

GEPHE SUMMARY

|                                                                                                                                                                                                                                                                                                                                       |  |              |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--------------|--|
| Gephebase Gene                                                                                                                                                                                                                                                                                                                        |  | GepheID      |  |
| Glucose-dependent insulintropic polypeptide ( <a href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^Glucose-dependent+insulintropic+polypeptide^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^Glucose-dependent+insulintropic+polypeptide^#gephebase-summary-title</a> ) |  | GP00000404   |  |
| Entry Status                                                                                                                                                                                                                                                                                                                          |  | Martin       |  |
| Published                                                                                                                                                                                                                                                                                                                             |  | Main curator |  |

PHENOTYPIC CHANGE

|                                                                                                                                                                                                                                    |                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Trait #1                                                                                                                                                                                                                           | Trait Category         |
| Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait+Category=^Physiology^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait+Category=^Physiology^#gephebase-summary-title</a> ) | Trait                  |
| Glycemia ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=^Glycemia^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=^Glycemia^#gephebase-summary-title</a> )                         | Trait State in Taxon A |
| Homo sapiens                                                                                                                                                                                                                       | Trait State in Taxon B |
| Homo sapiens                                                                                                                                                                                                                       |                        |

|                                                                                                                                                                                                                                    |                        |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|
| Trait #2                                                                                                                                                                                                                           | Trait Category         |
| Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait+Category=^Physiology^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait+Category=^Physiology^#gephebase-summary-title</a> ) | Trait                  |
| Adipolysis rate ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=^Adipolysis+rate^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=^Adipolysis+rate^#gephebase-summary-title</a> )    | Trait State in Taxon A |
| -                                                                                                                                                                                                                                  | Trait State in Taxon B |
| -                                                                                                                                                                                                                                  |                        |

|                                                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                                                                                                                                                  |  |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| Ancestral State                                                                                                                                                                                                                                                                                                                                                                  |  |                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Taxon A                                                                                                                                                                                                                                                                                                                                                                          |  |                                                                                                                                                                                                                                                                                                                                                                                  |  |
| Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Intraspecific^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Intraspecific^#gephebase-summary-title</a> )                                                                                                                                  |  | Taxonomic Status                                                                                                                                                                                                                                                                                                                                                                 |  |
| Taxon A                                                                                                                                                                                                                                                                                                                                                                          |  | Taxon B                                                                                                                                                                                                                                                                                                                                                                          |  |
| Homo sapiens                                                                                                                                                                                                                                                                                                                                                                     |  | Homo sapiens                                                                                                                                                                                                                                                                                                                                                                     |  |
| ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Homo+sapiens^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Homo+sapiens^#gephebase-summary-title</a> )                                                                                                                                              |  | ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Homo+sapiens^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Homo+sapiens^#gephebase-summary-title</a> )                                                                                                                                              |  |
| human                                                                                                                                                                                                                                                                                                                                                                            |  | human                                                                                                                                                                                                                                                                                                                                                                            |  |
| 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                                                                                                                                                   |  | 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                                                                                                                                                   |  |
| species                                                                                                                                                                                                                                                                                                                                                                          |  | species                                                                                                                                                                                                                                                                                                                                                                          |  |
| 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 |  | 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 |  |
| Homo () - (Rank: genus)                                                                                                                                                                                                                                                                                                                                                          |  | Homo () - (Rank: genus)                                                                                                                                                                                                                                                                                                                                                          |  |
| ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9605">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9605</a> )                                                                                                                                                                                                                              |  | ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9605">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9605</a> )                                                                                                                                                                                                                              |  |
| 9606                                                                                                                                                                                                                                                                                                                                                                             |  | 9606                                                                                                                                                                                                                                                                                                                                                                             |  |
| ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9606">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9606</a> )                                                                                                                                                                                                                              |  | ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9606">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9606</a> )                                                                                                                                                                                                                              |  |
| is Taxon A an Intraspecies?                                                                                                                                                                                                                                                                                                                                                      |  | is Taxon B an Intraspecies?                                                                                                                                                                                                                                                                                                                                                      |  |
| No                                                                                                                                                                                                                                                                                                                                                                               |  | No                                                                                                                                                                                                                                                                                                                                                                               |  |

