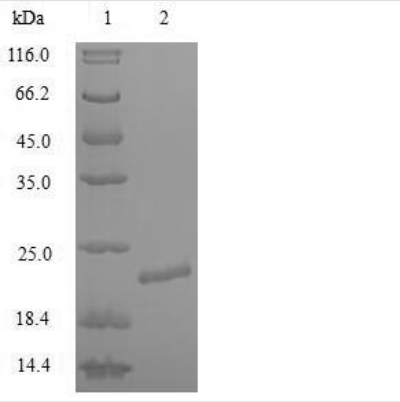
Recombinant Human Potassium voltage-gated channel subfamily A member 1 (KCNA1), partial

Product Code	CSB-EP012005HU
Relevance	Voltage-gated potassium channel that mediates transmbrane potassium transport in excitable mbranes, primarily in the brain and the central nervous syst, but also in the kidney . Contributes to the regulation of the mbrane potential and nerve signaling, and prevents neuronal hyperexcitability . Forms tetrameric potassium-selective channels through which potassium ions pass in accordance with their electrochical gradient. The channel alternates between opened and closed conformations in response to the voltage difference across the mbrane . Can form functional homotetrameric channels and heterotetrameric channels that contain variable proportions of KCNA1, KCNA2, KCNA4, KCNA5, KCNA6, KCNA7, and possibly other family mbers as well; channel properties depend on the type of alpha subunits that are part of the channel . Channel properties are modulated by Cytoplasmic domain beta subunits that regulate the subcellular location of the alpha subunits and promote rapid inactivation of delayed rectifier potassium channels . In vivo, mbranes 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 mber. Homotetrameric KCNA1 forms a delayed-rectifier potassium channel that opens in response to mbrane depolarization, followed by slow spontaneous channel closure . In contrast, a heterotetrameric channel formed by KCNA1 and KCNA4 shows rapid inactivation . 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 pacaking and regulate the output of deep cerebellar nuclear neurons . May function as down-stream effector for G protein-coupled receptors and inhibit GABAergic inputs to basolateral amygdala neurons . May contribute to the regulation of neurotransmitter release, such as gamma-aminobutyric acid (GABA) release . 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 . Required for normal neuromuscular responses . 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 . Required for normal responses to auditory stimuli and precise location of sound sources, but not for sound perception . The use of toxins that block specific channels suggest that it contributes to the regulation of the axonal release of the neurotransmitter dopamine . Required for normal postnatal brain development and normal proliferation of neuronal precursor cells in the brain . Plays a role in the reabsorption of Mg2+ in the distal convoluted tubules in the kidney and in magnesium ion homeostasis, probably via its effect on the mbrane potential .

Abbreviation	Recombinant Human KCNA1 protein, partial
Storage	The shelf life is related to many factors, storage state, buffer ingredients, storage temperature and the stability of the protein itself. Generally, the shelf life of liquid form is 6 months at -20°C/-80°C. The shelf life of lyophilized form is 12 months at -20°C/-80°C.
Uniprot No.	Q09470
Product Type	Recombinant Proteins
Immunogen Species	Homo sapiens (Human)
Purity	Greater than 90% as determined by SDS-PAGE.
Sequence	MTVMSGENVDEASAAPGHPQDGSYPRQADHDDHECCERVVINISGLRFETQL KTLAQFPNTLLGNPKKRMRYFDPLRNEYFFDRNRPSFDAILYYYQSGGRLRRP VNVPLDMFSEEIKFYELGEEAMEKFREDEGFIKEEERPLPEKEYQRQVW
Research Area	Neuroscience
Source	E.coli
Target Names	KCNA1
Expression Region	1-154aa
Notes	Repeated freezing and thawing is not recommended. Store working aliquots at 4°C for up to one week.
Tag Info	N-terminal 6xHis-tagged
Mol. Weight	22.2kDa
Protein Length	Partial

Image



(Tris-Glycine gel) Discontinuous SDS-PAGE (reduced) with 5% enrichment gel and 15% separation gel.

Description

The production of recombinant human potassium voltage-gated channel subfamily A member 1 (KCNA1) in E. coli involves co-cloning the gene encoding the partial KCNA1 protein (1-154aa) into an expression vector with an N-terminal 6xHis-tag gene and transforming it into E. coli cells. These cells are cultured under conditions that induce protein expression. After sufficient growth is achieved, the cells are lysed to release the recombinant KCNA1 protein. Purification is achieved using affinity chromatography method. The purity of the KCNA1 protein is assessed using SDS-PAGE, reaching over 90%.

The human KCNA1 gene encodes the potassium voltage-gated channel subfamily A member 1 (Kv1.1). This voltage-gated potassium channel regulates the excitability of neurons, muscles, and sensory cells [1]. Kv1.1 channels repolarize the membrane potential and shape action potentials in various tissues, including the heart and the central nervous system [1]. Mutations in the KCNA1 gene have been associated with neurological disorders such as episodic ataxia type 1 [1].

The KCNA1 gene belongs to the larger family of potassium voltage-gated channels, which includes various subfamilies such as KCNQ, KCNH, and KCNB. These channels are essential for mediating potassium ion permeability across cell membranes, thereby influencing cell excitability and function. The KCNA1 dysfunction can disrupt neuronal signaling and muscle contraction, manifesting as neurological and neuromuscular disorders [1].

References:
[1] C. Qu, J. Sun, Y. Liu, X. Wang, L. Wang, C. Hanet al., Caveolin?1 facilitated kcna5 expression, promoting breast cancer viability, Oncology Letters, 2018. https://doi.org/10.3892/ol.2018.9261

Shelf Life

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