

GEPHE SUMMARY

	Gephebase Gene	GephelD
Sulfotransferase-OXA-Resistance (SULT-OR) (https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=%Sulfotransferase-OXA-Resistance+(SULT-OR)%#gephebase-summary-title)	GP00001472	Main curator
	Prigent	
Published	Entry Status	

PHENOTYPIC CHANGE

	Trait Category	
Physiology (https://www.gephebase.org/search-criteria?/and+Trait+Category=%Physiology%#gephebase-summary-title)	Trait	
Xenobiotic resistance (oxamniquine) (https://www.gephebase.org/search-criteria?/and+Trait=%Xenobiotic+resistance+(oxamniquine)%#gephebase-summary-title)	Trait State in Taxon A	
Human blood fluke <i>S. mansoni</i> OXA-sensitive (wild-type)	Trait State in Taxon B	
Human blood fluke <i>S. haematobium</i> naturally OXA-resistant (wild-type)	Ancestral State	
Unknown	Taxonomic Status	
Intraspecific (https://www.gephebase.org/search-criteria?/and+Taxonomic+Status=%Intraspecific%#gephebase-summary-title)		
	Taxon A	Taxon B
	Latin Name	Latin Name
Schistosoma mansoni (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=%Schistosoma+mansoni%#gephebase-summary-title)	Schistosoma mansoni (https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=%Schistosoma+mansoni%#gephebase-summary-title)	
	Common Name	Common Name
-	Synonyms	Synonyms
-	Rank	Rank
species	Lineage	Lineage
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Platyhelminthes; Trematoda; Digenea; Strigeidida; Schistosomatoidea; Schistosomatidae; <i>Schistosoma</i>		
	Parent	Parent
<i>Schistosoma</i> () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6181)	<i>Schistosoma</i> () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6181)	
6183 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=6183)	NCBI Taxonomy ID	NCBI Taxonomy ID
	is Taxon A an Infraspecies?	is Taxon B an Infraspecies?
No	No	

GENOTYPIC CHANGE

	Generic Gene Name	UniProtKB Schistosoma mansoni
SULT-OR	Synonyms	GenebankID or UniProtKB
Smp_089320	String	
-	Sequence Similarities	
	GO - Molecular Function	
GO:0016740 : transferase activity (https://www.ebi.ac.uk/QuickGO/term/GO:0016740)		
	GO - Biological Process	
	GO - Cellular Component	
-		Presumptive Null
No (https://www.gephebase.org/search-criteria?/and+Presumptive+Null=%No%#gephebase-summary-title)		Molecular Type
Coding (https://www.gephebase.org/search-criteria?/and+Molecular+Type=%Coding%#gephebase-summary-title)		

SNP ([https://www.gephebase.org/search-criteria?/and+Aberration Type=%5E%5CSNP%5E%23gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Aberration%20Type=%5E%5CSNP%5E%23gephebase-summary-title))

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

F39 Sm > Y54 Sh (T>A) TTT>TAT

Experimental Evidence

Candidate Gene ([https://www.gephebase.org/search-criteria?/and+Experimental Evidence=%5ECandidate Gene%5E%23gephebase-summary-title](https://www.gephebase.org/search-criteria?/and+Experimental%20Evidence=%5ECandidate%20Gene%5E%23gephebase-summary-title))

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

Main Reference

Genetic and molecular basis of drug resistance and species-specific drug action in schistosome parasites. (2013) (<https://pubmed.ncbi.nlm.nih.gov/24263136>)

Authors

Valentim CL; Cioli D; Chevalier FD; Cao X; Taylor AB; Holloway SP; Pica-Mattoccia L; Guidi A; Basso A; Tsai IJ; Berriman M; Carvalho-Queiroz C; Almeida M; Aguilar H; Frantz DE; Hart PJ; LoVerde PT; Anderson TJ

Abstract

Oxamniquine resistance evolved in the human blood fluke (*Schistosoma mansoni*) in Brazil in the 1970s. We crossed parental parasites differing ~500-fold in drug response, determined drug sensitivity and marker segregation in clonally derived second-generation progeny, and identified a single quantitative trait locus (logarithm of odds = 31) on chromosome 6. A sulfotransferase was identified as the causative gene by using RNA interference knockdown and biochemical complementation assays, and we subsequently demonstrated independent origins of loss-of-function mutations in field-derived and laboratory-selected resistant parasites. These results demonstrate the utility of linkage mapping in a human helminth parasite, while crystallographic analyses of protein-drug interactions illuminate the mode of drug action and provide a framework for rational design of oxamniquine derivatives that kill both *S. mansoni* and *S. haematobium*, the two species responsible for >99% of schistosomiasis cases worldwide.

Additional References

RELATED GEPHE

Related Genes

No matches found.

Related Haplotypes

2 ([https://www.gephebase.org/search-criteria?/or+Gene Gephebase=%5CSulfotransferase-OXA-Resistance \(SULT-OR\)%5E%2Fand+Taxon ID=%5E%5C6183%5E%2For+Gene Gephebase=%5CSulfotransferase-OXA-Resistance \(SULT-OR\)%5E%2Fand+Taxon ID=%5E%5C6183%5E%23gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene%20Gephebase=%5CSulfotransferase-OXA-Resistance%20(SULT-OR)%5E%2Fand+Taxon%20ID=%5E%5C6183%5E%2For+Gene%20Gephebase=%5CSulfotransferase-OXA-Resistance%20(SULT-OR)%5E%2Fand+Taxon%20ID=%5E%5C6183%5E%23gephebase-summary-title))

EXTERNAL LINKS

COMMENTS

a change in aa polarity and size that is predicted to negatively impact OXA binding