

>Mus\_musculus MATRPQPLGMEPEGSADLLHGPEGARGQYGSTQKIEDLMDMVKKLQKVGSLPFRIEVLINRINEVQQAkkKASEELGEAQTWVNDNLQKEL  
>Homo\_sapiens --MAGRSLTSKAEPETAGAVDRAEKAGGQDTSSQKIEDLMDMVKKLQKVGSLPFRVEVLINRINEVQQAkkKANKDLGEARTICEALQKEL  
>Canis\_lupus -----MVKKLQKAGSLPFRVEVLINRINEVQQAkkKASEELGEARTVWEALQKEM  
>Monodelphis\_domestica -----GGPDSSRNLEPFRIEGMINRINELQQAkkNANKELCETQAHRSQKEL  
>Sarcophilus\_harrisii -----KMEEMISIIISQLQAQRCTNEELQRNQLKMETLKEEL  
>Macropus\_eugenii -----RNPQFRLENMNRINELQQAkkIANKELCETQAHRSLEKEL  
>Ornithorhynchus\_anatinus -----MEKNQQDQRSLGLMREKAMEHTEYKVEADLVMLVEKLOKAGTLEPRIEDLIKIKDLQVRKKNANEELLKTRAHSEALQREL  
>Anolis\_carolinensis -----MAGAEGGIRKRTMEGNDPDPWDFSSKMEEILSLVKQMNVKLEPFRIEDLVKIKKLQQAkkKILSEELSEANEHSKSLQREL  
>Pelodiscus\_sinensis -----GTLEPRMDDLVGRLRKLQRAKQALSQELQDSQARSKELQEEL  
>Chelonia\_mydas -----MLFESNELPPSFASDICALHYAGTLEPRMDDLVGRLSRQLQRAKQALSQELHEGQARSEELQAEL  
>Xenopus\_tropicalis -----ESLTSLLRKLLEATDLEPKLEELLTDIKRVQEARCALSRLEQECCREQQGETAKREL  
>Latimeria\_chalumnae FELARVPLGGKAAAVGGLLFHPSGVRGNEESRLEEDLLKIVKELKQAGKTVPRIEELVKKLKLQQLQGGKNAVDEELCEARKCREALQKEL  
>Danio\_rerio -----MSELLESSFSIEDIIKT--SKSPDSRAELKPEELITQLRKLQVKKILEEEVTEVMLLKCARKQEE  
>Oryzias\_latipes -----MSTYSSLRQTNMNSQDGELOGSTNSGNLMGKLRRLQKGNRALGEEKELKLTSEALQKDL  
>Oreochromis\_niloticus -----MSDLEGFSDIEDMINVKPLRGGGELQEPKVEQLIGKLGRLKQGRALGEEIVKIKSVSDSLEKEL  
>Ictalurus\_punctatus -----TRPKPESTESSFNVEDVFRF--PQAPGREKDLKIEELLSKLRKLQVVKLVLEEEVKEALSICSTLRDED  
>Branchiostoma\_floridae (136)MDPDGMVALLDFFREDGVTPLYMLFFKDGLEEKFEGLVEARTMSVKEPFRVEDLLSSVRELO  
>Asterina\_pectinifera -----KNCESSALVNFSCIAFAWNLQRLSLLLQECVMIHLMGETTGPFTFGIDIKNKIKDLQEEKERNERKLSEARSKRKRLENKY  
>Capitella\_teleta -----DVRVDVIVNSLKLQQLQERSNLDTKLNELRRKRFVVEKNV  
>Crassostrea\_gigas -----TRPMAGNSSTFRVDLLHLSLKEIQEKNCLEHKLAEERRSRRELENLL  
>Lottia\_gigantea -----MAAVEQNFVRVETLLHNLKELQNEKTCLEQKLEQRKRDAERHF  
>Mytilus\_californianus -----KKSYLEQKLNERNRRRQLEQEL  
Consensus : : \*:\*:\*:::\*\*\*:::\*\*\*:::\*\*\*:::\*\*\*:::\*\*\*:::\*\*\*

>Mus\_musculus DLLREKVRLEKIDILNRKEETLRIMQLHCQEKESERQRK--HSMLEQCKERISFLNSQIDKEKAKLRKLRLDFFEHLETLMSEQHKTLEFHF  
>Homo\_sapiens DSLHGKVLKLEILSKQETLRILRLHCQEKESERHRK--HTMLQECKERISALNLQIEEEKNKQRQLRLAFAEQLEDLMGQHKDLWDFH  
>Canis\_lupus DSLSGEKVRLKEILNKKQETLRILRLHCQEKESERQRK--HTMLQECKERISALNSQIEEEKNKQRQLRLDFFEHLETLMGQHKDLWKFH  
>Monodelphis\_domestica EELSLEEAQLKEILNKKQETLRILRLHCQEKETEALRQ--QAVSEGCQRITELNSKIQEEKMKRRNQVVEFGQOLEEMMEKHKTLEWFH  
>Sarcophilus\_harrisii DKLNLEMIQLEETLNMKQGTLLLLQERRREEKALRQ--QTTSMECLQNVATLNAKIQEEKLRKKRKLKEFEQOLEELMQHKHELMEFH  
>Macropus\_eugenii DNLSEETQLKEILIEKQETLRILHLHCQEKETEALRH--QTVSEGYKKRITELNLSKIQEEKLKKRNQRMFEFGOLEEMMEKHKTLEWFH  
>Ornithorhynchus\_anatinus DELNAEKAHLEELNQQETLMMRLQCEKQAEARQ--QEVSQGCKQRIEELTSKIQEEKLKQRKQRMEFDQOLEEMMEKHKSLEWFH  
>Anolis\_carolinensis EKLNAEKSSLEEIWNEKKEETRVKMQFHCEETIKRQWQ--QKLNLECKQRIEAVTAKIQAEKRKQSKQRMEFEQLEELMEKHKLWELLY  
>Pelodiscus\_sinensis EERCFHPPSWEEICSQKQELRLTLQRLRSQETAEGQRLGCSGLTQERKQHIEELAAKIQEEKLKQRKHRLFEFQLLGELMGEHQSL----  
>Chelonia\_mydas EELNKEKSNLEEICSQKQEVRLTLQRLCQETEVARQ--QTLSDQRKQSIEELTAKIQEEKLKQRKQRYXXX-----  
>Xenopus\_tropicalis EELKAEKLQLEQTLTKNQET--LQLQCEKGAETRQ--KELSDCKQRIEGLTNQIQEEKLKRMMQRLBYEKQVEELMAKHKDLWELLY  
>Latimeria\_chalumnae DKLSAESFHLEETLNKKQETLQLLQFQYKERENEIKRQ--LNHSEGCQRVEQITSQIQEEKLKRKKQRMEFEMQLEELMEKHKSTWFEH  
>Danio\_rerio DALAAEALKLEGTLNKAEELNLSQLKCEDLQLEARQ--LEQNHQKEELVKQYSFQIQETKLRHKIRMKFENQLQQLTEQHKNSLAVF  
>Oryzias\_latipes DALQARTNQLEKDYKEKEELCRKLOFQYDKSEQDFERE--MKDHKMRKDLLEQYRCEIQEFKLRHKLKRMRFENQLQHLMEKHKLHCVF  
>Oreochromis\_niloticus ENLQTKVVFLEAIHKEKEETVCKLQFQCESEQDARQ--LQLNKKSEQLLEQYRYEIQDLKLRHKLRMRFEENQLQHLMEKHKLHCVF  
>Ictalurus\_punctatus NALTAELQLQGLILSEKEETCRSLQFKLEDLEQESQKQ--SELKQKQELVLYQYSQCIQETKLRHKIRMKFENQLQQLIGHKNFCTLF  
>Branchiostoma\_floridae -KVSQQHRQISVLYNKMVETLKIATAKHKVDQSQMADNQ--EQVNQDKRASLETENSSIEQEVQRQRQYSREFFESQLDELTDASHHAWLYF  
>Asterina\_pectinifera ETALSQKFNQATDTKAKMTDILKVAQYKVDQSQAAIEGQ--QSINQEVKQRVSHLKDCKMEERRQEEERELLEGLASLTELPHMGKDFY  
>Capitella\_teleta ESLTGRYLQHRDVSNSKLNLTQVAQKQVNNNTQQAIDAL--QKQCHAASKENQQLVDQAERTKSQEMEIMREFFENQIVNMIKFKYAQVFY  
>Crassostrea\_gigas DIENNKFTQMKEGHEKLEETMKVAQLKETQTQSMANRL--EESNQQRKKNIDEILNRKLSAEEKQLQNVENFEKELADIANQLMNARTFY



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>Branchiostoma_floridae -----
>Asterina_pectinifera -----
>Capitella_teleta -----
>Crassostrea_gigas KLTTLKA-----
>Lottia_gigantea KLKESLE-----
>Mytilus_californianus LIEAI-----
Consensus :: ::::
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**Figure S1** Multiple alignment of SYCE1 homologues. Positions kept for phylogenetic inferences are indicated in red.

