

GEPHE SUMMARY

	Gephebase Gene		GepheID
Prolactin (deciduous Prolactin; dPRL) (<a +prolactin+(deciduous+prolactin;+dprl)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+Prolactin+(deciduous+Prolactin;+dPRL)+"#gephebase-summary-title)		GP00000926	
	Entry Status	Martin	Main curator
Published			

PHENOTYPIC CHANGE

	Trait Category		
Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title)		Trait	
Gene expression change (quantitative; increase) (<a +gene+expression+change+(quantitative;+increase)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Gene+expression+change+(quantitative;+increase)+"#gephebase-summary-title)			
	Trait State in Taxon A		
Other primates		Trait State in Taxon B	
great Apes			
	Ancestral State		
Data not curated		Taxonomic Status	
Intergeneric or Higher (<a +intergeneric+or+higher+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status="+Intergeneric+or+Higher+"#gephebase-summary-title)			
	Taxon A		Taxon B
	Latin Name		Latin Name
Primates (<a +primates+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+Synonyms="+Primates+"#gephebase-summary-title)		Homininae (<a +homininae+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+Synonyms="+Homininae+"#gephebase-summary-title)	
-	Common Name	-	Common Name
	Synonyms		Synonyms
Primata; Primates Linnaeus, 1758		Homo/Pan/Gorilla group	
	Rank		Rank
order		subfamily	
	Lineage		Lineage
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	
	Parent		Parent
Euarchontoglires () - (Rank: superorder) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=314146)		Hominidae (great apes) - (Rank: family) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9604)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
9443 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9443)		207598 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=207598)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

GENOTYPIC CHANGE

	Generic Gene Name		UniProtKB Homo sapiens
PRL		P01236 (http://www.uniprot.org/uniprot/P01236)	
	Synonyms		GenebankID or UniProtKB
GHA1		AAZ82304 (https://www.ncbi.nlm.nih.gov/nuccore/AAZ82304)	
	String		
9606.ENSP00000302150 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSP00000302150)			
	Sequence Similarities		
Belongs to the somatotropin/prolactin family.			
	GO - Molecular Function		
GO:0005179 : hormone activity (https://www.ebi.ac.uk/QuickGO/term/GO:0005179)			
GO:0005148 : prolactin receptor binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005148)			
	GO - Biological Process		
GO:0044267 : cellular protein metabolic process			

(<https://www.ebi.ac.uk/QuickGO/term/GO:0044267>)
GO:0001937 : negative regulation of endothelial cell proliferation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0001937>)
GO:0008283 : cell proliferation (<https://www.ebi.ac.uk/QuickGO/term/GO:0008283>)
GO:0008284 : positive regulation of cell proliferation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0008284>)
GO:0050679 : positive regulation of epithelial cell proliferation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0050679>)
GO:0007565 : female pregnancy (<https://www.ebi.ac.uk/QuickGO/term/GO:0007565>)
GO:0032496 : response to lipopolysaccharide
(<https://www.ebi.ac.uk/QuickGO/term/GO:0032496>)
GO:0007623 : circadian rhythm (<https://www.ebi.ac.uk/QuickGO/term/GO:0007623>)
GO:0032355 : response to estradiol (<https://www.ebi.ac.uk/QuickGO/term/GO:0032355>)
GO:0007166 : cell surface receptor signaling pathway
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007166>)
GO:0040014 : regulation of multicellular organism growth
(<https://www.ebi.ac.uk/QuickGO/term/GO:0040014>)
GO:0045471 : response to ethanol (<https://www.ebi.ac.uk/QuickGO/term/GO:0045471>)
GO:0060397 : JAK-STAT cascade involved in growth hormone signaling pathway
(<https://www.ebi.ac.uk/QuickGO/term/GO:0060397>)
GO:0046427 : positive regulation of JAK-STAT cascade
(<https://www.ebi.ac.uk/QuickGO/term/GO:0046427>)
GO:0030879 : mammary gland development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0030879>)
GO:0007595 : lactation (<https://www.ebi.ac.uk/QuickGO/term/GO:0007595>)
GO:0033555 : multicellular organismal response to stress
(<https://www.ebi.ac.uk/QuickGO/term/GO:0033555>)
GO:0016525 : negative regulation of angiogenesis
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016525>)
GO:0042698 : ovulation cycle (<https://www.ebi.ac.uk/QuickGO/term/GO:0042698>)
GO:0007567 : parturition (<https://www.ebi.ac.uk/QuickGO/term/GO:0007567>)
GO:1903489 : positive regulation of lactation
(<https://www.ebi.ac.uk/QuickGO/term/GO:1903489>)
GO:1902895 : positive regulation of pri-miRNA transcription by RNA polymerase II
(<https://www.ebi.ac.uk/QuickGO/term/GO:1902895>)
GO:0030278 : regulation of ossification
(<https://www.ebi.ac.uk/QuickGO/term/GO:0030278>)
GO:0007584 : response to nutrient (<https://www.ebi.ac.uk/QuickGO/term/GO:0007584>)
GO:0031667 : response to nutrient levels
(<https://www.ebi.ac.uk/QuickGO/term/GO:0031667>)

