GEPHE SUMMARY

Gephebase Gene

PIK3CG (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^PIK3CG^#gephebase-summary-title)

GepheID

GP00001611

Entry Status

Published

Main curator

Prigent

PHENOTYPIC CHANGE

Trait Category

Physiology (https://www.gephebase.org/search-criteria?/and+Trait Category=^Physiology^#gephebase-summary-title)

Trait

Hematopoiesis (mean blood platelet volume) (https://www.gephebase.org/search-criteria?/and+Trait=^Hematopoiesis (mean blood platelet volume)^#gephebase-summary-title)

Trait State in Taxon A

Human - Estonia Biobank

Trait State in Taxon B

Human - Estonia Biobank

Ancestral State

Unknown

Taxonomic Status

Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)

Taxon A

Latin Name

Homo sapiens (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Homo sapiens^#gephebase-summary-title)

Common Name

human

Synonyms

human; man; Homo sapiens Linnaeus, 1758; Home sapiens; Homo sampiens; Homo sapeins; Homo sapian; Homo sapians; Homo sapien; Homo sapience; Homo sapiense; Homo sapients; Homo sapines; Homo spaiens; Homo spiens; Humo sapiens

Rank

species

Lineage

cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Primates; Haplorrhini; Simiiformes; Catarrhini; Hominoidea; Hominidae; Homininae; Homo

Parent

Homo () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9605)

NCBI Taxonomy ID

9606 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9606)

is Taxon A an Infraspecies?

Yes

Taxon A Description

Human - Estonia Biobank

Taxon B

Latin Name

Homo sapiens (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Homo sapiens^#gephebase-summary-title)

Common Name

human

Synonyms

human; man; Homo sapiens Linnaeus, 1758; Home sapiens; Homo sampiens; Homo sapeins; Homo sapian; Homo sapians; Homo sapien; Homo sapience; Homo sapiense; Homo sapients; Homo sapines; Homo spaiens; Homo spiens; Humo sapiens

Rank

species

Lineage

cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Primates; Haplorrhini; Simiiformes; Catarrhini; Hominoidea; Hominidae; Homininae; Homo

Parent

Homo () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9605)

NCBI Taxonomy ID

9606 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9606)

is Taxon B an Infraspecies?

Yes

Taxon B Description

Human - Estonia Biobank

GENOTYPIC CHANGE

Generic Gene Name

PIK3CG

Synonyms

PI3K; PIK3; PI3CG; PI3Kgamma; p110gamma; p120-PI3K

String

9606.ENSP00000352121 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=9606.ENSP00000352121)

Sequence Similarities

Belongs to the PI3/PI4-kinase family.

GO - Molecular Function

GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)

UniProtKB Homo sapiens

P48736 (http://www.uniprot.org/uniprot/P48736)

GenebankID or UniProtKB

()

GO:0042802 : identical protein binding
(https://www.ebi.ac.uk/QuickGO/term/GO:0042802)
GO:0046934 : phosphatidylinositol-4,5-bisphosphate 3-kinase activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0046934)
GO:0004674 : protein serine/threonine kinase activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0004674)
GO:0004672 : protein kinase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004672)
GO:0016303 : 1-phosphatidylinositol-3-kinase activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0016303)
GO:0016301 : kinase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0016301)
GO:0046875 : ephrin receptor binding
(https://www.ebi.ac.uk/QuickGO/term/GO:0046875)
GO:0035005 : 1-phosphatidylinositol-4-phosphate 3-kinase activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0035005)
GO:0035004 : phosphatidylinositol 3-kinase activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0035004)

