

GEPHE SUMMARY

<p>beta-tubulin (<a +beta-tubulin+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene+Gephebase="+beta-tubulin+"#gephebase-summary-title)</p> <p>Published</p>	<p>Gephebase Gene</p> <p>Entry Status</p>	<p>GP00001820</p> <p>Courtier</p>	<p>GepheID</p> <p>Main curator</p>
--	---	-----------------------------------	------------------------------------

PHENOTYPIC CHANGE

<p>Physiology (<a +physiology+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait+Category=">https://www.gephebase.org/search-criteria?/and+Trait+Category="+Physiology+"#gephebase-summary-title)</p> <p>Xenobiotic resistance (benzimidazole) (<a +xenobiotic+resistance+(benzimidazole)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Xenobiotic+resistance+(benzimidazole)+"#gephebase-summary-title)</p> <p>sensitive</p> <p>resistant</p> <p>Taxon A</p> <p>Intraspecific (<a +intraspecific+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=">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 A</p> <p>Latin Name</p> <p>Haemonchus contortus (<a +haemonchus+contortus+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Haemonchus+contortus+"#gephebase-summary-title)</p> <p>Common Name</p> <p>barber pole worm</p> <p>Synonyms</p> <p>barber pole worm; red stomach worm; Haemonchus contortus (Rudolphi, 1803)</p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Nematoda; Chromadorea; Strongylida; Trichostrongyloidea; Haemonchidae; Haemonchus</p> <p>Parent</p> <p>Haemonchus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6288)</p> <p>NCBI Taxonomy ID</p> <p>6289 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6289)</p> <p>is Taxon A an Intraspecies?</p> <p>No</p>	<p>Taxon B</p> <p>Latin Name</p> <p>Haemonchus contortus (<a +haemonchus+contortus+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Haemonchus+contortus+"#gephebase-summary-title)</p> <p>Common Name</p> <p>barber pole worm</p> <p>Synonyms</p> <p>barber pole worm; red stomach worm; Haemonchus contortus (Rudolphi, 1803)</p> <p>Rank</p> <p>species</p> <p>Lineage</p> <p>cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Protostomia; Ecdysozoa; Nematoda; Chromadorea; Strongylida; Trichostrongyloidea; Haemonchidae; Haemonchus</p> <p>Parent</p> <p>Haemonchus () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6288)</p> <p>NCBI Taxonomy ID</p> <p>6289 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6289)</p> <p>is Taxon B an Intraspecies?</p> <p>No</p>
--	---	---	---

GENOTYPIC CHANGE

<p>TUB2</p> <p>ARM10; SHE8; YFL037W</p> <p>4932.YFL037W (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=4932.YFL037W)</p> <p>Belongs to the tubulin family.</p> <p>GO - Molecular Function</p> <p>GO:0005525 : GTP binding (https://www.ebi.ac.uk/QuickGO/term/GO:0005525)</p> <p>GO:0003924 : GTPase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0003924)</p> <p>GO:0005200 : structural constituent of cytoskeleton (https://www.ebi.ac.uk/QuickGO/term/GO:0005200)</p> <p>GO - Biological Process</p> <p>GO:0007010 : cytoskeleton organization (https://www.ebi.ac.uk/QuickGO/term/GO:0007010)</p> <p>GO:0000278 : mitotic cell cycle (https://www.ebi.ac.uk/QuickGO/term/GO:0000278)</p> <p>GO:0000070 : mitotic sister chromatid segregation</p>	<p>Generic Gene Name</p> <p>Synonyms</p> <p>String</p> <p>Sequence Similarities</p> <p>GO - Molecular Function</p> <p>GO - Biological Process</p>	<p>UniProtKB Saccharomyces cerevisiae (strain ATCC 204508 / S288c)</p> <p>P02557 (http://www.uniprot.org/uniprot/P02557)</p> <p>GenebankID or UniProtKB</p> <p>Q</p>
--	---	--

