

GEPHE SUMMARY

Pi-ta (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^Pi-ta^#gephebase-summary-title)	Gephebase Gene	GepheID
	GP00000876	
	Entry Status	Martin
Published		Main curator

PHENOTYPIC CHANGE

Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=^Physiology^#gephebase-summary-title)	Trait Category	
	Trait	
	Pathogen resistance (https://www.gephebase.org/search-criteria?/and+Trait=^Pathogen+resistance^#gephebase-summary-title)	
Oryza spp. - wild-type	Trait State in Taxon A	
	Trait State in Taxon B	
	Oryza sativa- resistant	
Data not curated	Ancestral State	
	Taxonomic Status	
	Domesticated (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Domesticated^#gephebase-summary-title)	

Taxon A		Taxon B	
Oryza sativa (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Oryza+sativa^#gephebase-summary-title)	Latin Name	Oryza sativa (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=^Oryza+sativa^#gephebase-summary-title)	Latin Name
	Common Name		Common Name
	Synonyms		Synonyms
rice		rice	
rice; red rice; Oryza sativa L.		rice; red rice; Oryza sativa L.	
species	Rank	species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzeae; Oryzinae; Oryza	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; Liliopsida; Petrosaviidae; commelinids; Poales; Poaceae; BOP clade; Oryzoideae; Oryzeae; Oryzinae; Oryza	Lineage
Oryza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4527)	Parent	Oryza () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4527)	Parent
4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4530)	NCBI Taxonomy ID	4530 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=4530)	NCBI Taxonomy ID
is Taxon A an Intraspecies?		is Taxon B an Intraspecies?	
No		No	

GENOTYPIC CHANGE

Pi-ta	Generic Gene Name	UniProtKB Oryza sativa subsp. japonica
	Synonyms	C9E6G5 (http://www.uniprot.org/uniprot/C9E6G5)
	String	GenebankID or UniProtKB
KPt.1		ACY25064 (https://www.ncbi.nlm.nih.gov/nuccore/ACY25064)
-		
Belongs to the disease resistance NB-LRR family.	Sequence Similarities	
	GO - Molecular Function	
	GO - Biological Process	
GO:0043531 : ADP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0043531)		
GO:0045454 : cell redox homeostasis (https://www.ebi.ac.uk/QuickGO/term/GO:0045454)		
GO:0005623 : cell (https://www.ebi.ac.uk/QuickGO/term/GO:0005623)	GO - Cellular Component	
No (https://www.gephebase.org/search-criteria?/and+Presumptive+Null=^No^#gephebase-summary-title)		Presumptive Null
		Molecular Type

Coding ([https://www.gephebase.org/search-criteria?/and+Molecular Type=~Coding~#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Molecular+Type=~Coding~#gephebase-summary-title))

Aberration Type

SNP ([https://www.gephebase.org/search-criteria?/and+Aberration Type=~SNP~#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration+Type=~SNP~#gephebase-summary-title))

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

Ala918Ser

Experimental Evidence

Linkage Mapping ([https://www.gephebase.org/search-criteria?/and+Experimental Evidence=~Linkage Mapping~#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental+Evidence=~Linkage+Mapping~#gephebase-summary-title))

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

Main Reference

tA single amino acid difference distinguishes resistant and susceptible alleles of the rice blast resistance gene Pi-ta. (2000) (<https://pubmed.ncbi.nlm.nih.gov/11090207>)

Authors

Bryan GT; Wu KS; Farrall L; Jia Y; Hershey HP; McAdams SA; Faulk KN; Donaldson GK; Tarchini R; Valent B

Abstract

The rice blast resistance (R) gene Pi-ta mediates gene-for-gene resistance against strains of the fungus Magnaporthe grisea that express avirulent alleles of AVR-Pita. Using a map-based cloning strategy, we cloned Pi-ta, which is linked to the centromere of chromosome 12. Pi-ta encodes a predicted 928-amino acid cytoplasmic receptor with a centrally localized nucleotide binding site. A single-copy gene, Pi-ta shows low constitutive expression in both resistant and susceptible rice. Susceptible rice varieties contain pi-ta(-) alleles encoding predicted proteins that share a single amino acid difference relative to the Pi-ta resistance protein: serine instead of alanine at position 918. Transient expression in rice cells of a Pi-ta(+) R gene together with AVR-Pita(+) induces a resistance response. No resistance response is induced in transient assays that use a naturally occurring pi-ta(-) allele differing only by the serine at position 918. Rice varieties reported to have the linked Pi-ta(2) gene contain Pi-ta plus at least one other R gene, potentially explaining the broadened resistance spectrum of Pi-ta(2) relative to Pi-ta. Molecular cloning of the AVR-Pita and Pi-ta genes will aid in deployment of R genes for effective genetic control of rice blast disease.

Additional References

Two evolutionary histories in the genome of rice: the roles of domestication genes. (2011) (<https://pubmed.ncbi.nlm.nih.gov/21695282>)

Resequencing 50 accessions of cultivated and wild rice yields markers for identifying agronomically important genes. (2011) (<https://pubmed.ncbi.nlm.nih.gov/22158310>)

RELATED GEPHE

Related Genes

15 (Pi2 (Nbs4-Pi2), Pi36, Pi37, Pi5-1 + Pi5-2 cluster, Pi9 (= Nbs2-Pi9), Pib, Pid3, PigmR, Pikm1-TS + Pikm2-TS cluster, Pit, Piz-t, SLB1/2, Xa1, Xa21, Xa26) ([https://www.gephebase.org/search-criteria?/or+Taxon ID=~4530~/and+Trait=Pathogen resistance/and+groupHaplotypes=true#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Taxon+ID=~4530~/and+Trait=Pathogen+resistance/and+groupHaplotypes=true#gephebase-summary-title))

Related Haplotypes

No matches found.

EXTERNAL LINKS

COMMENTS