GEPHE SUMMARY

Gephebase Gene
RPP5 (https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^RPP5^#gephebase-summary-title)

GepheID
GP00001008

Entry Status
Published

Main curator
Martin

PHENOTYPIC CHANGE

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

Trait
Pathogen resistance (https://www.gephebase.org/search-criteria?/and+Trait=^Pathogen resistance^#gephebase-summary-title)

Trait State in Taxon A
Arabidopsis thaliana- Col0 - sensitive

Trait State in Taxon B
Arabidopsis thaliana- Ler0 - resistant

Ancestral State
Data not curated

Taxonomic Status
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic Status=^Intraspecific^#gephebase-summary-title)

Taxon A

Latin Name
Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)

Common Name
thale cress

Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent
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)

is Taxon A an Infraspecies?
Yes

Taxon A Description
Arabidopsis thaliana- Col0 - sensitive

Taxon B

Latin Name
Arabidopsis thaliana (https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Arabidopsis thaliana^#gephebase-summary-title)

Common Name
thale cress

Synonyms
thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress

Rank
species

Lineage
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis

Parent
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)

is Taxon B an Infraspecies?
Yes

Taxon B Description
Arabidopsis thaliana- Ler0 - resistant

GENOTYPIC CHANGE

Generic Gene Name
RPP5

Synonyms
DISEASE RESISTANCE PROTEIN RPP5; DL4505C; FCAALL.315; RECOGNITION OF PERONOSPORA PARASITICA 5; At4g16950; dl4505c

String
3702.AT4G16950.1 (http://string-db.org/newstring_cgi/show_network_section.pl?identifier= 3702.AT4G16950.1)

Sequence Similarities
-

GO - Molecular Function
GO:0005524 : ATP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005524)
GO:0000166 : nucleotide binding (https://www.ebi.ac.uk/QuickGO/term/GO:0000166)
GO:0043531 : ADP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043531)

UniProtKB Arabidopsis thaliana
F4JNB7 (http://www.uniprot.org/uniprot/F4JNB7)

GenebankID or UniProtKB
Z97342 (https://www.ncbi.nlm.nih.gov/nuccore/Z97342)

GO - Biological Process

GO:0006952 : defense response (https://www.ebi.ac.uk/QuickGO/term/GO:0006952)
GO:0007165 : signal transduction (https://www.ebi.ac.uk/QuickGO/term/GO:0007165)
GO:0009817 : defense response to fungus, incompatible interaction (https://www.ebi.ac.uk/QuickGO/term/GO:0009817)

GO - Cellular Component

-

Presumptive Null

Unknown (https://www.gephebase.org/search-criteria?/and+Presumptive Null=^Unknown^#gephebase-summary-title)

Molecular Type

Coding (https://www.gephebase.org/search-criteria?/and+Molecular Type=^Coding^#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

Arabidopsis RPP4 is a member of the RPP5 multigene family of TIR-NB-LRR genes and confers downy mildew resistance through multiple signalling components. (2002) (https://pubmed.ncbi.nlm.nih.gov/11846877)

Authors

van der Biezen EA; Freddie CT; Kahn K; Parker JE; Jones JD

Abstract

In Arabidopsis, RPP4 confers resistance to Peronospora parasitica (P.p.) races Emoy2 and Emwa1 (downy mildew). We identified RPP4 in Col-0 as a member of the clustered RPP5 multigene family encoding nucleotide-binding leucine-rich repeat proteins with Toll/interleukin-1 receptor domains. RPP4 is the orthologue of RPP5 which, in addition to recognizing P.p. race Noco2, also mediates resistance to Emoy2 and Emwa1. Most differences between RPP4 and RPP5 occur in residues that constitute the TIR domain and in LRR residues that are predicted to confer recognition specificity. RPP4 requires the action of at least 12 defence components, including DTH9, EDS1, PAD4, PAL, PBS2, PBS3, SID1, SID2 and salicylic acid. The ndr1, npr1 and rps5-1 mutations partially compromise RPP4 function in cotyledons but not in true leaves. The identification of RPP4 as a TIR-NB-LRR protein, coupled with its dependence on certain signalling components in true leaves, is consistent with the hypothesis that distinct NB-LRR protein classes differentially signal through EDS1 and NDR1. Our results suggest that RPP4-mediated resistance is developmentally regulated and that in cotyledons there is cross-talk between EDS1 and NDR1 signalling and processes regulating systemic acquired resistance.

Additional References

Genome-wide survey of Arabidopsis natural variation in downy mildew resistance using combined association and linkage mapping. (2010) (https://pubmed.ncbi.nlm.nih.gov/20479233)

RELATED GEPHE

Related Genes

20 (ACD6 = ACCELERATED CELL DEATH 6, ERECTA, RAC1, Resistance related Kinase 1 (RKS1), RLM1, RLM2 cluster, RLM3, RPM1, RPP1-WsA, RPP1-WsB, RPP1-WsC, RPP13, RPP2A-RPP2B, RPP4, 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=^RPP5^/and+Taxon ID=^3702^/or+Gene Gephebase=^RPP5^/and+Taxon ID=^3702^#gephebase-summary-title)

EXTERNAL LINKS

COMMENTS