GEPHE SUMMARY

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

GepheID
GP00000924

Entry Status
Published

Main curator
Martin

PHENOTYPIC CHANGE

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

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

Trait State in Taxon A
Other primates

Trait State in Taxon B
Homo sapiens

Ancestral State
Data not curated

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

Taxon A

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

Common Name
-

Synonyms
Primata; Primates Linnaeus, 1758

Rank
order

Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires

Parent
Euarchontoglires () - (Rank: superorder) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 314146)

NCBI Taxonomy ID
9443 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9443)

is Taxon A an Infraspecies?
No

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?
No

GENOTYPIC CHANGE

Generic Gene Name
PDYN

Synonyms
ADCA; PENKB; SCA23

String
9606.ENSP00000217305 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 9606.ENSP00000217305)

Sequence Similarities
Belongs to the opioid neuropeptide precursor family.

GO - Molecular Function
GO:0001515 : opioid peptide activity (https://www.ebi.ac.uk/QuickGO/term/GO:0001515)

GO - Biological Process
GO:0007268 : chemical synaptic transmission (https://www.ebi.ac.uk/QuickGO/term/GO:0007268)

UniProtKB Homo sapiens
P01213 (http://www.uniprot.org/uniprot/P01213)

GenebankID or UniProtKB
AK289618 (https://www.ncbi.nlm.nih.gov/nuccore/AK289618)

GO:0007186 : G protein-coupled receptor signaling pathway (https://www.ebi.ac.uk/QuickGO/term/GO:0007186)
GO:0007218 : neuropeptide signaling pathway (https://www.ebi.ac.uk/QuickGO/term/GO:0007218)

GO - Cellular Component

GO:0005886 : plasma membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005886)
GO:0005576 : extracellular region (https://www.ebi.ac.uk/QuickGO/term/GO:0005576)
GO:0030425 : dendrite (https://www.ebi.ac.uk/QuickGO/term/GO:0030425)
GO:0043025 : neuronal cell body (https://www.ebi.ac.uk/QuickGO/term/GO:0043025)
GO:0043679 : axon terminus (https://www.ebi.ac.uk/QuickGO/term/GO:0043679)

Presumptive Null

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title)

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

up to 5 polymorphisms in 5′ regulatory region

Experimental Evidence

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

Main Reference

Ancient and recent positive selection transformed opioid cis-regulation in humans. (2005) (https://pubmed.ncbi.nlm.nih.gov/16274263)

Authors

Rockman MV; Hahn MW; Soranzo N; Zimprich F; Goldstein DB; Wray GA

Abstract

Changes in the cis-regulation of neural genes likely contributed to the evolution of our species' unique attributes, but evidence of a role for natural selection has been lacking. We found that positive natural selection altered the cis-regulation of human prodynorphin, the precursor molecule for a suite of endogenous opioids and neuropeptides with critical roles in regulating perception, behavior, and memory. Independent lines of phylogenetic and population genetic evidence support a history of selective sweeps driving the evolution of the human prodynorphin promoter. In experimental assays of chimpanzee-human hybrid promoters, the selected sequence increases transcriptional inducibility. The evidence for a change in the response of the brain's natural opioids to inductive stimuli points to potential human-specific characteristics favored during evolution. In addition, the pattern of linked nucleotide and microsatellite variation among and within modern human populations suggests that recent selection, subsequent to the fixation of the human-specific mutations and the peopling of the globe, has favored different prodynorphin cis-regulatory alleles in different parts of the world.

Additional References

Multiple Functional Variants in cis Modulate PDYN Expression. (2010) (https://pubmed.ncbi.nlm.nih.gov/19910384)

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS