Anti-Kv4.2 antibody

Description	Rabbit polyclonal to Kv4.2.

Model	STJ93879
Host	Rabbit
Reactivity	Human, Mouse, Rat
Applications	ELISA, IHC
Immunogen	Synthesized peptide derived from human Kv4.2 around the non-phosphorylation site of S616.
Immunogen Region	560-640 aa
Gene ID	3751
Gene Symbol	KCND2
Dilution range	IHC 1:100-1:300ELISA 1:10000
Specificity	Kv4.2 Polyclonal Antibody detects endogenous levels of Kv4.2 protein.
Tissue Specificity	Detected in ovary, in corpus luteum and in granulosa and theca cells in the follicle (at protein level) . Highly expressed throughout the brain . Detected in amygdala, caudate nucleus, cerebellum, hippocampus, substantia nigra and thalamus . Expression is not detectable or very low in heart, kidney, liver, lung, pancreas and skeletal muscle . Not detectable in human heart atrium .
Purification	The antibody was affinity-purified from rabbit antiserum by affinity-chromatography using epitope-specific immunogen.
Note	For Research Use Only (RUO).
Protein Name	Potassium voltage-gated channel subfamily D member 2 Voltage-gated

	potassium channel subunit Kv4.2
Molecular Weight	70.577 kDa
Clonality	Polyclonal
Conjugation	Unconjugated
Isotype	IgG
Formulation	Liquid in PBS containing 50% glycerol, 0.5% BSA and 0.02% sodium azide.
Concentration	1 mg/ml
Storage Instruction	Store at -20°C, and avoid repeat freeze-thaw cycles.
Database Links	HGNC:6238OMIM:605410
Alternative Names	Potassium voltage-gated channel subfamily D member 2 Voltage-gated potassium channel subunit Kv4.2
Function	Voltage-gated potassium channel that mediates transmembrane potassium transport in excitable membranes, primarily in the brain. Mediates the major part of the dendritic A-type current I(SA) in brain neurons . This current is activated at membrane potentials that are below the threshold for action potentials. It regulates neuronal excitability, prolongs the latency before the first spike in a series of action potentials, regulates the frequency of repetitive action potential firing, shortens the duration of action potentials and regulates the back-propagation of action potentials from the neuronal cell body to the dendrites. Contributes to the regulation of the circadian rhythm of action potential firing in suprachiasmatic nucleus neurons, which regulates the circadian rhythm of locomotor activity . Functions downstream of the metabotropic glutamate receptor GRM5 and plays a role in neuronal excitability and in nociception mediated by activation of GRM5 . Mediates the transient outward current I(to) in rodent heart left ventricle apex cells, but not in human heart, where this current is mediated by another family member. Forms tetrameric potassium-selective channels through which potassium ions pass in accordance with their electrochemical gradient . The channel alternates between opened and closed conformations in response to the voltage difference across the membrane . Can form functional homotetrameric channels and heterotetrameric channels that contain variable proportions of KCND2 and KCND3; channel properties depend on the type of pore-forming alpha subunits that are part of the channel. In vivo, membranes probably contain a mixture of heteromeric potassium channel complexes. Interaction with specific isoforms of the regulatory subunits KCNIP1, KCNIP2, KCNIP3 or KCNIP4 strongly increases expression at the cell surface and thereby increases channel activity; it modulates the kinetics of channel activation and inactivation, shifts the threshold for channel activation to more negative voltage values, shifts the threshold for inactivation to less negative voltages and accelerates recovery after inactivation . Likewise, interaction with DPP6 or DPP10 promotes expression at the cell membrane and regulates both channel characteristics and activity .
Sequence and Domain Family	The transmembrane segment S4 functions as voltage-sensor and is characterized by a series of positively charged amino acids at every third position. Channel opening and closing is effected by a conformation change that affects the position and orientation of the voltage-sensor paddle formed by S3 and S4 within the membrane. A transmembrane electric field that is

	positive inside would push the positively charged S4 segment outwards, thereby opening the pore, while a field that is negative inside would pull the S4 segment inwards and close the pore. Changes in the position and orientation of S4 are then transmitted to the activation gate formed by the inner helix bundle via the S4-S5 linker region. The N-terminal cytoplasmic region can mediate N-type inactivation by physically blocking the channel . This probably does not happen in vivo, where the N-terminal region mediates interaction with regulatory subunits, such as KCNIP1 and KCNIP2 . The zinc binding sites in the N-terminal domain are important for tetramerization and assembly of a functional channel complex . Most likely, the channel undergoes closed-state inactivation, where a subtle conformation change would render the protein less sensitive to activation. The C-terminal cytoplasmic region is important for normal expression at the cell membrane and modulates the voltage-dependence of channel activation and inactivation . It is required for interaction with KCNIP2, and probably other family members as well .
Cellular Localization	Cell membrane Cell projection, dendrite Cell junction, synapse Perikaryon Cell junction, synapse, postsynaptic cell membrane Cell projection, dendritic spine Cell junction. In neurons, primarily detected on dendrites, dendritic spines and on the neuron cell body, but not on axons. Localized preferentially at the dendrites of pyramidal cells in the hippocampus CA1 layer. Detected at GABAergic synapses. Detected at cell junctions that are distinct from synaptic cell contacts. Detected in lipid rafts. Detected primarily at the endoplasmic reticulum or Golgi when expressed by itself . Interaction with KCNIP1, KCNIP2, KCNIP3 or KCNIP4 promotes expression at the cell membrane . Interaction with DPP6 or DPP10 promotes expression at the cell membrane . Internalized from the cell membrane by clathrin-dependent endocytosis in response to activation of AMPA-selective glutamate receptors and PKA-mediated phosphorylation at Ser-552. Redistributed from dendritic spines to the main dendritic shaft in response to activation of AMPA-selective glutamate receptors and activation of PKA .
Post-translational Modifications	Phosphorylation at Ser-438 in response to MAPK activation is increased in stimulated dendrites. Interaction with KCNIP2 and DPP6 propomtes phosphorylation by PKA at Ser-552. Phosphorylation at Ser-552 has no effect on interaction with KCNIP3, but is required for the regulation of channel activity by KCNIP3. Phosphorylation at Ser-552 leads to KCND2 internalization . Phosphorylated by MAPK in response to signaling via the metabotropic glutamate receptor GRM5 . Phosphorylation at Ser-616 is required for the down-regulation of neuronal A-type currents in response to signaling via GRM5 .