

GEPHE SUMMARY

	Gephebase Gene	GephelD
CLV3 (https://www.gephebase.org/search-criteria/?and+GeneGephebase=%CLV3%#gephebase-summary-title)	GP00001565	Main curator
Published	Entry Status	Prigent

PHENOTYPIC CHANGE

	Trait Category
Morphology (https://www.gephebase.org/search-criteria/?and+TraitCategory=%Morphology%#gephebase-summary-title)	Trait

	Trait State in Taxon A
Fruit size (https://www.gephebase.org/search-criteria/?and+Trait=%Fruit+size%#gephebase-summary-title)	Trait State in Taxon A

	Trait State in Taxon B
Wild Solanum pimpinellifolium producing small bilocular fruits	Trait State in Taxon B

	Ancestral State
Cultivated tomato producing big multilocular fruits	Ancestral State

	Taxonomic Status
Taxon A	Taxonomic Status

	Latin Name
Solanum pimpinellifolium (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=%Solanum+pimpinellifolium%#gephebase-summary-title)	Solanum lycopersicum (https://www.gephebase.org/search-criteria/?and+Taxon+and+Synonyms=%Solanum+lycopersicum%#gephebase-summary-title)

	Common Name
-	-

	Synonyms
Lycopersicon pimpinellifolium; Solanum pimpinellifolium var. racemigerum; currant tomato; Lycopersicon pimpinellifolium (L.) Mill.; Solanum pimpinellifolium L.	Lycopersicon esculentum var. esculentum; Solanum esculentum; Solanum lycopersicum var. humboldtii; tomato; Lycopersicon esculentum Mill.; Solanum esculentum Dunal; Solanum lycopersicum L.; Lycopersicon lycopersicum; Lycopersicum esculentum; Solanum lycopersicon

	Rank
species	species

	Lineage
cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphylophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Solanoideae; Solaneae; Solanum; Lycopersicon	cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphylophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Solanoideae; Solaneae; Solanum; Lycopersicon

	Parent
Lycopersicon () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 49274)	Lycopersicon () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 49274)

	NCBI Taxonomy ID
4084 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4084)	4081 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4081)

	is Taxon A an Infraspecies?
No	No

	Lineage
Lycopersicon () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 49274)	cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphylophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Solanoideae; Solaneae; Solanum; Lycopersicon

	Rank
species	species

	Lineage
Lycopersicon () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 49274)	cellular organisms; Eukaryota; Viriplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphylophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Solanoideae; Solaneae; Solanum; Lycopersicon

	Parent
Lycopersicon () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 49274)	Lycopersicon () - (Rank: subgenus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 49274)

	NCBI Taxonomy ID
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	is Taxon B an Infraspecies?
No	No

GENOTYPIC CHANGE

	Generic Gene Name
CLV3	Q9XF04 (http://www.uniprot.org/uniprot/Q9XF04)

	Synonyms
AtCLV3; CLAVATA3; F12K2.17; F12K2_17; At2g27250	0

	String
3702.AT2G27250.3 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT2G27250.3)	Sequence Similarities

	GO - Molecular Function
Belongs to the CLV3/ESR signal peptide family.	GO - Biological Process

	GO - Biological Process
GO:0033612 : receptor serine/threonine kinase binding (https://www.ebi.ac.uk/QuickGO/term/GO:0033612)	GO:0045087 : innate immune response

UniProtKB Arabidopsis thaliana

GenebankID or UniProtKB

(<https://www.ebi.ac.uk/QuickGO/term/GO:0045087>)
GO:0007275 : multicellular organism development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0007275>)
GO:0045168 : cell-cell signaling involved in cell fate commitment
(<https://www.ebi.ac.uk/QuickGO/term/GO:0045168>)
GO:0010074 : maintenance of meristem identity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010074>)
GO:0048507 : meristem development
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048507>)
GO:0009934 : regulation of meristem structural organization
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009934>)

GO - Cellular Component

GO:0005615 : extracellular space (<https://www.ebi.ac.uk/QuickGO/term/GO:0005615>)
GO:0048046 : apoplast (<https://www.ebi.ac.uk/QuickGO/term/GO:0048046>)

Presumptive Null

No (<https://www.gephebase.org/search-criteria/?and+Presumptive+Null=%22No%22#gephebase-summary-title>)

Molecular Type

Cis-regulatory (<https://www.gephebase.org/search-criteria/?and+Molecular+Type=%22Cis-regulatory%22#gephebase-summary-title>)

Aberration Type

Inversion (<https://www.gephebase.org/search-criteria/?and+Aberration+Type=%22Inversion%22#gephebase-summary-title>)

Inversion Size

100-1000 kb

Molecular Details of the Mutation

A 294 kb inversion with a breakpoint 1 kb upstream of CLV3

Experimental Evidence

Linkage Mapping (<https://www.gephebase.org/search-criteria/?and+Experimental+Evidence=%22Linkage+Mapping%22#gephebase-summary-title>)

Main Reference

A cascade of arabinosyltransferases controls shoot meristem size in tomato. (2015) (<https://pubmed.ncbi.nlm.nih.gov/26005869>)

Authors

Xu C; Liberatore KL; MacAlister CA; Huang Z; Chu YH; Jiang K; Brooks C; Ogawa-Ohnishi M; Xiong G; Pauly M; Van Eck J; Matsubayashi Y; van der Knaap E; Lippman ZB

Abstract

Shoot meristems of plants are composed of stem cells that are continuously replenished through a classical feedback circuit involving the homeobox WUSCHEL (WUS) gene and the CLAVATA (CLV) gene signaling pathway. In CLV signaling, the CLV1 receptor complex is bound by CLV3, a secreted peptide modified with sugars. However, the pathway responsible for modifying CLV3 and its relevance for CLV signaling are unknown. Here we show that tomato inflorescence branching mutants with extra flower and fruit organs due to enlarged meristems are defective in arabinosyltransferase genes. The most extreme mutant is disrupted in a hydroxyproline O-arabinosyltransferase and can be rescued with arabinosylated CLV3. Weaker mutants are defective in arabinosyltransferases that extend arabinose chains, indicating that CLV3 must be fully arabinosylated to maintain meristem size. Finally, we show that a mutation in CLV3 increased fruit size during domestication. Our findings uncover a new layer of complexity in the control of plant stem cell proliferation.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS