

GEPHE SUMMARY

Sulfotransferase-OXA-Resistance (SULT-OR) (<a +sulfotransferase-oxa-resistance+(sult-or)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Gene+Gephebase=">https://www.gephebase.org/search-criteria?/and+Gene Gephebase=^Sulfotransferase-OXA-Resistance (SULT-OR)^#gephebase-summary-title)		Gephebase Gene	GepheID
		GP00001471	
		Prigent	Main curator
Published		Entry Status	

PHENOTYPIC CHANGE

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)		Trait Category	
		Trait	
Xenobiotic resistance (oxamniquine) (<a +xenobiotic+resistance+(oxamniquine)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait=^Xenobiotic resistance (oxamniquine)^#gephebase-summary-title)		Trait State in Taxon A	
Human blood fluke OXA-sensitive (wild-type)		Trait State in Taxon B	
Human blood fluke field-derived OXA-resistant (from a Brazilian patient in 1978)		Ancestral State	
Taxon A		Taxonomic Status	
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)			
Taxon A		Taxon B	
Schistosoma mansoni (<a +schistosoma+mansoni+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Schistosoma mansoni^#gephebase-summary-title)		Schistosoma mansoni (<a +schistosoma+mansoni+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon and Synonyms=^Schistosoma mansoni^#gephebase-summary-title)	
-		Common Name	Common Name
-		Synonyms	Synonyms
species		Rank	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Platyhelminthes; Trematoda; Digenea; Strigeidida; Schistosomatoidea; Schistosomatidae; Schistosoma		Lineage	Lineage
Schistosoma () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6181)		Parent	Parent
6183 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id= 6183)		NCBI Taxonomy ID	NCBI Taxonomy ID
is Taxon A an Intraspecies?			is Taxon B an Intraspecies?
No			No

GENOTYPIC CHANGE

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

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

C35R (T>C)

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

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=~Sulfotransferase-OXA-Resistance \(SULT-OR\)~/and+Taxon ID=~6183~/or+Gene Gephebase=~Sulfotransferase-OXA-Resistance \(SULT-OR\)~/and+Taxon ID=~6183~#gephebase-summary-title](https://www.gephebase.org/search-criteria?/or+Gene+Gephebase=~Sulfotransferase-OXA-Resistance+(SULT-OR)~/and+Taxon+ID=~6183~/or+Gene+Gephebase=~Sulfotransferase-OXA-Resistance+(SULT-OR)~/and+Taxon+ID=~6183~#gephebase-summary-title))

EXTERNAL LINKS

COMMENTS

protein was unable to activate OXA