GO - Biological Process

GO:0045087 : innate immune response
(https://www.ebi.ac.uk/QuickGO/term/GO:0045087)
GO:0007186 : G protein-coupled receptor signaling pathway
(https://www.ebi.ac.uk/QuickGO/term/GO:0007186)
GO:0043406 : positive regulation of MAP kinase activity
(https://www.ebi.ac.uk/QuickGO/term/GO:0043406)
GO:0051897 : positive regulation of protein kinase B signaling
(https://www.ebi.ac.uk/QuickGO/term/GO:0051897)
GO:0007204 : positive regulation of cytosolic calcium ion concentration
(https://www.ebi.ac.uk/QuickGO/term/GO:0007204)
GO:0006468 : protein phosphorylation
(https://www.ebi.ac.uk/QuickGO/term/GO:0006468)
GO:0006954 : inflammatory response
(https://www.ebi.ac.uk/QuickGO/term/GO:0006954)
GO:0030593 : neutrophil chemotaxis (https://www.ebi.ac.uk/QuickGO/term/GO:0030593)
GO:0016310 : phosphorylation (https://www.ebi.ac.uk/QuickGO/term/GO:0016310)
GO:0006897 : endocytosis (https://www.ebi.ac.uk/QuickGO/term/GO:0006897)
GO:0001525 : angiogenesis (https://www.ebi.ac.uk/QuickGO/term/GO:0001525)
GO:0002250 : adaptive immune response
(https://www.ebi.ac.uk/QuickGO/term/GO:0002250)
GO:0070527 : platelet aggregation (https://www.ebi.ac.uk/QuickGO/term/GO:0070527)
GO:0042110 : T cell activation (https://www.ebi.ac.uk/QuickGO/term/GO:0042110)
GO:0014068 : positive regulation of phosphatidylinositol 3-kinase signaling
(https://www.ebi.ac.uk/QuickGO/term/GO:0014068)
GO:0014065 : phosphatidylinositol 3-kinase signaling
(https://www.ebi.ac.uk/QuickGO/term/GO:0014065)
GO:0048015 : phosphatidylinositol-mediated signaling
(https://www.ebi.ac.uk/QuickGO/term/GO:0048015)
GO:0071320 : cellular response to cAMP
(https://www.ebi.ac.uk/QuickGO/term/GO:0071320)
GO:0043303 : mast cell degranulation
(https://www.ebi.ac.uk/QuickGO/term/GO:0043303)
GO:0016477 : cell migration (https://www.ebi.ac.uk/QuickGO/term/GO:0016477)
GO:0030168 : platelet activation (https://www.ebi.ac.uk/QuickGO/term/GO:0030168)
GO:0046854 : phosphatidylinositol phosphorylation
(https://www.ebi.ac.uk/QuickGO/term/GO:0046854)
GO:0010818 : T cell chemotaxis (https://www.ebi.ac.uk/QuickGO/term/GO:0010818)
GO:0001816 : cytokine production (https://www.ebi.ac.uk/QuickGO/term/GO:0001816)
GO:0002407 : dendritic cell chemotaxis
(https://www.ebi.ac.uk/QuickGO/term/GO:0002407)
GO:0097284 : hepatocyte apoptotic process
(https://www.ebi.ac.uk/QuickGO/term/GO:0097284)
GO:0035747 : natural killer cell chemotaxis
(https://www.ebi.ac.uk/QuickGO/term/GO:0035747)
GO:0055118 : negative regulation of cardiac muscle contraction
(https://www.ebi.ac.uk/QuickGO/term/GO:0055118)
GO:2000270 : negative regulation of fibroblast apoptotic process
(https://www.ebi.ac.uk/QuickGO/term/GO:2000270)
GO:0010897 : negative regulation of triglyceride catabolic process
(https://www.ebi.ac.uk/QuickGO/term/GO:0010897)
GO:0072672 : neutrophil extravasation
(https://www.ebi.ac.uk/QuickGO/term/GO:0072672)
GO:0036092 : phosphatidylinositol-3-phosphate biosynthetic process
(https://www.ebi.ac.uk/QuickGO/term/GO:0036092)
GO:0002675 : positive regulation of acute inflammatory response
(https://www.ebi.ac.uk/QuickGO/term/GO:0002675)
GO:1903169 : regulation of calcium ion transmembrane transport
(https://www.ebi.ac.uk/QuickGO/term/GO:1903169)
GO:0033628 : regulation of cell adhesion mediated by integrin
(https://www.ebi.ac.uk/QuickGO/term/GO:0033628)
GO:0002679 : respiratory burst involved in defense response

