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Voltage-gated calcium channels (version 2020.5) in the IUPHAR/BPS Guide to Pharmacology Database

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Abstract

Calcium (Ca^{2+}) channels are voltage-gated ion channels present in the membrane of most excitable cells. The nomenclature for Ca^{2+}channels was proposed by [120] and **approved by the NC-IUPHAR Subcommittee on Ca^{2+} channels [68]**. Ca^{2+} channels form hetero-oligomeric complexes. The α1 subunit is pore-forming and provides the binding site(s) for practically all agonists and antagonists. The 10 cloned α1-subunits can be grouped into three families: (1) the high-voltage activated dihydropyridine-sensitive (L-type, $Ca_V1.x$) channels; (2) the high-voltage activated dihydropyridine-insensitive ($Ca_V2.x$) channels and (3) the low-voltage-activated (T-type, $Ca_V3.x$) channels. Each α1 subunit has four homologous repeats (I-IV), each repeat having six transmembrane domains and a pore-forming region between transmembrane domains S5 and S6. Voltage-dependent gating is driven by the membrane spanning S4 segment, which contains highly conserved positive charges that respond to changes in membrane potential. Many of the α1-subunit genes give rise to alternatively spliced products. At least for high-voltage activated channels, it is likely that native channels comprise co-assemblies of α1, β and α2-δ subunits. The γ subunits have not been proven to associate with channels other than the α1s skeletal muscle Cav1.1 channel. The α2-δ1 and α2-δ2 subunits bind gabapentin and pregabalin.

Contents

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Channels and Subunits
$Ca_V1.1$
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$Ca_V1.2$
https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=529

$Ca_V1.3$
https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=530
$Ca_V1.4$
https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=531
$Ca_V2.1$
https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=532
$Ca_V2.2$
https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=533
$Ca_V2.3$
https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=534
$Ca_V3.1$
https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=535
$Ca_V3.2$
https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=536
$Ca_V3.3$
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