GO - Cellular Component

GO:0005576 : extracellular region (<https://www.ebi.ac.uk/QuickGO/term/GO:0005576>)
GO:0005615 : extracellular space (<https://www.ebi.ac.uk/QuickGO/term/GO:0005615>)
GO:0030141 : secretory granule (<https://www.ebi.ac.uk/QuickGO/term/GO:0030141>)
GO:0031904 : endosome lumen (<https://www.ebi.ac.uk/QuickGO/term/GO:0031904>)

	Presumptive Null
No (<a +no+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Presumptive Null=">https://www.gephebase.org/search-criteria?/and+Presumptive Null="+No+"#gephebase-summary-title)	
Cis-regulatory (<a +cis-regulatory+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Molecular Type=">https://www.gephebase.org/search-criteria?/and+Molecular Type="+Cis-regulatory+"#gephebase-summary-title)	Molecular Type
	Aberration Type
SNP (<a +snp+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Aberration Type=">https://www.gephebase.org/search-criteria?/and+Aberration Type="+SNP+"#gephebase-summary-title)	
	Molecular Details of the Mutation
Acquisition of enhancer activity in transposons via several base-pair substitutions	
	Experimental Evidence
Candidate Gene (<a +candidate="" gene+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Experimental Evidence=">https://www.gephebase.org/search-criteria?/and+Experimental Evidence="+Candidate Gene+"#gephebase-summary-title)	
	Main Reference
Transformation of a transposon into a derived prolactin promoter with function during human pregnancy. (2012) (https://pubmed.ncbi.nlm.nih.gov/22733751)	
	Authors
Emera D; Wagner GP	
	Abstract

Transposable elements (TEs) are known to provide DNA for host regulatory functions, but the mechanisms underlying the transformation of TEs into cis-regulatory elements are unclear. In humans two TEs--MER20 and MER39--contribute the enhancer/promoter for decidual prolactin (dPRL), which is dramatically induced during pregnancy. We show that evolution of the strong human dPRL promoter was a multistep process that took millions of years. First, MER39 inserted near MER20 in the primate/rodent ancestor, and then there were two phases of activity enhancement in primates. Through the mapping of causal nucleotide substitutions, we demonstrate that strong promoter activity in apes involves epistasis between transcription factor binding sites (TFBSs) ancestral to MER39 and derived sites. We propose a mode of molecular evolution that describes the process by which MER20/MER39 was transformed into a strong promoter, called "epistatic capture." Epistatic capture is the stabilization of a TFBS that is ancestral but variable in outgroup lineages, and is fixed in the ingroup because of epistatic interactions with derived TFBSs. Finally, we note that evolution of human promoter activity coincides with the emergence of a unique reproductive character in apes, highly invasive placentation. Because prolactin communicates with immune cells during pregnancy, which regulate fetal invasion into maternal tissues, we speculate that ape dPRL promoter activity evolved in response to increased invasiveness of ape fetal tissue.

Additional References

RELATED GEPHE

	Related Genes
2 (FoxP2, GLUD2 retrogene) (<a +9443"="" and+grouphaplotypes='true#gephebase-summary-title"' and+trait="Gene" change="" expression="" href="https://www.gephebase.org/search-criteria?/or+Taxon ID=" id="+207598" or+taxon="">https://www.gephebase.org/search-criteria?/or+Taxon ID="+9443"/and+Trait=Gene expression change/or+Taxon ID="+207598"/and+Trait=Gene expression change/and+groupHaplotypes=true#gephebase-summary-title)	

No matches found.

EXTERNAL LINKS

COMMENTS

@TE @Epistasis