Product Information

$Ca_v\beta4$ Calcium Channel Monoclonal Antibody (Clone S10-7)

Item No. 13701

Contents: This vial contains 100 µg of protein G-purified IgG in 100 µl PBS, pH 7.4, containing 50% glycerol and 0.09% sodium azide.
Antigen: Synthetic peptide from rat $Ca_v\beta4$ amino acids 458-474
Isotype: IgG_1
Host: Mouse, clone S10-7
Cross Reactivity: (+) Human, mouse, and rat $Ca_v\beta4$
Stability: ≥1 year at -20°C
Applications: Western blot (WB), immunohistochemistry (IHC), immunocytochemistry (ICC), and immunofluorescence (IF). The recommended starting dilution for WB is 1-10 µg/ml, IHC/ICC is 0.1-1.0 µg/ml (HRP detection), and IF is 1.0-10 µg/ml.

Ion channels are integral membrane proteins that help establish and control the small voltage gradient across the plasma membrane of living cells by allowing the flow of ions down their electrochemical gradient.[1] They are present in the membranes that surround all biological cells because their main function is to regulate the flow of ions across this membrane. Whereas some ion channels permit the passage of ions based on charge, others conduct based on a ionic species, such as sodium or potassium. Furthermore, in some ion channels, the passage is governed by a gate which is controlled by chemical or electrical signals, temperature, or mechanical forces.

There are a few main classifications of gated ion channels. There are voltage-gated ion channels, ligand-gated, other gating systems, and finally those that are classified differently, having more exotic characteristics. The first are voltage-gated ion channels which open and close in response to membrane potential. These are then seperated into sodium, calcium, potassium, proton, transient receptor, and cyclic nucleotide-gated channels, each of which is responsible for a unique role. Ligand-gated ion channels are also known as ionotropic receptors, and they open in response to specific ligand molecules binding to the extracellular domain of the receptor protein. The other gated classifications include activation and inactivation by second messengers, inward-rectifier potassium channels, calcium-activated potassium channels, two-pore-domain potassium channels, light-gated channels, mechano-sensitive ion channels, and cyclic nucleotide-gated channels. Finally, the other classifications are based on less normal characteristics such as two-pore channels, and transient receptor potential channels.[2]

Specifically, this gene encodes a member of the β subunit family, a protein in the voltage-dependent calcium channel complex. Calcium channels mediate the influx of calcium ions into the cell upon membrane polarization and consist of a complex of α1, α3/δ, β, and γ subunits in a 1:1:1:1 ratio. Various versions of each of these subunits exist, either expressed from similar genes or the result of alternative splicing. The protein described in this record plays an important role in calcium channel function by modulating G protein inhibition, increasing peak calcium current, controlling the α1 subunit membrane targeting and shifting the voltage dependence of activation and inactivation. Certain mutations in this gene have been associated with idiopathic generalized epilepsy (IGE) and juvenile myoclonic epilepsy (JME). Alternate transcriptional splice variants of this gene, encoding different isoforms, have been characterized.[3,4]

References

1. Hille, B. Ion Channels of Excitable Membranes. 3rd Ed., Sinauer Associates Inc., Sunderland, MA (2001).
2. What are ion channels? Retrieved October 22, 2009, from http://www.ionchannels.org/.
3. CACNB4 calcium channel, voltage-dependent, β4 subunit. Retrieved October 24, 2009, from http://www.ncbi.nlm.nih.gov/sites/entrez.
4. Xie,M., Li, X., Vogt, D.L., *et al.* Facilitation versus depression incultured hippocampal neurons determined by targeting of Ca^{2+} channel $Ca_v\beta_4$ *versus* $Ca_v\beta_2$ subunits to synaptic terminals. *J. Cell Biology* **178(3)**, 489-502 (2007).

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