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# KCNA1 Antibody (Center)

Affinity Purified Rabbit Polyclonal Antibody (Pab)
Catalog # AP14746c

## Product Information

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| **Application** | WB, IHC-P, E |
| **Primary Accession** | Q09470 |
| **Other Accession** | P10499, P16388, NP_000208.2 |
| **Reactivity** | Human |
| **Predicted** | Mouse, Rat |
| **Host** | Rabbit |
| **Clonality** | Polyclonal |
| **Isotype** | Rabbit IgG |
| **Clone Names** | RB34947 |
| **Calculated MW** | 56466 |
| **Antigen Region** | 172-201 |

## Additional Information

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| **Gene ID** | 3736 |
| **Other Names** | Potassium voltage-gated channel subfamily A member 1, Voltage-gated K(+) channel HuKI, Voltage-gated potassium channel HBK1, Voltage-gated potassium channel subunit Kv11, KCNA1 |
| **Target/Specificity** | This KCNA1 antibody is generated from rabbits immunized with a KLH conjugated synthetic peptide between 172-201 amino acids from the Central region of human KCNA1. |
| **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** | KCNA1 Antibody (Center) is for research use only and not for use in diagnostic or therapeutic procedures. |

## Protein Information

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| **Name** | KCNA1 ( HGNC:6218) |
| **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 kidney (PubMed:19903818, PubMed:8845167). Contributes to the regulation of the membrane potential and nerve signaling, and prevents neuronal hyperexcitability (PubMed:17156368). 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:19912772). 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:12077175, PubMed:17156368). 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 (PubMed:12077175, PubMed:17156368). 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 KCNA1 forms a delayed-rectifier potassium channel that opens in response to membrane depolarization, followed by slow spontaneous channel closure (PubMed:19307729, PubMed:19903818, PubMed:19912772, PubMed:19968958). In contrast, a heterotetrameric channel formed by KCNA1 and KCNA4 shows rapid inactivation (PubMed:17156368). Regulates neuronal excitability in hippocampus, especially in mossy fibers and medial perforant path axons, preventing neuronal hyperexcitability. Response to toxins that are selective for KCNA1, respectively for KCNA2, suggests that heteromeric potassium channels composed of both KCNA1 and KCNA2 play a role in pacemaking and regulate the output of deep cerebellar nuclear neurons (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) release (By similarity). Plays a role in regulating the generation of action potentials and preventing hyperexcitability in myelinated axons of the vagus nerve, and thereby contributes to the regulation of heart contraction (By similarity). Required for normal neuromuscular responses (PubMed:11026449, PubMed:17136396). Regulates the frequency of neuronal action potential firing in response to mechanical stimuli, and plays a role in the perception of pain caused by mechanical stimuli, but does not play a role in the perception of pain due to heat stimuli (By similarity). Required for normal responses to auditory stimuli and precise location of sound sources, but not for sound perception (By similarity). The use of toxins that block specific channels suggest that it contributes to the regulation of the axonal release of the neurotransmitter dopamine (By similarity). Required for normal postnatal brain development and normal proliferation of neuronal precursor cells in the brain (By similarity). Plays a role in the reabsorption of Mg(2+) in the distal convoluted tubules in the kidney and in magnesium ion homeostasis, probably via its effect on the membrane potential (PubMed:19307729, PubMed:23903368).

**Cellular Location**

Cell membrane; Multi-pass membrane protein. Membrane Cell projection, axon. Cytoplasmic vesicle. Perikaryon {ECO:0000250|UniProtKB:P10499}. Endoplasmic reticulum {ECO:0000250|UniProtKB:P10499}. Cell projection, dendrite {ECO:0000250|UniProtKB:P16388}. Cell junction {ECO:0000250|UniProtKB:P16388}. Synapse {ECO:0000250|UniProtKB:P16388} Presynaptic cell membrane {ECO:0000250|UniProtKB:P10499}. Presynapse {ECO:0000250|UniProtKB:P16388}. Note=Homotetrameric KCNA1 is primarily located in the endoplasmic reticulum. Interaction with KCNA2 and KCNAB2 or

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| | with KCNA4 and KCNAB2 promotes expression at the cell membrane (By similarity). {ECO:0000250\|UniProtKB:P10499, ECO:0000250\|UniProtKB:P16388} |
| **Tissue Location** | Detected adjacent to nodes of Ranvier in juxtaparanodal zones in spinal cord nerve fibers, but also in paranodal regions in some myelinated spinal cord axons (at protein level) (PubMed:11086297). Detected in the islet of Langerhans (PubMed:21483673). |

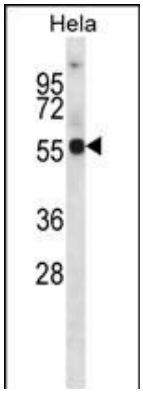
## Background

This gene encodes a voltage-gated delayed potassium channel that is phylogenetically related to the Drosophila Shaker channel. The encoded protein has six putative transmembrane segments (S1-S6), and the loop between S5 and S6 forms the pore and contains the conserved selectivity filter motif (GYGD). The functional channel is a homotetramer. The N-terminus of the channel is associated with beta subunits that can modify the inactivation properties of the channel as well as affect expression levels. The C-terminus of the channel is complexed to a PDZ domain protein that is responsible for channel targeting. Mutations in this gene have been associated with myokymia with periodic ataxia (AEMK).

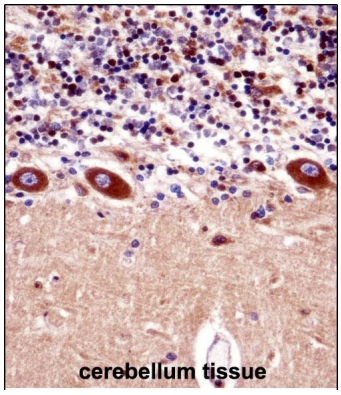
## References


Graves, T.D., et al. Neurology 75(4):367-372(2010)
Bailey, S.D., et al. Diabetes Care (2010) In press :
van der Wijst, J., et al. J. Biol. Chem. 285(1):171-178(2010)
Talmud, P.J., et al. Am. J. Hum. Genet. 85(5):628-642(2009)
Kim, E., et al. Nature 378(6552):85-88(1995)


## Images




KCNA1 Antibody (Center) (Cat. #AP14746c) western blot analysis in Hela cell line lysates (35ug/lane).This demonstrates the KCNA1 antibody detected the KCNA1 protein (arrow).




KCNA1 Antibody (Center) (AP14746c)immunohistochemistry analysis in formalin fixed and paraffin embedded human cerebellum tissue followed by peroxidase conjugation of the secondary antibody and DAB staining.This data demonstrates the use of KCNA1 Antibody (Center) for immunohistochemistry. Clinical relevance has not been evaluated.