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>Mus_musculus      ---MADSDPGERSYDNMLKMLSDLNKDLEKLLLEEMEKIS--VQATMAYDMVMRTNPTLAESMRRLEDAFLNCKEEMEKN--QELLTETKRKQ----
>Homo_sapiens      ---MDADPEERNYDNMLKMLSDLNKDLEKLLLEEMEKIS--VQATMAYDMVMRTNPTLAESMRRLEDAFVNCKEEMEKN--QELLHETKQRL----
>Canis_lupus       ---MADSEPGERNYDNMLKMLSDLNKDLEKLLLEEMEKIS--VQATMAYDMVMRTNPTLAESMRRLEDAFLNCKEEMEKN--QELLNETKHKQ----
>Monodelphis_domestica -----XXXS--LQATMAYDMVMRTNPALADSMRRLEDAFLNCKEEMEKN--QELLNETKPKQ----
>Sarcophilus_harrisii -----XXXA--VQATMAYDMVMRTNPALADSMRRLEDAFLNCKEEMEKN--QELLNETKPKQ----
>Macropus_eugenii  ---QGDAKSGD-NYDNILKMLSN-----LKD LKME--NQATMAYDMVMRTNPALADSMRRLEDAFLNCKEEMEKN--QELLNETKPKP----
>Ornithorhynchus_anatinus ---MAETDPGERSYD-MPKSLSDLNRDLENLLEEMEKIS--VQATMAYDMVMRTNPTLADTLRRLEGSFLDCKEEMEKN--QALLQETQSAPSR--
>Gallus_gallus     ---MARQEPQERNYDNMLKMVEDLNRDLEKLLLEEIEKLT--VQATMAYDMVMRTNPDLTNSMRRLEDAFLNCKEEMEKK--QEVLRRESKGEQKK--
>Taeniopygia_guttata ---MDESSEQKENYNEGKMVENFNMDMEELLEDMEKLT--VRAAMAYDYVAIQTNPGPYNAQHLEDAFLMCKEQMEKK--QEVLLFRGEGQKK--
>Meleagris_gallopavo ---MARQEPQERNYDNMLKMIEDLNRDLEKLLLEEMEKLT--VQATMAYDMVMRTNPDLTNSMRHLEDAFLNCKEEMEKK--QEVLRRESKGEQKK--
>Anolis_carolinensis ---MAKCEYERNYDNIVKQLEDLNRDLEKLLLEDMEKLSIPVQATMAYDMVMRTNPELANSMRRLEDAFLTCKEEMERN--QEMLKETKGAEQRP--
>Pelodiscus_sinensis ---MAKSEPEERNYDNMVKMLEDLNRDLEKLLLEEMEKLSVAVQATMAYDMVMRTNPDLANSMRQLEDAFLNCKEEMEKN--KEMLKETKGNEQKQ--
>Chelonia_mydas    ---MAKSEPREERNYDNMVKMLEDLNRDLEKLLLEEMEKLSVAVQATMAYDMVMRTNPDLANSMRRLEDAFLNCKEEMEKN--QEMLKETKGTEQKQ--
>Chrysemys_picta   ---MAKSEPEERNYDNMVKMLEDLNRDLEKLLLEEMEKLSVAVQATMAYDMVMRTNPDLANSMRRLEDAFLNCKEEMEKN--QEMLKETKGTEQKQ--
>Python_molurus    -----VS--VQATMAYDMVMRTNPDLANSMRRLEDAFLTCKEEMEKN--QEMLKETKGAEQPK--
>Alligator_mississippiensis ---MAKSEPEERNCDNMVKMLEDLNRDLEKLLLEEMEKLSVAVQATMAYDMVMRTNPDLANSMRRLEDAFLNCKEEMEKN--QEMLKETKDGGEKK--
>Xenopus_tropicalis ---MAEPETSVQSSQEDVSRMLRDLNDDLENMKEKMETLS--VRTTEMAYDMVLRTPALAQSMKRLDAFFKCRREEIEKN--QEMLEETKQKTKPEP--
>Latimeria_chalumnae ---MAESELCEKKHDNIIKMLCDLNRDLEKMLEDIKISGRVQATMAYDMVMRTNPELTDMSKRLDAFLNCKEEVERN--QEMLSETKGNO----
>Danio_rerio       ---MSGGLSDVQLCEDFSSESLLQNLQHLEKMTQMEDVVS--VKLSCMTMDMVLRTSPDLSESFKSLENEFQKCKAVLCGL--TDGQEVKCHPADEEQV
>Oryzias_latipes   (4)MSDSSASSELPG-SNDDVLELNKLERMVEDTENMS--AQLTMAAYDMVALRTNPEEGASMRQLEEAYQRCRAAVFGDSAPEPEGETDSASAKP--
>Oreochromis_niloticus ---MADSSARSELPRISDDDKLEMNKLERMIEDVESMS--AHLTMAAYDMVALRTSPELGASMQKLEAYLKCRAAVCGD--PDQESQIDKYAETAVT
>Tetraodon_nigroviridis ---MS-----ELTEDLERMTEHTEKMS--LQLTMAHDLVLRASPELASSMRKLEDAYRGCRAAVCGD--PEPDKSPAAPGAQP--
>Ictalurus_punctatus ---MVDNASAGEQYEDFGRETLECSKDLEKMTQMEKIS--VNVTMATMDMVLRTDPQLKSLKRLKNEFVQCKAVICGS--GDNLVQDRIVANQKT--
Consensus          *::: :::: :::: :::: :::: :::: :::: :::: :::: :::: :::: :::: :::: :::: :::: :::: :::: :::: :::: :::: :::: :::: ::::

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>Mus_musculus      -----
>Homo_sapiens      -----
>Canis_lupus       -----
>Monodelphis_domestica -----
>Sarcophilus_harrisii -----
>Macropus_eugenii  -----
>Ornithorhynchus_anatinus -----
>Gallus_gallus     -----E
>Taeniopygia_guttata -----E
>Meleagris_gallopavo -----E
>Anolis_carolinensis -----E
>Pelodiscus_sinensis -----E
>Chelonia_mydas    -----E
>Chrysemys_picta   -----E
>Python_molurus    -----
>Alligator_mississippiensis -----E
>Xenopus_tropicalis EANTD
>Latimeria_chalumnae -----
>Danio_rerio       SPKTN

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>Oryzias_latipes          --TEM
>Oreochromis_niloticus   TLSQM
>Tetraodon_nigroviridis  ----D
>Ictalurus_punctatus     --TQE
Consensus
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**Figure S2** Multiple alignment of SYCE3 homologues. Positions kept for phylogenetic inferences are indicated in red.

**Table S1 Origin of the SYCE2 homologues**

Species name	Taxonomic rank	Accession number	sequence	Method/database	seed	E-value
<i>M. musculus</i>	Tetrapoda	NP_082230	complete	BLASTp/ NCBI nr		0
<i>P. paniscus</i>	Tetrapoda	XP_003814885	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-70
<i>R. norvegicus</i>	Tetrapoda	EDL92193	complete	BLASTp /NCBI nr	<i>M. musculus</i>	5e-123
<i>H. sapiens</i>	Tetrapoda	NP_001099048	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-70
<i>P. troglodytes</i>	Tetrapoda	XP_0011155819	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-70
<i>P. abelii</i>	Tetrapoda	XP_002828793	complete	BLASTp /NCBI nr	<i>M. musculus</i>	4e-71
<i>P. anubis</i>	Tetrapoda	XP_003915053	complete	BLASTp /NCBI nr	<i>M. musculus</i>	5e-70
<i>N. leucogenys</i>	Tetrapoda	XP_003256956	complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-70
<i>L. africana</i>	Tetrapoda	XP_003413389	complete	BLASTp /NCBI nr	<i>M. musculus</i>	8e-75
<i>S. boliviensis</i>	Tetrapoda	XP_003941778	complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-69
<i>C. jacchus</i>	Tetrapoda	XP_002761833	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-66
<i>C. lupus</i>	Tetrapoda	XP_542039	complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-73
<i>B. taurus</i>	Tetrapoda	DAA28039	complete	BLASTp /NCBI nr	<i>M. musculus</i>	4e-74
<i>M. mulatta</i>	Tetrapoda	XP_002801138	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-54
<i>C. porcellus</i>	Tetrapoda	XP_003468209	complete	BLASTp /NCBI nr	<i>M. musculus</i>	7e-58

<i>O. cuniculus</i>	Tetrapoda	XP_002724280	complete	BLASTp /NCBI nr	<i>M. usculus</i>	1e-64
<i>S. scrofa</i>	Tetrapoda	XP_003480827	complete	BLASTp /NCBI nr	<i>M. musculus</i>	4e-63
<i>C. griseus</i>	Tetrapoda	EGW00612	partial	BLASTp /NCBI nr	<i>M. musculus</i>	2e-45
<i>A. melanoleuca</i>	Tetrapoda	EFB28619	Complete	BLASTp /NCBI nr	<i>M. musculus</i>	4e-65
<i>M. putorius</i>	Tetrapoda	AES07688	Complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-64
<i>O. garnettii</i>	Tetrapoda	XP_003798068	partial	BLASTp /NCBI nr	<i>M. musculus</i>	1e-39
<i>M. domestica</i>	Tetrapoda	XP_001377747	complete	BLASTp /NCBI nr	<i>M. musculus</i>	6e-57
<i>S. harrisii</i>	Tetrapoda	XP_003760717	complete	BLASTp /NCBI nr	<i>M. musculus</i>	4e-56
<i>M. eugenii</i>	Tetrapoda	ABQO021047289	partial	tBLASTn/NCBI wgs	<i>S. harrisii</i>	3e-41
<i>O. anatinus</i>	Tetrapoda	ENSOANP00000014450	partial	BLASTp/UniProtKB	<i>M. musculus</i>	2x10-5
<i>G. gallus</i>	Tetrapoda	XP_003643433	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-37
<i>T. guttata</i>	Tetrapoda	XP_002194928	partial	BLASTp /NCBI nr	<i>M. musculus</i>	4e-15
<i>A. carolinensis</i>	Tetrapoda	XP_003216437	complete	BLASTp /NCBI nr	<i>M. musculus</i>	6e-36
<i>P. sinensis</i>	Tetrapoda	ENSPSIP00000014147	partial	BLASTp/ UniProtKB	<i>A. carolinensis</i>	9x10-31
<i>P. molurus</i>	Tetrapoda	AEQU010394814	partial	tBLASTn/NCBI wgs	<i>A. carolinensis</i>	3e-30
<i>A. mississippiensis</i>	Tetrapoda	AKHW01024067	partial	tBLASTn/NCBI wgs	<i>A. carolinensis</i>	2e-18

<i>C. mydas</i>	Tetrapoda	EMP37242	complete	BLASTp /NCBI nr	<i>A. carolinensis</i>	3e-23
<i>C. picta</i>	Tetrapoda	AHGY01185898	partial	tBLASTn/NCBI wgs	<i>A. carolinensis</i>	1e-21
<i>X. tropicalis</i>	Tetrapoda	XP_002939167	partial	BLASTp /NCBI nr	<i>M. musculus</i>	1e-19
<i>L. chalunnae</i>	Coelacanth	AFYH01158832	partial	tBLASTn/NCBI wgs	<i>A. carolinensis</i>	8e-17
<i>D. rerio</i>	Actinopterygii	NP_001018339	complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-11
<i>O. mykiss</i>	Actinopterygii	BX_298349	complete	tBLASTn/Gene Indices	<i>D. rerio</i>	1,6e-44
<i>O. latipes</i>	Actinopterygii	FS528043	complete	tBLASTn/Gene Indices	<i>D. rerio</i>	1,1e-22
<i>O. niloticus</i>	Actinopterygii	XP_003453800	complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-06
<i>T. nigroviridis</i>	Actinopterygii	CAG03308	complete	BLASTp /NCBI nr	<i>M. musculus</i>	6e-10
<i>B. floridae</i>	Cephalochordata	XP_002591412	complete	BLASTp /NCBI nr	<i>M. musculus</i>	8e-15
<i>C. savignyi</i>	Tunicata	BW516106	complete	tBLASTn/NCBI est	<i>H. diversicolor</i>	2e-09
<i>C. intestinalis</i>	Tunicata	XP_002130896	complete	BLASTp /NCBI nr	<i>M. musculus</i>	0,008
<i>P. misakiensis</i>	Tunicata	AU036426	complete	tBLASTn/NCBI est	<i>H. diversicolor</i>	2e-06
<i>S. purpuratus</i>	Echinodermata	XP_003726746	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-13
<i>A. pompejana</i>	Annelida	GO169636	complete	tBLASTn/NCBI est	<i>L. gigantea</i>	2e-14
<i>C. teleta</i>	Annelida	Jgi 210482 AMQN01004103	complete	Blastp/InParanoid tBLASTn/NCBI wgs	<i>M. musculus</i> <i>C. teleta</i>	4,9e-06



<i>S. nudus</i>	Annelida	FR768618	complete	tBLASTn/ <i>NCBI</i> est	<i>L. gigantea</i>	2e-23
<i>L. stagnalis</i>	Mollusca	ES573602	complete	tBLASTn/ <i>NCBI</i> est	<i>L. gigantea</i>	1e-09
<i>L. gigantea</i>	Mollusca	jgi 158004 AMQO01001743	complete	Blastp/ <i>InParanoid</i> tBLASTn/ <i>NCBI</i> wgs	<i>M. musculus</i> <i>L. gigantea</i>	1,8e-08
<i>C. gigas</i>	Mollusca	EKC37702	complete	BLASTp / <i>NCBI</i> nr	<i>M. musculus</i>	1e-04
<i>H. diversicolor</i>	Mollusca	GT866818	complete	tBLASTn/ <i>NCBI</i> est	<i>L. gigantea</i>	2e-32
<i>D. pulex</i>	Crustacea	EFX69051	complete	Hmmsearch/ <i>NCBI</i> est	<i>hmmprofil</i>	0,023
<i>H. magnipapillata</i>	Cnidaria	XP_002165182	complete	BLASTp / <i>NCBI</i> nr	<i>M. musculus</i>	5e-06
<i>N. vectensis</i>	Cnidaria	XP_001625149	complete	BLASTp / <i>NCBI</i> nr	<i>M. musculus</i>	2e-11

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**Table S2 Origin of the Tex12 homologues**

Species name	Taxonomic rank	Accession number	sequence	Method/database	seed	E-value
<i>M. musculus</i>	Tetrapoda	NP_079963	complete	BLASTp /NCBI nr		0
<i>S. boliviensis</i>	Tetrapoda	XP_003923759	complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-60
<i>C. griseus</i>	Tetrapoda	XP_003498567	complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-68
<i>L. africana</i>	Tetrapoda	XP_003415682	complete	BLASTp /NCBI nr	<i>M. musculus</i>	3e-63
<i>B. taurus</i>	Tetrapoda	NP_001029435	complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-63
<i>M. mulatta</i>	Tetrapoda	NP_001181321	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-61
<i>O. garnettii</i>	Tetrapoda	XP_003794793	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-59
<i>O. cuniculus</i>	Tetrapoda	XP_002708480	complete	BLASTp /NCBI nr	<i>M. musculus</i>	7e-64
<i>E. caballus</i>	Tetrapoda	XP_001501942	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-63
<i>P. abelii</i>	Tetrapoda	XP_002822521	complete	BLASTp/NCBI nr	<i>M. musculus</i>	6e-62
<i>H. sapiens</i>	Tetrapoda	NP_112565	complete	BLASTp /NCBI nr	<i>M. musculus</i>	9e-62
<i>A. melanoleuca</i>	Tetrapoda	XP_002921152	complete	BLASTp /NCBI nr	<i>M. musculus</i>	5e-61
<i>S. scrofa</i>	Tetrapoda	XP_003357347	complete	BLASTp /NCBI nr	<i>M. musculus</i>	7e-63
<i>C. porcellus</i>	Tetrapoda	XP_003472874	complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-57
<i>R. norvegicus</i>	Tetrapoda	NP_001178035	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-72

<i>C. lupus</i>	Tetrapoda	XP_854089	complete	BLASTp/NCBI nr	<i>M. musculus</i>	2e-64
<i>H. glaber</i>	Tetrapoda	EHB18703	complete	BLASTp/NCBI nr	<i>M. musculus</i>	7e-18
<i>C. jacchus</i>	Tetrapoda	XP_003734157	complete	BLASTp/NCBI nr	<i>M. musculus</i>	3e-37
<i>S. harrisii</i>	Tetrapoda	XP_003764283	complete	BLASTp/NCBI nr	<i>M. musculus</i>	1e-36
<i>M. domestica</i>	Tetrapoda	AAFR03009835	complete	tBLASTn/NCBI wsg	<i>S. harrisii</i>	2e-23
<i>M. eugenii</i>	Tetrapoda	ENSMEUP00000005950	partial	tBLASTn/Ensembl genomic sequence	<i>S. harrisii</i>	5.4e-59
<i>M. gallopavo</i>	Tetrapoda	XP_003212810	complete	BLASTp/NCBI nr	<i>M. musculus</i>	3e-29
<i>G. gallus</i>	Tetrapoda	XP_001233099	complete	BLASTp/NCBI nr	<i>M. musculus</i>	3e-27
<i>T. guttata</i>	Tetrapoda	ABQF01045735	partial	tBLASTn/NCBI wsg	<i>G. gallus</i>	7e-16
<i>A. carolinensis</i>	Tetrapoda	FG795025	complete	tBLASTn/NCBI est	<i>O. niloticus</i>	1e-06
<i>P. sinensis</i>	Tetrapoda	AGCU01007591	partial	tBLASTn/NCBI wsg	<i>A. carolinensis</i>	9e-12
<i>P. molurus</i>	Tetrapoda	AEQU010325864	partial	tBLASTn/NCBI wsg	<i>A. carolinensis</i>	2e-16
<i>C. mydas</i>	Tetrapoda	AJIM01191925	partial	tBLASTn/NCBI wsg	<i>A. carolinensis</i>	1e-12
<i>C. picta</i>	Tetrapoda	AHGY01090089	partial	tBLASTn/NCBI wsg	<i>A. carolinensis</i>	3e-12
<i>A. mississippiensis</i>	Tetrapoda	AKHW01088812	partial	tBLASTn/NCBI wsg	<i>A. carolinensis</i>	1e-10
<i>X. tropicalis</i>	Tetrapoda	XP_002942798	complete	BLASTp/NCBI nr	<i>M. musculus</i>	5e-15