(https://www.ebi.ac.uk/QuickGO/term/GO:0002679)
GO:0032252 : secretory granule localization
(https://www.ebi.ac.uk/QuickGO/term/GO:0032252)
GO:0042098 : T cell proliferation (https://www.ebi.ac.uk/QuickGO/term/GO:0042098)

GO - Cellular Component

GO:0005886 : plasma membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005886)
GO:0005737 : cytoplasm (https://www.ebi.ac.uk/QuickGO/term/GO:0005737)
GO:0005829 : cytosol (https://www.ebi.ac.uk/QuickGO/term/GO:0005829)
GO:0016020 : membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0016020)
GO:0042629 : mast cell granule (https://www.ebi.ac.uk/QuickGO/term/GO:0042629)
GO:0005942 : phosphatidylinositol 3-kinase complex
(https://www.ebi.ac.uk/QuickGO/term/GO:0005942)
GO:0005944 : phosphatidylinositol 3-kinase complex, class IB
(https://www.ebi.ac.uk/QuickGO/term/GO:0005944)

Presumptive Null

Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Unknown^#gephebase-summary-title)

Molecular Type

Unknown (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Unknown^#gephebase-summary-title)

Aberration Type

Unknown (https://www.gephebase.org/search-criteria?/and+Aberration Type=^Unknown^#gephebase-summary-title)

Molecular Details of the Mutation

C>G at the associated SNP

Experimental Evidence

Association Mapping (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Association Mapping^#gephebase-summary-title)

Main Reference

Comprehensive population-based genome sequencing provides insight into hematopoietic regulatory mechanisms. (2017) (https://pubmed.ncbi.nlm.nih.gov/28031487)

Authors

Guo MH; Nandakumar SK; Ulirsch JC; Zekavat SM; Buenrostro JD; Natarajan P; Salem RM; Chiarle R; Mitt M; Kals M; PÃ¤rn K; Fischer K; Milani L; MÃ¤gi R; Palta P; Gabriel SB; Metspalu A; Lander ES; Kathiresan S; Hirschhorn JN; Esko T; Sankaran VG

Abstract

Genetic variants affecting hematopoiesis can influence commonly measured blood cell traits. To identify factors that affect hematopoiesis, we performed association studies for blood cell traits in the population-based Estonian Biobank using high-coverage whole-genome sequencing (WGS) in 2,284 samples and SNP genotyping in an additional 14,904 samples. Using up to 7,134 samples with available phenotype data, our analyses identified 17 associations across 14 blood cell traits. Integration of WGS-based fine-mapping and complementary epigenomic datasets provided evidence for causal mechanisms at several loci, including at a previously undiscovered basophil count-associated locus near the master hematopoietic transcription factor CEBPA The fine-mapped variant at this basophil count association near CEBPA overlapped an enhancer active in common myeloid progenitors and influenced its activity. In situ perturbation of this enhancer by CRISPR/Cas9 mutagenesis in hematopoietic stem and progenitor cells demonstrated that it is necessary for and specifically regulates CEBPA expression during basophil differentiation. We additionally identified basophil count-associated variation at another more pleiotropic myeloid enhancer near GATA2, highlighting regulatory mechanisms for ordered expression of master hematopoietic regulators during lineage specification. Our study illustrates how population-based genetic studies can provide key insights into poorly understood cell differentiation processes of considerable physiologic relevance.

Additional References

RELATED GEPHE

Related Genes

12 (ARHGEF3, BAK1, CCAAT-enhancer-binding protein alpha (CEBPA), F2RL2, GATA-binding protein 2 (GATA2), HBS1L-MYB, JAK2, JMJD1C, LPAR1, PSMD13, TMPRSS6, WDR66) (https://www.gephebase.org/search-criteria?/or+Taxon ID=^9606^/and+Trait=Hematopoiesis/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS