IUPHAR/BPS Guide to Pharmacology CITE
https://doi.org/10.2218/gtopdb/F70/2019.4

CatSper and Two-Pore channels (version 2019.4) in the IUPHAR/BPS Guide to Pharmacology Database

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Abstract

CatSper channels (CatSper1-4, **nomenclature as agreed by NC-IUPHAR [13]**) are putative 6TM, voltage-gated, alkalinization-activated calcium permeant channels that are presumed to assemble as a tetramer of α-like subunits and mediate the current $I_{CatSper}$ [21]. In mammals, CatSper subunits are structurally most closely related to individual domains of voltage-activated calcium channels (Ca_V) [36]. CatSper1 [36], CatSper2 [33] and CatSpers 3 and 4 [25, 19, 32], in common with a putative 2TM auxiliary CatSperβ protein [24] and two putative 1TM associated CatSperγ and CatSperδ proteins [42, 11], are restricted to the testis and localised to the principle piece of sperm tail. The novel cross-species CatSper channel inhibitor, RU1968, has been proposed as a useful tool to aid characterisation of native CatSper channels [37].

Two-pore channels (TPCs) are structurally related to CatSpers, Ca_Vs and Na_Vs. TPCs have a 2x6TM structure with twice the number of TMs of CatSpers and half that of Ca_Vs. There are three animal TPCs (TPC1-TPC3). Humans have TPC1 and TPC2, but not TPC3. TPC1 and TPC2 are localized in endosomes and lysosomes [4]. TPC3 is also found on the plasma membrane and forms a voltage-activated, non-inactivating Na^+ channel [5]. All the three TPCs are Na^+-selective under whole-cell or whole-organelle patch clamp recording [44, 7, 6]. The channels may also conduct Ca^{2+} [29].

Contents

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Database links

CatSper and Two-Pore channels
http://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=70
Introduction to CatSper and Two-Pore channels
http://www.guidetopharmacology.org/GRAC/FamilyIntroductionForward?familyId=70

Channels and Subunits

- CatSper1
  http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=388
- CatSper2
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- TPC2
  http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=393

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