

Dataset S1 to S3

The chemosensory receptor repertoire of a true shark is dominated by a single olfactory receptor family

Sharma et al

Dataset S1. *Scyliorhinus canicula* (Sc) and *Callorhinus milii* (Cm) olfactory and gustatory gene list

18		Cm-V2R28	SINCAMP00000017718_17887 SINCAMG00000011524	763AA	Venkatesh et al (2014)	387733	459291	-
19		Cm-V2R22	SINCAMP00000019659_19856 SINCAMG00000012801	799AA	Venkatesh et al (2014)	1067	8032	+
20		Cm-V2R29	SINCAMP00000020657_20862 SINCAMG00000013446	663AA	Venkatesh et al (2014)	4	4947	-
21		Cm-V2R25	SINCAMP00000022119_22342 SINCAMG00000014366	873AA	Venkatesh et al (2014)	298	6546	+
22		Cm-V2R13	SINCAMP00000025021_25275 SINCAMG00000016226	837AA	Venkatesh et al (2014)	8113736	8118549	-
23		Cm-V2R12	SINCAMP00000025037_25291 SINCAMG00000016227	870AA	Venkatesh et al (2014)	8119835	8123927	-
24		Cm-V2R15	SINCAMP00000025041_25295 SINCAMG00000016237	865AA	Venkatesh et al (2014)	8131390	8137320	-
25		Cm-V2R17	SINCAMP00000025043_25297 SINCAMG00000016239	843AA	Venkatesh et al (2014)	8138413	8159566	-
26		Cm-V2R14	SINCAMP00000025044_25298 SINCAMG00000016241	595AA	Venkatesh et al (2014)	8161476	8171864	-
27		Cm-V2R16	SINCAMP00000025045_25299 SINCAMG00000016242	813AA	Venkatesh et al (2014)	8177136	8182781	-
28		Cm-V2R18	SINCAMP00000025049_25303 SINCAMG00000016243	864AA	Venkatesh et al (2014)	8185728	8193356	-
29		Cm-V2R11	SINCAMP00000025051_25305 SINCAMG00000016247	866AA	Venkatesh et al (2014)	8227770	8233299	-
30		Cm-V2R20	SINCAMP00000025078_25332 SINCAMG00000016248	869AA	Venkatesh et al (2014)	8237197	8241820	+
31		Cm-V2R1	SINCAMP00000025728_25987 SINCAMG00000016659	858AA	Found in this study	17102368	17109407	-
32		Cm-V2R2	SINCAMP00000025730_25989 SINCAMG00000016660	858AA	Venkatesh et al (2014)	17115848	17122751	-
33		Cm-V2R3	SINCAMP00000025739_25998 SINCAMG00000016665	860AA	Venkatesh et al (2014)	17238108	17242406	+
34		Cm-V2R9	SINCAMP00000025740_25999 SINCAMG00000016666	840AA	Venkatesh et al (2014)	17247593	17253666	+
Scyliorhinus canicula catshark v2rl								
1		Sc-V2RL4	sf38213	393AA	Found in this study	4290	11993	+
2		Sc-V2RL1	sf38988	435AA	Found in this study	10136	4799	-
3		Sc-V2RL2	sf98342	358AA	Found in this study	3522	4595	+
4		Sc-V2RL5	sf82161	304AA	Found in this study	5087	4176	-
5		Sc-V2RL3	sf8910	557AA	Found in this study	17598	1456	-
Callorhinus milii elephant shark v2rl								
1		Cm-V2RL3	SINCAMP00000007400_07481 SINCAMG00000004834	825AA	Found in this study	2988049	3001242	+
2		Cm-V2RL2	SINCAMP00000020270_20473 SINCAMG00000013232	873AA	Venkatesh et al (2014)	166981	171510	+
3		Cm-V2RL5	SINCAMP00000024414_24667 SINCAMG00000015837	858AA	Found in this study	5258189	5274003	+

Dataset S2. Amino acid sequences of receptor families ORA/V1R, TAAR, OR, V2R, and TAS1R in catshark (Sc), Spotted Gar (Lo), and elephant shark (Cm). A gene name ending with “Ps” indicates a pseudogene. An asterisk in an amino acid sequence represent a stop codon. In catshark, sf refers to scaffold.

ORA/V1R

>Sc-ORA2_sf1492

MEGRSIVKGTLYLLLTVIGIPGNLTIVTSFIHIACYDHKLLPADTIVSNLASVNLIVVLV
RCIPETTAAFGLKQLFDDYGCKIVIFIYRTRTRALSIWLTFLLSGFQCITLAPVTSTWSTIK
RQAAKYLSAVIAFLWVLNMSLSTPAILFSISSENNASAGNKHAVNLEYCLVKFPSQTVK
LANGALQTSRDVPIVLMVLASAYILLVLYRHKQQVKGIRSSSKNQGSTIETRAAKAV
VTLVTLYVLFVFGVDSILWIYTLTVAKTMRTSLISDLRVFFSSLYASVSPIVVIISNRKVH
NKLKCVKAKPETMLSE

>Sc-ORA4_sf75446

MAEHPVQVFVYALVVSCGIFGNALVLWIAADSTRENYLASSDLILMNIAAANLMIS
LTRNTLLTTFDAGQSVSFSVGCRLMMFIWTWLRASAGIWWTSLSLYHFITIRTSRTM
LEKLSERRKVVKALVVEWVLNLVYASFALPYSSNSKNNSTNNLTVISSTIRPLLGCV
WTFPNESIGLTYAMVSVVIHEAIPVSLMIFSNSATLLFLYKHHRKTRDVQFSSVHGSTE
WKAAKTILYLILFIVSWGTHVISVNYNFNGSPSTRYMLIARFSASGFVGFYPLVVA
SGHSLRKRMRNILK

