

GEPHE SUMMARY

		Gephebase Gene		GepheID
BRANCHED1a (BRC1a) (https://www.gephebase.org/search-criteria?/and+Gene)			GP00000156	
Gephebase="BRANCHED1a (BRC1a)"#gephebase-summary-title)				Main curator
	Entry Status		Martin	
Published				

PHENOTYPIC CHANGE

Trait #1	Trait Category
Morphology (https://www.gephebase.org/search-criteria?/and+Trait)	
Category="Morphology"#gephebase-summary-title)	Trait
Plant architecture (https://www.gephebase.org/search-criteria?/and+Trait="Plant)	
architecture"#gephebase-summary-title)	Trait State in Taxon A
Plant and Flower architecture of Capsicum and Petunia	
	Trait State in Taxon B
Plant and Flower architecture of Solanum spp.	

Trait #2	Trait Category
Morphology (https://www.gephebase.org/search-criteria?/and+Trait)	
Category="Morphology"#gephebase-summary-title)	Trait
Inflorescence architecture (https://www.gephebase.org/search-criteria?/and+Trait="Inflorescence)	
architecture"#gephebase-summary-title)	Trait State in Taxon A
Plant and Flower architecture of Capsicum and Petunia	
	Trait State in Taxon B
Plant and Flower architecture of Solanum spp.	

	Ancestral State
Taxon A	
	Taxonomic Status
Intergeneric or Higher (https://www.gephebase.org/search-criteria?/and+Taxonomic)	
Status="Intergeneric or Higher"#gephebase-summary-title)	

Taxon A	Latin Name	Taxon B	Latin Name
Capsicum annuum (https://www.gephebase.org/search-criteria?/and+Taxon)		Solanum (https://www.gephebase.org/search-criteria?/and+Taxon)	
annuum"#gephebase-summary-title)		Synonyms="Solanum"#gephebase-summary-title)	
	Common Name		Common Name
-		-	
	Synonyms		Synonyms
Capsicum annuum L.; Capsicum annuum; Capsicum capsicum		Cyphomandra Mart. ex Sendtn.; Solanum L.	
	Rank		Rank
species		genus	
	Lineage		Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta;		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta;	
Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae;		Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae;	
eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae;		eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae;	
Solanoideae; Capsiceae; Capsicum		Solanoideae; Solaneae	
	Parent		Parent
Capsicum (peppers) - (Rank: genus)		Solaneae () - (Rank: tribe)	
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4071)		(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=424574)	
	NCBI Taxonomy ID		NCBI Taxonomy ID
4072		4107	
(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4072)		(https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4107)	
	is Taxon A an Intraspecies?		is Taxon B an Intraspecies?
No		No	

GENOTYPIC CHANGE

BRC1A
 TCP18; 102578271
 -
 -
 GO:0003677 : DNA binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0003677>)
 GO:0006355 : regulation of transcription, DNA-templated (<https://www.ebi.ac.uk/QuickGO/term/GO:0006355>)
 GO:0006351 : transcription, DNA-templated (<https://www.ebi.ac.uk/QuickGO/term/GO:0006351>)
 GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)
 No (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title>)
 Coding (<https://www.gephebase.org/search-criteria?/and+Molecular Type=^Coding^#gephebase-summary-title>)
 SNP (<https://www.gephebase.org/search-criteria?/and+Aberration Type=^SNP^#gephebase-summary-title>)
 -
 Evolution of an alternative splice site (G>A) that unlocks a short isoform
 Candidate Gene (<https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Candidate Gene^#gephebase-summary-title>)

Generic Gene Name

F6KB94 (<http://www.uniprot.org/uniprot/F6KB94>)

UniProtKB Solanum tuberosum

Synonyms

0

GenebankID or UniProtKB

String

Sequence Similarities

GO - Molecular Function

GO - Biological Process

GO - Cellular Component

Presumptive Null

Molecular Type

Aberration Type

SNP Coding Change

Molecular Details of the Mutation

Experimental Evidence

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	-	-	-

Main Reference

A Recently Evolved Alternative Splice Site in the BRANCHED1a Gene Controls Potato Plant Architecture. (2015) (<https://pubmed.ncbi.nlm.nih.gov/26119747>)

Authors

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Abstract

Amplification and diversification of transcriptional regulators that control development is a driving force of morphological evolution. A major source of protein diversity is alternative splicing, which leads to the generation of different isoforms from a single gene. The mechanisms and timing of intron evolution nonetheless remain unclear, and the functions of alternative splicing-generated protein isoforms are rarely studied. In *Solanum tuberosum*, the BRANCHED1a (BRC1a) gene encodes a TCP transcription factor that controls lateral shoot outgrowth. Here, we report the recent evolution in *Solanum* of an alternative splice site in BRC1a that leads to the generation of two BRC1a protein isoforms with distinct C-terminal regions, BRC1a(Long) and BRC1a(Short), encoded by unspliced and spliced mRNA, respectively. The BRC1a(Long) C-terminal region has a strong activation domain, whereas that of BRC1a(S) lacks an activation domain and is predicted to form an amphipathic helix, the H domain, which prevents protein nuclear targeting. BRC1a(Short) is thus mainly cytoplasmic, while BRC1a(Long) is mainly nuclear. BRC1a(Long) functions as a transcriptional activator, whereas BRC1a(Short) appears to have no transcriptional activity. Moreover, BRC1a(Short) can heterodimerize with BRC1a(Long) and act as a dominant-negative factor; it increases BRC1a(Long) concentration in cytoplasm and reduces its transcriptional activity. This alternative splicing mechanism is regulated by hormones and external stimuli that control branching. The evolution of a new alternative splicing site and a novel protein domain in *Solanum* BRC1a led to a multi-level mechanism of post-transcriptional and post-translational BRC1a regulation that effectively modulates its branch suppressing activity in response to environmental and endogenous cues.

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Additional References

RELATED GEPHE

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No matches found.

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EXTERNAL LINKS

COMMENTS

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