99.93	3 of 3
SHOC2	Noonan Syndrome	AD	99.98	8 of 8
SHOX	Langer Mesomelic Dysplasia, Leri-Weill Dyschondrosteosis, Short Stature, Shox-Related Short Stature	AD,AR,X,G	99.98	-
SMARCA2	Nicolaides-Baraitser Syndrome, Intellectual Disability, Sparse Hair, Brachydactyly Syndrome	AD	97.99	80 of 81
SMARCE1	Coffin-Siris Syndrome	AD	98.98	15 of 15
SMC1A	Cornelia De Lange Syndrome, Semilobar Holoprosencephaly, Wiedemann-Steiner Syndrome	X,XR,XD,G	100	-
SMC3	Cornelia De Lange Syndrome	AD	100	30 of 30
SOS1	Fibromatosis, Noonan Syndrome	AD	100	103 of 104
SOX11	Mental Retardation, Coffin-Siris Syndrome	AD	95.23	11 of 11

SOX2	Microphthalmia, Septo-Optic Dysplasia Spectrum	AD	99.91	78 of 78
SOX3	Mental Retardation, Growth Hormone Deficiency, Panhypopituitarism, Disorder Of Sex Development	X,G	92.88	-
SOX9	Campomelic Dysplasia, Disorder Of Sex Development, Complete Gonadal Dysgenesis, Pierre Robin Syndrome	AD	97.28	87 of 95
SRCAP	Floating-Harbor Syndrome	AD	99.98	53 of 53
STAT5B	Immune Dysregulation, Growth Hormone Insensitivity, Immunodeficiency	AD	99.94	12 of 12
TALDO1	Transaldolase Deficiency	AR	95	13 of 14
TBX19	ACTH Deficiency	AR	100	25 of 25
TBX2	Vertebral Anomalies, Endocrine Dysfunction, T-Cell Dysfunction	AD	93.43	8 of 13
TBX3	Ulnar-Mammary Syndrome	AD	99.95	27 of 28
TOP3A	Microcephaly, Growth Restriction, Ophthalmoplegia, Mitochondrial Dna Deletions	AR	97.16	7 of 7
TRIM37	Mulibrey Nanism	AR	97	20 of 22
TRMT10A	Microcephaly, Short Stature, Impaired Glucose Metabolism	AR	99.81	7 of 7
XRCC4	Short Stature, Microcephaly, Endocrine Dysfunction, Lig4 Syndrome, Dwarfism, Insulin Resistance	AR	99.73	10 of 10

*Inheritance: AD: Autosomal Dominant; AR: Autosomal Recessive; X: X linked; XLR: X linked Recessive; Mi: Mitochondrial; Mu: Multifactorial.
**Number of clinically relevant mutations according to HGMD

Methodology



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Call +34 963 905 310 or send an email to supportspain@igenomix.com for any of the following objectives:

- Get more information about the test.
- Request your kit.
- Request a pick up of the kit after collecting the sample.

References

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