>Sc-ORA3_sf4878

MEFESTAELFFYGLLVFLGVWGNILVLVTIFATTVESHGCLAASDIILTNLAAVNLLISIF
RNILLVITESRVKILLSLSWCRVFMFLWMWLKSVSVWVTFCLSCFHFLKIKQHVHLST
KMKEIMYVLAILVGVWFVNFLYSIPAFIYSQTASGNETKILMVVSTTMEPFLGCVWK
FPTHESGIIFTAFTLVHELPIIFMVCTNLSTVYYLSKHIRTIADEHLHSVQVERMATK
LIMALVTLFVLCTGTHLLAVSYYNHNGGPATAFLTLAKYCATIFIGFSPLLIAAGHSK
LRHKVCKVLHIKI

>Sc-ORA5_sf55821

VWFNSSFSYSFTGNVFFVSLAFADLVVAVYPYPLILFAMFHNGWLLGDIHCKVSGFL
MGLSVIGSIFNITAIANRYCYICHSLAYDKLYSCRNTLIFVFLIWWLTVLAIVPNFFVGS
LKYDARVYSCTFVQTVSSSYTIAVVVIHFLVPITVVSFCYLRIWILVIQVRRRVKTDVR
PGLKQSDFRNFLTMFLVFLFAFCWAPLNFGLAVAINPQKIAPKIPWLFVLSYFMA
YFNCLNNAIYGLLNQNFKEYKRIIMSLWTPRRLFQETSKGGTEAQKTKPSPAINND
QARANSL

>Sc-ORA6_sf97348

SQHSPEVYLIKTFYPATSCTKRTLSGDRMDGIAFIYAGNLSNLFNFERNFTLGHYDQ
CYSPTAMIFVLALVYSAIILGVFGNLLLITIVMKQKEMHNVTNILIVNLSVSDLLISVM
SLPFTFVYTFMDHWIFGEAMCKLNSMIQCISITVSIFSLVLIIVERHQLIINPRGWRPTN
KHAYLSITIMWALALLTSLPFLFHVLTDEQFQYDPKYSKEFAGKYLCIDQWPSENQR
LVYTTCLLMQYFAPLCFIFICYFKVSGKKYLGFMLIWSICL

>Sc-ORA7_sf96894

FFILLYCALVAVACVGNVFLVGSIGDKKLHNATNFFIGNLSVTDLLMCLTCVPLTLS
YAFELRGWLFGRFMCHFVSLMQSAMVYVSVLSLTAIAVDRIYVVA YPIRQRVTLSCC
ALIVGGIWALSLALASPASIYATYVELKVTGNDVNICEEFWRGMETERLAYSCVVILV

SYMIPLLAVTISYCAITVHLKRRNVPGAVEQNQVRWNRKKRKTFFLLVISVVTFAICW
MPLQILNLIRDLDVDFTIIDTRYINVVQVSCHWVAMSSSCYNPFYIYASLHRKFR

>Cm-ORA1_XM_007894309.1

MELCTVVKGTSFLLQTAIGILGNLTILLSYAHIGYSDRKLLPVDVILTHLAFVNLMVVL
TRGVPQTLVTFDVANLLNDAGCKIVIYAYRVVRALSV CETCLLSVFQGLTLMPVTSK
LANYKRKAGRSIGPLAAALWALNIALCIAAPLFSVAVANSTVSNFTLDLGFCLVGFDP
RVSYYVNGVFISTRDFLVGLMTFASGYILLILHRHRRQVRAIQRAGSAQQAENR
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IKSKLFRATPQIGPRPPSTEMSHVQQ

>Cm-ORA2_XM_007894310.1

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VRCVPETTAAFGLEQLFDDNGCKIVIFIYRTRRSLSIWLTFLLSGFQGITLAPSTPKWSI
AKRLAPRCLPGALALLWLLNMCLSTSAILFSISSGNNSTRKKFAVNLEYCLVKFPSRA
VKIAIGALQTSRDVIPIALMILASAYILLILYKHHQQVKGLRSSSKGQRSSAETRAAKA
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QNKMKCTKAKPEMEASETVP SHN

>Cm-ORA3_XM_007906972.1

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IPEFILESGVEMLLPLSWCRLFMFIWVWLRCSVWVTFLLSLFYFLKIKQHVRLSTKAR
EATFVSATLLAIWLVNFAYAIPALFYAKATSGNETVSLMIVSTTVKPF LGCVWNFPNA
QAALAVSKSYLVIQEILPMLLMLGTNLSTVYYLQKHMRSIGVERLHSLQVERKAAKV
IMALVTLFVLCWGTHLLAVNYYSYNRGSATSFILTLANYSASLFIGFSPLILAMGHGK
LRGKICKILRIKLT

>Cm-ORA4_XM_007906911.1

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RNTLLLTL DAGLPVSFSSEGCRLMMFVWTWLRSTSIWVTL SLSWFHFVTVRTSRGAL
ERLSERRRVIALMAAEWGVNLVYSGFALGYSSNSTNSTNHLAVISSTIRPLLGCVWTF
PTKQSGFIYALVSVVHEAIPVVLMLYANAGTLLFLYQHHRKVQDSQLAGGDRISHE
WRAAKTILYLIGLFVFCWGTHVLSVNYYNFKGSPSTHYLLVIARFSASGFIGLYPLVV
AMGHSKLKHRLKNILKCLCP

TAAR

>Sc-Taar1a_sf32353

MNTSLRNTEMVEFCYEFVHGTSCANATRSHGVRAALYAFGAVAILVTIFGNMLVIISI
SHFKQLHTPTNYLILSLAIADFSLGCMVMPYSLMRSIENCWYLGELFCKLQASDFMFL
CAASIFHLCFISVDRYYAVCDPLKYKTRITLQIVLIMIFLSWILSAFVGFGMICLELNLIE
IRDFYNNIYCYGGCILVMGKLCSVIYSLISFYFPGFIMLCIYTKIYHVATKQARAINDI
TRQIQTIKDKTKVTSQTSERKAAKTLGIVVGVFLICWSPYFTCNFIDPFIEHSTPPIMFD
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>Sc-Taar2_sf155079

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SIYTLCFIAIDRYYAMCDPLLHPIKITLPVTIVTVILIWLFATFYGFSVFLDFSKKSVDD
YIAKSCEGSCIA YHKFEGHVDALIVFFIPIFILGIYVKIFFVARCKCDRKIGSLPNNSKH
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>Sc-Taar1b_sf112989

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CVISVDRYYAVCDPLRYKIRMTFSSVKLMIIFSWAISAVFAFLIFLELNLKGIEGFYSN
HTACYGSCVIMFSEISGVVSSMISFYIPGVTMLCIYCKIYFVAMKQVRCINRITVQISSL
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>Sc-Tar13_sf169680

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PLAYHCKMSPGKV VILLFVCWTVPAAISFIPIMLQLHKFNIPDLLTKSSCVFMVNPIY
AVCASLIAFYLPMTMLAAYWKIYRAARKQAIQIGAVDNQIQGCASGFVTAHCHKQS
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>Sc-Tar14_sf110123

GNLLIIVSIA YFTKLRTPTNAFIMSLAAADFLVGVTVMPFMAKVVFGWHFGKTFCK
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VPLLLDANLRGLDLQLDTHSCTFIVNIPYAVSASLVSFFLPMLVMLVA YGKIFQVARM
QAKQIYSIGNGFQGN SVRTRQSASMKKERKAAKTLGIIIGCFLLCWL PFFTNIANPLL
GYSMPHVLLVFLWLG YINSMFNPLLYAFFNKSFRRAFCLIMGCKILTND CQNNNL

>Cm-Taar1a_AAVX01005735

LCYESVNGSCPRAIRSTGVRITLYLLAVLAILVTLFGNMLVIISIAHFKQLHTPTNYLVF
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VCDPLKYKTITVSTVLIMICLSWALSFLVGFVIIFLELHLIEIKDFYYHEIACFGGCTL

MMGKVCALVYSTISFYFPAFIMVCIYTKIYLVAKKQARTINNLSRKVQPINEGNSIASQ
RSERKAAKTLGIVMGVFILCWSPYFVCDSEPFIKYSTPPVLFDAFFWVGYLNSTFNPM
IYGGFYSWFRKALKIILTCKIFAPDSSRINLF

>Cm-Taar2a_AAVX01045569

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LQTPNTYLVLSLAFVDFLMGFFVLPFSMVRVSVETCWYFGDTFCDIHSTLDVVLTTVSI
YNLCFIAIDRYYAVCEPLLYSIKMTLPMTALIITLNWLFIIYGSCVFLSEFTKKASGHY
RTTISCKGSCIEYRFGGHMDALIVLFIPTFIILGIYKLYFVQRKHARKIGNMPNNINSKE
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>Cm-Tar14_NW_006890197.1

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KIHSIMDVMLCTSSIVNLSCIAFDRYFAVCYPLKYRFTMSRKRVTFLLLICWILPALVSI
VPLVLDLHVIGLEDSFEQLDSQDCVFVNIPYSVTASIIAFYLPMPVILVAYAKIFLVAT
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>Cm-Taar1b_XM_007899230.1

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ERYYTVC DPLRYKVRMTLFSVLVMIFISWASAVFXFCMVCLELNLEGIKEFYNNIA
CYGGCILMLTETTGMVASVXSIFYVPGTTMLFIYK
IYLVAKKQLRTIHNVAHQIHTIEENKHRMSQNNERKAAKTLGIVMGVFILCWSPFFIC
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SRTSLF

>Cm-Taar3_XM_007899302.1

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IDCYYAVFDPLLYTTKITPPVITTFVA VSWVPTIFAFGVVFSEINLAGIENLLETSSCM
GSCALLFNELSVSSGNRVFIPSIIMLGIYIKRFLVARKHARAIEGVTEKNNEGKTNRISR
NKEHKPAKTLGLVMGIFLIYWVPPFITIIDPIINFSTPPIIFDTFVWFGYFNFAFPILYA
FFYPWFHKALKLILSCLFSDSDSSTINLFPK

V2R/V2RL

>Sc-V2RL2_sf98342

YLTFEISDALRCYPCLADEWAPPGSASCHKKSIIFLDWSNGFSIVLLTLSAFGIVLIIVISI
IFMKNVKTPVVKSSGGTMSFIMLISLLLSFLSVGLFIGKPNNDITCKIRQCLFGISFTLAVS
CAVAKSLKILLAFNPNANRNHLKLYNYGFITSFCTGLQVVICTLWLVFNGPKALR
DVSRLQREILVECSEGSYLAFAVMLGYIAFLALICFTFAFKGRKLPENYNEAKFITFSM
LIYFISWITFPVYVTTTHGKYLPAVEVVAILSSTYGILCCQFFTKCYIILFKKDCNTTTSF
LENLYDYSLKSSNIITNHSSKCKSIKTNNSQNSLNVTPISSVQNNAITNVSRRKRCSSW

>Sc-V2R1_sf5423_sf36572

MELLYFRFLVYFTISVTVSGKKTCKLKGTFNLNSFKTPGDVIGGMFPIHYRVVASN
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GTLTYLTGQDEAVPNYRCNGAPLAVLIGAGGSALSATARILGLYFPQVDYSASCS
VLSDKFQFPFIRTPSDIFQSRAMAKLVVHFGWTWVGTIASDDDYGKYGIKNFKKEEV
EKVGVCSIFSETIPKVYAREKIDRIVDTIQQSTARIIAVFSADIDLSYLMEEVLRNISR
TWIASEAWINSALISKPEYSSLLSGTIGLAIQRADIRGLQNHLIQLDPINAGEKLITFEW
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YTDVSQLRLTYSVYKSVYTVANALHNLHTCKKGEGPFVGGSCANITDFQPWQXXXX
ITLWKILLNLYQCSIWQPPFVCSSESCQPGTRKGRQGEVCCFDCIPCADGEITNVTD
RECIQCPEDYWSNANRDECVHKLIEYLYGNDALGMALIALSIFGACIAAAIAIAYMVR
RDTPLVKTNDRGLSFVLLFSLVICFLSSIVFVGLPVAWSCMTRQVLLAISFSTCLSCML
SKAVNLMLKARANKAKSPEGTKKSLSHFQQRMITLAFVVSCHACLCAAWLLILPPHP
IKNTQSQNIKIIMECNEGSVIFLCCVLGYDLLAAICFVFAFISRKLDPDNFNEAKFMTFA
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LVKGTNDANDKSAPPTSQSVTSSAISTTCSTVELN

>Sc-V2R3_sf20408

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LPELSYKMKPEVLQCEGFNFRTFRWLQMMIFTIEEINKDQTLPSIRLGYSIYDNCRKV
PQAVRAAVTLLNGADNIFKNSKCTGPPPIPAIVGDARSTQSIIGRIAGRFGIPMVRKVS
YSSSCSCLSNKLEFPTFFRTIPSDSFQAKAMAQLVKHFGWTWVGSATQDDYGQYL
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VSYNVYKAVYIAHALHNLVNCEPNKGPQNKTCANISHLAPWQLLHYLKEVNFTN
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LSFLLASLLLCFLCSLTFIQPTAWSCILRHTVFGVVSFALCISCILGKTIVVLMVFSATL
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>Sc-V2R14_sf20916

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CLSNRNEFPAFFRTMPSDAYQAKGVARLVQRFGWTWVGS IAGDDDYSHNAIQAFSD
EVRKLGVCIAFTEVIPKVYSRRKILQITETIKASTARVIVMFALEGDAYPLISEVVKQNI
TGRQWIASEAWVTSALIATKENFLSLSGTIGFAIHRAEIPGLRSFLLQVHPFKTPNNLF
VKELWETIFNCSFGMAVEQKKGKSPASISSQKKCTGLEELTNTYNIYSDVSELRISYNVY
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GEISNET

>Sc-V2R12_sf3790

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DKAEYPAFLRTVPSDYFQVRALAQLVKHFGWTWVG TIAGDDDYGRYGIQMFSEQIE
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TEFWETLFQCSLQTSENGTSQCTGSEDIKSRVNIYSDVSQLRVSYNVYKGIYAIAHAL
HNLSACKDGKGFENN SCANTVDIKPWQLLHYLKHVNFTNKLGE EVVFDENGDPNP
SYDLINWRKTADGSVRYVAVGQFGGSFDSNRLEIDESAIWNN GKKEIPRSSCSVG
CVRGTRKAVRQGPACCFDCISCADGEISNETDSIECIKCHLDYWSNSLKDRCLPKDI
EFLSFEDPLGISLVTFALCGASLTIGAAA VFTYYRNTPIVRANSEL SFFILLSLVLCFLC
SLTFIGKPTIWSCMLRHTLFGISFVLCTSCILGKTIVVLMAFRATPPNSDRMKWFGPVQ
QRVIILLCTCLQIII CLLWLTTSPPLPVKNTKYQNAKIILECDVGSIKAF AFLVLYGIGILSS
SCFLLAFFARKLPDNFNEAKFITFSMVIFFAVWVTFIPAYVSTSGKYTVAVEIFAILASS
FGILSCIFVPKCYIILFKPEKNNRKHLMCWRSAD

>Sc-V2R4_sf5901

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AAMTFLSGAEELMSNNTCRGAVSVP AIIGEAGSLQSSIIASTTGPFQIPIVSTTGPFQIPI
VSTRGPYFSTCTCLSDRRKYPAFFRTAPSDYFQTKAL AQLVKHFGWTWIGAFGNDDD
YGRFGIQQFIEQVTD FGAFCVAFSYILPKIYDAAKISQMVNVIKRSSARVIVVFTPEREM
LQIIEEIARQNV TGIQWLASEAWVTGSVLYTEQFMPYLEGTIGFSFRRAEIPGLREFLL
QVKPSPHQSNNYVNVFWEELFACKFKQPKNSTDGASIGARVCTGSE SLEDINTIYSDT
SQLRVSYNVYKGVY AIAHALHRLSLCESGKGFINSTCASIHSFEPWQLLHYLKEVRF
TDHFGGEIGFDENGDAIASYDMINCQRGPSGNIEYVQVGRFD AFAAAGQELSLEEHSI
VWTGGKAEP PWSACSESCPPGTRKASRNGEPLCCFDCVPCAEGEISNATDSVECKKC
SSDDWSSSDRTVCIPREIEYLSYKDG TGMTLAIALLGACLTVAVLAIFFRHRDTPIVK
ANNSELSFLLLSSLVLCFLCSLTFIGRPTLWSCMLRHTVFGV VFLCISCILAKTVVVL
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>Sc-V2R26_sf33886

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>Sc-V2R23_sf28714

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>Sc-V2R13_sf120645

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>Sc-V2R10_sf16807

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>Sc-V2R34_sf17118

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>Sc-V2R33_sf132767

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>Sc-V2R19_sf122650

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>Sc-V2R27_sf130314

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>Sc-V2R17_sf58048

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>Sc-V2R5_sf21367

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>Sc-V2R24_sf20060

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>Sc-V2R32_sf43102

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>Sc-V2R11_sf12477

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>Sc-V2R9_sf29147

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>Sc-V2R21_sf25216

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>Sc-V2R7_sf54760

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>Sc-V2R15_sf63087

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>Sc-V2R29_sf84419

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>Sc-V2R2b_sf17803

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***** Lepisosteus oculatus (Spotted gar) *****

>Lo_TAS1R3 XP_006642093.1

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Dataset S3. Phylogenetic tree files in Newick format for olfactory receptor families OR, TAAR, ORA/V1R, V2R, and TAS1R in catshark (Sc) and elephant shark (Cm) with reference species and outgroups.

Treefile 1

Fig 1a, Fig 2

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mn2r106:0.1071550632,(Mm_ENSMUSG00000091805|ENSMUST00000167314|Vmn2r108
:0.0873036406,(Mm_ENSMUSG00000091259|ENSMUST00000169559|Vmn2r110:0.05089
95739,Mm_ENSMUSG00000090572|ENSMUST00000167093|Vmn2r109:0.0732486670)0.9
953290521:0.0184333944)0.9998500075:0.0482371035)0.9998500075:0.0307555232)0.999
8500075:0.0226450232,((Mm_ENSMUSG00000091859|ENSMUST00000166081|Vmn2r100
:0.0759805175,Mm_ENSMUSG00000079698|ENSMUST00000079206|Vmn2r93:0.0895099
637)0.9998500075:0.0081435631,((Mm_ENSMUSG00000090315|ENSMUST00000168050|
Vmn2r104:0.1005315557,Mm_ENSMUSG00000090417|ENSMUST00000172190|Vmn2r94:
0.0777526949)0.9998500075:0.0366457078,(Mm_ENSMUSG00000056910|ENSMUST0000
0042090|Vmn2r107:0.0848297926,(((Mm_ENSMUSG00000090304|ENSMUST0000017610
7|Vmn2r99:0.0637581265,(Mm_ENSMUSG00000091631|ENSMUST00000166327|Vmn2r9
5:0.0491449394,((Mm_ENSMUSG00000091491|ENSMUST00000168710|Vmn2r97:0.0380
250678,Mm_ENSMUSG00000091679|ENSMUST00000165692|Vmn2r96:0.0371654919)0.9
918966197:0.0042607150,Mm_ENSMUSG00000096717|ENSMUST00000170424|Vmn2r98
:0.0315085516)0.9998500075:0.0255454724)0.9998500075:0.0120311693)0.9998500075:0.
0243684553,(Mm_ENSMUSG00000094892|ENSMUST00000171914|Vmn2r101:0.0640633
095,(Mm_ENSMUSG00000095961|ENSMUST00000171741|Vmn2r102:0.0262757184,Mm
_ENSMUSG00000091771|ENSMUST00000172203|Vmn2r103:0.0328066739)0.9998500075
:0.0230124220)0.9998500075:0.0304897788)0.9998500075:0.0210395993,(Mm_ENSMUSG
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50|ENSMUST00000169686|Vmn2r92:0.0134353262)0.9998500075:0.0808746737)0.999850
0075:0.0146453797)0.9042231894:0.0038350878)0.6562437379:0.0042040548)0.99985000

75:0.0662029587)0.9998500075:0.1364770382)0.9998500075:0.1037710813)0.9998500075:
0.1384833699)0.9998500075:0.1751102430)0.9998500075:0.1732720225)0.9998500075:0.3
239001022)0.9998500075:0.4644873032,((CmV2R2:0.2038353169,Sc-
V2R2b:0.2820508294)0.3078873586:0.0216158850,Sc-
V2R2a:0.2771026070)0.9998500075:0.3617852298)0.9496366138:0.0614759637)0.9998500
075:0.0776265679,((Dr_OlfCc1:0.3866433692,(((Mm_ENSMUSG00000091572|ENSMUST
00000176328|Vmn2r3:0.1272151309,((Mm_ENSMUSG00000090581|ENSMUST000001650
12|Vmn2r6:0.0162593818,Mm_ENSMUSG00000062200|ENSMUST00000161972|Vmn2r7:
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0175724|Vmn2r4:0.0235989956)0.9998500075:0.0510088336)0.9998500075:0.0548036738,
(Mm_ENSMUSG00000068999|ENSMUST00000170270|Vmn2r5:0.0551913494,Mm_ENS
MUSG00000043897|ENSMUST00000077958|Vmn2r2:0.0531647934)0.9998500075:0.0369
864047)0.9998500075:0.0506237922,Mm_ENSMUSG00000027824|ENSMUST0000002940
6|Vmn2r1:0.0827905753)0.9998500075:0.4862202579)0.9990071005:0.0718268306,((CmV
2R1:0.1137431228,Sc-
V2R1_:0.1231183600)0.2522779714:0.0137130801)0.9998500075:0.1850609630)0.9998500
075:0.2151253813)0.9998500075:0.2153553551,(((Xt_CaSR.1:0.1599371546,Mm_CaSR:0.0
654071574)0.9998500075:0.0297822082,Dr-
CaSR.:0.2001762361)0.8799414553:0.0243287318,(CM_CaSR:0.0485565378,Sc-
CasR:0.0797812725)0.9998500075:0.0422223236)0.9998500075:0.4302726200)0.99985000
75:0.1085846745,((((Dr_TAS1R3:0.9037120853,Mm_TAS1R3:0.8768945203)0.983503269
9:0.1495172228,Sc-
TAS1R3:0.9094260028)0.9998500075:0.2540464119,((CmTAS1R7:0.4155979575,Sc-
TAS1R8:0.6328107666)0.3596376751:0.0330151931,Sc-
TAS1R7:0.3367905874)0.9998500075:0.2520175847)0.9998500075:0.1068363327,(((CmT
AS1R4:0.4778480893,Sc-
TAS1R4:0.3524435244)0.9998500075:0.2988934301,(CmTAS1R6:0.5178487647,((Sc-
TAS1R5:0.3671303081,CmTAS1R5:0.4421032884)0.8895046355:0.0973521382,Sc-
TAS1R6:0.6871644957)0.9637263649:0.0957667682)0.9998500075:0.1660710007)0.99985
00075:0.1065827942,((Dr_TAS1R2b:0.2053926621,Dr_TAS1R2a:0.1904638906)0.9998500
075:0.8363920149,(Mm_TAS1R1:0.6949263257,Dr_TAS1R1:0.7017920891)0.9998500075:
0.1450928830)0.9998500075:0.1389108146)0.9998500075:0.1799606871)0.9998500075:0.3
199948693,((((CmV2RL3:0.4546677871,Sc-
V2RL3:0.4770771373)0.9998500075:0.1959239194,((Sc-
V2RL5:0.4312376052,CmV2RL5:0.2056639739)0.3452680559:0.0239389033,Sc-
V2RL4:0.2833321218)0.9998500075:0.2055381795)0.9587952243:0.0418018561,Dr_OlfCb
1:1.0026177111)0.9799146033:0.0647422885,(Dr_OlfCa1:0.7665250987,(Sc-
V2RL1:0.1778861590,(CmV2RL2:0.1943814329,ScV2RL2:0.3702992950)0.2090347394:0.
0103194855)0.9998500075:0.2174393864)0.9998500075:0.1430434119)0.9998500075:0.23
04661900)0.9998500075:0.2555429448)0.9998500075:0.9606190085,(((Sc-
grm1:0.0794032842,Cm-grm1:0.0770415724)0.9990352591:0.0328771655,Mm-
grm1:0.1047149252)0.9998500075:0.0999523115,Sc-
GRM2:0.2384528812)0.9998500075:0.4505751497)0.8846047977:0.0697232898,((((Cm-
grm7:0.1781032606,Sc-GRM3:0.1630302103)0.9998500075:0.0616219098,Sc-
GRM4:0.2256671944)0.6249916101:0.0114016340,Sc-

GRM5:0.3633222216)0.3516464196:0.0238807854,(Cm-grm4:0.0712992664,Sc-GRM6:0.0456317271)0.9998500075:0.1092819716)0.9998500075:0.5191029929)0.999850075:0.3591194458,(Mm-grm2:0.2074281081,(Cm-grm2:0.0847463008,Sc-GRM7:0.0905605385)0.9945911297:0.0525313336)0.9998500075:0.0669086079,(Sc-GRM8:0.1497284755,(Cm-grm3:0.1180066566,Sc-GRM9:0.0692079499)0.9444652587:0.0561484572)0.9998500075:0.0917078450);

Treefile 2

Fig 1b

(Mm_EN09618:0.00478437,(Mm_EN07084_1:0.00000007,Mm_EN07084:0.00000007)0.000000:0.00592534,(Mm_EN09674:0.00605773,(Mm_EN06682:0.06434978,(Mm_EN09076:0.74299796,(Cm-V2R1_SI:0.29321213,((Mm_EN02782:0.08625450,((Mm_EN09157:0.12440375,(Mm_EN09204:0.02391636,(Mm_EN09058:0.01626428,Mm_EN06220:0.00560713)0.999850:0.01930514)0.999850:0.05530207)0.999850:0.05946231,(Mm_EN04389:0.05270474,Mm_EN06899:0.05479329)0.999850:0.03486091)0.999850:0.04978633)0.999850:0.55828649,Dr_OlfCc1:0.36786462)0.938575:0.06534221)0.999850:0.32563531,(((Sc_CasR:0.07329994,CM_CaSR_AD:0.04402687)0.999850:0.05646488,((Mm_CaSR_AA:0.05948710,Xt_CaSR_XP:0.16312503)0.999850:0.02923929,(Lc_CASR:0.09715289,Dr-CaSR:0.22529203)0.911178:0.01164268)0.988269:0.02595962)0.999850:0.47943993,(((Sc-V2RGrm1-:0.16551978,(Mm-grm1_mG:0.11329602,(Cm-grm1:0.07512548,Sc-V2RGrm2-:0.06244525)0.000000:0.02745281)0.999850:0.10849042)0.000000:0.57658465,((Sc-V2RGrm3-:0.09903416,(Sc-V2RGrm4-:0.08181964,Cm-grm3:0.12891184)0.000000:0.06229581)0.000000:0.08430912,(Mm-grm2_mG:0.22372718,(Sc-V2RGrm5-:0.08112093,Cm-grm2:0.09118287)0.000000:0.05097620)0.999850:0.08221296)0.999850:0.37930673)0.000000:0.09388289,((Sc-V2RGrm6-:0.03323184,Cm-grm4:0.06635227)0.000000:0.10343683,((Sc-V2RGrm7-:0.12770619,Cm-grm7:0.19116505)0.000000:0.06523715,(Sc-V2RGrm8-:0.28561546,Sc-V2RGrm9-:0.28561546)0.000000:0.02885273)0.000000:0.04032162)0.999850:0.52614255)0.999850:1.02608300,(((Dr_OlfCb1_:1.11959474,((Sc-V2RL5-s:0.32306559,(Sc-V2RL4-s:0.36622217,Cm-V2RL5_S:0.21882951)0.257471:0.01849691)0.999850:0.26056259,(Sc-V2RL3-s:0.43579259,Cm-V2RL3_S:0.47546368)0.999850:0.19541204)0.987356:0.05167461)0.408600:0.06156723,(Dr_OlfCa1:0.82714648,(Sc-V2RL2:0.31722869,(Sc-V2RL1-s:0.21127194,Cm-V2RL2_S:0.18980951)0.321413:0.02157677)0.999850:0.22439464)0.999850:0.11433657)0.999850:0.23193098,(((Lc_TAS1R4:0.46428645,(Sc-TAS1R8:0.53696932,(Sc-TAS1R7:0.45583558,Cm-TAS1R7:0.37514952)0.998013:0.12738665)0.984336:0.11033012)0.999850:0.19855073,(Sc-TAS1R3:0.90171272,((Mm_TAS1R3:0.18124786,Hs_TAS1R3:0.19099811)0.999850:0.757