<i>L. chalumnae</i>	Coelacanth	BAHO01008061	partial	tBLASTn/NCBI wsg	<i>A. carolinensis</i>	8e-09
<i>D. rerio</i>	Actinopterygii	XP_003200088	complete	BLASTp/NCBI nr	<i>M. musculus</i>	2e-10
<i>A. fimbria</i>	Actinopterygii	ACQ58790	complete	BLASTp/NCBI nr	<i>M. musculus</i>	2e-08
<i>O. niloticus</i>	Actinopterygii	XP_003453604	complete	BLASTp/NCBI nr	<i>M. musculus</i>	0,21
<i>O. latipes</i>	Actinopterygii	FS551872	complete	tBLASTn/NCBI est	<i>O. niloticus</i>	4e-39
<i>T. nigroviridis</i>	Actinopterygii	CR716219	Complete	tBLASTn/NCBI nr	<i>O. niloticus</i>	5e-22
<i>R. rutilus</i>	Actinopterygii	EG548787	complete	tBLASTn/NCBI est	<i>O. niloticus</i>	1e-21
<i>P. promelas</i>	Actinopterygii	DT342891	complete	tBLASTn/NCBI est	<i>O. niloticus</i>	5e-21
<i>D. labrax</i>	Actinopterygii	FM002700	complete	tBLASTn/NCBI est	<i>O. niloticus</i>	1e-41
<i>O. mykiss</i>	Actinopterygii	CR370999	complete	tBLASTn/NCBI est	<i>O. niloticus</i>	1e-26
<i>I. furcatus</i>	Actinopterygii	FD158102	complete	tBLASTn/NCBI est	<i>O. niloticus</i>	6e-11
<i>G. morhua</i>	Actinopterygii	EY966699	complete	tBLASTn/NCBI est	<i>O. niloticus</i>	3e-20
<i>P. olivaceus</i>	Actinopterygii	CX286679	complete	tBLASTn/NCBI est	<i>O. niloticus</i>	3e-18
<i>S. salar</i>	Actinopterygii	CB508238	partial	tBLASTn/NCBI est	<i>O. niloticus</i>	2e-24
<i>B. floridae</i>	Cephalochordata	XP_002590156	complete	BLASTp/NCBI nr	<i>M. musculus</i>	0,15
<i>S. purpuratus</i>	Echinodermata	AAGJ04009105	partial	tBLASTn/NCBI wsg	<i>A. pompejana</i>	0,35

<i>C. teleta</i>	Annelida	AMQN01002974	partial	tBLASTn/NCBI wsg	<i>L. gigantea</i>	8e-05
<i>A. pompejana</i>	Annelida	GO142621	complete	tBLASTn/NCBI est	<i>G. gallus</i>	0,009
<i>L. gigantea</i>	Mollusca	AMQO01006439	complete	tBLASTn/NCBI wsg	<i>B. floridae</i>	2e-09
<i>H. vulgaris</i>	Cnidaria	CN567182	complete	tBLASTn/NCBI est	<i>B. floridae</i>	3e-09

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**Table S3 Origin of the SYCE1 homologues**

Species name	Taxonomic rank	Accession number	sequence	Method/database	seed	E-value
<i>M. musculus</i>	Tetrapoda	NP_001137237	complete	BLASTp/NCBI nr		0
<i>R. norvegicus</i>	Tetrapoda	NP_001020229	complete	BLASTp /NCBI nr	<i>M. musculus</i>	0
<i>H. sapiens</i>	Tetrapoda	NP_001137236	complete	BLASTp/NCBI nr	<i>M. musculus</i>	7e-119
<i>P. troglodytes</i>	Tetrapoda	XP_001146521	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-117
<i>P. abelii</i>	Tetrapoda	XP_002821352	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-120
<i>C. porcellus</i>	Tetrapoda	XP_003479623	complete	BLASTp/NCBI nr	<i>M. musculus</i>	2e-144
<i>N. leucogenys</i>	Tetrapoda	XP_003275547	complete	BLASTp /NCBI nr	<i>M. musculus</i>	6e-117
<i>P. paniscus</i>	Tetrapoda	XP_003805584	complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-115
<i>A. melanoleuca</i>	Tetrapoda	XP_002928741	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-138
<i>C. griseus</i>	Tetrapoda	XP_003514379	complete	BLASTp /NCBI nr	<i>M. musculus</i>	4e-169
<i>L. africana</i>	Tetrapoda	XP_003423552	complete	BLASTp /NCBI nr	<i>M. musculus</i>	3e-122
<i>M. mulatta</i>	Tetrapoda	XP_002805923	complete	BLASTp /NCBI nr	<i>M. musculus</i>	4e-116
<i>E. caballus</i>	Tetrapoda	XP_001497316	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-126
<i>P. anubis</i>	Tetrapoda	XP_003904501	complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-120
<i>O. cuniculus</i>	Tetrapoda	XP_002718820	complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-123

<i>B. taurus</i>	Tetrapoda	NP_001033238	complete	BLASTp /NCBI nr	<i>M. musculus</i>	5e-128
<i>C. lupus</i>	Tetrapoda	XP_537943	complete	BLASTp /NCBI nr	<i>M. musculus</i>	4e-144
<i>O. garnettii</i>	Tetrapoda	XP_003803715	complete	BLASTp /NCBI nr	<i>M. musculus</i>	7e-140
<i>M. fascicularis</i>	Tetrapoda	Q4R7J8	complete	BLASTp /NCBI nr	<i>M. musculus</i>	3e-101
<i>H. glaber</i>	Tetrapoda	EHB13133	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-94
<i>M. domestica</i>	Tetrapoda	ADB77889	complete	BLASTp /NCBI nr	<i>M. musculus</i>	4e-55
<i>S. harrisii</i>	Tetrapoda	ENSSHAP00000009845	partial	BLASTp /UniProtKB	<i>M. domestica</i>	1x10-52
<i>M. eugenii</i>	Tetrapoda	FY576800	complete	tBLASTn/NCBI est	<i>M. domestica</i>	7e-109
<i>S. boliviensis</i>	Tetrapoda	XP_003938136	complete	BLASTp /NCBI nr	<i>M. musculus</i>	3e-38
<i>C. jacchus</i>	Tetrapoda	XP_003735392	complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-39
<i>O. anatinus</i>	Tetrapoda	ENSOANP00000022990	complete	BLASTp/ UniProtKB	<i>M. domestica</i>	4x10-76
<i>A. carolinensis</i>	Tetrapoda	XP_003216702	complete	BLASTp /NCBI nr	<i>M. musculus</i>	5e-44
<i>C. mydas</i>	Tetrapoda	EMP26554	partial	BLASTp/NCBI nr	<i>A. carolinensis</i>	6e-33
<i>P. sinensis</i>	Tetrapoda	ENSPSIP00000010027	partial	BLASTp/UniProtKB	<i>A. carolinensis</i>	2x10-38
<i>X. tropicalis</i>	Tetrapoda	XP_002943661	complete	BLASTp /NCBI nr	<i>M. musculus</i>	3e-20
<i>L. chalumnea</i>	Coelacanth	H3ALY1	complete	Hmmsearch/UniProt	<i>hmmprofil</i>	8,7e-77

<i>P. reticulata</i>	Actinopterygii	ES386322	complete	tBLASTn/NCBI est	<i>O. latipes</i>	2e-49
<i>R. rutilus</i>	Actinopterygii	EG545611	complete	tBLASTn/NCBI est	<i>O. latipes</i>	3e-36
<i>I. punctatus</i>	Actinopterygii	CK426085	complete	tBLASTn/NCBI est	<i>O. latipes</i>	3e-31
<i>P. promelas</i>	Actinopterygii	DT113652	partial	tBLASTn/NCBI est	<i>O. latipes</i>	2e-23
<i>S. maximus</i>	Actinopterygii	HQ603845	partial	tBLASTn/NCBI est	<i>O. latipes</i>	3e-23
<i>P. maniculatus</i>	Actinopterygii	GH530402	complete	tBLASTn/NCBI est	<i>O. latipes</i>	3e-09
<i>O. niloticus</i>	Actinopterygii	XP_003444205	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-17
<i>D. rerio</i>	Actinopterygii	XP_694355	complete	tBLASTn/NCBI est	<i>M. musculus</i>	5e-14
<i>O. latipes</i>	Actinopterygii	XP_004074263	complete	BLASTp/NCBI nr	<i>D. rerio</i>	1e-32
<i>B. floridae</i>	Cephalochordata	XP_002592847	complete	tBLASTn/NCBI nr	<i>O. latipes</i>	0,16
<i>A. pectinifera</i>	Echinodermata	DB424359	complete	tBLASTn/NCBI est	<i>L. gigantea</i>	1e-12
<i>C. teleta</i>	Annelida	AMQN01011277	complete	tBLASTn/NCBI wsg	<i>L. gigantea</i>	2e-12
<i>M. californianus</i>	Mollusca	ES407417	partial	tBLASTn/NCBI est	<i>B. floridae</i>	1e-10
<i>L. gigantea</i>	Mollusca	jgi 156257 AMQQ01001205	complete	Blastp/InParanoid tBLASTn/NCBI wsg	<i>M. musculus</i> <i>L. gigantea</i>	<0,01
<i>C. gigas</i>	Mollusca	AM858590	complete	tBLASTn/NCBI est	<i>L. gigantea</i>	3e-48



