

ERECTA (https://www.gephebase.org/search-criteria?/and+GeneGephebase=^ERECTA^#gephebase-summary-title)	Gephebase Gene	GP00001244	GepheID
Published	Entry Status	Arnout	Main curator

Physiology (#gephebase-summary-title)		Trait Category	
Pathogen resistance (Cucumerina fungus) (https://www.gephebase.org/search-criteria?/and+Trait=~Pathogen resistance (Cucumerina fungus)^#gephebase-summary-title)		Trait	
Arabidopsis thaliana- Ler0		Trait State in Taxon A	
Arabidopsis thaliana- Cvi		Trait State in Taxon B	
Data not curated		Ancestral State	
Intraspecific (#gephebase-summary-title)		Taxonomic Status	
Taxon A		Taxon B	
Arabidopsis thaliana (#gephebase-summary-title)		Arabidopsis thaliana (#gephebase-summary-title)	
thale cress		thale cress	
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	
species		species	
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis		cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	
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)	
NCBI Taxonomy ID 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)	
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?	
Yes		Yes	
Arabidopsis thaliana- Ler0		Arabidopsis thaliana- Cvi	

RECTA	Generic Gene Name	UniProtKB Arabidopsis thaliana
	Synonyms	GenebankID or UniProtKB
RECTA; QRP1; QUANTITATIVE RESISTANCE TO PLECTOSPHAERELLA 1; T1D16.3; T1D16_3; ER; QRS1; TE1; At2g26330		EF598346 (https://www.ncbi.nlm.nih.gov/nuccore/EF598346)
	String	
3702.AT2G26330.1 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=3702.AT2G26330.1)		
	Sequence Similarities	
Belongs to the protein kinase superfamily. Ser/Thr protein kinase family.		
	GO - Molecular Function	
GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)		
GO:0005102 : signaling receptor binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005102)		

GO:0004674 : protein serine/threonine kinase activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0004674>)
GO:0004672 : protein kinase activity (<https://www.ebi.ac.uk/QuickGO/term/GO:0004672>)
GO:0042277 : peptide binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0042277>)
GO:0033612 : receptor serine/threonine kinase binding
(<https://www.ebi.ac.uk/QuickGO/term/GO:0033612>)
GO:0019199 : transmembrane receptor protein kinase activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0019199>)

GO - Biological Process

GO:0042742 : defense response to bacterium
(<https://www.ebi.ac.uk/QuickGO/term/GO:0042742>)
GO:0050832 : defense response to fungus
(<https://www.ebi.ac.uk/QuickGO/term/GO:0050832>)
GO:0046777 : protein autophosphorylation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0046777>)
GO:0070370 : cellular heat acclimation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0070370>)
GO:0048281 : inflorescence morphogenesis
(<https://www.ebi.ac.uk/QuickGO/term/GO:0048281>)
GO:0009965 : leaf morphogenesis (<https://www.ebi.ac.uk/QuickGO/term/GO:0009965>)
GO:0010087 : phloem or xylem histogenesis
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010087>)
GO:0009664 : plant-type cell wall organization
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009664>)
GO:0009944 : polarity specification of adaxial/abaxial axis
(<https://www.ebi.ac.uk/QuickGO/term/GO:0009944>)
GO:0030155 : regulation of cell adhesion
(<https://www.ebi.ac.uk/QuickGO/term/GO:0030155>)
GO:0051302 : regulation of cell division
(<https://www.ebi.ac.uk/QuickGO/term/GO:0051302>)
GO:0001558 : regulation of cell growth
(<https://www.ebi.ac.uk/QuickGO/term/GO:0001558>)
GO:1905421 : regulation of plant organ morphogenesis
(<https://www.ebi.ac.uk/QuickGO/term/GO:1905421>)
GO:0010103 : stomatal complex morphogenesis
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010103>)
GO:0010148 : transpiration (<https://www.ebi.ac.uk/QuickGO/term/GO:0010148>)

GO - Cellular Component

GO:0016021 : integral component of membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)
GO:0005886 : plasma membrane (<https://www.ebi.ac.uk/QuickGO/term/GO:0005886>)
GO:0009506 : plasmodesma (<https://www.ebi.ac.uk/QuickGO/term/GO:0009506>)
GO:0005739 : mitochondrion (<https://www.ebi.ac.uk/QuickGO/term/GO:0005739>)

	Presumptive Null
Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=~Unknown^#gephebase-summary-title)	
	Molecular Type
Unknown (https://www.gephebase.org/search-criteria?/and+Molecular Type=~Unknown^#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
ERECTA receptor-like kinase and heterotrimeric G protein from Arabidopsis are required for resistance to the necrotrophic fungus Plectosphaerella cucumerina. (2005) (https://pubmed.ncbi.nlm.nih.gov/15998304)	

	Authors
Llorente F; Alonso-Blanco C; S��nchez-Rodr��guez C; Jorda L; Molina A	
	Abstract

Arabidopsis resistance to the necrotrophic fungus Plectosphaerella cucumerina is complex and depends on the ethylene, jasmonic acid and salicylic acid signaling pathways. A quantitative trait loci (QTL) analysis of resistance to this fungus was performed using two populations of recombinant inbred lines. Three loci QRP1-QRP3 (for Quantitative Resistance to Plectosphaerella) were identified and mapped on chromosome 2 (QRP1 and QRP2) and 5 (QRP3). QRP1, the locus showing the strongest effect, was found to correspond to the ERECTA (ER) gene that encodes a receptor-like-kinase (RLK), which has been previously implicated in plant development, and resistance to the bacterium Ralstonia solanacearum. The leucine-rich repeat and the kinase domains of ERECTA were specifically required for resistance to P. cucumerina, as er mutant alleles impaired in any of these domains showed enhanced susceptibility to this fungus, but not to other virulent pathogens. The involvement of the ER-signaling pathway in resistance to P. cucumerina was supported by the fact that three mutants defective in this pathway, elk2, elk5 and elk4 (agb1-1), which encodes the beta-subunit of Arabidopsis heterotrimeric G protein, were also impaired in their resistance to this fungus. The putative function of the Arabidopsis heterotrimeric G protein in resistance to P. cucumerina suggested by the enhanced susceptibility of agb1-1 was corroborated by the demonstration that a null allele (gpa1-4) of the G protein alpha-subunit showed enhanced resistance to this pathogen. Deposition of beta-1,3-glucan callose at infection sites was specifically impaired in er-1 and agb1-1 mutants upon P. cucumerina inoculation. Taken together, these data suggest a putative function of ERECTA and heterotrimeric G protein in P. cucumerina perception.

Additional References

RELATED GEPHE

	Related Genes
20 (ACD6 = ACCELERATED CELL DEATH 6, RAC1, Resistance related Kinase 1 (RKS1), RLM1, RLM2 cluster, RLM3, RPM1, RPP1-WsA, RPP1-WsB, RPP1-WsC, RPP13, RPP2A-RPP2B, RPP4, RPP5, RPP8, RPS2, RPS4, RPS5, RRS1, WRR4) (https://www.gephebase.org/search-criteria?/or+Taxon ID=~3702^/and+Trait=Pathogen)	

resistance/and+groupHaplotypes=true#gephebase-summary-title)

Related Haplotypes

1 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^ERECTA^/and+Taxon ID=^3702^/or+Gene Gephebase=^ERECTA^/and+Taxon ID=^3702^#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=^ERECTA^/and+Taxon+ID=^3702^/or+Gene+Gephebase=^ERECTA^/and+Taxon+ID=^3702^#gephebase-summary-title))

EXTERNAL LINKS

COMMENTS

ERECTA not involved in other fungus resistance.