



Product Information

ANTI-POTASSIUM CHANNEL Kv1.4

Developed in Rabbit,
Affinity Isolated Antibody

Product Number **P9232**

Product Description

Anti-Potassium Channel Kv1.4 is developed in rabbit using a highly purified GST fusion protein of a C-terminal part of rat potassium channel Kv1.4 as immunogen. The protein corresponds to amino acids 589-655.¹ This epitope is identical in mouse and highly conserved in human and bovine. The antibody is affinity isolated using Kv1.4 GST fusion protein-agarose.

Anti-Potassium Channel Kv1.4 recognizes a full-length Kv1.4 protein in both rat and mouse by immunoblotting. The antibody may also be used for immunohistochemistry.²

Chloride channels have several functions including: (1) regulating cell volume; (2) membrane potential stabilization; (3) signal transduction; and (4) transepithelial transport. The CLC chloride channel family (which includes voltage-gated chloride channels) represents one of the structural families of chloride channels. Mammals have at least nine different members.³ CLC-2 channels exhibit differential brain distribution and are implicated in regulating and maintaining the chloride gradient in cells that exhibit primarily inhibitory GABA_A responses.⁴ CLC-3 channels are important in cardiac function and their volume sensitivity may be due to PKC/PKA modulated phosphorylation.⁵

Voltage-gated sodium channels (VGSC) are present in most excitable cells. In neuronal tissue, they are responsible for generating and propagating action potentials. Brain VGSC are heteromers of $\alpha\beta 1\beta 2$ subunits. Of these, the α subunit forms the channel pore. Twelve α subunit genes have been identified.⁶ VGSC have been implicated in numerous neurological and cardiac disorders. Further, VGSC are important in mediating many therapeutic drug effects (including the actions of anesthetics, antiarrhythmics and antiepileptics).^{7,8}

Potassium channels contribute to maintaining cell volume, membrane potential, neuronal excitability and the secretion of transmitters, salt and hormones. Two families of potassium channels have been identified. One family includes the inwardly rectifying potassium channels whereas, the other family includes: voltage-sensing (KV); big conductance, calcium activated (BK_{CA}); and small conductance, calcium activated (SK) potassium channels. In neuronal tissue, BK and SK channels modulate the action potential duration, the speed of repolarization and the after hyperpolarization.^{9,10} These channels are implicated both in therapeutic drug effects and also in disease.⁹⁻¹¹ KV channels have been implicated in activity-dependent, plastic changes in neuronal tissue.^{12,13} HERG (human ether-a-go-go-related gene) is similar to the delayed rectifier channel and is important in cardiac function and may also play a role in certain cardiac arrhythmias.¹⁴

Many subunits that form the ion channels have been cloned and expressed. With the combination of molecular biology and electrophysiology, although much has been learned about the structure and function of the ion channels, much remains to be determined about the *in vivo* physiological roles of the ion channel subtypes and also in their roles in mediating therapeutic drug effects.

Monovalent ion channels are being associated with a growing number of diseases.^{8,15} Thus, further research is required to determine the physiological function and role of Cl, K and Na channel subtypes as well as the ion channels themselves in the hopes of discovering new treatments for these pathologies.

Reagents

Anti-Potassium Channel Kv1.4 is supplied lyophilized at approximately 0.3 mg/ml from phosphate buffered saline, pH 7.4, containing 1% bovine serum albumin, 5% sucrose and 0.025% sodium azide.

Precautions and Disclaimer

Due to the sodium azide content, a material safety data sheet (MSDS) for this product has been sent to the attention of the safety officer of your institution. Consult the MSDS for information regarding hazardous and safe handling practices.

Preparation Instructions

Reconstitute the lyophilized vial with 0.05 ml or 0.2 ml deionized water. Antibody dilutions should be made in buffer containing 1-3% bovine serum albumin.

Storage/Stability

Prior to reconstitution, store at -20°C . After reconstitution, the stock antibody solution may be stored at $2-8^{\circ}\text{C}$. for up to one month. For extended storage, freeze in working aliquots. Repeated freezing and thawing is not recommended. Storage in "frost-free" freezers is not recommended. If slight turbidity occurs upon prolonged storage, clarify the solution by centrifugation before use. Working dilution samples should be discarded if not used within 12 hours.

Product Profile

The recommended working dilution is 1:200 – 1:600 (0.5-1.5 $\mu\text{g/ml}$) for immunoblotting using an anti-rabbit IgG-peroxidase conjugate and detection by ECL.

Note: In order to obtain best results and assay sensitivities of different techniques and preparations, we recommend determining optimal working dilutions by titration test.

References

1. Stuhmer, W., et al., EMBO J., **8**, 3235 (1989).
2. Veh, R.W., et al., Eur. J. Neurosci., **7**, 2189 (1995).
3. Jentsch, T.J. et al., J. Physiol., **482**, 19S, (1995).
4. Staley, K. et al., Neuron, **17**, 543, (1996).
5. Nagasaki M. et al., J.Physiol., **523**, 705 (2000).
6. Jeong, S.Y. et al., Biochem. Biophys. Res. Commun., **267**, 262 (2000).
7. Catterall, W.A., Adv. Neurol., **79**, 441 (1999).
8. Vincent, G.M. et al., Cardiol. Rev., **7**, 44 (1999).
9. Scholtz, A. et al., J. Physiol., **513**, 55 (1998).
10. Dreixler, J.C. et al., Anesth. Analg., **90**, 727 (2000).
11. Bond, C.T. et al., Ann. N.Y. Acad. Sci., **868**, 370 (1999).
12. Grosse, G. et al., J. Neurosci., **20**, 1869 (2000).
13. McFarlane, S. and Pollock, N.S., J. Neurosci., **20**, 1020 (2000).
14. Teschemacher, A.G. et al., Br. J. Pharmacol., **128**, 479 (1999).
15. Lehmann-Horn, F. and Jurkat-Rott, K., Physiol. Rev., **79**, 1317 (1999).

lpg 3/00

Sigma brand products are sold through Sigma-Aldrich, Inc.

Sigma-Aldrich, Inc. warrants that its products conform to the information contained in this and other Sigma-Aldrich publications. Purchaser must determine the suitability of the product(s) for their particular use. Additional terms and conditions may apply. Please see reverse side of the invoice or packing slip.