

File S1 CYP82 protein sequence from *C. yanhusuo*, *A. thaliana*, *C. sativus*, and *E. californica*.

Species	Sequence ID	Gene name	GeneBank or source
<i>A. thaliana</i>	AT4G31950.1	AtCYP82C3	NP_194923.1
	AT4G31940.1	AtCYP82C4	NP_194922.1
	AT3G25180.1	AtCYP82G1	NP_189154.1
	AT4G31970.1	AtCYP82C2	NP_194925.1
	AT2G25160.1	AtCYP82F1	NP_180088.1
<i>C. sativus</i>	Csa_3G852560	CsCYP82D98	Chinese Long v2 (https://doi.org/10.7717/peerj.17162)
	Csa_3G852580	CsCYP82D99	
	Csa_3G852590	CsCYP82AG1	
	Csa_3G852600	CsCYP82AG2	
	Csa_3G852610	CsCYP82D101	
	Csa_3G852620	CsCYP82D104	
	Csa_3G852630	CsCYP82D102	
	Csa_3G852640	CsCYP82D103	
	Csa_3G853140	CsCYP82D100	
	Csa_3G853150	CsCYP82D105	
	Csa_3G853160	CsCYP82D106	
	Csa_3G853170	CsCYP82D107	
<i>E. californica</i>	Eca_sc000081.1_g0880.1	EcCYP82AT1	ECA_r1.0 (https://doi.org/10.1093/pcp/pcx210)
	Eca_sc000081.1_g0870.1	EcCYP82AT2	
	Eca_sc000058.1_g2080.1	EcCYP82AT3	
	Eca_sc007583.1_g1180.1	EcCYP82AU1	
	Eca_sc000179.1_g0280.1	EcCYP82AV1	
	Eca_sc066992.1_g0940.1	EcCYP82B2	
	Eca_sc066992.1_g0950.1	EcCYP82B3	
	Eca_sc066992.1_g1070.1	EcCYP82B4	
	Eca_sc194486.1_g2450.1	EcCYP82B5	
	Eca_sc007583.1_g0950.1	EcCYP82D170	
	Eca_sc007583.1_g0920.1	EcCYP82D171	
	Eca_sc000805.1_g0110.1	EcCYP82D172	
	Eca_sc194664.1_g0840.1	EcCYP82N1	
	Eca_sc194758.1_g0720.1	EcCYP82N2v2	
	Eca_sc004736.1_g0030.1	EcCYP82N2v3	
	Eca_sc012219.1_g0510.1	EcCYP82N2v4	
	Eca_sc001139.1_g1890.1	EcCYP82N5	
	Eca_sc009029.1_g0010.1	EcCYP82N6	
	Eca_sc193916.1_g0930.1	EcCYP82N7	
	Eca_sc002196.1_g0200.1	EcCYP82P1v1	
Eca_sc001031.1_g0250.1	EcCYP82P1v2		
Eca_sc000081.1_g0860.1	EcCYP82P2		

>CyCYP82N1

MDSLIVLLQWLSASMAAILALSFLYNHLWVKSRISDKKSTKQAPVAAGAWPVLGHLHLFN
GSDQLPHKILAAMADKYGPAFTMKFGTHRTLVSNTQIVKECFTTNDTHFSNRPSTTAFH
LMTYDNDSDVAFTPYGPFWRRLKISTLKLLSNHRLQAIKDVRVSEVNVCFKDLYNQWKMN
QNKRPILVDMKKWFEEVSNNVVIRVIVGKQNFSGKIVRGEEEA VKYKKIMDEVLR LAAVP
MLSDMAPLLGWLDLFQGHKSAMKRNAKEVDDMLSEWLEEHKKRLSGVNGAEDEDFDVM
LSIMEENKFTGRDTNTVIKSTVLAMIMGGTDTTAVSLTWILSLLMNNRHVLKKAQEELDM
HVGKDRQVEDSDLKNLVYLIAIVKETMRMYPLGALLERETKEDCEVGGYHVRAGTHLLVN
VWKLQRDPSCWTDPTGFKPERFLTENTKIDVGGQHFELLPGAGRRVCPGVSFALQFMHL
VLARLIHGFELGTPMDADVDLTETTGGHVNYKAILQMHDISTLDRHNLTELDLQNTNLQA
RKR*

>CyCYP82N2

MTFIHLALSINTSHTFTLLKHNSFHPFSVSVSFSFQTIKSLRKMDSLFVLLQWFSTMAA
LLALAFLYNLWVKARMSDSKGNKRSTKQAPMAAGAWPVLGHLHLFGGSELPHKMLAIMAD
KYGPAFTMKFGTHRTLVSNTQIVKECFTANDTHFSNRPSTTAFHLMTYDNDSDVAFTPYG
PFWRRLKISTLKLLSNHRLQAIKDVRVSEVNVCFKDLYNQWKTNQNKRPVLVDMKKWFE
EVSNNVVIRVIVGKQNFSGKIVRGEEEA VKYKKIMDEVLR LAAVPMLSDMAPLLGWLDLF
QGHKSAMKRNAKEVDNMLSEWLEEHKRKRLSGVTGAEEDFMDVMLSIMEENKFTGRDNN
TVIKSTVLAMIMGGTDTTAVSLTWIFSLMNNRHVLKKAQEELDMHVGKDRQVEDSDLKN
LVYLNAIVKETMRMYPLGALLERETKEDCEVGGYQVRAGTRLLVNVWKLQRDPSCWTDPT
EFKPERFLTENAKIDVGGQHFELLPGAGRRVCPGVSFALQFMNLVLARLIHGFELGTPM
DADVDLTTESTEGHVNHKATPLDLLITPRLDSKLYDY*

>CyCYP82N3

MAALLALAFLYNLWVKARTGDSKGNKRSTKQAPIAAGAWPVLGHLHLFGGSELPHKMLAV
MADKYGPAFTMKFGTHRTLVSNTQIVKECFTANDTHFSNRPSTTAFHLMTYDNDSDVAFT
PYGPFWRRLKISTLKLLSNHRLQAIKDVRVSEVNVCFKDLYNQWKTNQNKRPVLVDMKK
WFEEVSNNVVIRVIVGKQNFSGKIIHGVEEA VKYKKIMDEVLR LAAVPMLSDMAPLLGWL
DLFQGHKSAMKRNAKEVDNMLSEWLEEHKRKRLSGVNGAVEEDFMDVMLSIMEENKFTGR
DSNTVIKSTVLAMIMGGTDTTAVSLTWIFSLMNNRHILKKAQEELDMHVGKDRQVEDSD
LKNLVYLNAIVKETMRMYPLGALLERETKEDCEVGGYQVRAGTRLLVNVWKLQRDPSCFWT
DPTFEKPERFLTENAKIDVGGQHFELLPGAGRRVCPGVSFALQFMNLVLARLIHGFELG
TPMDADVDLTTESTEGHVNHKATPLDLLISPRLDSKLYDY*

>CyCYP82N4

MTFIHLALSINTSHNFTLLKHNSFHPFSVSVSFSFQTIKSLRKMDSLFVLLQWFSTMAA
LLALAFLYNLWVKARMSDSKGNKRSTKQAPMAAGAWPVLGHLHLFGGSELPHKMLAVMAD
KYGPAFTMKFGTHRTLVSNTQIVKECFTANDTHFSNRPSTTAFHLMTYDNDSDVAFTPYG
PFWRRLKISTLKLLSNYRLQAIKDVRVSEVNVCFKDLYNQWKTNQNKRPVLVDMKKWFE
EVSNNVVIRVIVGKQNFSGKIVRGEEEA VKYKKIMDEVLR LAAVPMLSDMAPLLGWLDLF
QGHKSAMKRNAKEVDNMLSEWLEEHKRKRLSGVTGAEEDFMDVMLSIMEENKFTGRDSN
TVIKSTVLAMIMGGTDTTAVSLTWIFSLMNNRHVLKKAQEELDMHVGKDRQVEDSDLKN
LVYLNAIVKETMRMYPLGALLERETKEDCEVGGYQVRAGTRLLVNVWKLQRDPSCWTDPT
EFKPERFLTENAKIDVGGQHFELLPGAGRRVCPGVSFALQFMNLVLARLIHGFELGTPM
DADVDLTTESTEGHVNHKATPLDLLITPRLDSKLYDY*

>CyCYP82N5

MAALLALAFLYNLWVKARTSDSKGNKRSTKQAPIAAGAWPVLGHLHLFGGSELPHKMLAV
MADKYGPAFTMKFGTHRTLVSNTQIVKECFTANDTHFSNRPSTTAFHLMTYDNDSVAFT
PYGPFWRELKISTLKLLSNHRLQAIKDVRVSEVNVCFKDLYNQWKTNQNKRPVLVDMKK
WFEEVSNNVVIRVIVGKQNFSGKIVHGVEEAVKYKKIMDEVLRLLAAVPMLSDMAPLLGWL
DLFQGHKSAMKRNAKEVDNMLESWLEEHKRKRLSGVNGAVEEDFMDVMLSIMEENKFTGR
DSNTVIKSTVLAMIMGGTDTTAVSLTWIFSLLMNNRHILKKAQEELDMHVGKDRQVEDSD
LKNLVYLNAIVKETMRMYPLGALLERETKEDCEVGGYQVRAGTRLLVNVWKLQRDPFSWT
DPTEFKPERFLTENAKIDVGGQHFELLPGAGRRVCPGVSFALQFMNLVLARLIHGFELG
TPMDADVDLTESTEGHVNHKATPLDLLISPRLDSKLYDY*

>CyCYP82N6

MFNSVYYYDFHSPCTLYKSHNFTLLKHNSFHPFSVSVSVSFSFQTIKSLRKMDSLFVLLQ
WFSTSMALLALAFLYNLWVKARMSDSKGNKRSTKQAPMAAGAWPVLGHLHLFGGSELPH
KMLAVMADKYGPAFTMKFGTHRTLVSNTQIVKECFTANDTHFSNRPSTTAFHLMTYDND
SVAFTPYGPFWRELKISTLKLLSNHRLQAIKDVRVSEVNVCFKDLYNQWKTNQNKRPVL
VDMKKWFEEVSNNVVIRVIVGKQNFSGKIVRGEAAVYKKIMDEVLRLLAAVPMLSDMAP
LLGWLDLFQGHKSAMKRNAKEVDNMLESWLEEHKRKRLSGVTGAEEDFMDVMLSIMEEN
KFTGRDNNTVIKSTVLAMIMGGTDTTAVSLTWIFSLLMNNRHVLKKAQEELDMHVGKDRQ
VEDSDLKNLVYLNAIVKETMRMYPLGALLERETKEDCEVGGYQVRAGTRLLVNVWKLQRD
PSCWTDPTFEKPERFLTENAKIDVGGQHFELLPGAGRRVCPGVSFALQFMNLVLARLIH
GFDLGTMDADVDLTESTEGHVNHKATPLDLLITPRLDSKLYDY*

>CyCYP82N7

MDSLLVLLQWFSTSMALLALAFLYNLWVKARTSDSKGNKRSTKQAPIAAGAWPVLGHLH
LFGGSELPHKMLAVMADKYGPAFTMKFGTHRTLVSNTQIVKECFTANDTHFSNRPSTTA
FHLMTYDNDSVAFTPYGPFWRELKISTLKLLSNHRLQAIKDVRVSEVNVCFKDLYNQWK
TNQNKRPVLVDMKKWFEEVSNNVVIRVIVGKQNFSGKIVRGEAAVYKKIMDEVLRLLAA
VPMLSDMAPLLGWLDLFQGHKSAMKRNAKEVDNMLESWLEEHKRKRLSGVTGAEEDFVD
VMLSIMEENKFTGRDSNTVIKSTVLAMIMGGTDTTAVSLTWIFSLLMNNRHVLKKAQEEL
DMHVGKDRQVEDSDLKNLVYLNAIVKETMRMYPLGALLERETKEDCEVGGYQVRAGTRLL
VNVWKLQRDPFSWTDPTFEKPERFLTENAKIDVGGQHFELLPGAGRRVCPGVSFALQFM
NLVLARLIHGFELGTMDADVDLTESTEGHVNHKATPLDLLISPRLDSKLYDY*

>CyCYP82N8

MDSLFVLLQWFSTSMALLALAFLYNLWVKARMSDSKGNKRSTKQAPMAAGAWPVLGHLH
LFGGSELPHKMLAVMADKYGPAFTMKFGTHRTLVSNTQIVKECFTANDTHFSNRPSTTA
FHLMTYDNDSVAFTPYGPFWRELKISTLKLLSNHRLQAIKDVRVSEVNVCFKDLYNQWK
TNQNKRPVLVDMKKWFEEVSNNVVIRVIVGKQNFSGKIVRGEAAVYKKIMDEVLRLLAA
VPMLSDMAPLLGWLDLFQGHKSAMKRNAKEVDNMLESWLEEHKRKRLSGVTGAEEDFMD
VMLSIMEENKFTGRDSNTVIKSTVLAMIMGGTDTTAVSLTWIFSLLMNNRHVLKKAQEEL
DMHVGKDRQVEDSDLKNLVYLNAIVKETMRMYPLGALLERETKEDCEVGGYQVRAGTRLL
VNVWKLQRDPSCWTDPTFEKPERFLTENAKIDVGGQHFELLPGAGRRVCPGVSFALQFM
NLVLARLIHGFELGTMDADVDLTERHLDKPNESIPIGFERGDVEPDKETPSEGESEPS
DMVSSEFKAHEQRLISMKFIALQLICQPPLLLDVVASTDYDVAKSVMFCCFCIKGLDV
SCFVLNDNTKMMLDRQRIAQGIELWFLR*

>CyCYP82N9

MAALLALAFVYNLWVKARTSDSKGNKRSTKQAPIAAGAWPVLGHLHLFGGSELPHKMLAV

MADKYGPAFTMKFGTHRTLVSNTQIVKECFTANDTHFSNRPSTTAFHLMTYDNDSVAFT
PYGPFWRELKISTLKLLSNHRLQAIKDVVRVSEVNVCFKDLYNQWKTNQNKRPVLVDMKK
WFEEVSNNVIRVILGKQNFSGSNIVRGEAEVVKYKKIMDEVLRLLAAVPMLSMAPLLGWL
DLFQGHKSAMKRNAKEVDNMLESWLEEHKRKRLSGVTGAEEEDFVDVMLSIMEENKFTGR
DSNTVIKSTVLAMIMGGTDTTAVSLTWIFSLLMNNRHVLKKAQEELDMHVGKDRQVEDSD
LKNLVYLNAIVKETMRMYPLGALLERETKEDCEVGGYQVRAGTRLLVNVWKLQRDPFSWT
DPTEFKPERFLTENAKIDVGGQHFELLPFGAGRRVCPGVSFALQFMNLVLARLIHGFELG
TPMDADVDLTESTEGHVNHKATPLNLLISPRLD SKLYDY*

>CyCYP82C1

MESSLLSIQFNAFTIVLASAFISVYYLYLWKQKSKTNNKSNIKDKKAPEPAGGWPVIGHL
HLLGTNEILHRKFGAMADNYGPAFMLRLGILRAFVVNDLELAKECLTKNDRILATRPNLA
AARHMGYNRAGLGFAPYNSFWREMRKISTLELLSSQRLQMLKHIRIMEINTSIKELYEKF
WSENGSTGDQRAVLVDMKGWFEDLTNIIVRMISGKRHYGACEDEESMKCRKVVTDLFYL
MGIFVPSDAIPLGLLDLHGHEAMKRTFKDFDGILSRWLEEHRLKKKGSNEQHEDFMDV
MLSTVTDDNPHLCDHDSNTAIKSTCLALVAAGSDTTGATLTWALSLLNHRHVLKKAQAE
LDTHVGKDRQVDESDIKNLIYLAIVKETLRLYPAAPLAVPHQAMEDCTIGGFGVPAGTC
VFINIWKIQRDPNVWSDPTEFKPERFLTSTYGEIDFSGQHFELIPFGAGRRKCPGISLAA
HVLHLTLARLIHEFELRTPLDAPVDMSEGFGTLTPKATPLEVLLTPRSSTVNGYY*

>CyCYP82C2

MESSLLSIQFNAFTIVLASAFISVYYLYLWKQKSKTNNKSNIKDKKAPEPAGGWPVIGHL
HLLGTNEILHRKFGAMADNYGPAFMLRLGILRAFVVNDLELAKECLTKNDRILATRPNLA
AARHMGYNRAGLGFAPYNSFWREMRKISTLELLSSQRLQMLKHIRIMEINTSIKELYEKF
WAENGSTGDQRAVLVDMKGWFEDLTNIIVRMISGKRHYGAYAIPLGLLDLHGHEAMK
RTFKDFDGILSRWLEEHRLKKKGSNEQHEDFMDVMLSTVTDDNPHLCDHDSNTAIKSTCL
ALVAAGSDTTGATLTWALSLLNHRHVLKKAQAE LDTHVGKDRQVDESDIKNLIYLAIV
KETLRLYPAGPLAVPHQAMEDCTIGGFGVPAGTCVFINIWKIQRDPNVWSDPTEFKPERF
LTSTYGEIDFSGQHFELIPFGAGRRKCPGISLA AHVLHLTLARLIHEFELRTPLDAPVDM
SEGFGTLTPKATPLEVLLTPRSSTVNGYY*

>CyCYP82C3

MESSLLSIQFNAFTIVLSAFISVYYLYLWKQKSKTNNKSNTNDKKAPEPAGGWPVIGHL
HLLGTNEILHRKFGAMADNNGPAFMLRLGILRAFVVNDLELAKECLTKNDRILATRPNLA
AARHMGYNRAALGFAPYNSFWREMRKISTLELLSSQRLQMLKHIRIMEINTSIKELYEKF
WAENRSTGDQRAVLVDMKGWFEDLTNIMVVRMISGKRHYGACEDEESRKCRKVVTDLLYL
MGIFVPSDAIPLGLLDLHGERAMKRTFKDFDDILSRWLEEHRLKKKGSNEQHEDFMDV
MLSTVTDDNPHLCDHDANTA KSTCLALVAAGSDTTVVTLTWALSLLNHRHVIKKAQAE
LGTHVGKDRQVDESDIKNLIYLAIVKETLRLYPAAPLAVPHQAMEDCTIGGFGVPAGTC
VFINIWKIQRDPNVWTDPTFEKPERFLTSTYGEIDFTGQHFELIPFGAGRRKCPGISLAA
HVLHLTLARLIHEFELRTPLDAPVDMSEGVGITLTPKATPLEVLLTPRLSSTVNGFEVL*

>CyCYP82C4

MESSLLSIQFNAFTIVLASAFISYYLYLWKQKSKTNNKSNINDKKAPEPAGGWPVIGHL
HLLGTNEILHRKFGAMADNYGPAFMLRLGILRAFVVNDLELAKECLTKNDRILATRPNLA
AARHMGYNRAALGFAPYNSFWREMRKISTLELLSSQRLQMLKHIRIMEINTLIKELYAKF
WAENESTGDQRAVLVDMKGWFEDLTNIMVVRMISGKRHYGACEDEESRKCKKVVTDLFYL
MGIFVPSDAIPLGLLDLHGHEAMKRTFKDFDGILSRWLEEHRLKKKGSNEQHEDFMDV

MLSTVTDDNPHLCDHDANTAISTCLALVAAGSDTTVVTLTWALSLLLNRHVLKKAQAE
LDTHVGKDRQVDESDIKNLIYLQAIVKETLRLYPAPLAVPHQAMENCTIGGFGIPAGTC
VFINIWKIQRDPNVWTDPTFEKPERFLTSTYREIDFTGQHFELIPFGAGRRKCPGISLAA
HVLHLLTLARLIHEFELRTPLDAPVDMSEGFGITLPKATPLEVLLTPRLSSTVNGFEVL*

>CyCYP82C5

MESSLLSIQFNAFTIVLVSAFISVYYLYLWKQKSKTNNKSNINDKMAPEPAGVWPVIGHL
HLLGTNEILHRKFGAMADNYGPAFMLRLGILRAFVVNDLELAKECLTKNDRILATRPNLA
AARHMGYNRAALGFAPYNSFWREMRKISTLELLSSQRLQMLKHIRIMEINTSIKELYEF
WAENRSMGDQRAVLVDMKGWFEDLTNIMVVRMISGKRHYGACEDEESRKCRKVVTDLLEYL
MGIFVPSDAIPLLGLLDLHGHERAMKRTFKDFDDILSRWLEEHRLKKKGSKEQHEDFMDV
MLSTVTDDNPHLCDHDANTAISTCLALVTAGSDTTVVTLTWALSLLLNRHVLKKAQAE
LDTHVGKDRQVDESDIKNLIYLQAIVKETLRLYPATPLALPHQAMEDCAIGGFGVPAGTC
VFINIWKIQRDPNVWTDPTFEKPERFLTSTYGEIDFTGQHFELIPFGAGRRKCPGISLAA
HVLHLLTLARLIHEFELRTPLGAPVDMSEGFGITLPKATPLEVLLTPRLSSTVNGFEVL*

>CyCYP82C6

MESSLLSIQFNFTIIVLASAFISVYYLYLWKQKSKTNNKSNVKDKKAPEPAGGWPVIGHL
HLLGANEILHRKFGAMADNYGPAIMLRLGILRAFVVNDLELAKECLTKNDRILATRPNLA
AARHMGYNRAALGFAPYNSFWREMRKISTSELLSSQRLQMLKHIRIMEINTSIKELYEF
WAENGSTGDQRAVLVDMKGWFEDLTNIMVVRMISGKRHYGACEDEESRKCRKVVTDLFYL
MGIFVPSDAIPLLGLLDLHGHEAMKRTFKDFDGILNRWLEEHRLKKKGSNEQPEDFMDV
MLSTVTDDNPHLCDHDANTAISTCLALVAAGSDTTVVTLTWALSLLLNRHVIKKAQAE
LDTHVGKDRQVDESDIKNLIYLQAIVKETLRLYPAPLAVPHQAMEDCTIGGFGVPAGTC
VFINIWKIQRDPNVWTDPTFEKPERFLTSTYGEIDFTGQHFELIPFGSGRRKCPGISLAT
HVLHLLTLARLIHEFELRTPDTPVDMSEGFGLGLAKATPLEVLLTPRLSSSVNGF*

