

GEPHE SUMMARY

interleukin-4 (https://www.gephebase.org/search-criteria?/and+GeneGephebase=~interleukin-4~#gephebase-summary-title)	Gephebase Gene	GP00000504	GepheID
	Entry Status	Martin	Main curator
	Published		

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+TraitCategory=~Physiology~#gephebase-summary-title)		Trait Category	
Immune response (https://www.gephebase.org/search-criteria?/and+Trait=~Immune response~#gephebase-summary-title)		Trait	
Other primates		Trait State in Taxon A	
Homo sapiens		Trait State in Taxon B	
Data not curated		Ancestral State	
Interspecific (https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=~Interspecific~#gephebase-summary-title)		Taxonomic Status	
Taxon A		Taxon B	
Primates (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Primates~#gephebase-summary-title)		Homo sapiens (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=~Homo sapiens~#gephebase-summary-title)	
-		human	
Primata; Primates Linnaeus, 1758		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	
order		species	
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires		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	
Euarchontoglires () - (Rank: superorder) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 314146)		Homo () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9605)	
9443 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9443)		9606 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 9606)	
No		No	

GENOTYPIC CHANGE

IL4R		Generic Gene Name		UniProtKB Homo sapiens
CD124; IL4RA; IL-4RA; 582J2.1		Synonyms		GenebankID or UniProtKB
9606.ENSPP00000170630 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=9606.ENSPP00000170630)		String		
Belongs to the type I cytokine receptor family. Type 4 subfamily.		Sequence Similarities		
GO:0004913 : interleukin-4 receptor activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004913)		GO - Molecular Function		
GO:0006955 : immune response (https://www.ebi.ac.uk/QuickGO/term/GO:0006955)		GO - Biological Process		

GO:0007165 : signal transduction (<https://www.ebi.ac.uk/QuickGO/term/GO:0007165>)
GO:0043627 : response to estrogen (<https://www.ebi.ac.uk/QuickGO/term/GO:0043627>)
GO:0019221 : cytokine-mediated signaling pathway (<https://www.ebi.ac.uk/QuickGO/term/GO:0019221>)
GO:1990834 : response to odorant (<https://www.ebi.ac.uk/QuickGO/term/GO:1990834>)
GO:1901741 : positive regulation of myoblast fusion (<https://www.ebi.ac.uk/QuickGO/term/GO:1901741>)
GO:0120162 : positive regulation of cold-induced thermogenesis (<https://www.ebi.ac.uk/QuickGO/term/GO:0120162>)
GO:0042127 : regulation of cell proliferation (<https://www.ebi.ac.uk/QuickGO/term/GO:0042127>)
GO:0042832 : defense response to protozoan (<https://www.ebi.ac.uk/QuickGO/term/GO:0042832>)
GO:0016064 : immunoglobulin mediated immune response (<https://www.ebi.ac.uk/QuickGO/term/GO:0016064>)
GO:0045626 : negative regulation of T-helper 1 cell differentiation (<https://www.ebi.ac.uk/QuickGO/term/GO:0045626>)
GO:0030728 : ovulation (<https://www.ebi.ac.uk/QuickGO/term/GO:0030728>)
GO:0090197 : positive regulation of chemokine secretion (<https://www.ebi.ac.uk/QuickGO/term/GO:0090197>)
GO:0002639 : positive regulation of immunoglobulin production (<https://www.ebi.ac.uk/QuickGO/term/GO:0002639>)
GO:0043032 : positive regulation of macrophage activation (<https://www.ebi.ac.uk/QuickGO/term/GO:0043032>)
GO:0043306 : positive regulation of mast cell degranulation (<https://www.ebi.ac.uk/QuickGO/term/GO:0043306>)
GO:0045630 : positive regulation of T-helper 2 cell differentiation (<https://www.ebi.ac.uk/QuickGO/term/GO:0045630>)
GO:0002532 : production of molecular mediator involved in inflammatory response (<https://www.ebi.ac.uk/QuickGO/term/GO:0002532>)

GO - Cellular Component

GO:0005886 : plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005886>)
GO:0005887 : integral component of plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005887>)
GO:0043235 : receptor complex (<https://www.ebi.ac.uk/QuickGO/term/GO:0043235>)
GO:0005615 : extracellular space (<https://www.ebi.ac.uk/QuickGO/term/GO:0005615>)

No (https://www.gephebase.org/search-criteria?/and+Presumptive Null=~No~#gephebase-summary-title)	Presumptive Null
Cis-regulatory (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Cis-regulatory~#gephebase-summary-title)	Molecular Type
SNP (https://www.gephebase.org/search-criteria?/and+Aberration Type=~SNP~#gephebase-summary-title)	Aberration Type
1bp substitution in promoter	Molecular Details of the Mutation
Candidate Gene (https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Candidate Gene~#gephebase-summary-title)	Experimental Evidence
Positive selection on a human-specific transcription factor binding site regulating IL4 expression. (2003) (https://pubmed.ncbi.nlm.nih.gov/14654003)	Main Reference
Rockman MV; Hahn MW; Soranzo N; Goldstein DB; Wray GA	Authors
	Abstract

A single nucleotide polymorphism in the promoter of the multifunctional cytokine Interleukin 4 (IL4) affects the binding of NFAT, a key transcriptional activator of IL4 in T cells. This regulatory polymorphism influences the balance of cytokine signaling in the immune system, with important consequences-positive and negative-for human health. We determined that the NFAT binding site is unique to humans; it arose by point mutation along the lineage separating humans from other great apes. We show that its frequency distribution among human subpopulations has been shaped by the balance of selective forces on IL4’s diverse roles. New statistical approaches, based on parametric and nonparametric comparisons to neutral variants typed in the same individuals, indicate that differentiation among subpopulations at the IL4 promoter polymorphism is too great to be attributed to neutral drift. The allele frequencies of this binding site represent local adaptation to diverse pathogenic challenges; disease states associated with the common derived allele are side-effects of positive selection on other IL4 functions.

Additional References

RELATED GEPHE

2 (IL4, TLR6-TLR1-TLR10 cluster) (https://www.gephebase.org/search-criteria?/or+Taxon ID=~9443~/and+Trait=Immune response/or+Taxon ID=~9606~/and+Trait=Immune response/and+groupHaplotypes=true#gephebase-summary-title)	Related Genes
No matches found.	Related Haplotypes

EXTERNAL LINKS

