CatSper and Two-Pore channels (TPC) in GtoPdb v.2022.1

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Abstract

CatSper channels (CatSper1-4, nomenclature as agreed by NC-IUPHAR [14]) are putative 6TM, voltage-gated, alkalization-activated calcium permeant channels that are presumed to assemble as a tetramer of α-like subunits and mediate the current I_{CatSper} [23]. In mammals, CatSper subunits are structurally most closely related to individual domains of voltage-activated calcium channels (Ca½) [40]. CatSper1 [40], CatSper2 [37] and CatSpers 3 and 4 [27, 21, 36], in common with a putative 2TM auxiliary CatSperβ protein [26] and two putative 1TM associated CatSpery and CatSperδ proteins [46, 12], are restricted to the testis and localized 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 [41].

Two-pore channels (TPCs) are structurally related to CatSpers, Ca½s and Na½s. TPCs have a 2x6TM structure with twice the number of TMs of CatSpers and half that of Ca½s. There are three animal TPCs (TPC1-TPC3). Humans have TPC1 and TPC2, but not TPC3. TPC1 and TPC2 are localized in endosomes and lysosomes [5]. TPC3 is also found on the plasma membrane and forms a voltage-activated, non-inactivating Na⁺ channel [6]. All the three TPCs are Na⁺-selective under whole-cell or whole-organelle patch clamp recording [48, 8, 7]. The channels may also conduct Ca²⁺ [31].

Contents

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Database links

CatSper and Two-Pore channels (TPC)
https://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=70
Introduction to CatSper and Two-Pore channels (TPC)
https://www.guidetopharmacology.org/GRAC/FamilyIntroductionForward?familyId=70
Channels and Subunits
CatSper1
https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=388
CatSper2
https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=389
References