GENOTYPIC CHANGE

|                                                                                                                                                                                                                                 |                                                                                                                        |                                   |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|-----------------------------------|
|                                                                                                                                                                                                                                 | Generic Gene Name                                                                                                      | UniProtKB Homo sapiens            |
| GIP                                                                                                                                                                                                                             | P09681 ( <a href="http://www.uniprot.org/uniprot/P09681">http://www.uniprot.org/uniprot/P09681</a> )                   |                                   |
|                                                                                                                                                                                                                                 | Synonyms                                                                                                               | GenebankID or UniProtKB           |
| -                                                                                                                                                                                                                               | BC096148 ( <a href="https://www.ncbi.nlm.nih.gov/nuccore/BC096148">https://www.ncbi.nlm.nih.gov/nuccore/BC096148</a> ) |                                   |
|                                                                                                                                                                                                                                 | String                                                                                                                 |                                   |
| 9606.ENSPO0000350005<br>( <a href="http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSPO0000350005">http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSPO0000350005</a> ) |                                                                                                                        |                                   |
|                                                                                                                                                                                                                                 | Sequence Similarities                                                                                                  |                                   |
| Belongs to the glucagon family.                                                                                                                                                                                                 |                                                                                                                        |                                   |
|                                                                                                                                                                                                                                 | GO - Molecular Function                                                                                                |                                   |
| GO:0005179 : hormone activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005179">https://www.ebi.ac.uk/QuickGO/term/GO:0005179</a> )                                                                                     |                                                                                                                        |                                   |
|                                                                                                                                                                                                                                 | GO - Biological Process                                                                                                |                                   |
| GO:0007165 : signal transduction ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0007165">https://www.ebi.ac.uk/QuickGO/term/GO:0007165</a> )                                                                                  |                                                                                                                        |                                   |
| GO:0007186 : G protein-coupled receptor signaling pathway ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0007186">https://www.ebi.ac.uk/QuickGO/term/GO:0007186</a> )                                                         |                                                                                                                        |                                   |
| GO:0070328 : triglyceride homeostasis ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0070328">https://www.ebi.ac.uk/QuickGO/term/GO:0070328</a> )                                                                             |                                                                                                                        |                                   |
| GO:0007565 : female pregnancy ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0007565">https://www.ebi.ac.uk/QuickGO/term/GO:0007565</a> )                                                                                     |                                                                                                                        |                                   |
| GO:0042493 : response to drug ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0042493">https://www.ebi.ac.uk/QuickGO/term/GO:0042493</a> )                                                                                     |                                                                                                                        |                                   |
| GO:0014070 : response to organic cyclic compound ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0014070">https://www.ebi.ac.uk/QuickGO/term/GO:0014070</a> )                                                                  |                                                                                                                        |                                   |
| GO:0008344 : adult locomotory behavior ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0008344">https://www.ebi.ac.uk/QuickGO/term/GO:0008344</a> )                                                                            |                                                                                                                        |                                   |
| GO:0031018 : endocrine pancreas development ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0031018">https://www.ebi.ac.uk/QuickGO/term/GO:0031018</a> )                                                                       |                                                                                                                        |                                   |
| GO:0019233 : sensory perception of pain ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0019233">https://www.ebi.ac.uk/QuickGO/term/GO:0019233</a> )                                                                           |                                                                                                                        |                                   |
| GO:0055123 : digestive system development ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0055123">https://www.ebi.ac.uk/QuickGO/term/GO:0055123</a> )                                                                         |                                                                                                                        |                                   |
| GO:0035640 : exploration behavior ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0035640">https://www.ebi.ac.uk/QuickGO/term/GO:0035640</a> )                                                                                 |                                                                                                                        |                                   |
| GO:0060291 : long-term synaptic potentiation ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0060291">https://www.ebi.ac.uk/QuickGO/term/GO:0060291</a> )                                                                      |                                                                                                                        |                                   |
| GO:0007613 : memory ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0007613">https://www.ebi.ac.uk/QuickGO/term/GO:0007613</a> )                                                                                               |                                                                                                                        |                                   |
| GO:0043950 : positive regulation of cAMP-mediated signaling ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0043950">https://www.ebi.ac.uk/QuickGO/term/GO:0043950</a> )                                                       |                                                                                                                        |                                   |
| GO:0070094 : positive regulation of glucagon secretion ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0070094">https://www.ebi.ac.uk/QuickGO/term/GO:0070094</a> )                                                            |                                                                                                                        |                                   |
| GO:0010828 : positive regulation of glucose transmembrane transport ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0010828">https://www.ebi.ac.uk/QuickGO/term/GO:0010828</a> )                                               |                                                                                                                        |                                   |
| GO:0032024 : positive regulation of insulin secretion ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0032024">https://www.ebi.ac.uk/QuickGO/term/GO:0032024</a> )                                                             |                                                                                                                        |                                   |
| GO:0042304 : regulation of fatty acid biosynthetic process ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0042304">https://www.ebi.ac.uk/QuickGO/term/GO:0042304</a> )                                                        |                                                                                                                        |                                   |
| GO:0050796 : regulation of insulin secretion ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0050796">https://www.ebi.ac.uk/QuickGO/term/GO:0050796</a> )                                                                      |                                                                                                                        |                                   |
| GO:0010447 : response to acidic pH ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0010447">https://www.ebi.ac.uk/QuickGO/term/GO:0010447</a> )                                                                                |                                                                                                                        |                                   |
| GO:0043200 : response to amino acid ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0043200">https://www.ebi.ac.uk/QuickGO/term/GO:0043200</a> )                                                                               |                                                                                                                        |                                   |
| GO:0048678 : response to axon injury ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0048678">https://www.ebi.ac.uk/QuickGO/term/GO:0048678</a> )                                                                              |                                                                                                                        |                                   |
| GO:0009749 : response to glucose ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0009749">https://www.ebi.ac.uk/QuickGO/term/GO:0009749</a> )                                                                                  |                                                                                                                        |                                   |
| GO:0033993 : response to lipid ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0033993">https://www.ebi.ac.uk/QuickGO/term/GO:0033993</a> )                                                                                    |                                                                                                                        |                                   |
| GO:0043434 : response to peptide hormone ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0043434">https://www.ebi.ac.uk/QuickGO/term/GO:0043434</a> )                                                                          |                                                                                                                        |                                   |
| GO:0010269 : response to selenium ion ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0010269">https://www.ebi.ac.uk/QuickGO/term/GO:0010269</a> )                                                                             |                                                                                                                        |                                   |
| GO:0042594 : response to starvation ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0042594">https://www.ebi.ac.uk/QuickGO/term/GO:0042594</a> )                                                                               |                                                                                                                        |                                   |
|                                                                                                                                                                                                                                 | GO - Cellular Component                                                                                                |                                   |
| GO:0005576 : extracellular region ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005576">https://www.ebi.ac.uk/QuickGO/term/GO:0005576</a> )                                                                                 |                                                                                                                        |                                   |
| GO:0005615 : extracellular space ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005615">https://www.ebi.ac.uk/QuickGO/term/GO:0005615</a> )                                                                                  |                                                                                                                        |                                   |
| GO:0005788 : endoplasmic reticulum lumen ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0005788">https://www.ebi.ac.uk/QuickGO/term/GO:0005788</a> )                                                                          |                                                                                                                        |                                   |
| GO:0043025 : neuronal cell body ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0043025">https://www.ebi.ac.uk/QuickGO/term/GO:0043025</a> )                                                                                   |                                                                                                                        |                                   |
| GO:0034774 : secretory granule lumen ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0034774">https://www.ebi.ac.uk/QuickGO/term/GO:0034774</a> )                                                                              |                                                                                                                        |                                   |
|                                                                                                                                                                                                                                 |                                                                                                                        | Presumptive Null                  |
| No ( <a href="https://www.gephebase.org/search-criteria?/and+Presumptive Null=~No~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Presumptive Null=~No~#gephebase-summary-title</a> )                  |                                                                                                                        |                                   |
|                                                                                                                                                                                                                                 |                                                                                                                        | Molecular Type                    |
| Coding ( <a href="https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding~#gephebase-summary-title</a> )          |                                                                                                                        |                                   |
|                                                                                                                                                                                                                                 |                                                                                                                        | Aberration Type                   |
| SNP ( <a href="https://www.gephebase.org/search-criteria?/and+Aberration Type=~SNP~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Aberration Type=~SNP~#gephebase-summary-title</a> )                 |                                                                                                                        |                                   |
|                                                                                                                                                                                                                                 |                                                                                                                        | SNP Coding Change                 |
| Nonsynonymous                                                                                                                                                                                                                   |                                                                                                                        |                                   |
|                                                                                                                                                                                                                                 |                                                                                                                        | Molecular Details of the Mutation |
| Ser103Gly                                                                                                                                                                                                                       |                                                                                                                        |                                   |