>CyCYP82C7

MADNYGPAFMLRLGILRAFVVNDLELAKECLTKNDRILATRPNLAAARHMGYNRAALGFA
PYNSFWREMRKISTLELLSSQRLQMLKHIRIMEINTSIKELYEFWGENGSTGDQRAVLV
DMKGWFEDLTNIMVVRMISGKRHYGACEDEESRKCRKVVTDLFYLMGIFVPSDAIPLLGL
LDLHGHEAMKRTFKDFDGILNRWLEEHRLKKKGSNEQPEDFMDVMLSTVTNDNPHLCDH
DANTAISTCLALVAAGSDTTVVSLTWALSLLLNRHVIKKAQAE
LDTHVGKDRQVDESDIKNLIYLQAIVKETLRLYPAPLAVPHQAMEDCAIGGFGVPAGTCVFINIWKIQRDPNVW
TDPTFEKPERFLTSTYGEIDFTGQHFELIPFGAGRRKCPGISLAHVLHLLTLARLIHEFE
LRTPLDAPVDMSEGFGITLPKATPLEVLLTPRLSSTVNGFEVL*

>CyCYP82N11

MDFLALQWFPASLAALLALAVLYNFWTKPGSYKNGKASTKQAPAAAGAWPVLGHLHLFGG
GELPHKMLATMADKYGPAFTMKFGTHQTLVVSNTKIVKECFTTNDTLFANRPSTTAFHLM
TYDNESVAFTPYGPFWRERLKRISTLKLLSNHRLQAIDVRASEVNVCFRELYSQWRINKS
EPKTSDHQGPIVDMKKWFEEVSDNVVLRVIAGKQNFSGKIVRGDKEALNYKKIMDEILR
LAAVSMLSDVAPLLGWLDMFQGHLSAMKRNAKEVDTMLCNWLEEHRTLRRLSSGHDGVEQD
FIDVMSLIVEENKFSGRDNDTVIKATVLAMIMGGDTTAVSLTWIVSLLMNNRHVLRARR
DELDLQVGKDRQVEDSDLKNLVYLNIAIVKETMRLYPLGALLERETKEDCEVGGFHVKGGT
RLLVNVWKLQRDPFSWTDPTFEKPERFLEDKANIDVGGQHFELLPFGAGRRVCPGVSFAL
QFMHLVLRLLHGFDLATPMNADVDLTESTEGHVNQKASPLNLLITPRLRSKLYEY*

>CyCYP82N12

MDFLALQWFPASLAALLALAVLYNFWTKPRSYKNGKASTKQAPAAAGAWPVLGHLHLFGG
GELPHKMLATLADKYGPAFTMKFGTHQTLVVSNTKIVKECFTTNDTLFANRPSTTAFHLM
TYDNESVAFTPYGPFWRERLKISTLKLLSNHRLQAIKDVRASEVNVCFRELYSQWRINKS
EPKTS DHQGPILVDMKKWFEEVSDNVVLRVIAGKQNFSGKIVRGDKEALNYKKIMDEILR
LAAVSMLSDVAPLLGWLD MFQGHLSAMKRNAKEVD TMLCNWLEEHRTRRLSSGHDGVEQD
FIDVMLSIVEENKFSGRDNDTVIKATVLAMIMGGDTTAVSLTWIVSLLMNNRHVLRAR
DELDLQVGKDRQVEDSDLKNLVYLNAIVKETMRLYPLGALLERETKEDCEVGGFHVKG GT
RLLVNVWKLQRDP SFWTDPTFEKPERFLEDKANIDVGGQHFELLPGAGRRVCPGVSFAL
QFMHLVLARLLHGFDLATPMNADVDLTESTEGHVNQKASPLNLLITPRLYSKLYEY*

>CyCYP82N13

MDFLALQWFTASLAALLALAVLYNFWTKPRSYKNGKASTKQAPAAAGAWPVLGHLHLFGG
GELPHKMLATMADKYGPAFTMKFGTHQTLVVSNTKIVKECFTTNDTLFANRPSTTAFHLM
TYDNESVAFTPYGPFWRERLKISTLKLLSNHRLQAIKDVRASEVNVCFRELYSQWRINKS
EPKTS DHQGPILVDMKKWFEEVSDNVVLRVIAGKQNFSGKIVRGDKEALNYKKIMDEILR
LAAVSMLSDVAPLLGWLD MFQGHLSAMKRNAKEVD TMLCNWLEEHRTRRLSSGHDGVEQD
FIDVMLSIVEENKFSGRDNDTVIKATVLAMIMGGDTTAVSLTWIVSLLMNNRHVLRAR
DELDLQVGKDRQVEDSDLKNLVYLNAIVKETMRLYPLGALLERETKEDCEVGGFHVKG GT
RLLVNVWKLQRDP SFWTDPTFEKPERFLEDKANIDVGGQHFELLPGAGRRVCPGVSFAL
QFMHLVLARLLHGFDLATPMNADVDLTEKSSQNPKGSRVSAEDKDSPSSSVISID*

>CyCYP82N14

MDFLALQWFPASLAALLALAVLYNFWTKPRSYKNGKASTKQAPAAAGAWPVLGHLHLFGG
GELPHKMLATMADKYGPAFTMKFGTHQTLVVSNTKIVKECFTTNDTLFANRPSTTAFHLM
TYDNESVAFTPYGPFWRERLKISTLKLLSNHRLQAIKDVRASEVNVCFRELYSQWRINKS
EPKTS DHQGPILVDMKKWFEEVSDNVVLRVIAGKQNFSGKIVRGDKEALNYKKIMDEILR
LAAVSMLSDVAPLLGWLD MFQGHLSAMKRNAKEID TMLCNWLEEHRTRRLSSGHDGVEPD
FIDVMLSIVEENKFSGRDNDTVIKATVLAMIMGGDTTAVSLTWIVSLLMNNRHVLRAR
DELDLQVGKDRQVEDSDLKNLVYLNAIVKETMRLYPLGALLERETKEDCEVGGFHVKG GT
RLLVNVWKLQRDP SFWTDPTFEKPERFLEDKANIDVGGQHFELLPGAGRRVCPGVSFAL
QFMHLVLARLLHGFDLATPMNADVDLTESTEGHVNQKASPLNLLITPRLRSKLYEY*

>CyCYP82N15

MEFFALQWFPASLAALLALAVLYNFWTKPRSYKNGKASTKQAPAAAGAWPVLGHLHLFGG
GELPHKMLATMADKYGPAFTMKFGTHQTLVVSNTKIVKECFTTNDTLFANRPSTTAFHLM
TYDNESVAFTPYGPFWRERLKISTLKLLSNHRLQANKDVRASEVNVCFRELYSQWRINKS
EPKTS DHQGPILVDMKKWFEEVSDNVVLRVIAGKQNFSGKIVRGDKEALNYKKIMDEILR
LAAVSMLSDVAPLLGWLD MFQGHLSAMKRNAKEVD TMLCNWLEEHRTRRLSSGHDGVEQD
FIDVMLSIVEENKFSGRDNDTVIKATVLAMIMGGDTTAVSLTWIVSLLMNNRHVLRAR
DELDLQVGEDRQVEDSDLKNLVYLNAIVKETMRLYPLGALLERETKEDCEVGGFHVKG GT
RLLVNVWKLQRDP SFWTDPTFEKPERFLEDKANVDVGGQHFELLPGAGRRVCPGVSFAL
QFMHLVLARLLHGFDLATPMNADVDLTESTEGHVNQKASPLDLLITPRLQSTLYEY*

>CyCYP82N16

MDFLALQWFPASLAALLALAVLYNFWTKPRSYKNGKASTKQAPAAAGAWPVLGHLHLFGG
GELPHKMLATMADKYGPAFTMKFGTHQTLVVSNTKIVKECFTTNDTLFANRPSTTAFHLM
TYDNESVAFTPYGPFWRERLKISTLKLLSNHRLQAIKDVRASEVNVCFRELYSQWRINKS
EPKTS DHQGPILVDMKKWFEEVSDNVVLRVIAGKQNFSGKIVRGDKEALNYKKIMDEILR

LAAVSMLSDVAPLLGWLDMFQGHLSAMKRNAKEVDTMLCNWLEEHRTRRLSSGHDGVEQD
FIDVMLSIVEENKFSGRDNDTVIKATVLAMIMGGTDTTAVSLTWIVSLLMNNRHVLRARR
DELDLQVGKDRQVEDSDLKNLVYLNAIVKETMRLYPLGALLERETKEDCEVGGFHVKGGT
RLLNVNVWKLQRDPSFWTDPTEFKPERFLEDKANIDVGGQHFELLPGAGRRVCPGVSFAL
QFMHLVLARLLHGFDLATPMNADVDLTESTEGHVNQKASPLNLLITPRLRSKLYEY*

>CyCYP82N17

MSNCNVGDGVEHVVEKLECGEDSSLNSPSDFAFVTTNLQGGERIMMTYRTKKSRAEPTRT
SLAALLALAVLYNFWTKPRSYKNGKASTKQAPAAAGAWPVLGHLHLFGGGELPHKMLATM
ADKYGPAFTMKFGTHQTLVVSNTKIVKECFTTNDTLFANRPSTTAFHLMTYDNESVAFTP
YGPFWRELKISTLKLLSNHRLQAIKDVRASEVNVCFRELYSQWRINKNEPKTSDHQGP
LVDMMKKWFEEVSDNVVLRVIAGKQNFSGKIVRGDKEALNYKKIMDEILRLAAVSMLSDVA
PLLGWLDMFQGHLSAMKRNAKEVDTMLCNWLEEHRTRRLSSGHDGVEQDFIDVMLSIVEE
NKFSGRDNDTVIKATVLAMIMGGTDTTAVSLTWIVSLLMNNRHVLRARRARDELDLQVGKDR
QVEDSDLKNLVYLNAIVKETMRLYPLGALLERETKEDCEVGGFHVKGGTTRLLNVNVWKLQR
DPSFWTDPTEFKPERFLEDKANIDVGGQHFELLPGAGRRVCPGVSFALQFMHLVLARLL
HGFDLATPMNADVDLTESTEGHVNQKASPLNLLITPRLYSKLYEY*

>CyCYP82N18

MEVKAGEVVHTVQVKEQVSSSLKYVSSKGLTTHEDPFAQQFTYVVASIRYLDFMKQPLL
IFSGFSDLLKEFERAQWEYTRHQYKMRGKLISMDFLALQWFPASLAALLALAVLYNFWTK
PRSYKNGKASTKQAPAAAGAWPVLGHLHLFGGGELPHKMLATMADKYGPAFTMKFGTHQT
LVVSNTKIVKECFTTNDTLFANRPSTTAFHLMTYDNESVAFTPYGPFWRELKISTLKLL
SNHRLQAIKDVRASEVNVCFRELYSQWRINKSEPKTSDHQGPILVDMMKKWFEEVSDNVVLR
VIAGKQNFSGKIVRGDKEALNYKKIMDEILRLAAVSMLSDVAPLLGWLDMFQGHLSAMK
RNAKEVDTMLCNWLEEHRTRRLSSGHDGVEQDFIDVMLSIVEENKFSGRDNDTVIKATVL
AMIMGGTDTTAVSLTWIVSLLMNNRHVLRARRARDELDLQVGKDRQVEDSDLKNLVYLNAIV
KETMRLYPLGALLERETKEDCEVGGFHVKGGTTRLLNVNVWKLQRDPSFWTDPTEFKPERFL
EDKANIDVGGQHFELLPGAGRRVCPGVSFALQFMHLVLARLLHGFDLATPMNADVDLTE
STEGHVNQKASPLDLLITPRLQSTLYEY*

>CyCYP82N19

MDFLALQWFPASLAALLALAVLYNFWTKPGSYKNGKASTKQAPAAAGAWPVLGHLHLFGG
GELPHKMLATMADKYGPAFTMKFGTHQTLVVSNTKIVKECFTTNDTLFANRPSTTAFHLM
TYDNESVAFTPYGPFWRELKISTLKLLSNHRLQAIKDVRASEVNVCFRELYSQWRINKS
EPKTS DHQGPILVDMMKKWFEEVSDNVVLRVIAGKQNFSGKIVRGDKEALNYKKIMDEILR
LAAVSMLSDVAPLLGWLDMFQGHLSAMKRNAKEVDTMLCNWLEEHRTRRLSSGHDGVEQD
FIDVMLSIVEENKFSGRDSDTVIKATVLAMIMGGTDTTAVSLTWIVSLLMNNRHVLRARR
DELDLQVGKDRQVEDSDLKNLVYLNAIVKETMRLYPLGALLERETKEDCEVGGFHVKGGT
RLLNVNVWKLQRDPSFWTDPTEFKPERFLEDKANIDVGGQHFELLPGAGRRVCPGVSFAL
QFMHLVLARLLHGFDLATPMNADVDLTESTEGHVNQKASPLNLLITPRLRSKLYEY*

>CyCYP82N20

MDFLALQWFPASLAALLALAVLYNFWTKPRSYKNGKASTKQAPAAAGAWPVLGHLHLFGG
GELPHKMLATMADKYGPAFTMKFGTHQTLVVSNTKIVKECFTTNDTLFANRPSTTAFHLM
TYDNESVAFTPYGPFWRELKISTLKLLSNHRLQAIKDVRASEVNVCFRELYSQWRINKS
EPKTS DHQGPILVDMMKKWFEEVSDNVVLRVIAGKQNFSGKIVRGDKEALNYKKIMDEILR
LAAVSMLSDVAPLLGWLDMFQGHLSAMKRNAKEVDTMLCNWLEEHRTRRLSSGHDGVEPD

FIDVMSLIVEENKFSGRDNDTVIKATVLAMIMGGTDTTAVSLTWIVSLLMNNRHVLRARR
DELDLQVGKDRQVEDSDLKNLVYLNAIVKETMRLYPLGALLERETKEDCEVGGFHVKGGT
RLLVNVWKLQRDPSPFWTDPTEFKPERFLEDKANIDVGGQHFELLPGAGRRVCPGVSFAL
QFMHLVLARLLHGFDLATPMNADVDLTESTEGHVNQKASPLNLLITPRLHSKLYEY*

>CyCYP82N21

MEFFALQWFPASLAALLALAVLYNFWTKPRSYKNGKASTKQAPAAAGAWPVLGHLHLFGG
GELPHKMLATMADKYGAFTMKFGTHQTLVVSNTKIVKECFATNDTLFANRPSTTAFHLM
TYDNESVAFTPYGPFWRERLKISTLKLLSNHRLQAIKDVRASEVNVCFRELYSQWRINKS
EPKTS DHQGPILVDMKKWFEEVSDNVVLRVIAGKQNFSGSKIVRGDKEALNYKKIMDEILR
LAAVSMLSDVAPLLGWLD MFQGHLSAMKRNAKEVD TMLCNWLEEHRTRRLSSGHDGVEQD
FIDVMSLIVEENKFSGRDNDTVIKATVLAMIMGGTDTTAVSLTWIVSLLMNNRHVLRARR
DELDLQVGKDRQVEDSDLKNLVYLNAIVKETMRLYPLGALLERETKEDCEVGGFHVKGGT
RLLVNVWKLQRDPSPFWTDPTEFKPERFLEDKANIDVGGQHFELLPGAGRRVCPGVSFAL
QFMHLVLARLLHGFDLATPMNADVDLTESTEGHVNQKASPLDLLITPRLQSTLYEY*

