

GEPHE SUMMARY

CYCD5;1 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=%CYCD5;1#gephebase-summary-title)	Gephebase Gene	GP00000196	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		
Endoreduplication (https://www.gephebase.org/search-criteria?/and+Trait=%Endoreduplication%gephebase-summary-title)	Trait State in Taxon A		
Arabidopsis thaliana- Colo	Trait State in Taxon B		
Arabidopsis thaliana- Kashmir	Ancestral State		
Data not curated	Taxonomic Status		
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=%Intraspecific%gephebase-summary-title)			
Taxon A		Taxon B	
Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=%Arabidopsis+thaliana%gephebase-summary-title)	Latin Name	Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=%Arabidopsis+thaliana%gephebase-summary-title)	Latin Name
thale cress	Common Name	thale cress	Common Name
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	Synonyms	thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis	Lineage	cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelinae; Arabidopsis	Lineage
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	Parent	Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	Parent
3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	NCBI Taxonomy ID	3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	NCBI Taxonomy ID
is Taxon A an Infraspecies?		is Taxon B an Infraspecies?	
Yes	Taxon A Description	Yes	Taxon B Description
Arabidopsis thaliana- Colo		Arabidopsis thaliana- Kashmir	

GENOTYPIC CHANGE

CYCD5-1	Generic Gene Name	UniProtKB Arabidopsis thaliana
cyclin d5;1; F19F18_120; F19F18_120; At4g37630	Synonyms	GenebankID or UniProtKB
3702.AT4G37630.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT4G37630.1)	String	AL035605 (https://www.ncbi.nlm.nih.gov/nucleotide/AL035605)
Belongs to the cyclin family. Cyclin D subfamily.	Sequence Similarities	
GO:0019901 : protein kinase binding (https://www.ebi.ac.uk/QuickGO/term/GO:0019901) GO:0016538 : cyclin-dependent protein serine/threonine kinase regulator activity (https://www.ebi.ac.uk/QuickGO/term/GO:0016538)	GO - Molecular Function GO - Biological Process	

GO:0051301 : cell division (<https://www.ebi.ac.uk/QuickGO/term/GO:0051301>)
GO:0008284 : positive regulation of cell proliferation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0008284>)
GO:0006468 : protein phosphorylation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0006468>)
GO:0042023 : DNA endoreduplication
(<https://www.ebi.ac.uk/QuickGO/term/GO:0042023>)
GO:0000278 : mitotic cell cycle (<https://www.ebi.ac.uk/QuickGO/term/GO:0000278>)
GO:0045787 : positive regulation of cell cycle
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045787>)
GO:0000079 : regulation of cyclin-dependent protein serine/threonine kinase activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0000079>)
GO:0007088 : regulation of mitotic nuclear division
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007088>)

GO - Cellular Component

GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)
GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)
GO:0000307 : cyclin-dependent protein kinase holoenzyme complex
(<https://www.ebi.ac.uk/QuickGO/term/GO:0000307>)

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

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

Main Reference

Combined linkage and association mapping reveals CYCD5;1 as a quantitative trait gene for endoreduplication in Arabidopsis. (2012) (<https://pubmed.ncbi.nlm.nih.gov/22392991>)

Authors

Sterken R; Kiekens R; Boruc J; Zhang F; Vercauteren A; Vercauteren I; De Smet L; Dhondt S; Inzé D; De Veylder L; Russinova E; Vuylsteke M

Abstract

Endoreduplication is the process where a cell replicates its genome without mitosis and cytokinesis, often followed by cell differentiation. This alternative cell cycle results in various levels of endopolyploidy, reaching 4– or higher one haploid set of chromosomes. Endoreduplication is found in animals and is widespread in plants, where it plays a major role in cellular differentiation and plant development. Here, we show that variation in endoreduplication between *Arabidopsis thaliana* accessions Columbia-0 and Kashmir is controlled by two major quantitative trait loci, ENDO-1 and ENDO-2. A local candidate gene association analysis in a set of 87 accessions, combined with expression analysis, identified CYCD5;1 as the most likely candidate gene underlying ENDO-2, operating as a rate-determining factor of endoreduplication. In accordance, both the overexpression and silencing of CYCD5;1 were effective in changing DNA ploidy levels, confirming CYCD5;1 to be a previously undescribed quantitative trait gene underlying endoreduplication in *Arabidopsis*.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS