

GEPHE SUMMARY

<p>MITOGEN-ACTIVATED PROTEIN KINASE 12 (MPK12) https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=^MITOGEN-ACTIVATED+PROTEIN+KINASE+12+(MPK12)^#gephebase-summary-title</p> <p>Published</p>	<p>Gephebase Gene</p> <p>GP00001383</p> <p>Prigent</p> <p>Entry Status</p>	<p>GepheID</p> <p>Main curator</p>
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PHENOTYPIC CHANGE

<p>Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=^Physiology^#gephebase-summary-title)</p> <p>Ozone sensitivity (stomata opening and stomatal CO₂-sensitivity) https://www.gephebase.org/search-criteria?/and+Trait=^Ozone+sensitivity+(stomata+opening+and+stomatal+CO2-sensitivity)^#gephebase-summary-title</p> <p>Thale cress ; wild type</p> <p>thale cress ; Cape Verde Islands (Cvi-0) - ozone hypersensitivity and more open stomata and stomatal CO₂-insensitivity</p> <p>Taxon A</p> <p>Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=^Intraspecific^#gephebase-summary-title)</p>	<p>Trait Category</p> <p>Trait</p> <p>Trait State in Taxon A</p> <p>Trait State in Taxon B</p> <p>Ancestral State</p> <p>Taxonomic Status</p>	<p>Taxon B Description</p> <p>thale cress ; Cape Verde Islands (Cvi-0) - ozone hypersensitivity and more open stomata and stomatal CO₂-insensitivity</p>
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Taxon A	Latin Name	Taxon B	Latin Name
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)	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)
thale cress	Common Name	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	Synonyms	thale cress; mouse-ear cress; thale-cress; Arabidopsis thaliana (L.) Heynh.; Arabidopsis thaliana (thale cress); Arabidopsis_thaliana; Arbisopsis thaliana; thale kress	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	Lineage	cellular organisms; Eukaryota; Viridiplantae; Streptophyta; Streptophytina; Embryophyta; Tracheophyta; Euphyllophyta; Spermatophyta; Magnoliophyta; Mesangiospermae; eudicotyledons; Gunneridae; Pentapetalae; rosids; malvids; Brassicales; Brassicaceae; Camelineae; Arabidopsis	Lineage
Arabidopsis () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3701)	Parent	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)	NCBI Taxonomy ID	3702 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=3702)	NCBI Taxonomy ID
No	is Taxon A an Intraspecies?	Yes	is Taxon B an Intraspecies?

GENOTYPIC CHANGE

<p>MPK12</p> <p>ATMPK12; MAPK12; mitogen-activated protein kinase 12; T3F17.28; At2g46070</p> <p>3702.AT2G46070.1 http://string-db.org/newstring_cgi/show_network_section.pl?identifier=3702.AT2G46070.1</p> <p>Belongs to the protein kinase superfamily. CMGC Ser/Thr protein kinase family. MAP kinase subfamily.</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p>	<p>UniProtKB Arabidopsis thaliana</p> <p>Q8GYQ5 (http://www.uniprot.org/uniprot/Q8GYQ5)</p> <p>GenebankID or UniProtKB</p>
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GO - Molecular Function

- GO:0005524 : ATP binding (<https://www.ebi.ac.uk/QuickGO/term/GO:0005524>)
- GO:0004713 : protein tyrosine kinase activity (<https://www.ebi.ac.uk/QuickGO/term/GO:0004713>)
- GO:0016301 : kinase activity (<https://www.ebi.ac.uk/QuickGO/term/GO:0016301>)
- GO:0004707 : MAP kinase activity (<https://www.ebi.ac.uk/QuickGO/term/GO:0004707>)

GO - Biological Process

- GO:0009734 : auxin-activated signaling pathway (<https://www.ebi.ac.uk/QuickGO/term/GO:0009734>)
- GO:0009733 : response to auxin (<https://www.ebi.ac.uk/QuickGO/term/GO:0009733>)
- GO:0010468 : regulation of gene expression (<https://www.ebi.ac.uk/QuickGO/term/GO:0010468>)
- GO:0035556 : intracellular signal transduction (<https://www.ebi.ac.uk/QuickGO/term/GO:0035556>)
- GO:0080026 : response to indolebutyric acid (<https://www.ebi.ac.uk/QuickGO/term/GO:0080026>)

GO - Cellular Component

- GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)
- GO:0005634 : nucleus (<https://www.ebi.ac.uk/QuickGO/term/GO:0005634>)

- No (<https://www.gephebase.org/search-criteria?/and+Presumptive Null=^No^#gephebase-summary-title>) Presumptive Null
- Coding (<https://www.gephebase.org/search-criteria?/and+Molecular Type=^Coding^#gephebase-summary-title>) Molecular Type
- SNP (<https://www.gephebase.org/search-criteria?/and+Aberration Type=^SNP^#gephebase-summary-title>) Aberration Type
- Nonsynonymous SNP Coding Change
- G53R Molecular Details of the Mutation
- Linkage Mapping (<https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Linkage Mapping^#gephebase-summary-title>) Experimental Evidence

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

- Natural Variation in Arabidopsis Cvi-0 Accession Reveals an Important Role of MPK12 in Guard Cell CO₂ Signaling. (2016) (<https://pubmed.ncbi.nlm.nih.gov/27923039>) Main Reference
- Jakobson L; Vaahtera L; Tãµldsepp K; Nuhkat M; Wang C; Wang YS; Hãµrak H; Valk E; Pechter P; Sindarovska Y; Tang J; Xiao C; Xu Y; Gerst Talas U; Garcãa-Sosa AT; Kangasjãrvi S; Maran U; Remm M; Roelfsema MR; Hu H; Kangasjãrvi J; Loog M; Schroeder JI; Kollist H; Broschã M Authors
- Plant gas exchange is regulated by guard cells that form stomatal pores. Stomatal adjustments are crucial for plant survival; they regulate uptake of CO₂ for photosynthesis, loss of water, and entrance of air pollutants such as ozone. We mapped ozone hypersensitivity, more open stomata, and stomatal CO₂-insensitivity phenotypes of the Arabidopsis thaliana accession Cvi-0 to a single amino acid substitution in MITOGEN-ACTIVATED PROTEIN (MAP) KINASE 12 (MPK12). In parallel, we showed that stomatal CO₂-insensitivity phenotypes of a mutant cis (CO₂-insensitive) were caused by a deletion of MPK12. Lack of MPK12 impaired bicarbonate-induced activation of S-type anion channels. We demonstrated that MPK12 interacted with the protein kinase HIGH LEAF TEMPERATURE 1 (HT1)-a central node in guard cell CO₂ signaling-and that MPK12 functions as an inhibitor of HT1. These data provide a new function for plant MPKs as protein kinase inhibitors and suggest a mechanism through which guard cell CO₂ signaling controls plant water management. Abstract
- Additional References

RELATED GEPHE

- No matches found. Related Genes
- No matches found. Related Haplotypes

EXTERNAL LINKS

COMMENTS

