

Gene	OMIM gene	Disease	OMIM disease	Inheritance	Function
<i>SCN5A</i>	600163	BrS1	601144	AD, DR	Mediates voltage-dependent Na ⁺ permeability of excitable membranes
<i>GPD1L</i>	611778	BrS2	611777	AD	Decreases cardiac Na ⁺ current
<i>CACNA1C</i>	114205	BrS3	611875	AD	Pore-forming, alpha-1C subunit of voltage-gated Ca ₂₊ channel
<i>CACNB2</i>	600003	BrS4	611876	AD	Increases cardiac peak Ca ₂₊ current, regulates voltage-dependent activation, controls alpha-1 subunit recruitment
<i>SCN1B</i>	600235	BrS5	612838	AD	Regulates assembly, expression and function of Na ⁺ channel complex
<i>KCNE3</i>	604433	BrS6	613119	AD	Modulates gating kinetics, stabilizes channel complex
<i>SCN3B</i>	608214	BrS7	613120	AD	Modulates channel gating kinetics
<i>HCN4</i>	605206	BrS8	613123	AD	Contributes to native pacemaker currents in the heart that regulate heartbeat rhythm
<i>KCND3</i>	605411	BrS9	616399	AD	Pore-forming subunit of voltage-gated rapidly-inactivating A-type K ⁺ channels
<i>ABCC9</i>	601439	BrS	/	AD	Subunit of ATP-sensitive K ⁺ channels
<i>SCN10A</i>	604427	BrS	/	AD	Mediates voltage-dependent Na ⁺ permeability of excitable membranes
<i>SLMAP</i>	602701	BrS	/	AD	Excitation-contraction coupling
<i>SCN2B</i>	601327	BrS	/	AD	Assembly, expression and modulation of Na ⁺ channel complex
<i>CACNA2D1</i>	114204	BrS	/	AD	Regulates Ca ₂₊ current density and activation/inactivation of Ca ₂₊ channel
<i>KCNJ8</i>	600935	BrS	/	AD	Inward-rectifier K ⁺ channel
<i>PKP2</i>	602861	BrS	/	AD	Maintains transcription of genes that control intracellular calcium cycling
<i>TRPM4</i>	606936	BrS	/	AR, DR	Ca ₂₊ -activated non selective cation channel that depolarizes membranes
<i>RYR2</i>	180902	CPVT1	604772	AD	Ca ₂₊ channel triggers cardiac muscle contraction
<i>CASQ2</i>	114251	CPVT2	611938	AR	Regulates release of luminal Ca ₂₊ via RYR2
<i>TECRL</i>	617242	CPVT3	614021	AR	Ca ₂₊ transport into myocytes
<i>CALM1</i>	114180	CPVT4	614916	AD	Regulates release of Ca ₂₊ via RYR2
<i>TRDN</i>	603283	CPVT5 with/without muscle weakness	615441	AR	Regulates release of luminal Ca ₂₊ release via RYR1 and RYR2

<i>KCNJ2</i>	600681	CPVT	/	AD	Establishes action potential and excitability of neurons and muscles
<i>KCNQ1</i>	607542	LQT1	192500	AD	Repolarizes cardiac action potential
		JLNS1	220400	AR	
<i>KCNH2</i>	152427	LQT2	613688	AD	Pore-forming subunit of voltage-gated inwardly rectifying K ₊ channel
<i>SCN5A</i>	600163	LQT3	603830	AD	Mediates voltage-dependent Na ⁺ permeability of excitable membranes
<i>ANK2</i>	106410	LQT4	600919	AD	Coordinates assembly of Na/Ca exchanger, Na/K ATPase and InsP3 receptor in sarcoplasmic reticulum of cardiomyocytes
<i>KCNE1</i>	176261	LQT5	613695	AD	Modulates gating kinetics and enhances stability of voltage-gated K ₊ channel complex
		JLNS2	612347	AR	
<i>KCNE2</i>	603796	LQT6	613693	AD	Modulates gating kinetics and enhances stability of voltage-gated K ₊ channel complex
<i>KCNJ2</i>	600681	LQT7	170390	AD	Establishes neuron and muscle action potentials and excitability
<i>CACNA1C</i>	114205	LQT8	601005	AD	Pore-forming, alpha-1C subunit of voltage-gated Ca ₂₊ channel
<i>CAV3</i>	601253	LQT9	611818	AD	Regulates voltage-gated K ₊ channels
<i>SCN4B</i>	608256	LQT10	611819	AD	Interacts with voltage-gated alpha subunits to change Na ⁺ channel kinetics
<i>AKAP9</i>	604001	LQT11	611820	AD	Effector in regulating K ₊ channel
<i>SNTA1</i>	601017	LQT12	612955	AD	Interacts with pore-forming alpha subunit of cardiac Na ⁺ channel
<i>KCNJ5</i>	600734	LQT13	613485	AD	Allows K ₊ flow into cells
<i>CALM1</i>	114180	LQT14	616247	AD	Mediates ion channel control
<i>CALM2</i>	114182	LQT15	616249	AD	Mediates ion channel control
<i>CALM3</i>	114183	LQT	/	AD	Mediates ion channel control
<i>KCNH2</i>	152427	SQT1	609620	AD	Pore-forming subunit of voltage-gated inwardly rectifying K ₊ channel
<i>KCNQ1</i>	607542	SQT2	609621	AD	Repolarizes cardiac action potential
<i>KCNJ2</i>	600681	SQT3	609622	AD	Establishes action potential and excitability of neurons and muscles
<i>KCNQ1</i>	607542	ATFB3	607554	AD	Repolarizes cardiac action potential
<i>KCNE2</i>	603796	ATFB4	611493	AD	Modulates gating kinetics and enhances stability of voltage-gated K ₊ channel complex

