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KCNA2 Antibody (C-term)

Affinity Purified Rabbit Polyclonal Antibody (Pab)
Catalog # AP14749b

Product Information

Application	WB, IHC-P, E
Primary Accession	P16389
Other Accession	P63142, P63141, NP_004965.1
Reactivity	Human
Predicted	Mouse, Rat
Host	Rabbit
Clonality	Polyclonal
Isotype	Rabbit IgG
Clone Names	RB34951
Calculated MW	56717
Antigen Region	451-479

Additional Information

Gene ID	3737
Other Names	Potassium voltage-gated channel subfamily A member 2, NGK1, Voltage-gated K(+) channel HuKIV, Voltage-gated potassium channel HBK5, Voltage-gated potassium channel subunit Kv12, KCNA2
Target/Specificity	This KCNA2 antibody is generated from rabbits immunized with a KLH conjugated synthetic peptide between 451-479 amino acids from the C-terminal region of human KCNA2.
Dilution	WB~~1:1000 IHC-P~~1:100~500 E~~Use at an assay dependent concentration.
Format	Purified polyclonal antibody supplied in PBS with 0.09% (W/V) sodium azide. This antibody is purified through a protein A column, followed by peptide affinity purification.
Storage	Maintain refrigerated at 2-8°C for up to 2 weeks. For long term storage store at -20°C in small aliquots to prevent freeze-thaw cycles.
Precautions	KCNA2 Antibody (C-term) is for research use only and not for use in diagnostic or therapeutic procedures.

Protein Information

Name	KCNA2
Function	Voltage-gated potassium channel that mediates transmembrane potassium

transport in excitable membranes, primarily in the brain and the central nervous system, but also in the cardiovascular system. Prevents aberrant action potential firing and regulates neuronal output. 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 (PubMed:11211111, PubMed:19912772, PubMed:23769686, PubMed:8495559). Can form functional homotetrameric channels and heterotetrameric channels that contain variable proportions of KCNA1, KCNA2, KCNA4, KCNA5, KCNA6, KCNA7, and possibly other family members as well; channel properties depend on the type of alpha subunits that are part of the channel (PubMed:20220134, PubMed:8495559). Channel properties are modulated by cytoplasmic beta subunits that regulate the subcellular location of the alpha subunits and promote rapid inactivation of delayed rectifier potassium channels. In vivo, membranes probably contain a mixture of heteromeric potassium channel complexes, making it difficult to assign currents observed in intact tissues to any particular potassium channel family member. Homotetrameric KCNA2 forms a delayed-rectifier potassium channel that opens in response to membrane depolarization, followed by slow spontaneous channel closure (PubMed:19912772, PubMed:23769686). In contrast, a heteromultimer formed by KCNA2 and KCNA4 shows rapid inactivation (PubMed:8495559). Regulates neuronal excitability and plays a role as pacemaker in the regulation of neuronal action potentials (By similarity). KCNA2- containing channels play a presynaptic role and prevent hyperexcitability and aberrant action potential firing (By similarity). Response to toxins that are selective for KCNA2-containing potassium channels suggests that in Purkinje cells, dendritic subthreshold KCNA2- containing potassium channels prevent random spontaneous calcium spikes, suppressing dendritic hyperexcitability without hindering the generation of somatic action potentials, and thereby play an important role in motor coordination (By similarity). Plays a role in the induction of long-term potentiation of neuron excitability in the CA3 layer of the hippocampus (By similarity). May function as down-stream effector for G protein-coupled receptors and inhibit GABAergic inputs to basolateral amygdala neurons (By similarity). May contribute to the regulation of neurotransmitter release, such as gamma-aminobutyric acid (GABA) (By similarity). Contributes to the regulation of the axonal release of the neurotransmitter dopamine (By similarity). Reduced KCNA2 expression plays a role in the perception of neuropathic pain after peripheral nerve injury, but not acute pain (By similarity). Plays a role in the regulation of the time spent in non-rapid eye movement (NREM) sleep (By similarity).

