Monogenic and Syndromic Obesity

Precision Panel

Overview

The heritability of obesity is estimated between 40-70%, but the genetics of obesity for most individuals is complex and involves the interaction of multiple genes with the environment. There are however several syndromic and non-syndromic forms of obesity that are monogenic and oligogenic that provide insight into the underlying molecular control of food intake and the mechanisms that control ingestive behavior and satiety to regulate body weight. The mode of inheritance is typically autosomal dominant.

The Igenomix Monogenic and Syndromic Precision Panel can be used to make a directed and accurate differential diagnosis of obesity, ultimately leading to a better management and prognosis of the disease and its outcomes. It provides a comprehensive analysis of the genes involved in this disease using next-generation sequencing (NGS) to fully understand the spectrum of relevant genes involved.

Indications

The Igenomix Monogenic and Syndromic Obesity Precision Panel is indicated for those patients with obesity with or without family history of obesity presenting with the following manifestations:

- Abnormal weight growth pattern
- Elevated body mass index
- Hypertension
- Type 2 diabetes
- Metabolic Syndrome

Clinical Utility

The clinical utility of this panel is:

- The genetic and molecular confirmation for an accurate clinical diagnosis of a symptomatic patient.
- Early initiation of treatment with a multidisciplinary team for early pharmacologic therapy, surgical intervention, and/or dietary modifications to reduce comorbidities associated with obesity.
- Risk assessment of asymptomatic family members according to the mode of inheritance.

Genes & Diseases

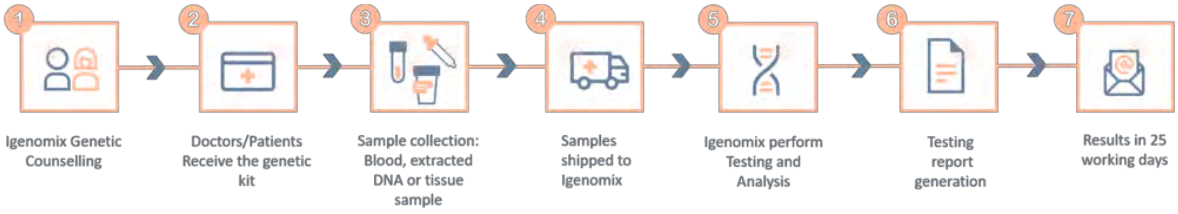
GENE	OMIM DISEASES	INHERITANCE*	% GENE COVERAGE (20X)	HGMD**
ADCY3	Body Mass Index Quantitative Trait Locus	AR	97.98%	7 of 7
AFF4	Chops Syndrome, Cognitive Impairment-Coarse Facies-Heart Defects-Obesity-Pulmonary Involvement-Short Stature-Skeletal Dysplasia Syndrome	AD	99.42%	6 of 6
ALMS1	Alstrom Syndrome	AR	99.92%	302 of 305
ANOS1	Hypogonadotropic hypogonadism, Kallmann syndrome	X,XR,G	96.86	-
ARL6	Bardet-Biedl Syndrome, Retinitis Pigmentosa	AD,AR,X,XR,G	100%	17 of 21
ATRX	Alpha-thalassemia myelodysplasia syndrome, Mental retardation, Carpenter-waziri syndrome, Chudley-lowry-hoar syndrome, Holmes-gang syndrome, Juberg-marsidi syndrome, Neuroendocrine tumor of stomach, Smith-fineman-myers syndrome	X,XR,XD,G	98.5	-
BBIP1	Bardet-Biedl Syndrome	AR	99.88%	1 of 1
BBS1	Bardet-Biedl Syndrome	AR	100%	102 of 105
BBS10	Bardet-Biedl Syndrome	AR	100%	114 of 114
BBS12	Bardet-Biedl Syndrome	AR	99.78%	61 of 61
BBS2	Bardet-Biedl Syndrome, Retinitis Pigmentosa	AR	100%	99 of 100
BBS4	Bardet-Biedl Syndrome	AR	100%	45 of 48
BBS5	Bardet-Biedl Syndrome	AR	99.80%	30 of 31
BBS7	Bardet-Biedl Syndrome	AR	100%	48 of 48
BBS9	Bardet-Biedl Syndrome	AR	99.56%	50 of 51
BDNF	Ondine syndrome, Wagr syndrome	-	99.96	7 of 7
C8ORF37	Bardet-Biedl Syndrome, Cone Rod Dystrophy, Retinitis Pigmentosa	AD,AR,X,XR,G	-	-
CEP19	Morbid Obesity And Spermatogenic Failure	AR	99.88%	2 of 2
CEP290	Bardet-Biedl Syndrome, Joubert Syndrome, Joubert Syndrome With Oculorenal Defect, Leber Congenital Amaurosis, Meckel Syndrome, Senior-Loken Syndrome	AR	96.47%	293 of 327
CPE	Hyperproinsulinemia, Gas Gangrene, Insulinoma, Diabetes Mellitus	-	96.28	0 of 1
CREBBP	Menke-hennekam syndrome, Rubinstein-taybi syndrome	AD	100	318 of 318
CUL4B	X-Linked Mental Retardation With Short Stature, Small Testes, Musclewasting, And Tremor, X-linked Intellectual Disability, Cabezas Type	X,XR,G	99.77%	-
DYRK1B	Abdominal Obesity-Metabolic Syndrome	AD	99.72%	3 of 3
EHMT1	Kleefstra syndrome	AD	98.58	58 of 75
EP300	Colorectal cancer, Menke-hennekam syndrome, Rubinstein-taybi syndrome	AD	100	109 of 109
FGFR1	Encephalocraniocutaneous lipomatosis, Hartsfield syndrome, Jackson-weiss syndrome, Kallmann syndrome, Osteoglophonic dysplasia, Pfeiffer syndrome, Trigonocephaly, Trigonocephaly, Holoprosencephaly, Hypogonadotropic hypogonadism, Oligodontia, Septo-optic dysplasia spectrum	AD	100	279 of 280
FTO	Body mass index quantitative trait locus, Growth retardation, developmental delay, coarse facies	AR	99.91	8 of 8
GHRL	Obesity	AD,AR,MU,P	100	1 of 1
GNAS	ACTH-Independent Macronodular Adrenal Hyperplasia, Albright Hereditary Osteodystrophy, Cushing Syndrome, Mazabraud Syndrome, McCune-Albright Syndrome, Progressive Osseous Heteroplasia, Pseudohypoparathyroidism Type 1A Pseudohypoparathyroidism Type 1B, Pseudohypoparathyroidism Type 1C, Pseudopseudohypoparathyroidism	AD	99.95%	263 of 273
IFT172	Bardet-Biedl Syndrome, Jeune Syndrome, Retinitis Pigmentosa, Short-Rib Thoracic Dysplasia	AR	100%	37 of 37

IFT27	Bardet-Biedl Syndrome	AR	100%	5 of 5
IFT74	Bardet-Biedl Syndrome	AR	99.95%	6 of 6
INPP5E	Joubert syndrome, Mental retardation, truncal obesity, retinal dystrophy	AR	99.89	56 of 56
INS	Diabetes mellitus, Hyperproinsulinemia	AD,AR	100	78 of 84
INSR	Donohue syndrome, Hyperinsulinemic hypoglycemia, Pineal hyperplasia, Leprechaunism, Rabson-mendenhall syndrome	AD,AR	98.03	181 of 184
KDM6A	Kabuki syndrome	AD,X,XD,G	99.98	-
KIDINS220	Spastic Paraplegia-Intellectual Disability-Nystagmus-Obesity Syndrome	AD	99.83%	17 of 17
KMT2D	Kabuki syndrome	AD	99.71	839 of 847
KSR2	Obesity, Insulin Resistance and Impaired Cellular Fuel Oxidation	-	99.88%	29 of 29
LEP	Leptin Deficiency Or Dysfunction	AR	100%	19 of 19
LEPR	Leptin Receptor Deficiency	AR	97.92%	49 of 49
LZTFL1	Bardet-Biedl Syndrome	AR	99.83%	4 of 4
MAGEL2	MAGEL2-related Prader-Willi-Like Syndrome, Prader-Willi Syndrome	AD	99.99%	43 of 48
MC3R	Body mass index quantitative trait locus	-	100	20 of 20
MC4R	Body Mass Index Quantitative Trait Locus, Obesity Due To Melanocortin 4 Receptor Deficiency	AD,AR	100%	165 of 166
MEGF8	Carpenter syndrome	AR	98.97	22 of 22
MKKS	Bardet-Biedl Syndrome, Mckusick-Kaufman Syndrome	AR	89.96%	71 of 71
MKS1	Bardet-Biedl Syndrome, Joubert Syndrome, Joubert Syndrome With Ocular Defect, Meckel Syndrome	AR	99.98%	49 of 49
MYT1L	Autosomal Dominant Mental Retardation, MRD39 chromosome 2p25.3 Deletion Syndrome	AD	99.98%	30 of 30
NR0B2	Obesity	AD,AR,MU,P	99.09%	15 of 15
NTRK2	Early Infantile Epileptic Encephalopathy, Obesity, Hyperphagia, And Developmental Delay, Undetermined Early-onset Epileptic Encephalopathy, West Syndrome	AD	100%	9 of 9
PCNT	Microcephalic osteodysplastic primordial dwarfism, Seckel syndrome	AR	99.92	103 of 105
PCSK1	Obesity Due To Prohormone Convertase I Deficiency, Proprotein Convertase 1 Deficiency	AR	99.98%	45 of 45
PHF6	Borjeson-Forssman-Lehmann Syndrome	X,XR,G	99.93%	-
PHIP	Developmental Delay, Intellectual Disability, Obesity, And Dysmorphic Features	AD	98.74%	51 of 52
POMC	Obesity Due To Pro-Opiomelanocortin Deficiency	AD,AR,MU,P	99.98%	40 of 40
PPARG	Berardinelli-Seip Congenital Lipodystrophy, Carotid Intimal Medial Thickness, Noninsulin-Dependent Diabetes Mellitus, Familial Partial Lipodystrophy, Obesity, PPARG-related Familial Partial Lipodystrophy	AD,AR,MU,P	99.94%	53 of 53
PPARGC1B	Carotid intimal medial thickness, Diabetes mellitus, Lipodystrophy, Obesity, Berardinelli-seip congenital lipodystrophy	-	99.98	6 of 6
PRMT7	Short Stature-Brachydactyly-Obesity-Global Developmental Delay Syndrome	AR	100%	13 of 14
PROK2	Hypogonadotropic hypogonadism, Kallmann syndrome	AD	100	20 of 20
PROKR2	Hypogonadotropic hypogonadism, Kallmann syndrome, Pituitary stalk interruption syndrome, Septo-optic dysplasia spectrum	AD	100	64 of 64
PYY	Eating Disorder, Short Bowel Syndrome, Dumping Syndrome	-	99.99	-
RAB23	Carpenter syndrome	AR	100	15 of 15
RAI1	17p11.2 Microduplication Syndrome, PMP22-RAI1 Contiguous Gene Duplication Syndrome, Smith-Magenis Syndrome	AD	99.91%	50 of 53
RPS6KA3	Coffin-lowry syndrome, Mental retardation	X,XD,G	99.95	-
SDCCAG8	Bardet-Biedl Syndrome, Senior-Loken Syndrome	AR	96.29%	18 of 19
SETD2	Luscan-Lumish Syndrome, Sotos Syndrome	AD	99.83%	19 of 19

