

GEPHE SUMMARY

	Gephebase Gene		GepheID
ABO histo blood group glycosyltransferase (<a +abo+histo+blood+group+glycosyltransferase+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene=Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene=Gephebase="+ABO+histo+blood+group+glycosyltransferase+"#gephebase-summary-title)		GP00000017	
	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	
ABO antigen blood type (<a +abo+antigen+blood+type+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+ABO+antigen+blood+type+"#gephebase-summary-title)			
	Trait State in Taxon A		
Homo sapiens; other primates - blood group A		Trait State in Taxon B	
Homo sapiens; other primates -blood group B			
	Ancestral State		
Data not curated		Taxonomic Status	
Intraspecific (<a +intraspecific+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+TaxonomicStatus=">https://www.gephebase.org/search-criteria?/and+TaxonomicStatus="+Intraspecific+"#gephebase-summary-title)			
	Taxon A		Taxon B
	Latin Name		Latin Name
Homininae (<a +homininae+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Homininae+"#gephebase-summary-title)		Homininae (<a +homininae+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Homininae+"#gephebase-summary-title)	
-	Common Name	-	Common Name
	Synonyms		Synonyms
Homo/Pan/Gorilla group		Homo/Pan/Gorilla group	
	Rank		Rank
subfamily		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; Primates; Haplorrhini; Simiiformes; Catarrhini; Hominoidea; Hominidae		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
Hominidae (great apes) - (Rank: family) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9604)		Hominidae (great apes) - (Rank: family) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9604)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
207598 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=207598)		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
ABO		P16442 (http://www.uniprot.org/uniprot/P16442)	
	Synonyms		GenebankID or UniProtKB
GTB; NAGAT; A3GALNT; A3GALT1		AAC50121 (https://www.ncbi.nlm.nih.gov/nuccore/AAC50121)	
-	String		
	Sequence Similarities		
Belongs to the glycosyltransferase 6 family.			
	GO - Molecular Function		
GO:0003823 : antigen binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003823)			
GO:0004381 : fucosylgalactoside 3-alpha-galactosyltransferase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004381)			
GO:0004380 : glycoprotein-fucosylgalactoside alpha-N-acetylgalactosaminyltransferase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004380)			
GO:0030145 : manganese ion binding (https://www.ebi.ac.uk/QuickGO/term/GO:0030145)			
GO:0000166 : nucleotide binding (https://www.ebi.ac.uk/QuickGO/term/GO:0000166)			

GO:0016757 : transferase activity, transferring glycosyl groups
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016757>)

GO - Biological Process

GO:0005975 : carbohydrate metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005975>)

GO:0030259 : lipid glycosylation (<https://www.ebi.ac.uk/QuickGO/term/GO:0030259>)

GO:0006486 : protein glycosylation (<https://www.ebi.ac.uk/QuickGO/term/GO:0006486>)

GO - Cellular Component

GO:0016021 : integral component of membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)

GO:0005576 : extracellular region (<https://www.ebi.ac.uk/QuickGO/term/GO:0005576>)

GO:0005794 : Golgi apparatus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005794>)

GO:0032580 : Golgi cisterna membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0032580>)

GO:0031982 : vesicle (<https://www.ebi.ac.uk/QuickGO/term/GO:0031982>)

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

Coding (<https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding~#gephebase-summary-title>)

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

Nonsynonymous

Gly268 (group A) <-> Ala (group B)

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

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

Sugar-nucleotide donor specificity of histo-blood group A and B transferases is based on amino acid substitutions. (1990) (<https://pubmed.ncbi.nlm.nih.gov/2121736>)

Yamamoto F; Hakomori S

Four amino acid substitutions (aa 176, 235, 266, and 268) have been found between the coding regions of cDNAs for histo-blood group A and B transferases (Yamamoto F., Clausen, H., White, T., Marken, J., and Hakomori, S. (1990) Nature 345, 229-233). Here we establish the basis of differential affinity of these glycosyltransferases to nucleotide-sugar (UDP-GalNAc or UDP-Gal). On the basis of gene reconstruction experiments and studies of expression in DNA transfected HeLa cells, the third as well as the fourth aa substitutions (leucine and glycine in A and methionine and alanine in B), which were calculated to modify flexibility of the protein, were found to be crucial in determining nucleotide-sugar specificity. The second substitution (glycine in A and serine in B) also affects the specificity. We have also created new enzymes which catalyze the transfer of both GalNAc and Gal, and may provide an explanation of the rare cis-AB phenotype.

The ABO blood group is a trans-species polymorphism in primates. (2012) (<https://pubmed.ncbi.nlm.nih.gov/23091028>)

RELATED GEPHE

1 (FUT2) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=~207598~/and+Trait=ABO antigen blood type/and+groupHaplotypes=true#gephebase-summary-title>)

7 (<https://www.gephebase.org/search-criteria?/or+Gene Gephebase=~ABO histo blood group glycosyltransferase~/and+Taxon ID=~207598~/or+Gene Gephebase=~ABO histo blood group glycosyltransferase~/and+Taxon ID=~207598~#gephebase-summary-title>)

EXTERNAL LINKS

COMMENTS