85087,(Lc_TAS1R3:0.62052947,(Dr_TAS1R3:0.56287641,Lo_TAS1R3:0.27897148)0.999850:0.40885265)0.999850:0.15972393)0.999850:0.12051508)0.999850:0.23807481)0.999850:0.11804831,(((Cm-TAS1R6:0.57314347,(Sc-TAS1R6:0.71263661,(Sc-TAS1R5:0.47952382,Cm-TAS1R5:0.47525587)0.622085:0.07136554)0.989313:0.09708767)0.999850:0.17510150,(Sc-TAS1R4:0.29298434,Cm-TAS1R4:0.42664206)0.999850:0.37289034)0.999850:0.13126078,((Lc_TAS1R2a:0.24513604,Lc_TAS1R2b:0.24513604)0.999850:0.55361829,((Mm_TAS1R2:0.23184378,Hs_TAS1R2:0.21922328)0.999850:0.98042710,((Lo_TAS1R4:0.38401885,(Lo_TAS1R3:0.37711159,(Lo_TAS1R2:0.31957458,(Dr_TAS1R2a:0.24396233,Dr_TAS1R2b:0.16107684)0.999850:0.60293041)0.993548:0.07806272)0.999850:0.08497440)0.999850:0.48561993,((Mm_TAS1R1:0.19776776,Hs_TAS1R1:0.18272539)0.999850:0.57791983,(Lc_TAS1R1:0.36633942,(Dr_TAS1R1_:0.46570471,Lo_TAS1R1:0.28406114)0.999850:0.30364484)0.999850:0.13630935)0.999850:0.12307834)0.999850:0.08519210)0.000000:0.04743686)0.999850:0.06547155)0.999850:0.16841527)0.999850:0.37421805)0.999850:0.34025319)0.000000:0.09277097)0.999850:0.20248710)0.999850:0.54050683)0.999850:1.31664531)0.989641:0.02345778)0.348516:0.00108254);

Treefile 3

Fig 3

((((((((((((((((((((((MOR262-1:0.4129699946,(MOR274-1:0.5148627706,Xt1OR28190.1:0.6350844537)0.9935979591:0.1051670188)0.9998500075:0.0986295532,(MOR213-2:0.4926942488,(MOR189-1:0.4161041713,MOR175-1:0.3521335280)0.9998500075:0.1034155843)0.9998500075:0.0999132634)0.4167519192:0.0216215644,(((MOR156-1:0.5925060292,MOR145-2:0.4209850803)0.9998500075:0.1158586369,MOR224-1:0.5906533913)0.9681822304:0.0441658256,((Xt1OR27832.3:0.0338539874,Xt1OR27832.2:0.1341300799)0.9998500075:0.4334409957,Xt1OR27704.1:0.3615954229)0.9998500075:0.1813141499)0.9998500075:0.1129119623)0.9957271476:0.0531586608,(((MOR112-1:0.1545452444,MOR115-1:0.2455439933)0.9998500075:0.3314939176,MOR104-1:0.4755077712)0.9939394357:0.0815715354,(Xt1OR28273.2:0.0613835192,Xt1OR28273.1:0.0601405042)0.9998500075:0.4957754558)0.6342448328:0.0426402943)0.9959888956:0.0886643490,(((Xt1OR27472.2:0.1099387110,Xt1OR27472.1:0.0494066162)0.9998500075:0.3142211304,Xt1OR27812.1:0.4678124903)0.6425046565:0.0721639804,(((Xt1OR27315.2:0.0606334224,Xt1OR27315.1:0.0654376688)0.9998500075:0.0357985544,Xt1OR27101.2:0.0410224155)0.9272918349:0.0266553434,Xt1OR27101.1:0.0903661677)0.9998500075:0.4054546450,Xt1OR26941.2:0.4173968224)0.7361562885:0.0655038327)0.9998500075:0.2571777407)0.9998500075:0.1830942213,Dr3OR5.4:0.5601659768)0.9934800281:0.1472078294,Sc-OR2:1.0062724630)0.9919544811:0.1310948575,(((Dr3OR15.30:0.5291712007,Dr3OR6.2:0.7386548628)0.7408632502:0.1029135464,(((Dr3OR15.42:0.1588303248,((Dr3OR15.39:0.1342896953,Dr3OR15.40:0.1913459463)0.9998500075:0.0612666587,(((Dr3OR15.37:0.1309975746,Dr3OR15.41:0.1108364185)0.9937658558:0.0298201382,(Dr3OR15.38:0.12748716