|            | Taxon A | Taxon B | Position |
|------------|---------|---------|----------|
| Codon      | -       | -       | -        |
| Amino-acid | -       | -       | -        |

Main Reference

Adaptive selection of an incretin gene in Eurasian populations. (2011) (<https://pubmed.ncbi.nlm.nih.gov/20978139>)

Authors

Chang CL; Cai JJ; Lo C; Amigo J; Park JI; Hsu SY

Abstract

Diversities in human physiology have been partially shaped by adaptation to natural environments and changing cultures. Recent genomic analyses have revealed single nucleotide polymorphisms (SNPs) that are associated with adaptations in immune responses, obvious changes in human body forms, or adaptations to extreme climates in select human populations. Here, we report that the human GIP locus was differentially selected among human populations based on the analysis of a nonsynonymous SNP (rs2291725). Comparative and functional analyses showed that the human GIP gene encodes a cryptic glucose-dependent insulinotropic polypeptide (GIP) isoform (GIP55S or GIP55G) that encompasses the SNP and is resistant to serum degradation relative to the known mature GIP peptide. Importantly, we found that GIP55G, which is encoded by the derived allele, exhibits a higher bioactivity compared with GIP55S, which is derived from the ancestral allele. Haplotype structure analysis suggests that the derived allele at rs2291725 arose to dominance in East Asians ~1/48100 yr ago due to positive selection. The combined results suggested that rs2291725 represents a functional mutation and may contribute to the population genetics observation. Given that GIP signaling plays a critical role in homeostasis regulation at both the enteroinsular and enteroadipocyte axes, our study highlights the importance of understanding adaptations in energy-balance regulation in the face of the emerging diabetes and obesity epidemics.

Additional References

RELATED GEPHE

No matches found.

No matches found.

Related Genes

Related Haplotypes

EXTERNAL LINKS

COMMENTS