

KUK (https://www.gephebase.org/search-criteria?/and+GeneGephebase=^KUK^#gephebase-summary-title)	Gephebase Gene	GP00001233	GepheID
Published	Entry Status	Courtier	Main curator

Morphology (https://www.gephebase.org/search-criteria?/and+Trait+Category=~Morphology^#gephebase-summary-title)		Trait Category
Root development (https://www.gephebase.org/search-criteria?/and+Trait=~Root+development^#gephebase-summary-title)		Trait
Arabidopsis thaliana - long meristem and long mature cells		Trait State in Taxon A
Arabidopsis thaliana - short meristem and short mature cells		Trait State in Taxon B
Data not curated		Ancestral State
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=~Intraspecific^#gephebase-summary-title)		Taxonomic Status
Taxon A	Taxon B	
Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Arabidopsis+thaliana^#gephebase-summary-title)	Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=~Arabidopsis+thaliana^#gephebase-summary-title)	Latin Name
thale cress	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	thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	Synonyms
species	species	Rank
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	Lineage
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	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)	3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	NCBI Taxonomy ID
is Taxon A an Intraspecies?	is Taxon B an Intraspecies?	
Yes	Yes	
Taxon A Description	Taxon B Description	
Wa-1	Uk-1	

At1g60370	Generic Gene Name	O80758 (http://www.uniprot.org/uniprot/O80758)	UniProtKB Arabidopsis thaliana
KUK; KURZ UND KLEIN; T13D8.24; T13D8_24; At1g60370	Synonyms	842332 (https://www.ncbi.nlm.nih.gov/nucore/842332)	GenebankID or UniProtKB
3702.AT1G60370.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier= 3702.AT1G60370.1)	String		
-	Sequence Similarities		
-	GO - Molecular Function		
-	GO - Biological Process		
-	GO - Cellular Component		

Mutation #1

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>)

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

exact causing mutation(s) unknown

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

Genome-wide association study using cellular traits identifies a new regulator of root development in Arabidopsis. (2014) (<https://pubmed.ncbi.nlm.nih.gov/24212884>)

Meijã³n M; Satbhai SB; Tsuchimatsu T; Busch W

Presumptive Null

Molecular Type

Aberration Type

Molecular Details of the Mutation

Experimental Evidence

Main Reference

Authors

Abstract

Additional References

With the increased availability of high-resolution sequence information, genome-wide association (GWA) studies have become feasible in a number of species. The vast majority of these studies are conducted in human populations, where it is difficult to provide strong evidence for the functional involvement of unknown genes that are identified using GWA. Here we used the model organism Arabidopsis thaliana to combine high-throughput confocal microscopy imaging of traits at the cellular level, GWA and expression analyses to identify genomic regions that are associated with developmental cell-type traits. We identify and characterize a new F-box gene, KUK, that regulates meristem and cell length. We further show that polymorphisms in the coding sequence are the major causes of KUK allele-dependent natural variation in root development. This work demonstrates the feasibility of GWA using cellular traits to identify causal genes for basic biological processes such as development.

Mutation #2

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

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

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

role of the upstream cis-regulatory region on phenotypic trait shown by various chimeric constructs rescuing a kuk1 mutant - exact causing cis-regulatory mutation(s) unknown

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

Genome-wide association study using cellular traits identifies a new regulator of root development in Arabidopsis. (2014) (<https://pubmed.ncbi.nlm.nih.gov/24212884>)

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Presumptive Null

Molecular Type

Aberration Type

Molecular Details of the Mutation

Experimental Evidence

Main Reference

Authors

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With the increased availability of high-resolution sequence information, genome-wide association (GWA) studies have become feasible in a number of species. The vast majority of these studies are conducted in human populations, where it is difficult to provide strong evidence for the functional involvement of unknown genes that are identified using GWA. Here we used the model organism Arabidopsis thaliana to combine high-throughput confocal microscopy imaging of traits at the cellular level, GWA and expression analyses to identify genomic regions that are associated with developmental cell-type traits. We identify and characterize a new F-box gene, KUK, that regulates meristem and cell length. We further show that polymorphisms in the coding sequence are the major causes of KUK allele-dependent natural variation in root development. This work demonstrates the feasibility of GWA using cellular traits to identify causal genes for basic biological processes such as development.

RELATED GEPHE

No matches found.

No matches found.

Related Genes

Related Haplotypes

EXTERNAL LINKS

COMMENTS

Strong experimental evidence through comparison of KUK gene expression in root of different lines. KUK mutant displaying small meristem and reduced mature cell length.

