

CBF gene cluster ( <a href="https://www.gephebase.org/search-criteria?/and+GeneGephebase=~CBF+gene+cluster~#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+GeneGephebase=~CBF gene cluster~#gephebase-summary-title</a> )	Gephebase Gene	GP00000174	GepheID
Published	Entry Status	Martin	Main curator

Physiology ( <a href="https://www.gephebase.org/search-criteria?/and+Trait+Category=~Physiology^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait+Category=~Physiology^#gephebase-summary-title</a> )		Trait Category
Temperature tolerance (cold) ( <a href="https://www.gephebase.org/search-criteria?/and+Trait=~Temperature+tolerance+(cold)^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Trait=~Temperature+tolerance+(cold)^#gephebase-summary-title</a> )		Trait
Arabidopsis thaliana- Col0		Trait State in Taxon A
Arabidopsis thaliana- Can-0		Trait State in Taxon B
Data not curated		Ancestral State
Intraspecific ( <a href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Intraspecific^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Intraspecific^#gephebase-summary-title</a> )		Taxonomic Status
Taxon A		Taxon B
Arabidopsis thaliana ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Arabidopsis+thaliana^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Arabidopsis+thaliana^#gephebase-summary-title</a> )		Arabidopsis thaliana ( <a href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Arabidopsis+thaliana^#gephebase-summary-title">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Arabidopsis+thaliana^#gephebase-summary-title</a> )
thale cress		thale cress
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress		thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress
species		species
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetales; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetales; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis
Arabidopsis () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701</a> )		Arabidopsis () - (Rank: genus) ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701</a> )
3702 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702</a> )		3702 ( <a href="https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702">https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702</a> )
Yes		Yes
Taxon A Description		Taxon B Description
Arabidopsis thaliana- Col0		Arabidopsis thaliana- Can-0

	Generic Gene Name	UniProtKB Triticum monococcum
-		B1NSN2 ( <a href="http://www.uniprot.org/uniprot/B1NSN2">http://www.uniprot.org/uniprot/B1NSN2</a> )
	Synonyms	GenebankID or UniProtKB
-		AIU34717 ( <a href="https://www.ncbi.nlm.nih.gov/nuccore/AIU34717">https://www.ncbi.nlm.nih.gov/nuccore/AIU34717</a> )
	String	
-		
	Sequence Similarities	
-		
	GO - Molecular Function	
	GO:0003700 : DNA-binding transcription factor activity ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0003700">https://www.ebi.ac.uk/QuickGO/term/GO:0003700</a> )	
	GO:0003677 : DNA binding ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0003677">https://www.ebi.ac.uk/QuickGO/term/GO:0003677</a> )	
	GO - Biological Process	
	GO:0006351 : transcription, DNA-templated ( <a href="https://www.ebi.ac.uk/QuickGO/term/GO:0006351">https://www.ebi.ac.uk/QuickGO/term/GO:0006351</a> )	

GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)

Presumptive Null

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

Molecular Type

Unknown (<https://www.gephebase.org/search-criteria?/and+Molecular Type=^Unknown^#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

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

Main Reference

Natural variation in the freezing tolerance of *Arabidopsis thaliana*: effects of RNAi-induced CBF depletion and QTL localisation vary among accessions. (2011)  
(<https://pubmed.ncbi.nlm.nih.gov/21421342>)

Authors

Gery C; Zuther E; Schulz E; Legoupi J; Chauveau A; McKhann H; Hinch DK; TÃ©oulÃ© E

Abstract

Plants from temperate regions are able to withstand freezing temperatures and to increase their freezing tolerance during exposure to low, but non-freezing, temperatures through a process known as cold acclimation. Key regulatory proteins in this process are the cold-induced CBF1, 2 and 3 transcription factors which control many cold regulated genes. Although much work has focused on this signal transduction pathway, the details of its regulation and of its quantitative contribution to cold acclimation are still unclear. Here, we have used the large natural variation present in the 48 accessions of the Versailles core collection of *Arabidopsis thaliana* to further elucidate the function of the CBF transcription factors. CBF gene expression studies showed that the freezing sensitive accessions had mostly low expression levels 2h after transfer of plants to 5°C, while the most tolerant accessions showed a wide range of CBF expression levels. To investigate the quantitative contribution of CBF expression to plant freezing tolerance and low temperature growth performance, RNAi lines targeting all three CBF genes were produced in eight different accessions. We observed striking differences between different accessions in the effects that reduced CBF expression had on freezing tolerance, while effects on growth were generally too small to draw firm conclusions. Analysis of CBF expression indicated a tight co-regulation between CBF1 and CBF3, while the relationship between the expression levels of CBF2 and CBF1 or CBF3 strongly depended on the genetic background of the RNAi lines. In agreement with the observed differences between the different accessions, QTL analyses with two different RIL populations indicated that QTL localisation varies strongly between populations. Collectively, these results show that both the regulation of the CBF genes and their relative contribution to freezing tolerance strongly depend on the accession studied. In addition, natural variation is suggested to be an interesting source of novel regulatory pathways and genes that may be useful in the future for improving plant freezing tolerance.

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Additional References

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EXTERNAL LINKS

COMMENTS

Cluster of paralogous genes