

GEPHE SUMMARY

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

Taxon A	Ancestral State	
	Taxonomic Status	
Intergeneric or Higher (https://www.gephebase.org/search-criteria?/and+Taxonomic Status="Intergeneric or Higher^#gephebase-summary-title")		
Taxon A	Latin Name	Latin Name
Capsicum annuum (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Capsicum+annuum^#gephebase-summary-title)	Solanum (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Solanum^#gephebase-summary-title)	
-	Common Name	Common Name
Capsicum annuum L.; Capsicum annum; Capsicum capsicum	Synonyms	
species	Rank	
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllphyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; asterids; lamiids; Solanales; Solanaceae; Solanoideae; Capsiceae; Capsicum	Lineage	
Capsicum (peppers) - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4071)	Parent	
4072 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 4072)	NCBI Taxonomy ID	NCBI Taxonomy ID
	is Taxon A an Infraspecies?	is Taxon B an Infraspecies?
No		

GENOTYPIC CHANGE

BRCA1	Generic Gene Name	F6KB94 (http://www.uniprot.org/uniprot/F6KB94)	UniProtKB Solanum tuberosum
TCP18; 102578271	Synonyms	0	GenebankID or UniProtKB
-	String		
-	Sequence Similarities		
-	GO - Molecular Function		
GO:0003677 : DNA binding (https://www.ebi.ac.uk/QuickGO/term/GO:0003677)	GO - Biological Process		
GO:0006355 : regulation of transcription, DNA-templated (https://www.ebi.ac.uk/QuickGO/term/GO:0006355)	GO - Cellular Component		
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)		Presumptive Null
No (https://www.gephbase.org/search-criteria/?and+Presumptive+Null=%No%#gephbase-summary-title)	Coding (https://www.gephbase.org/search-criteria/?and+Molecular+Type=%Coding%#gephbase-summary-title)		Molecular Type
SNP (https://www.gephbase.org/search-criteria/?and+Aberration+Type=%SNP%#gephbase-summary-title)			Aberration Type
-			SNP Coding Change
Evolution of an alternative splice site (G>A) that unlocks a short isoform			Molecular Details of the Mutation
Candidate Gene (https://www.gephbase.org/search-criteria/?and+Experimental+Evidence=%Candidate+Gene%#gephbase-summary-title)			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
Nicolas M; Rodríguez-Buey ML; Franco-Zorrilla JM; Cubas P

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 (BRCA1a) 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 BRCA1a that leads to the generation of two BRCA1a protein isoforms with distinct C-terminal regions, BRCA1a(Long) and BRCA1a(Short), encoded by unspliced and spliced mRNA, respectively. The BRCA1a(Long) C-terminal region has a strong activation domain, whereas that of BRCA1a(S) lacks an activation domain and is predicted to form an amphipathic helix, the H domain, which prevents protein nuclear targeting. BRCA1a(Short) is thus mainly cytoplasmic, while BRCA1a(Long) is mainly nuclear. BRCA1a(Long) functions as a transcriptional activator, whereas BRCA1a(Short) appears to have no transcriptional activity. Moreover, BRCA1a(Short) can heterodimerize with BRCA1a(Long) and act as a dominant-negative factor; it increases BRCA1a(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 BRCA1a led to a multi-level mechanism of post-transcriptional and post-translational BRCA1a regulation that effectively modulates its branch suppressing activity in response to environmental and endogenous cues.

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Additional References

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No matches found.	Related Haplotypes

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