

Supplementary material from “TRP Channels: Current Perspectives on Evolution, Structure, Function, and Nomenclature”

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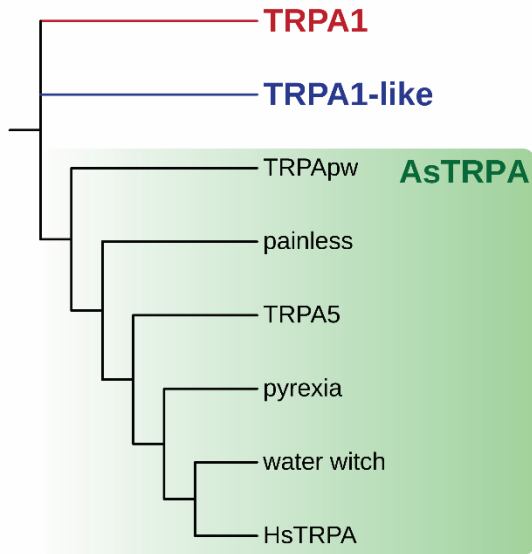
Nathaniel J. Himmel^{1,2} and Daniel N. Cox^{1,3}

1 - Neuroscience Institute, Georgia State University, Atlanta, GA, USA

2 – ORCID: 0000-0001-7876-6960

3 – ORCID: 0000-0001-9191-9212

A.



B.

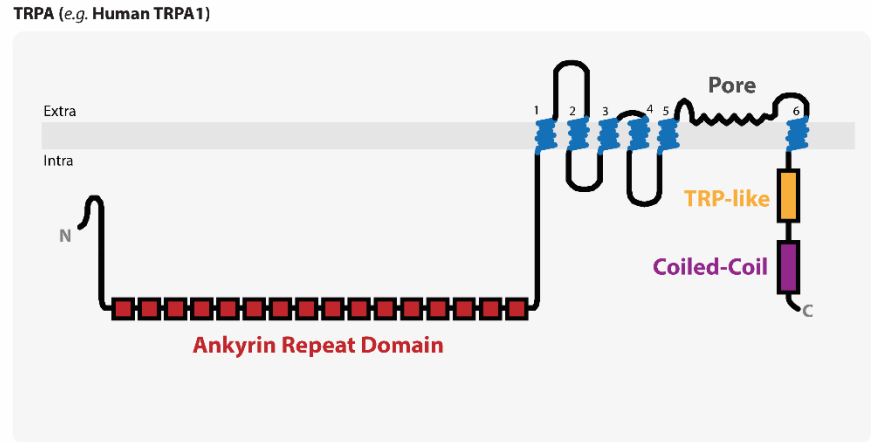
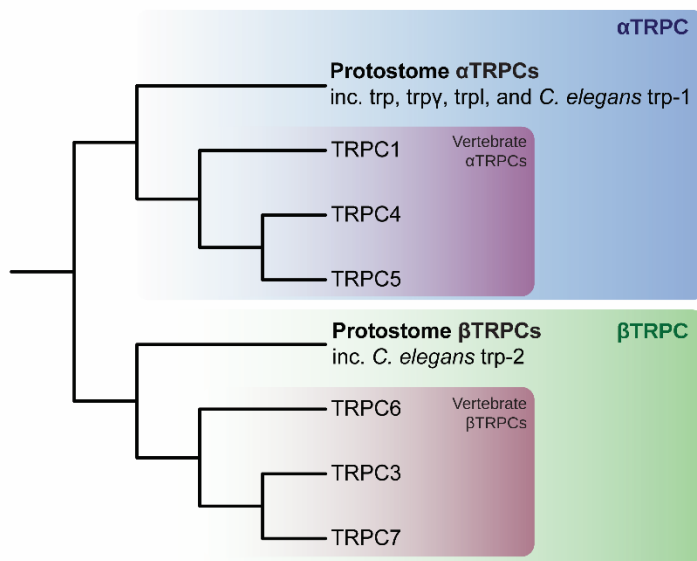


Figure S2. TRPA channels, A for ankyrin. **(A)** The TRPA family is divided into 3 distinct subfamilies: TRPA1 (e.g. Human TRPA1), TRPA1-like (e.g. *C. elegans* trpa-1), and AsTRPA (Arthropod-specific, called “basal TRPA” in the literature; e.g. *Drosophila* painless) [1-4]. The phylogenetic relationship between these clades has not been well resolved. **(B)** Structure of TRPA1 channels, modified from topology predicted and visualized via Protter and InterProScan [5, 6]. TRPA channels are 6-transmembrane spanning ion channels most well known for their extensive N-terminal ankyrin repeats [7].

A.



B.

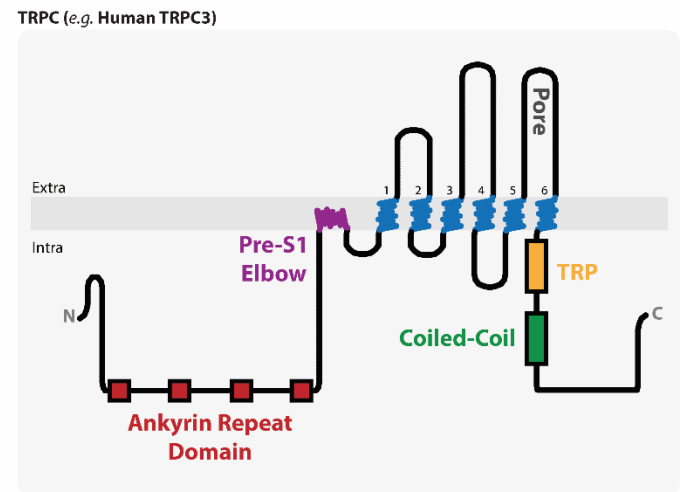


Figure S3. TRPC channels, C for canonical. **(A)** Here, we propose the TRPC family is divided into 2 major subfamilies, α TRPC and β TRPC [3, 8-11]. **(B)** TRPC genes encode 6-transmembrane ion channels with a Pre-S1 elbow, ankyrin repeats, a TRP domain, and a coiled-coil domain [12-14].

