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Letter to the Editor

A Unified Nomenclature for the Superfamily of TRP Cation Channels

The TRP superfamily includes a diversity of non-voltage-gated cation channels that vary significantly in their selectivity and mode of activation. Nevertheless, members of the TRP superfamily share significant sequence homology and predicted structural similarities. Currently, most of the genes and proteins that comprise the TRP superfamily have multiple names and, in at least one instance, two distinct genes belonging to separate subfamilies have the same name. Moreover, there are many cases in which highly related proteins that belong to the same subfamily have unrelated names. Therefore, to minimize confusion, we propose a unified nomenclature for the TRP superfamily.

The current effort to unify the TRP nomenclature focuses on three subfamilies (TRPC, TRPV, and TRPM) that bear significant similarities to the founding member of this superfamily, *Drosophila* TRP, and which include highly related members in worms, flies, mice, and humans (Table 1). Members of the three subfamilies contain six transmembrane segments, a pore loop separating the final two transmembrane segments, and similarity in the lengths of the cytoplasmic and extracellular loops. In addition, the charged residues in the S4 segment that appear to contribute to the voltage sensor in voltage-gated ion channels are not conserved. The TRP-Canonical (TRPC) subfamily (formerly short-TRPs or STRPs) is comprised of those proteins that are the most highly related to *Drosophila* TRP. The TRPV subfamily (formerly OTRPC), is so named based on the original designation, Vanilloid Receptor 1 (VR1), for the first mammalian member of this subfamily (now TRPV1). The name for the TRPM subfamily (formerly long-TRPs or LTRPs) is derived from the first letter of Melastatin, the former name (now TRPM1) of the founding member of this third subfamily of TRP-related proteins. Based on amino acid homologies, the mammalian members of these three subfamilies can be subdivided into several groups each (Table 2 and Figure 1).

The numbering system for the mammalian TRPC, TRPV, and TRPM proteins takes into account the order of their discovery and, in as many cases as possible, the number that has already been assigned to the genes and proteins (Table 2). In the case of the TRPV proteins, the numbering system is also based in part on the groupings of the TRPV proteins. New members of each subfamily will maintain the same root name and, with the exception of TRPV3, will be assigned the next number in the sequence. Currently, TRPV3 is unassigned to maintain the TRPV1/ TRPV2 and TRPV5/TRPV6 groupings and so that the former OTRPC4 could be renamed TRPV4. The next TRPV protein will be designated TRPV3.

Table 1. Number of TRP Genes in Worms (*C. elegans*), Flies (*Drosophila melanogaster*), Mice, and Humans

Subfamily	Worms	Flies	Mice	Humans
TRPC	3	3	7	6[a]
TRPV	5	2	5	5
TRPM	4	1	8	8

[a]TRPC2 is a pseudogene and is not counted.

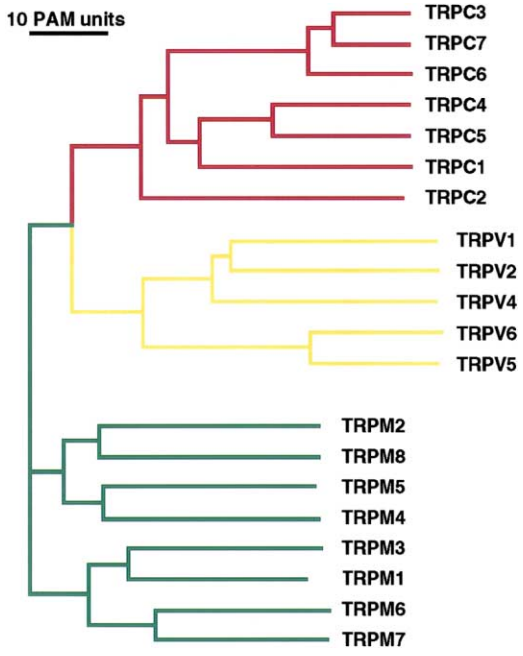

Figure 1. Phylogenetic Tree of the TRP Superfamily

The tree, which was adapted from Clapham et al., 2001 (Nat. Rev. Neurosci. *2*, 387–396), was calculated using the neighbor-joining method and human, rat, and mouse sequences.

We hope this new nomenclature will add clarity to the field and simplify the naming of new members of the TRP superfamily. We recommend that accession numbers be used whenever it is necessary to unambiguously specify a given variant resulting from alternative mRNA splicing. Finally, this nomenclature has been approved by the HUGO Gene Nomenclature Committee and we recommend that this system be used in all future publications concerning TRPC, TRPV, and TRPM subfamily members.

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[1]TRP Nomenclature Committee

Table 2. Nomenclature of the Mammalian TRP Superfamily

Name	Group	Former Names	Accession Numbers
TRPC Subfamily			
TRPC1	1	TRP1 TRPC1	CAA61447, AAA93252
TRPC2	2	TRP2 TRPC2	X89067, AAD17195, AAD17196, AAG29950, AAG29951, AAD31453, CAA06964
TRPC3	3	TRP3 TRPC3	AAC51653
TRPC4	4	TRP4 TRPC4	CAA68125, BAA23599
TRPC5	4	TRP5 TRPC5	AAC13550, CAA06911, CAA06912
TRPC6	3	TRP6 TRPC6	NP_038866
TRPC7	3	TRP7 TRPC7	AAD42069, NP_065122
TRPV Subfamily			
TRPV1	1	VR1 OTRPC1	AAC53398
TRPV2	1	VRL-1 OTRPC2 GRC	AAD26363, AAD26364, BAA78478
TRPV3 (not assigned)			
TRPV4	2	OTRPC4 VR-OAC TRP12 VRL-2	AAG17543, AAG16127, AAG28027, AAG28028, AAG28029, CAC20703
TRPV5	3	ECaC1 CaT2	CAB40138
TRPV6	3	CaT1 ECaC2 CaT-L	AAD47636 CAC20416 CAC20417
TRPM Subfamily			
TRPM1	1	Melastatin	AAC13683, AAC80000
TRPM2	2	TRPC7 LTRPC2	BAA34700
TRPM3	1	KIAA1616 LTRPC3	AA038185
TRPM4	3	TRPM4 LTRPC4	H18835
TRPM5	3	MTR1 LTRPC5	AAF26288
TRPM6	4	Chak2	AF350881
TRPM7	4	TRP-PLIK Chak1 LTRPC7	AAF73131
TRPM8	2	TRP-p8	AC005538

Indicated are the suggested gene and protein names, the groups within each subfamily, the former names, and accession numbers.

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