SH2B1	Distal 16p11.2 Microdeletion Syndrome, Proximal 16p11.2 Microdeletion Syndrome, Severe Early-Onset Obesity-Insulin Resistance Syndrome Due To Sh2b1 Deficiency	-	99.98%	25 of 25
SIM1	6q16 Microdeletion Syndrome, Obesity Due To SIM1 Deficiency, SIM1-Related Prader-Willi-Like Syndrome	-	99.64%	39 of 40
SOX10	Waardenburg syndrome, Kallmann syndrome, Peripheral demyelinating neuropathy, Dysmyelinating leukodystrophy, hirschsprung disease	AD	99.74	139 of 147
TBX3	Ulnar-mammary syndrome	AD	99.95	27 of 28
TMEM67	Bardet-biedl syndrome, Coach syndrome, Joubert syndrome, Meckel syndrome, Nephronophthisis, Rhyns syndrome	AR	96.93	177 of 179
TRIM32	Bardet-Biedl Syndrome, Limb-Girdle Muscular Dystrophy Type 2H, TRIM32-Related Limb-Girdle Muscular Dystrophy	AR	100%	17 of 17
TTC8	Bardet-Biedl Syndrome, Retinitis Pigmentosa	AR	99.33%	28 of 28
TUB	Retinal dystrophy, obesity, Retinitis pigmentosa	AR	99.91	4 of 4
UBE2A	Mental retardation	X,XR,G	99.99	-
UCP1	Lipomatosis, Diabetes Mellitus	-	100	2 of 2
UCP2	Hyperinsulinism	-	100	7 of 7
UCP3	Obesity	AD,AR,MU,P	99.98%	6 of 6
VPS13B	Cohen Syndrome	AR	99.98%	182 of 190
WDPCP	Bardet-Biedl Syndrome, Congenital Heart Defects, Hamartomas Of Tongue, And Polysyndactyly, Meckel Syndrome	AR	99.30%	8 of 8

*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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