

Vkorc1 (https://www.gephebase.org/search-criteria?and+Gene=Gephebase=~Vkorc1^#gephebase-summary-title)	Gephebase Gene	GP00001170	GepheID
Published	Entry Status	Martin	Main curator

	Trait Category		
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)			
Xenobiotic resistance (anti-coagulant drug response; warfarin) (<a +xenobiotic+resistance+(anti-coagulant+drug+response;+warfarin)+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Trait=">https://www.gephebase.org/search-criteria?/and+Trait="+Xenobiotic+resistance+(anti-coagulant+drug+response;+warfarin)+"#gephebase-summary-title)	Trait		
Homo sapiens - Caucasians and Japanese	Trait State in Taxon A		
Homo sapiens - Caucasians and Japanese	Trait State in Taxon B		
Taxon A	Ancestral State		
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)	Taxonomic Status		
Taxon A		Taxon B	
Homo sapiens (<a +homo+sapiens+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Homo+sapiens+"#gephebase-summary-title)	Latin Name	Homo sapiens (<a +homo+sapiens+"#gephebase-summary-title"="" href="https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms=">https://www.gephebase.org/search-criteria?/and+Taxon+and+Synonyms="+Homo+sapiens+"#gephebase-summary-title)	Latin Name
human	Common Name	human	Common Name
human; man; Homo sapiens Linnaeus, 1758; Home sapiens; Homo sampiens; Homo sapeins; Homo sapian; Homo sapians; Homo sapien; Homo sapience; Homo sapience; Homo sapients; Homo sapines; Homo spaiens; Homo spiens; Humo sapiens	Synonyms	human; man; Homo sapiens Linnaeus, 1758; Home sapiens; Homo sampiens; Homo sapeins; Homo sapian; Homo sapians; Homo sapien; Homo sapience; Homo sapience; Homo sapients; Homo sapines; Homo spaiens; Homo spiens; Humo sapiens	Synonyms
species	Rank	species	Rank
cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Primates; Haplorrhini; Simiiformes; Catarrhini; Hominoidea; Hominidae; Homininae; Homo	Lineage	cellular organisms; Eukaryota; Opisthokonta; Metazoa; Eumetazoa; Bilateria; Deuterostomia; Chordata; Craniata; Vertebrata; Gnathostomata; Teleostomi; Euteleostomi; Sarcopterygii; Dipnotetrapodomorpha; Tetrapoda; Amniota; Mammalia; Theria; Eutheria; Boreoeutheria; Euarchontoglires; Primates; Haplorrhini; Simiiformes; Catarrhini; Hominoidea; Hominidae; Homininae; Homo	Lineage
Homo () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9605)	Parent	Homo () - (Rank: genus) (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9605)	Parent
9606 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9606)	NCBI Taxonomy ID	9606 (https://www.ncbi.nlm.nih.gov/Taxonomy/Browser/wwwtax.cgi?id=9606)	NCBI Taxonomy ID
No	is Taxon A an Infrasppecies?	No	is Taxon B an Infrasppecies?

Gene Name	Generic Gene Name	UniProtKB Homo sapiens
VKORC1		Q9BQB6 (http://www.uniprot.org/uniprot/Q9BQB6)
	Synonyms	GenebankID or UniProtKB
VKOR; MST134; MST576; VKCFD2; EDTP308; MSTP134; MSTP576; UNQ308/PRO351		BC002911 (https://www.ncbi.nlm.nih.gov/nucore/BC002911)
	String	
9606.ENSPP00000378426 (http://string-db.org/newstring.cgi/show_network_section.pl?identifier=9606.ENSPP00000378426)		
	Sequence Similarities	
Belongs to the VKOR family.		
	GO - Molecular Function	
GO:0048038 : quinone binding (https://www.ebi.ac.uk/QuickGO/term/GO:0048038)		
GO:0047058 : vitamin-K-epoxide reductase (warfarin-insensitive) activity (https://www.ebi.ac.uk/QuickGO/term/GO:0047058)		

GO:0047057 : vitamin-K-epoxide reductase (warfarin-sensitive) activity
(<https://www.ebi.ac.uk/QuickGO/term/GO:0047057>)

GO - Biological Process

GO:0014070 : response to organic cyclic compound
(<https://www.ebi.ac.uk/QuickGO/term/GO:0014070>)
GO:0017144 : drug metabolic process (<https://www.ebi.ac.uk/QuickGO/term/GO:0017144>)
GO:0007596 : blood coagulation (<https://www.ebi.ac.uk/QuickGO/term/GO:0007596>)
GO:0060348 : bone development (<https://www.ebi.ac.uk/QuickGO/term/GO:0060348>)
GO:0017187 : peptidyl-glutamic acid carboxylation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0017187>)
GO:0030193 : regulation of blood coagulation
(<https://www.ebi.ac.uk/QuickGO/term/GO:0030193>)
GO:0046677 : response to antibiotic (<https://www.ebi.ac.uk/QuickGO/term/GO:0046677>)
GO:0010243 : response to organonitrogen compound
(<https://www.ebi.ac.uk/QuickGO/term/GO:0010243>)
GO:0042373 : vitamin K metabolic process
(<https://www.ebi.ac.uk/QuickGO/term/GO:0042373>)

GO - Cellular Component

GO:0016021 : integral component of membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0016021>)
GO:0005783 : endoplasmic reticulum
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005783>)
GO:0005789 : endoplasmic reticulum membrane
(<https://www.ebi.ac.uk/QuickGO/term/GO:0005789>)

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>)

Aberration Type

SNP (<https://www.gephebase.org/search-criteria?/and+Aberration Type=^SNP^#gephebase-summary-title>)

SNP Coding Change

Nonsynonymous

Molecular Details of the Mutation

V45A

Experimental Evidence

Candidate Gene (<https://www.gephebase.org/search-criteria?/and+Experimental Evidence=^Candidate Gene^#gephebase-summary-title>)

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

Main Reference

Mutations in VKORC1 cause warfarin resistance and multiple coagulation factor deficiency type 2. (2004) (<https://pubmed.ncbi.nlm.nih.gov/14765194>)

Authors

Rost S; Fregin A; Ivaskevicius V; Conzelmann E; Härtl Nagel K; Pelz HJ; Lappegard K; Seifried E; Scharrer I; Tuddenham EG; MÃ¼ller CR; Strom TM; Oldenburg J

Abstract

Coumarin derivatives such as warfarin represent the therapy of choice for the long-term treatment and prevention of thromboembolic events. Coumarins target blood coagulation by inhibiting the vitamin K epoxide reductase multiprotein complex (VKOR). This complex recycles vitamin K 2,3-epoxide to vitamin K hydroquinone, a cofactor that is essential for the post-translational gamma-carboxylation of several blood coagulation factors. Despite extensive efforts, the components of the VKOR complex have not been identified. The complex has been proposed to be involved in two heritable human diseases: combined deficiency of vitamin-K-dependent clotting factors type 2 (VKCFD2; Online Mendelian Inheritance in Man (OMIM) 607473), and resistance to coumarin-type anticoagulant drugs (warfarin resistance, WR; OMIM 122700). Here we identify, by using linkage information from three species, the gene vitamin K epoxide reductase complex subunit 1 (VKORC1), which encodes a small transmembrane protein of the endoplasmic reticulum. VKORC1 contains missense mutations in both human disorders and in a warfarin-resistant rat strain. Overexpression of wild-type VKORC1, but not VKORC1 carrying the VKCFD2 mutation, leads to a marked increase in VKOR activity, which is sensitive to warfarin inhibition.

Additional References

A genome-wide association study confirms VKORC1, CYP2C9, and CYP4F2 as principal genetic determinants of warfarin dose. (2009) (<https://pubmed.ncbi.nlm.nih.gov/19300499>)
Genome-wide association study identifies genetic determinants of warfarin responsiveness for Japanese. (2010) (<https://pubmed.ncbi.nlm.nih.gov/20833655>)

RELATED GEPHE

Related Genes

4 (alcohol dehydrogenase (ADH1B), CYP2C9, CYP4F2, MDR1) (<https://www.gephebase.org/search-criteria?/or+Taxon ID=^9606^/and+Trait=Xenobiotic resistance/and+groupHaplotypes=true#gephebase-summary-title>)

Related Haplotypes

3 (<https://www.gephebase.org/search-criteria?/or+Gene Gephebase=^Vkorc1^/and+Taxon ID=^9606^/or+Gene Gephebase=^Vkorc1^/and+Taxon ID=^9606^#gephebase-summary-title>)

EXTERNAL LINKS