(<https://www.ebi.ac.uk/QuickGO/term/GO:000070>)
 GO:0007017 : microtubule-based process
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0007017>)
 GO:0046677 : response to antibiotic (<https://www.ebi.ac.uk/QuickGO/term/GO:0046677>)
 GO:0000226 : microtubule cytoskeleton organization
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0000226>)
 GO:0045143 : homologous chromosome segregation
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0045143>)
 GO:0030473 : nuclear migration along microtubule
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0030473>)
 GO:0090316 : positive regulation of intracellular protein transport
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0090316>)

GO - Cellular Component

GO:0005737 : cytoplasm (<https://www.ebi.ac.uk/QuickGO/term/GO:0005737>)
 GO:0005874 : microtubule (<https://www.ebi.ac.uk/QuickGO/term/GO:0005874>)
 GO:0005816 : spindle pole body (<https://www.ebi.ac.uk/QuickGO/term/GO:0005816>)
 GO:0005881 : cytoplasmic microtubule
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0005881>)
 GO:0005828 : kinetochore microtubule
 (<https://www.ebi.ac.uk/QuickGO/term/GO:0005828>)
 GO:0005880 : nuclear microtubule (<https://www.ebi.ac.uk/QuickGO/term/GO:0005880>)
 GO:0045298 : tubulin complex (<https://www.ebi.ac.uk/QuickGO/term/GO:0045298>)

Presumptive Null

No ([https://www.gephebase.org/search-criteria?/and+Presumptive Null="No"#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+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=))

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 Coding Change

Nonsynonymous

Molecular Details of the Mutation

Glu198Ala

Experimental Evidence

Candidate Gene ([https://www.gephebase.org/search-criteria?/and+Experimental Evidence="Candidate Gene"#gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental Evidence=))

	Taxon A	Taxon B	Position
Codon	-	-	-
Amino-acid	Glu	Ala	198

Main Reference

Phenotyping and genotyping of *Haemonchus contortus* isolates reveals a new putative candidate mutation for benzimidazole resistance in nematodes. (2007)
 (<https://pubmed.ncbi.nlm.nih.gov/17101226>)

Authors

Ghisi M; Kaminsky R; MÄrser P

Abstract

In order to monitor and eventually control the spread of drug-resistant *Haemonchus contortus*, knowledge of the molecular mechanisms underlying resistance is essential. Here we phenotypically and genotypically characterize three multidrug-resistant *H. contortus* field isolates from Australia and South Africa. All were significantly less susceptible to thiabendazole than a sensitive reference strain in an in vitro egg-hatch assay. The sensitivity was further reduced in a surviving population after treatment of infected sheep with albendazole. The beta-tubulin genes were amplified from genomic DNA of the *H. contortus* isolates, cloned, and sequenced. There was a high degree of sequence variation. The known mutation phenylalanine-200 to tyrosine (F200Y) occurred in 60% of the sequences from resistant isolates, but not in the sensitive reference. Interestingly, 90% of the beta-tubulin sequences from resistant isolates lacking tyrosine-200 carried another mutation nearby, glutamate-198 to alanine (E198A). This mutation was not found in the sensitive isolate, nor in sequences from resistant isolates carrying the mutation F200Y. However, the mutation E198A is known from benomyl-resistant isolates of phytopathogenic fungi such as *Monilinia fructicola*. The finding that alanine-198 correlates with thiabendazole resistance in *H. contortus* isolates from South Africa and Australia suggests that also in nematodes, the mutation E198A plays a role in benzimidazole resistance. Alanine-198 alleles of beta-tubulin can be detected by PCR-RFLP and we suggest to include this test in future surveys of *H. contortus* field populations.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

2 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase="beta-tubulin"/and+Taxon ID="6289"/or+Gene Gephebase="beta-tubulin"/and+Taxon ID="6289"#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene Gephebase=))

EXTERNAL LINKS