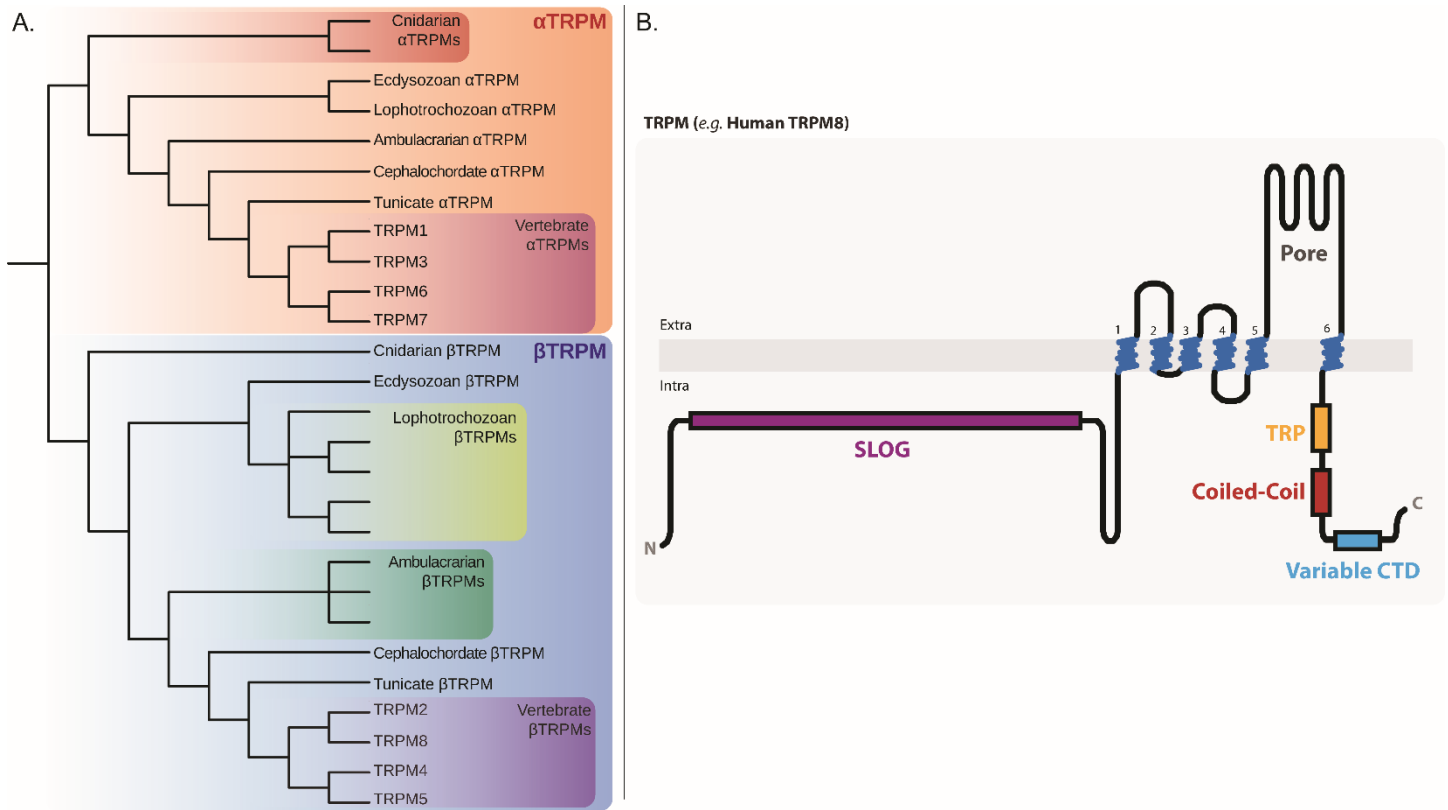
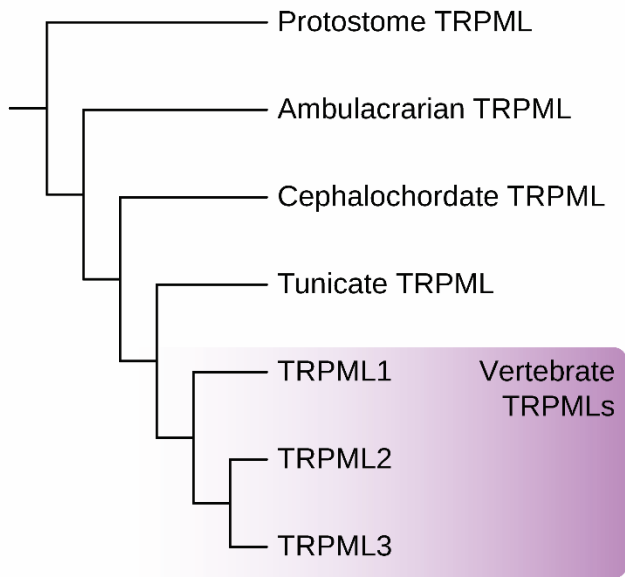


Figure S4. TRPM channels, M for melastatin. **(A)** The TPRM family is divided into 2 major, well resolved subfamilies, α TRPM and β TRPM [1, 3, 8-10, 15]. **(B)** TRPM channels form archetypal TRP channels with a SLOG domain, TRP domain, a coiled-coil domain, and a variable C-terminal domain (Variable CTD), which can encode nudix-hydrolase like domains or alpha-kinase domains [4, 16-18].

A.



B.