76,Dr3OR15.36:0.1041221533)0.9998500075:0.0378168315)0.5395198015:0.0115311423,((
Dr3OR15.34:0.0468078484,(Dr3OR15.35:0.0955011126,Dr3OR15.33:0.1185977357)0.2551
729889:0.0032875646)0.9998500075:0.0763249528,(Dr3OR15.32:0.0808756343,Dr3OR15.
31:0.0759504512)0.9998500075:0.0385499093)0.9927534911:0.0106627168)0.9998500075:
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89783839,((Dr3OR10.21:0.0056156205,Dr3OR6.3:0.0000003153)0.9998500075:0.15421383
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Dr3OR10.18:0.1570755805)0.9782053637:0.0217092204,((Dr3OR10.22:0.0920928590,Dr3
OR10.20:0.0429956306)0.9998500075:0.0586215073,Dr3OR10.19:0.1039683760)0.999850
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075:0.0701326772)0.9998500075:0.1475135368,Dr3OR15.43:0.2421314480)0.9998500075:
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)0.9998500075:0.2499129973)0.9998500075:0.2286044492)0.7580571495:0.0537040781)0.
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R10.5:0.0000000001)0.9998500075:0.0642771047,Dr3OR10.4:0.0493614835)0.9998500075
:0.0817763774,(((Dr3OR10.9:0.2292988814,Dr3OR10.11:0.0601966256)0.3921105296:0.02
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8500075:0.0741830677,(Dr3OR10.15:0.0282702074,Dr3OR10.14:0.0331548077)0.9998500
075:0.0473286592)0.9427526851:0.0313450543)0.9998500075:0.8395207875)0.987094692
6:0.0860747139)0.8688842019:0.0609455865)0.9896186253:0.0942393285,(((Dr3OR113-
1:0.0911652780,Dr3OR113-2:0.0986134068)0.9998500075:0.3353940018,(Dr3OR114-
1:0.3170062709,Dr3OR9.1:0.5218217553)0.9998500075:0.2538577685)0.9998500075:0.179
5419048,Dr3OR9.2:0.5030315459)0.9998500075:0.1886762829,(((MOR41-
1:0.5620393986,MOR33-1:0.2921613086)0.9982365685:0.1157274651,(MOR20-
1:0.5737918701,(MOR17-1:0.2558332043,((MOR2-1:0.3947256932,(MOR4-
1:0.3062595774,MOR1-
1:0.3677002231)0.9488660163:0.0582044313)0.9998500075:0.0771196305,MOR8-
2:0.4091554280)0.4822705530:0.0654001595)0.9822126870:0.0771047884)0.9998500075:0
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Treefile 4

Fig 4

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Treefile 5

Fig 5

((((((((((((Lo-ORA7:0.4145474517,Lc-V1R07:0.2738402039)0.9998500075:0.1096602289,(((Xt_ORA12:0.4418444675,(Xt_ORA13:0.4728255265,((Xt_ORA6:0.2600217833,(Xt_ORA2:0.0000002698,((Xt_ORA4:0.0651294438,Xt_ORA3:0.0094825441)0.9998500075:0.0183369352,Xt_ORA5:0.0540996073)0.9998500075:0.0377806610)0.9998500075:0.1976777654)0.9998500075:0.0905659801,(Xt_ORA11:0.6806833149,Xt_ORA7:0.2067223095)0.8788498360:0.0411981032)0.9998500075:0.0558500666,((Xt_ORA8:0.0528594026,Xt_ORA9:0.0841141685)0.9985159282:0.0400412196,Xt_ORA10:0.1245450703)0.9998500075:0.1793991575)0.9820519937:0.0819166515)0.9998500075:0.1689667657)0.9998500075:0.1634490532,((Lc-V1R10:0.1049870553,Lc-V1R09:0.1036644980)0.9998500075:0.1579454208,Lc-V1R08:0.4858728108)0.9925804027:0.0570561358)0.9927698233:0.0415017861,(Lo-ORA8b:0.0403247436,Lo-ORA8a:0.0352534173)0.9998500075:0.3548965665)0.9998500075:0.1549844918,(((Cm_ORA1:0.3327117980,(Lc-V1R01:0.4108993083,(((Lo-ORA1:0.1511720862,(Dr-ORA1:0.1720305881,(Gm-ORA1:0.1253198545,Ga-ORA1:0.1090082153)0.9998500075:0.0830582566)0.9998500075:0.0698990439)0.999850075:0.1194038910,Lc-V1R01a:0.1741504306)0.9998500075:0.0499168450,Xt_ORA1:0.4096198699)0.3597868135:0.0127966683)0.9386441989:0.0340238916)0.7448072471:0.0637379394,(Xt_ORA14:0.7334832930,((Mm_285399105001160201.1|_V1R_31:0.4910289449,(Mm_285398425001160200.1|_V1R_A16:0.4458007906,(Mm_87262444460_V1R_41:0.3495621126,Mm_87272444451_V1R_42:0.3417439761)0.9998500075:0.1715466259)0.9998500075:0.3277103616)0.9998500075:0.4558892905,((((((((((((Mm_285402392001160227.1|_V1R_163:0.0183033952,(Mm_285400453001160210.1|_V1R_104:0.0000003139,Mm_285402042001160224.1|_V1R_152:0.0030148571)0.9998500075:0.0121708814,Mm_285402145001160225.1|_V1R_155:0.0030094436)0.9814706311:0.0030255014)0.9998500075:0.0143297499,((Mm_28540151901160220.1|_V1R_139:0.0000004054,Mm_285402262001160226.1|_V1R_157:0.0158255507)0.9998500075:0.0148612497,(Mm_285400150001160208.1|_V1R_91:0.0183299792,Mm_

285402808001160229.1|_V1R_124:0.0342026869)0.9998500075:0.0197534339)0.93664919
94:0.0060113951)0.9998500075:0.0117349051,((Mm_296841149001160623_V1R_Vmn1r9
7:0.0030360752,((Mm_285400898001160218.1|_V1R_111:0.0000000001,Mm_2968410280
01160641_V1R_Vmn1r138:0.0000000001)0.0000000000:0.0000002201,Mm_296841151001
160626.1|_V1R_Vmn1r156:0.0030528642)0.9998500075:0.0061373721)0.9998500075:0.02
63658781,Mm_296841161001160635_V1R_Vmn1r106:0.0280792245)0.9998500075:0.0289
207997)0.9998500075:0.0108543948,Mm_285397842001160196.1|_V1R_160:0.033899400
0)0.9986242448:0.0142163036,((Mm_296841131001160223_V1R_Vmn1r147:0.030849949
4,(Mm_285402909001160230.1|_V1R_159:0.0290472862,Mm_285400290001160209.1|_V1
R_103:0.0146942100)0.6830228511:0.0050616895)0.9957600500:0.0076008580,(Mm_2969
23877001160638.1|_V1R_Vmn1r162:0.0000000001,Mm_296923880001160639_V1R_Vmn
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