
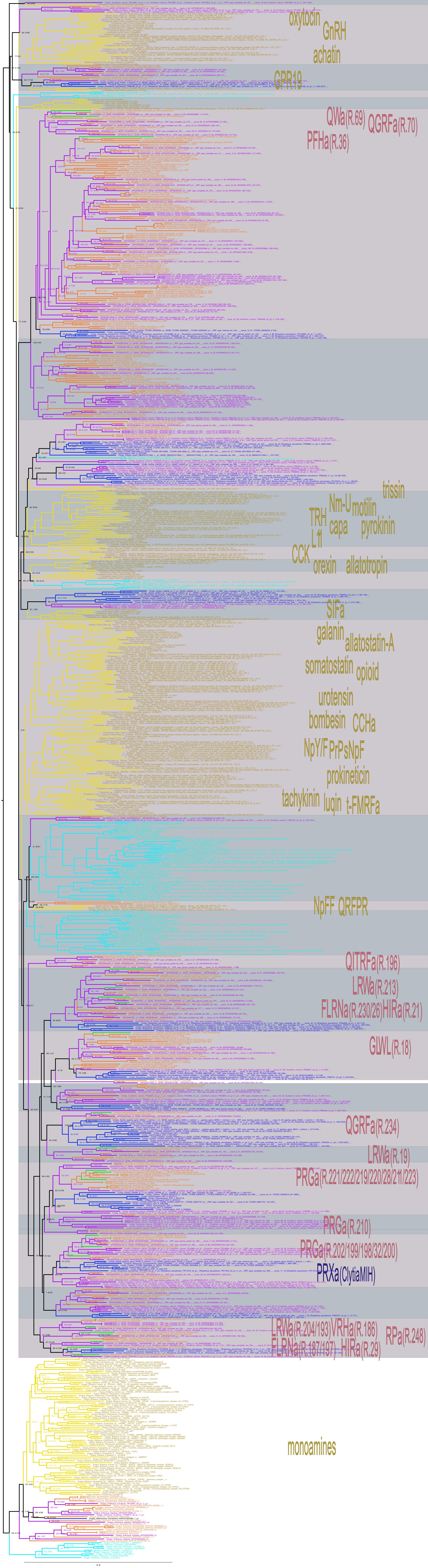


Supplementary tree1: Tree (FastTree) of neuropeptide GPCRs and related bilaterian chemokine receptors. Bilaterian sequences are shown in yellow, cnidarian sequences are shown in dark blue (Medusozoa) and magenta (Anthozoa), placozoan sequences are shown in light blue. Deorphanized *Nematostella vectensis* sequences are shown in green. Sequences were aligned using muscle, alignment was trimmed with the gappyout option of trimal, tree was calculated using FastTree. Abbreviations: a = amide, CCK = cholecystokinin, GnRH = gonadotropn releasing hormone, GPR19 = G protein-coupled receptor 19, L11 = elevenin, MCH = melanin concentrating hormone, Nm-U = neuromedin U, NpFF = neuropeptide FF, NpS = neuropeptide S, NpY/F = neuropeptide Y/neuropeptide F, PrP = prolactin releasing peptide, sNpF = short neuropeptide F, TRH = thyrotropin releasing hormone,



Supplementary tree2: Tree (IQtree) of neuropeptide GPCRs and related bilaterian chemokine receptors. Bilaterian sequences are shown in yellow, cnidarian sequences are shown in dark blue (Medusozoa) and magenta (Anthozoa), placozoan sequences are shown in light blue. Deorphanized *Nematostella vectensis* sequences are shown in green. Sequences were aligned using mafft, alignment was trimmed with the gappyout option of trimal, tree was calculated using IQtree. Abbreviations: a = amide, CCK = cholecystokinin, GnRH = gonadotropn releasing hormone, GPR19 = G protein-coupled receptor 19, L11 = elevenin, MCH = melanin concentrating hormone, Nm-U = neuromedin U, NpB/W = neuropeptide B/neuropeptide W, NpFF = neuropeptide FF, NpS = neuropeptide S, NpY/F = neuropeptide Y/neuropeptide F, sNpF = short neuropeptide F,



Supplementary tree 3: Phylogeny of metazoan class A neuropeptide GPCRs. Same tree as figure 4 in the main manuscript, but with added branch annotations and exact support values (aBayes/aLRT-SH-like support). Bilaterian sequences are shown in yellow, cnidarian sequences are shown in dark blue (medusozoan species) and magenta (*Aiptasia* and *Corallium*) and orange (*Nematostella*), placozoan sequences are shown in light blue. Branches of deorphanized *Nematostella* GPCRs are shown in green. Alternating shades behind the tree branches highlight different monophyletic groups. Abbreviations: a = amide, B = Bilateria, CCK = cholecystokinin, GnRH = gonadotropin releasing hormone, MIH = maturation-inducing hormone, Nm-U = neuromedin U, NpFF = neuropeptide FF, NpY/F = neuropeptide Y/neuropeptide F, P = Placozoa, PrP = prolactin releasing peptide, R.# = Nematostella GPCR number, sNpF = short neuropeptide F, t-FMRFa = trochozoan FMRFamide, TRH = thyrotropin releasing hormone.