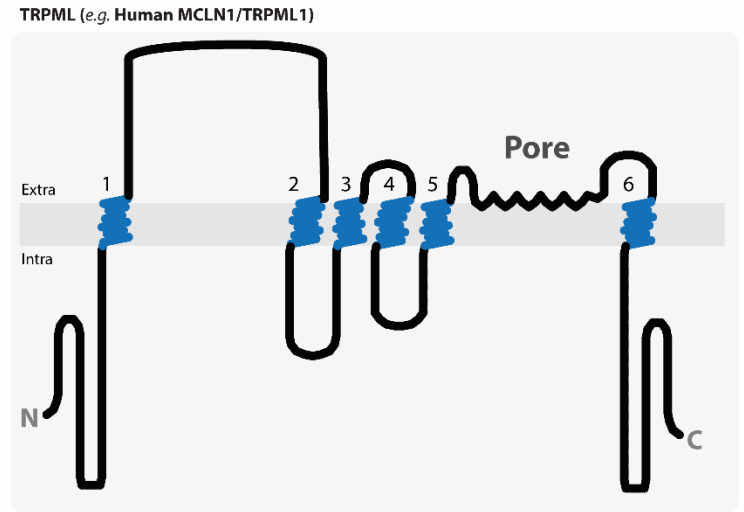


Figure S5. TRPML channels, ML for mucolipin. **(A)** There is only a single major TRPML clade, which remains relatively phylogenetically understudied outside Vertebrata (in which there are 3 canonical paralogues) [3, 4, 19]. **(B)** TRPML genes encode archetypal 6-transmembrane ion channels [20, 21].

TRPN (e.g. *Drosophila* **nompC**)

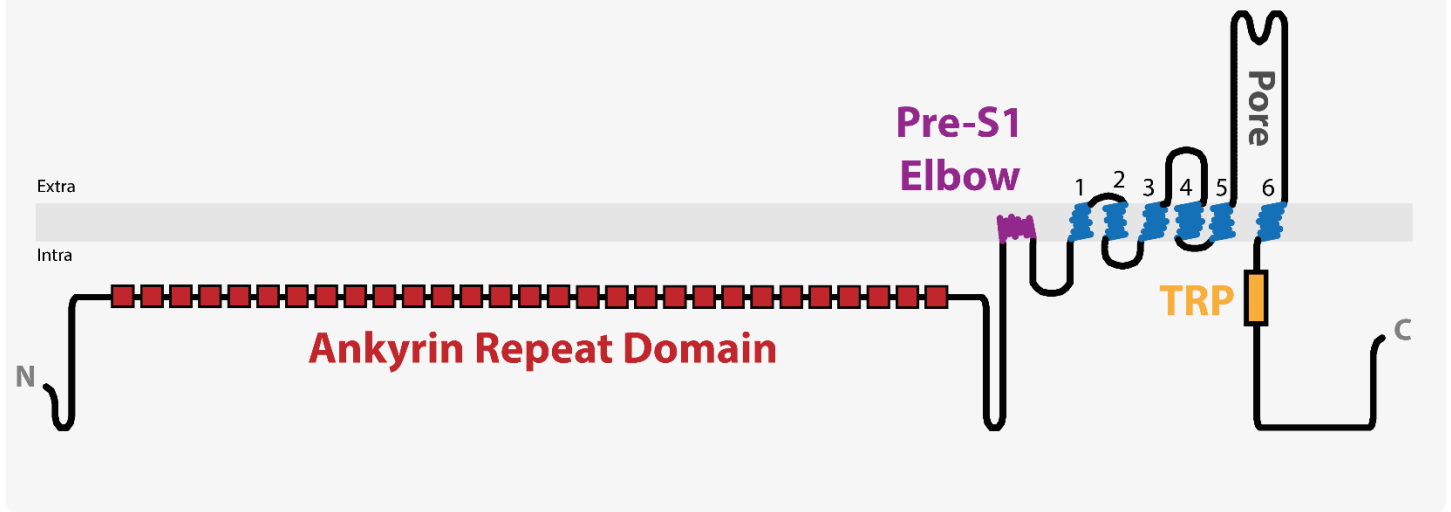


Figure S6. TRPN channels, N for no mechanoreceptor potential C (or **nompC**). Only a single TRPN is present in most genomes surveyed in the literature [3, 4, 22]. TRPN genes encode archetypal, 6-transmembrane ion channels with highly conserved ankyrin-repeat domains [22, 23].

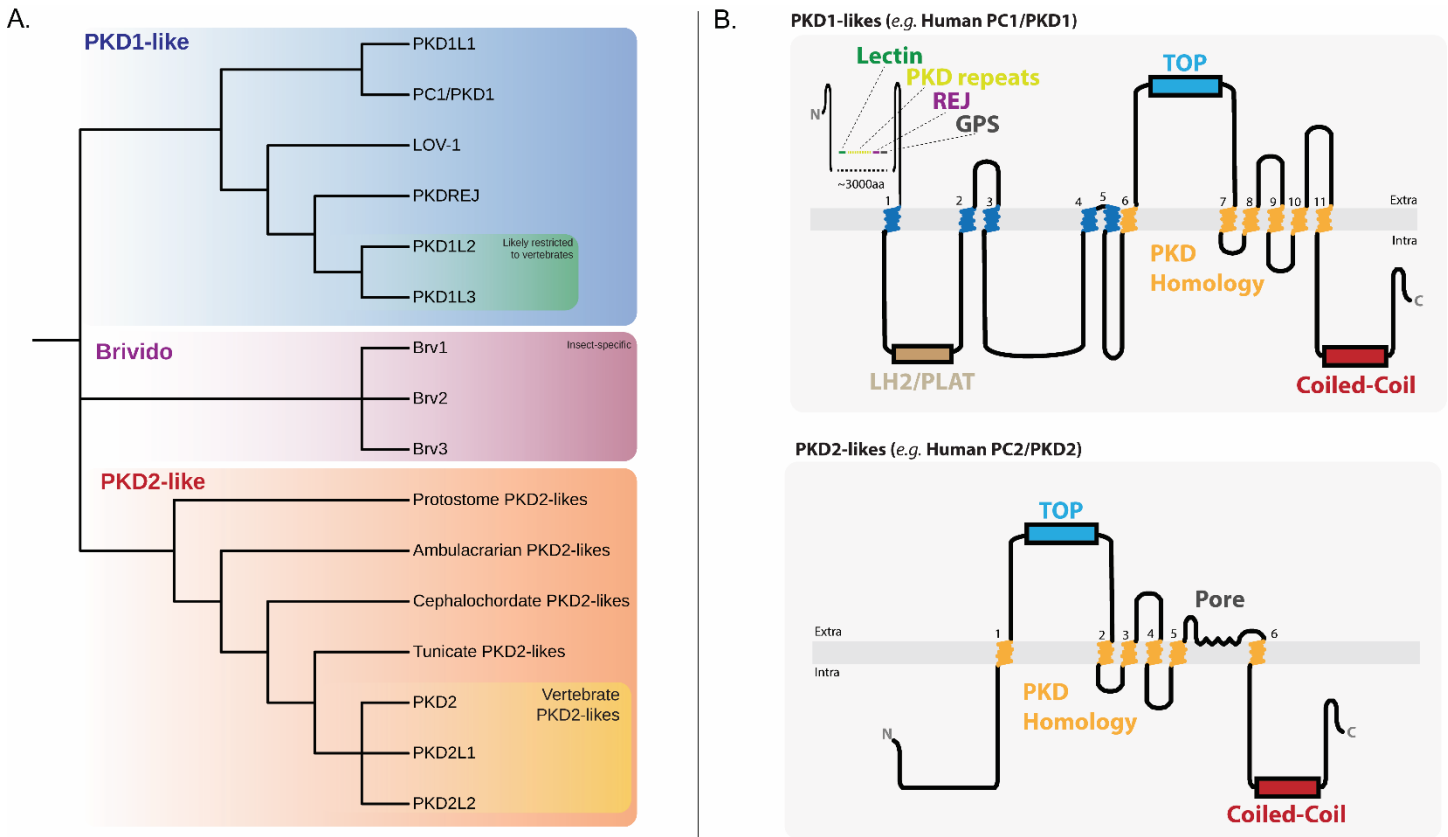


Figure S7. TRPP channels, P for polycystin or polycystic kidney disease. **(A)** The TRPP family is divided into 3 distinct subfamilies: PKD1-like, PKD2-like, and Brivido [24-28]. **(B)** PKD2-like genes encode channels with an archetypal TRP structure, while PKD1-like and Brivido genes encode much larger proteins [29-32]. PKD1- and PKD2-likes share a coiled-coil and tetragonal opening for polycystin (TOP) domains, which facilitate the formation of heteromeric units. PKD1-likes have several additional domains, including PKD repeats, receptor for egg jelly (REJ), lectin, G-protein-coupled receptor sites (GPS), and LH2/PLAT (Lipoxygenase homology/ Polycystin-1, Lipoxygenase, Alpha-Toxin) domains.

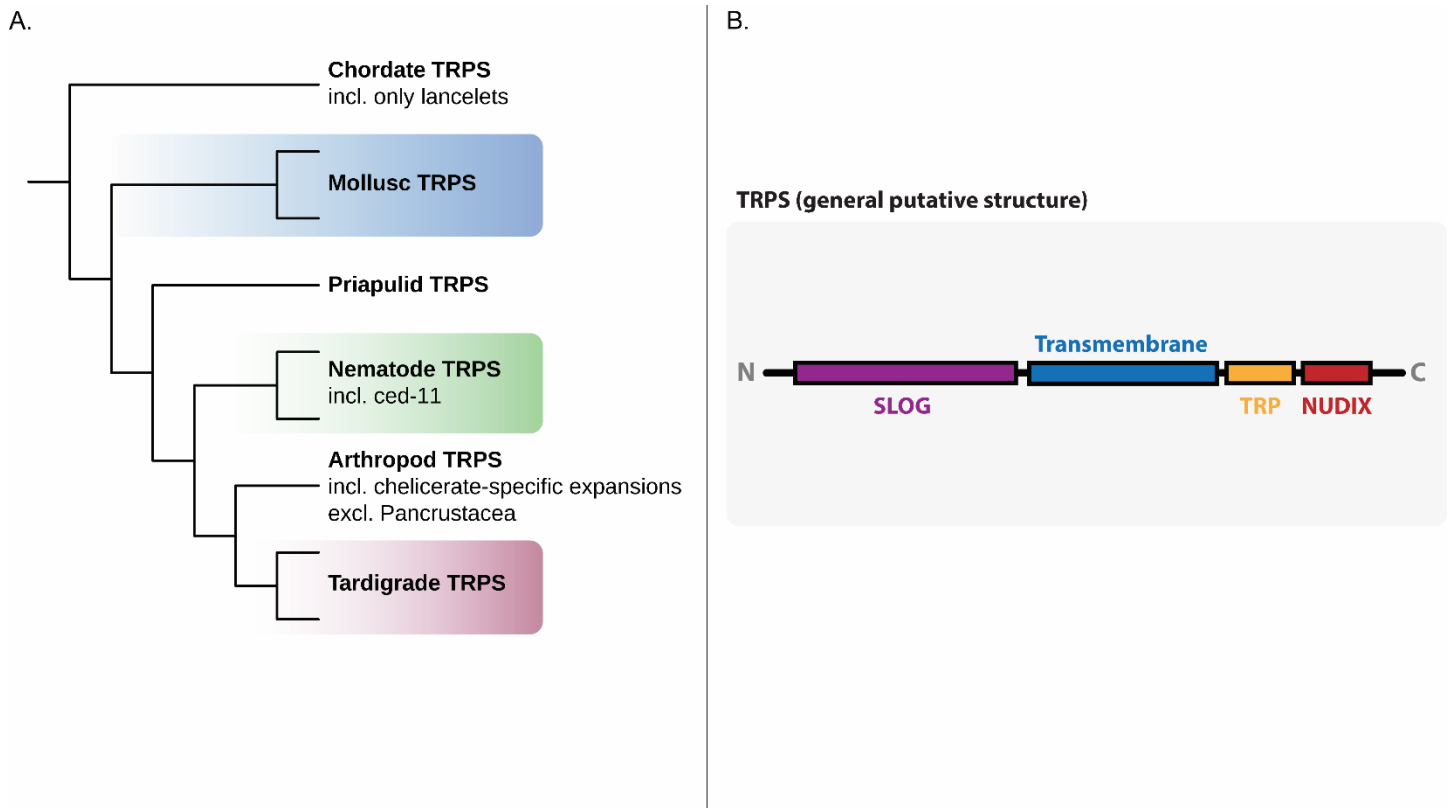
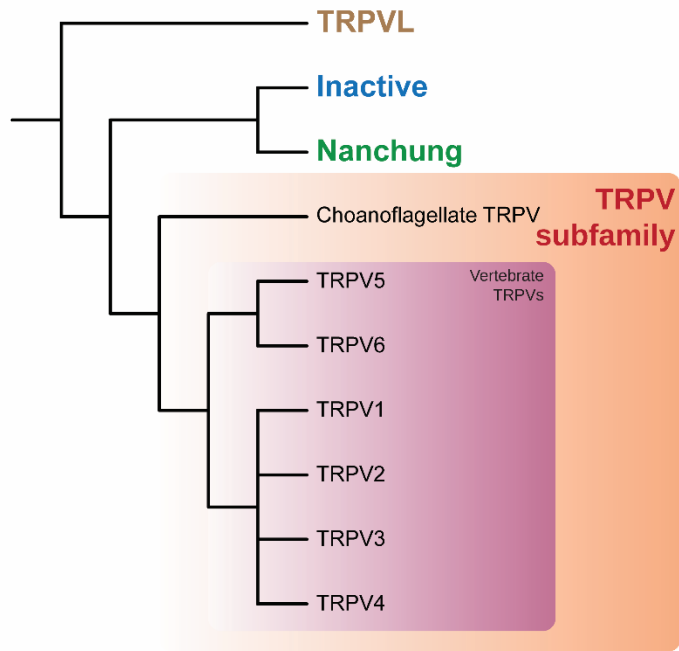


Figure S8. TRPS channels, S for soromelastatin. **(A)** Only a single major TRPS clade is present in bilateria and cnidaria, but it has diversified differently among different taxa [8]. **(B)** The structure of TRPS channels has not been well resolved, but they are characterized by the variable presence of SLOG, nudix-hydrolase like, and TRP domains [8].

A.



B.

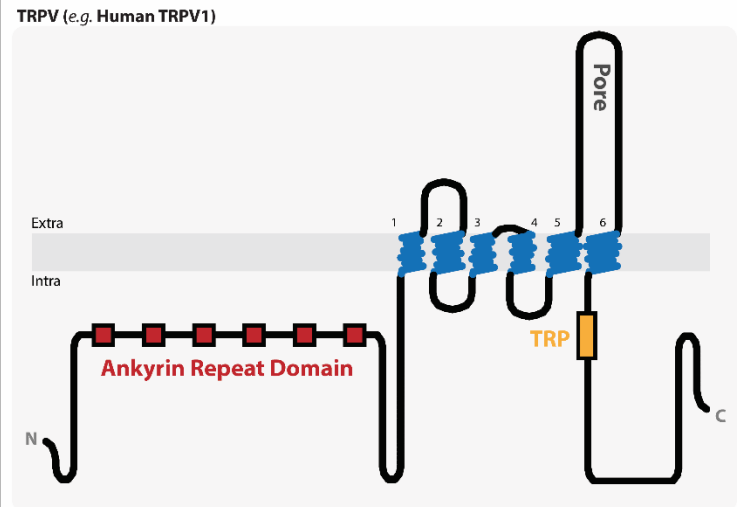


Figure S9. TRPV/TRPVL channels, V for vanilloid. **(A)** The TRPV family is divided into 3 major subfamilies: nanchung, inactive, and what is here called the TRPV subfamily [3, 4]. TRPVs, which are poorly understood, are a sister clade to TRPV [3]. **(B)** TRPV genes encode canonical 6-transmembrane segment spanning ion channels characterized by N-terminal ankyrin repeats and a C-terminal TRP domain [33, 34].

Family	Species	Source: Accession
TRPA	Human (<i>Homo sapiens</i>)	CCDS: 34908.1
	Fruit Fly (<i>Drosophila melanogaster</i>)	FlyBase: FBpp0304207, FBpp0072323, FBpp0072423, FBpp0081250
	Nematode (<i>Caenorhabditis elegans</i>)	WormBase: C29E6.2a.1
	Honey Bee (<i>Apis mellifera</i>)	NCBI: ANT80566.1, XP_001122445.1
	Caribbean Spiny Lobster (<i>Panulirus argus</i>)	DOI: 10.1371/journal.pone.0203935
TRPC	Human (<i>Homo sapiens</i>)	CCDS: 8311.1, 47130.1, 47267.2, 58856.1, 9365.1, 14561.1
	Fruit Fly (<i>Drosophila melanogaster</i>)	FlyBase: FBpp0087555, FBpp0080498, FBpp0084879
	Nematode (<i>Caenorhabditis elegans</i>)	Wormbase: ZC21.2b.1, R06B10.4b.1
TRPM	Human (<i>Homo sapiens</i>)	CCDS: 13710.1, 33407.1, 33073.1, 1340.1, 10024.2, 6634.1, 6647.1, 42035.1
	Fruit Fly (<i>Drosophila melanogaster</i>)	FlyBase: FBpp0308220
	Nematode (<i>Caenorhabditis elegans</i>)	WormBase: CE40563, CE30390, CE33754
TRPML	Human (<i>Homo sapiens</i>)	CCDS: 701.1, 30762.1, 12180.1
	Fruit Fly (<i>Drosophila melanogaster</i>)	FlyBase: FBpp0074720
	Nematode (<i>Caenorhabditis elegans</i>)	WormBase: R13A5.1e.1
TRPN	Fruit Fly (<i>Drosophila melanogaster</i>)	FlyBase: FBpp0289289
	Nematode (<i>Caenorhabditis elegans</i>)	WormBase: Y71A12B.4.1
TRPP	Human (<i>Homo sapiens</i>)	CCDS: 14073.1, 73912.1, 61999.1, 32369.1, 34633.1, 7492.1, 3627.1, 43367.1
	Fruit Fly (<i>Drosophila melanogaster</i>)	FlyBase: FBpp0079947, FBpp0074750, FBpp0075004, FBpp0289932
	Nematode (<i>Caenorhabditis elegans</i>)	WormBase: ZK945.9.1, Y73F8A.1.1
TRPS	Nematode (<i>Caenorhabditis elegans</i>)	WormBase: CE00409
TRPV	Human (<i>Homo sapiens</i>)	CCDS: 5875.1, 5874.2, 11029.1, 32576.1, 45576.1, 9134.1
	Fruit Fly (<i>Drosophila melanogaster</i>)	FlyBase: FBpp0070930, FBpp0088509
	Nematode (<i>Caenorhabditis elegans</i>)	WormBase: T09A12.3a.1, F28H7.10a.1, T10B10.7.1, B0212.5.1
TRPVL	Starlet Sea Anemone (<i>Nematostella vectensis</i>)	JGI: jgi21409
TRPY/F	Fungus (<i>Colletotrichum graminicola</i>)	DOI: 10.1371/journal.pone.0158561

Table S1. Accession numbers for publicly available data used in Figure S1.

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