Cellular Location

Cell membrane; Multi-pass membrane protein {ECO:0000250|UniProtKB:P63142, ECO:0000305}. Membrane {ECO:0000250|UniProtKB:P63142}. Cell projection, axon. Synapse {ECO:0000250|UniProtKB:P63142} Endoplasmic reticulum membrane {ECO:0000250|UniProtKB:P63142}. Cell projection, lamellipodium membrane {ECO:0000250|UniProtKB:P63142} Synapse, synaptosome {ECO:0000250|UniProtKB:P63141}. Presynaptic cell membrane {ECO:0000250|UniProtKB:P63141}. Cell projection, dendrite {ECO:0000250|UniProtKB:P63141}. Cell junction, paranodal septate junction {ECO:0000250|UniProtKB:P63141}. Note=KCNA2 by itself is detected both at the endoplasmic reticulum and at the cell membrane Coexpression with KCNA4 or with beta subunits promotes expression at the cell membrane. Coexpression with KCNA1 inhibits cell surface expression. In myelinated peripheral axons, clustered in the juxtaparadonal region and at an internodal line located along the mesaxon and below the Schmidt-Lanterman incisures (By similarity) {ECO:0000250|UniProtKB:P63141, ECO:0000250|UniProtKB:P63142}

Tissue Location	Detected in brain cortex (PubMed:16473933). Detected in peroneal nerve in the juxtaparanodal regions of the node of Ranvier; expression is decreased in patients with diabetes mellitus that suffer from axonal neuropathy (PubMed:22649228). Detected in paranodal and juxtanodal zones in myelinated spinal cord (at protein level) (PubMed:11086297).

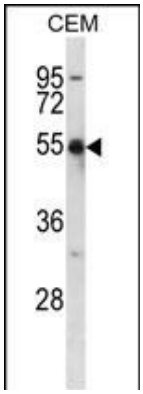
Background

Potassium channels represent the most complex class of voltage-gated ion channels from both functional and structural standpoints. Their diverse functions include regulating neurotransmitter release, heart rate, insulin secretion, neuronal excitability, epithelial electrolyte transport, smooth muscle contraction, and cell volume. Four sequence-related potassium channel genes - shaker, shaw, shab, and shal - have been identified in Drosophila, and each has been shown to have human homolog(s). This gene encodes a member of the potassium channel, voltage-gated, shaker-related subfamily. This member contains six membrane-spanning domains with a shaker-type repeat in the fourth segment. It belongs to the delayed rectifier class, members of which allow nerve cells to efficiently repolarize following an action potential. The coding region of this gene is intronless, and the gene is clustered with genes KCNA3 and KCNA10 on chromosome 1.

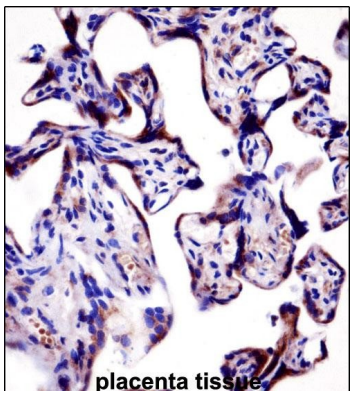
References

Denning, E.J., et al. Mol. Membr. Biol. 26(8):397-421(2009)
Peters, C.J., et al. Channels (Austin) 3(5):314-322(2009)
Martos, V., et al. Proc. Natl. Acad. Sci. U.S.A. 106(26):10482-10486(2009)
Stirling, L., et al. Mol. Biol. Cell 20(12):2991-3002(2009)
Zhu, J., et al. Biochem. J. 375 (PT 3), 769-775 (2003) :

Images



KCNA2 Antibody (C-term) (Cat. #AP14749b) western blot analysis in CEM cell line lysates (35ug/lane).This demonstrates the KCNA2 antibody detected the KCNA2 protein (arrow).



KCNA2 Antibody (C-term) (AP14749b)immunohistochemistry analysis in formalin fixed and paraffin embedded human placenta tissue followed by peroxidase conjugation of the secondary antibody and DAB staining.This data demonstrates the use of KCNA2 Antibody (C-term) for immunohistochemistry. Clinical relevance has not been evaluated.