<i>NPPA</i>	108780	ATFB6	612201	AD	Key role in regulation of natriuresis, diuresis, vasodilation
<i>KCNA5</i>	176267	ATFB7	612240	AD	Mediates transmembrane potassium transport in excitable membranes
<i>KCNJ2</i>	600681	ATFB9	613980	AD	Establishes action potential and excitability of neurons and muscles
<i>SCN5A</i>	600163	ATFB10	614022	AD	Mediates voltage-dependent Na ⁺ permeability of excitable membranes
<i>GJA5</i>	121013	ATFB11	614049	AD	Allows passive diffusion of small molecules, including glucose, K ⁺ , Ca ²⁺ and cAMP
<i>ABCC9</i>	601439	ATFB12	614050	AD	Subunit of ATP-sensitive K ⁺ channels
<i>SCN1B</i>	600235	ATFB13	615377	AD	Regulates assembly, expression, function of Na ⁺ channel complex
<i>SCN2B</i>	601327	ATFB14	615378	AD	Assembly, expression, modulation Na ⁺ channel complex
<i>SCN3B</i>	608214	ATFB16	613120	AD	Modulates channel-gating kinetics
<i>SCN4B</i>	608256	ATFB17	611819	AD	Interacts with voltage-gated alpha subunits to change Na ⁺ channel kinetics
<i>MYL4</i>	160770	ATFB18	617280	AD	Encodes a myosin alkali light chain expressed in embryonic muscle and adult atria
<i>NUP155</i>	606694	ATFB15	615770	AR	Plays a role in fusion of nuclear envelope vesicles and may also be involved in heart physiology
<i>KCND3</i>	605411	ATFB	/	AD	Pore-forming subunit of voltage-gated rapidly-inactivating A-type K ⁺ channels
<i>KCNE1</i>	176261	ATFB	/	AD	Modulates gating kinetics and enhances stability of voltage-gated K ⁺ channel complex
<i>KCNH2</i>	152427	ATFB	/	AD	Pore-forming subunit of voltage-gated inwardly rectifying K ⁺ channels
<i>LMNA</i>	150330	ATFB	/	AD	Component of nuclear lamina and required for cardiac homeostasis
<i>NKX2-5</i>	600584	ATFB	/	AD	Transcription factor involved in heart formation and development
<i>PRKAG2</i>	602743	ATFB	/	AD	Energy-sensing enzyme that monitors cell energy status and functions; inhibits <i>de novo</i> biosynthesis of fatty acids and cholesterol
<i>RYR2</i>	180902	ATFB	/	AD	Ca ²⁺ channel that triggers cardiac muscle contraction
<i>GATA4</i>	600576	ATFB	/	AD	Regulates genes involved in myocardial differentiation and function
<i>GATA5</i>	611496	ATFB	/	AD	Required for cardiovascular development
<i>GATA6</i>	601656	ATFB	/	AD	Required for cardiovascular development
<i>PITX2</i>	601542	ATFB	/	AD	May play a role in proper localization of asymmetric organs such as heart

<i>TBX5</i>	601620	ATFB	/	AD	Regulates transcription of several genes involved in heart development
<i>ZFH3</i>	104155	ATFB	/	AD	Regulates myogenic differentiation
<i>SHOX2</i>	602504	ATFB	/	AD	Transcriptional regulator involved in pattern formation in vertebrates
<i>PRRX1</i>	167420	ATFB	/	AD	Role in establishment of diverse mesodermal muscle types
<i>KCNN3</i>	602983	ATFB	/	AD	Forms a voltage-independent K ⁺ channel activated by intracellular Ca ₂₊

Table S1. Genes associated with various forms of Brugada syndrome (BrS), catecholaminergic polymorphic ventricular tachycardia (CPVT), short/long QT syndrome (SQT/LQT), Jervell and Lange-Nielsen syndrome (JLNS), atrial fibrillation (ATFB). AD=autosomal dominant; AR=autosomal recessive; DR= digenic recessive.