

GEPHE SUMMARY

MGAM (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=%MGAM%#gephebase-summary-title)	Gephebase Gene	GP00000654	GepheID
Published	Entry Status	Martin	Main curator

PHENOTYPIC CHANGE

Trait Category			
Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=%Physiology%#gephebase-summary-title)	Trait		
Starch processing (https://www.gephebase.org/search-criteria?/and+Trait=%Starch+processing%#gephebase-summary-title)	Trait State in Taxon A		
Canis lupus	Trait State in Taxon B		
Canis familiaris	Ancestral State		
Data not curated	Taxonomic Status		
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=%Domesticated%#gephebase-summary-title)			
Taxon A	Latin Name	Taxon B	Latin Name
Canis lupus (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=%Canis+lupus%#gephebase-summary-title)		Canis lupus familiaris (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=%Canis+lupus+familiaris%#gephebase-summary-title)	
gray wolf	Common Name	dog	Common Name
gray wolf; grey wolf; Canis lupus Linnaeus, 1758	Synonyms	Canis canis; Canis domesticus; Canis familiaris; dog; dogs; Canis familiaris Linnaeus, 1758; Canis lupus familiaris Linnaeus, 1758	Synonyms
species	Rank	subspecies	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Laurasiatheria; Carnivora; Caniformia; Canidae; Canis	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Laurasiatheria; Carnivora; Caniformia; Canidae; Canis; Canis lupus	Lineage
Canis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9611)	Parent	Canis lupus (gray wolf) - (Rank: species) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9612)	Parent
9612 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9612)	NCBI Taxonomy ID	9615 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9615)	NCBI Taxonomy ID
No	is Taxon A an Infraspecies?	No	is Taxon B an Infraspecies?

GENOTYPIC CHANGE

MGAM	Generic Gene Name	UniProtKB Homo sapiens
MG; MGA; MGAML	Synonyms	GenebankID or UniProtKB
9606.ENSP00000447378 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=9606.ENSP00000447378)	String	KHN85505 (https://www.ncbi.nlm.nih.gov/nuccore/KHN85505)
Belongs to the glycosyl hydrolase 31 family.	Sequence Similarities	
GO:0030246 : carbohydrate binding (https://www.ebi.ac.uk/QuickGO/term/GO:0030246)	GO - Molecular Function	
GO:0003824 : catalytic activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003824)		
GO:0004558 : alpha-1,4-glucosidase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0004558)		
GO:0016160 : amylase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0016160)		
GO:0004339 : glucan 1,4-alpha-glucosidase activity		

(<https://www.ebi.ac.uk/QuickGO/term/GO:0004339>)
GO:0032450 : maltose alpha-glucosidase activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0032450>)

GO - Biological Process

GO:0043312 : neutrophil degranulation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0043312>)
GO:0044245 : polysaccharide digestion
(<https://www.ebi.ac.uk/QuickGO/term/GO:0044245>)
GO:0005983 : starch catabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005983>)

GO - Cellular Component

GO:0016021 : integral component of membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)
GO:0005886 : plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005886>)
GO:0016324 : apical plasma membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016324>)
GO:0070062 : extracellular exosome (<https://www.ebi.ac.uk/QuickGO/term/GO:0070062>)
GO:0101003 : ficolin-1-rich granule membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0101003>)
GO:0070821 : tertiary granule membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0070821>)

Presumptive Null

Unknown (<https://www.gephebase.org/search-criteria?/and+Presumptive+Null=^Unknown^#gephebase-summary-title>)

Molecular Type

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

Aberration Type

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

Molecular Details of the Mutation

unknown

Experimental Evidence

Association Mapping (<https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=^Association+Mapping^#gephebase-summary-title>)

Main Reference

The genomic signature of dog domestication reveals adaptation to a starch-rich diet. (2013) (<https://pubmed.ncbi.nlm.nih.gov/23354050>)

Authors

Axelsson E; Ratnakumar A; Arendt ML; Maqbool K; Webster MT; Perloski M; Liberg O; Arnemo JM; Hedhammar A; Lindblad-Toh K

Abstract

The domestication of dogs was an important episode in the development of human civilization. The precise timing and location of this event is debated and little is known about the genetic changes that accompanied the transformation of ancient wolves into domestic dogs. Here we conduct whole-genome resequencing of dogs and wolves to identify 3.8 million genetic variants used to identify 36 genomic regions that probably represent targets for selection during dog domestication. Nineteen of these regions contain genes important in brain function, eight of which belong to nervous system development pathways and potentially underlie behavioural changes central to dog domestication. Ten genes with key roles in starch digestion and fat metabolism also show signals of selection. We identify candidate mutations in key genes and provide functional support for an increased starch digestion in dogs relative to wolves. Our results indicate that novel adaptations allowing the early ancestors of modern dogs to thrive on a diet rich in starch, relative to the carnivorous diet of wolves, constituted a crucial step in the early domestication of dogs.

Additional References

RELATED GEPHE

2 (amylase 2B (AMY2B), SGLT1) (<https://www.gephebase.org/search-criteria?/or+Taxon+ID=^9612^/and+Trait=Starch+processing/or+Taxon+ID=^9615^/and+Trait=Starch+processing/and+groupHaplotypes=true#gephebase-summary-title>)

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS