

GEPHE SUMMARY

ALMT1 (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase+ALMT1+gephebase-summary-title)	Gephebase Gene	GP00000080	GepheID
Published	Entry Status	Martin	Main curator

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category+Physiology+gephebase-summary-title)	Trait Category		
Metal tolerance (https://www.gephebase.org/search-criteria?/and+Trait+Metal+tolerance+gephebase-summary-title)	Trait		
Triticum aestivum	Trait State in Taxon A		
Triticum aestivum	Trait State in Taxon B		
Data not curated	Ancestral State		
Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status+Domesticated+gephebase-summary-title)	Taxonomic Status		
	Taxon A		Taxon B
	Latin Name		Latin Name
Triticum aestivum (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+Triticum+aestivum+gephebase-summary-title)	Latin Name	Triticum aestivum (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms+Triticum+aestivum+gephebase-summary-title)	Latin Name
bread wheat	Common Name	bread wheat	Common Name
Triticum aestivum subsp. aestivum; Triticum vulgare; bread wheat; Canadian hard winter wheat; common wheat; wheat; Triticum aestivum L.; Triticum vulgare L.; Triticum vulgare Vill., nom. illeg.; Tricum aestivum; Triticum aestivum; Triticum aestivum8	Synonyms	Triticum aestivum subsp. aestivum; Triticum vulgare; bread wheat; Canadian hard winter wheat; common wheat; wheat; Triticum aestivum L.; Triticum vulgare L.; Triticum vulgare Vill., nom. illeg.; Tricum aestivum; Triticum aestivum; Triticum aestivum8	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Pooideae; Triticoadae; Triticeae; Triticinae; Triticum	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Pooideae; Triticoadae; Triticeae; Triticinae; Triticum	Lineage
Triticum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4564)	Parent	Triticum () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4564)	Parent
4565 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4564)	NCBI Taxonomy ID	4565 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4564)	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	No	is Taxon B an Intraspecies?

GENOTYPIC CHANGE

ALMT1	Generic Gene Name	Q76LB1 (http://www.uniprot.org/uniprot/Q76LB1)	UniProtKB Triticum aestivum
ALMT1-1; ALMT1-2	Synonyms		GenebankID or UniProtKB
-	String	DQ072270 (https://www.ncbi.nlm.nih.gov/nuccore/DQ072270)	
Belongs to the aromatic acid exporter (TC 2.A.85) family.	Sequence Similarities		
-	GO - Molecular Function		
GO:0015743 : malate transport (https://www.ebi.ac.uk/QuickGO/term/GO:0015743)	GO - Biological Process		
GO:0016021 : integral component of membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0016021)	GO - Cellular Component		
GO:0005886 : plasma membrane (https://www.ebi.ac.uk/QuickGO/term/GO:0005886)			

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

Presumptive Null

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

Molecular Type

Unknown ([https://www.gephebase.org/search-criteria?/and+Aberration Type="+Unknown`#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration+Type=))

Aberration Type

multiple regulatory changes

Molecular Details of the Mutation

Linkage Mapping ([https://www.gephebase.org/search-criteria?/and+Experimental Evidence="+Linkage Mapping`#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=))

Experimental Evidence

Molecular characterization and mapping of ALMT1, the aluminium-tolerance gene of bread wheat (*Triticum aestivum* L.). (2005) (<https://pubmed.ncbi.nlm.nih.gov/16391684>)

Main Reference

Raman H; Zhang K; Cakir M; Appels R; Garvin DF; Maron LG; Kochian LV; Moroni JS; Raman R; Imtiaz M; Drake-Brockman F; Waters I; Martin P; Sasaki T; Yamamoto Y; Matsumoto H; Hebb DM; Delhaize E; Ryan PR

Authors

The major aluminum (Al) tolerance gene in wheat ALMT1 confers. An Al-activated efflux of malate from root apices. We determined the genomic structure of the ALMT1 gene and found it consists of 6 exons interrupted by 5 introns. Sequencing a range of wheat genotypes identified 3 alleles for ALMT1, 1 of which was identical to the ALMT1 gene from an *Aegilops tauschii* accession. The ALMT1 gene was mapped to chromosome 4DL using 'Chinese Spring' deletion lines, and loss of ALMT1 coincided with the loss of both Al tolerance and Al-activated malate efflux. Aluminium tolerance in each of 5 different doubled-haploid populations was found to be conditioned by a single major gene. When ALMT1 was polymorphic between the parental lines, QTL and linkage analyses indicated that ALMT1 mapped to chromosome 4DL and cosegregated with Al tolerance. In 2 populations examined, Al tolerance also segregated with a greater capacity for Al-activated malate efflux. Aluminium tolerance was not associated with a particular coding allele for ALMT1, but was significantly correlated with the relative level of ALMT1 expression. These findings suggest that the Al tolerance in a diverse range of wheat genotypes is primarily conditioned by ALMT1.

Abstract

Quantitative trait loci for aluminum resistance in Chinese wheat landrace FSW. (2008) (<https://pubmed.ncbi.nlm.nih.gov/18379752>)

Additional References

The multiple origins of aluminium resistance in hexaploid wheat include *Aegilops tauschii* and more recent cis mutations to TaALMT1. (2010) (<https://pubmed.ncbi.nlm.nih.gov/20804458>)

RELATED GEPHE

No matches found.

Related Genes

No matches found.

Related Haplotypes

EXTERNAL LINKS

COMMENTS