**Table S4 Origin of the SYCE3 homologues**

Species name	Taxonomic rank	Accession number	sequence	Method/database	seed	E-value
<i>M. musculus</i>	Tetrapoda	NP_001156352	complete	BLASTp /NCBI nr		0
<i>A. melanoleuca</i>	Tetrapoda	XP_002917318	complete	BLASTp /NCBI nr	<i>M. musculus</i>	6e-57
<i>C. porcellus</i>	Tetrapoda	XP_003461608	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-54
<i>C. griseus</i>	Tetrapoda	XP_003515506	complete	BLASTp /NCBI nr	<i>M. musculus</i>	5e-59
<i>B. taurus</i>	Tetrapoda	XP_001193262	complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-54
<i>R. norvegicus</i>	Tetrapoda	NP_001128725	complete	BLASTp /NCBI nr	<i>M. musculus</i>	3e-59
<i>E. caballus</i>	Tetrapoda	XP_003364377	complete	BLASTp /NCBI nr	<i>M. musculus</i>	8e-58
<i>L. africana</i>	Tetrapoda	XP_003423236	complete	BLASTp/NCBI nr	<i>M. musculus</i>	3e-46
<i>S. scrofa</i>	Tetrapoda	NP_001193291	complete	BLASTp /NCBI nr	<i>M. musculus</i>	9e-56
<i>O. cuniculus</i>	Tetrapoda	XP_002723272	complete	BLASTp /NCBI nr	<i>M. musculus</i>	4e-56
<i>C. lupus</i>	Tetrapoda	XP_003431525	complete	BLASTp /NCBI nr	<i>M. musculus</i>	7e-57
<i>S. boliviensis</i>	Tetrapoda	XP_003932838	complete	BLASTp /NCBI nr	<i>M. musculus</i>	7e-53
<i>M. mulatta</i>	Tetrapoda	NP_001180282	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-53
<i>O. garnettii</i>	Tetrapoda	XP_003783125	complete	BLASTp /NCBI nr	<i>M. musculus</i>	3e-56
<i>P. troglodytes</i>	Tetrapoda	XP_001156556	complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-52

<i>H. sapiens</i>	Tetrapoda	NP_001116697	complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-52
<i>O. anatinus</i>	Tetrapoda	XP_003430278	complete	BLASTp /NCBI nr	<i>M. musculus</i>	2e-43
<i>H. glaber</i>	Tetrapoda	EHB03472	complete	BLASTp /NCBI nr	<i>M. musculus</i>	9e-50
<i>N. leucogenys</i>	Tetrapoda	XP_003281537	partial	BLASTp /NCBI nr	<i>M. musculus</i>	2e-28
<i>M. domestica</i>	Tetrapoda	XP_003341970	partial	BLASTp /NCBI nr	<i>M. musculus</i>	2e-28
<i>S. harrisii</i>	Tetrapoda	XP_003770860	partial	BLASTp /NCBI nr	<i>M. musculus</i>	2e-28
<i>M. eugenii</i>	Tetrapoda	ENSMEUP00000004105	partial	tBLASTn/Ensembl genomic	<i>S. harrisii</i>	1.2e-38
<i>O. anatinus</i>	Tetrapoda	XP_003430278	complete	BLASTp /NCBI nr	<i>G. gallus</i>	9e-35
<i>G. gallus</i>	Tetrapoda	XP_001231764	complete	BLASTp /NCBI nr	<i>M. musculus</i>	5e-44
<i>T. guttata</i>	Tetrapoda	XP_002188999	complete	BLASTp /NCBI nr	<i>M. musculus</i>	1e-24
<i>M. gallopavo</i>	Tetrapoda	XP_003202713	complete	BLASTp /NCBI nr	<i>M. musculus</i>	4e-43
<i>A. carolinensis</i>	Tetrapoda	AAWZ02027734	complete	tBLASTn/NCBI wsg	<i>G. gallus</i>	2e-24
<i>P. sinensis</i>	Tetrapoda	AGCU01015398 AGCU01015399	complete	tBLASTn/NCBI wsg	<i>A. carolinensis</i>	6e-26 4e-10
<i>C. mydas</i>	Tetrapoda	AJIM01252458	complete	tBLASTn/NCBI wsg	<i>G. gallus</i>	7e-33
<i>C. picta</i>	Tetrapoda	AHGY01153388	complete	tBLASTn/NCBI wsg	<i>G. gallus</i>	2e-31
<i>P. molurus</i>	Tetrapoda	AEQU010368279	partial	tBLASTn/NCBI wsg	<i>A. carolinensis</i>	1e-29

<i>A. mississippiensis</i>	Tetrapoda	AKHW01109662	complete	tBLASTn/NCBI wsg	<i>A. carolinensis</i>	5e-28
<i>X. tropicalis</i>	Tetrapoda	XP_002939573	complete	BLASTp /NCBI nr	<i>M. musculus</i>	4e-32
<i>L. chalumnea</i>	Coelacanth	BAHO01390606	complete	tBLASTn/NCBI wsg	<i>A. carolinensis</i>	3e-20
<i>D. rerio</i>	Actinopterygii	NP_001129458	complete	BLASTp /NCBI nr	<i>M. musculus</i>	3e-12
<i>O. niloticus</i>	Actinopterygii	XP_003445882	complete	BLASTp /NCBI nr	<i>M. musculus</i>	3e-13
<i>T. nigroviridis</i>	Actinopterygii	CAG10121	partial	BLASTp /NCBI nr	<i>M. musculus</i>	3e-15
<i>O. latipes</i>	Actinopterygii	FS547734	complete	tBLASTn/NCBI est	<i>O. niloticus</i>	4e-34
<i>P. flavescens</i>	Actinopterygii	GO658805	complete	tBLASTn/NCBI est	<i>O. niloticus</i>	2e-33
<i>H. hippoglossus</i>	Actinopterygii	FD698650	complete	tBLASTn/NCBI est	<i>O. niloticus</i>	1e-20
<i>R. rutilus</i>	Actinopterygii	EG545621	complete	tBLASTn/NCBI est	<i>O. niloticus</i>	3e-17
<i>I. punctatus</i>	Actinopterygii	CK419473	complete	tBLASTn/NCBI est	<i>O. niloticus</i>	3e-17
<i>T. thynnus</i>	Actinopterygii	EG630239	partial	tBLASTn/NCBI est	<i>O. niloticus</i>	2e-16

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