>CyCYP82N22

MDSLLQWFPASMAALFALAFYKLWSTKPKTYNDGNNTNKQAPVAADAWPVLGHLHLFGG
SELPHKMLAAMADKYGAFTMKFGMHRTL VVSNTQIVKECFTTNDTHFANRPSTKAFQLM
TYDNESVAFTPYGPFWRERLKISTLKLLSNHRLQAIKDVRSEVNVCFRELYSLWNTNES
EERPVLVDMKKWFEEVSNNVIRVIVGKQNFSGSKIVRGEALYKKIMDEVLRLAGVSM
LSDVAPLLGWLDHFQGHMSAMKRNAKEVD TMLSSWLEEHRKRRTSVGDNKGDNVEQDFMD
VMSLIVEENKLSGHDNDTVIKATVMAMIMGGTDTTAVSLTWIVSLLMNNRQVLKKAREEL
DTHVGKDRQVDDSDLKNLTYLNAIVKETMRLYPLGALLERETKEDCEVGGFHVKGGTRLL
VNVWKLQRDPNFWSNPTEFKPERFLEHANLDVGGQHFELLPGAGRRVCPGVSFALQFM
HLVLARLIHGFEETLMNADIDLTESTEGHVNHKATPLDLLITPRLDAKLYNY*

>CyCYP82N23

MDSLLQWFPASMAALFALAFYKLWSTKPKTYNDGNNTNKQAPVAADAWPVLGHLHLFGG
SELPHKMLAAMADKYGAFTMKFGMHRTL VVSNTQIVKECFTTNDTHFANRPSTKAFQLM
TYDNESVAFTPYGPFWRERLKISTLKLLSNHRLQAIKDVRSEVNVCFRELYSLWNTNES
EGTNSNDEHQQRPVLDVDMKKWFEEVSNNVIRVIVGKQNFSGSKIVRGEALYKKIMD
EVLRLAGMSMLSDVAPLLGWLDLFQGHTSAMKRNAKEVD TMLSSWLEEHRKRRTSVGDNK
GDNVEQDFMDVMSLIVEENKLSGHDNDTVIKATVMAMIMGGTDTTAVSLTWIVSLLMNNR
QVLKKAREELDTHVGKDRQVDDSDLKNLTYLNAIVKETMRLYPLGALLERETKEDCEVGG
FHVKGGTRLLVNVWKLQRDPNFWSNPTEFKPERFLTENANLDVGGQHFELLPGAGRRVC
PGVSFALQFMHLVLARLIHGFEETLMNADVDLTESTEGHVNHKATPLDLLITPRLDSKL
YNY*

>CyCYP82N24

MDSLLQWFPASMAALFALAFYKLWSTKPKTYNDGNNTNKQAPVAADAWPVLGHLHLFGG
SELPHKMLAAMADKYGAFTMKFGMHRTL VVSNTQIVKECFTTNDTHFANRPSTKAFQLM
TYDNESVAFTPYGPFWRERLKISTLKLLSNHRLQAIKDVRSEVNVCFRELYSLWNTNES
EERPVLVDMKKWFEEVSNNVIRVIVGKQNFSGSKIVRGEALYKKIMDEVLRLAGVSM
LSDVAPLLGWLDHFQGHMSAMKRNAKEVD TMLSSWLEEHRKRRTSVGDNKGDNVEQDFMD
VMSLIVEENKLSGHDNDTVIKATVMAMIMGGTDTTAVSLTWIVSLLMNNRQVLKKAREEL
DTHVGKDRQVDDSDLKNLTYLNAIVKETMRLYPLGALLERETKEDCEVGGFHVKGGTRLL
VNVWKLQRDPNFWSNPTEFKPERFLTENANLDVGGQHFELLPGAGRRVCPGVSFALQFM

HLVLARLIHGFELETLMNADIDLTESTEGHVNHKATPLDLLITPRLDSKLYNY*

>CyCYP82N25

MESLLLLQWQPTSIALLVAIAIFLYTFTKSPPKTHKKLAPEATGGRPLMGHLHLFNSNE
LTHRILGSMADKYGPAFNIRFGSHKTLVVSSWEIVKECFTINDRLFSNRPGTLYIKLMFY
NEDSVGYAPYGPYWRDLRKLSTLKLLSNHRLES�KHLRISEMNAFCQLYEMCTKGGGSI
ESVAAAIRMDNWFGLSFNVVARIVAGKRSFASDSNDVGAMKYKTAMDEAFRLMSNFS
FSDVIPSLGWLDNLRGLVGGMKKAGKEIDAVVSGWVEEHREKRKRRRSSSGGGHGGELEE
EEEDFIDITLSILETSSLLPGDDPDITIKSTCLDMILGGSDDTTVTLTWALSLLNNPHA
LKRAREELDLHVGRDRQVEDSDINNLYVYQAIKETMRLYPAGPLIERMTKEDCEVGGGFH
IPAGTRLLVNLWKMQRDPNVWEDPLEFRPDRFLTDNAEIDLKGQHFELIPFGTGRRICPG
VSFALQMLHALARLLHSFEVSPMDAKIDMTETAGLISHKVTPLEVLMTPRLDSKLYNY
Q*

>CyCYP82N26

MTMESLLLLQWQPTSIIVLLAITIFLYTFTKSSPKTHKKLAPEATGGRPVMGHLHLFNS
NELKHQTLGSMADKYGPAFNVRFGSHKTLVVSTWEIVKECFTTSDRLFSNRPGTLYVKHM
FYDEDAIGYAPYGPYWRDMRKLSTLKLLSNNRLES�KHLMISEMNGCFKKLYEMCTKGGG
STESVGIRMDNWFGEISFNVVARIVAGKKNFSSVSNDGAMRYKTAMDEALRWMSFFSF
SDLIPSLGWLDNLRGIVGGMKKAGKEIDSVVSGWVEEHREKRKRRRSSSGVGHGGELEEE
EEDFIDITLSILETSSLLPGDDPNMTMKVLCLDMILGGSDDTTSVTLAWALCLLLNNPHVLK
KAREELDLHVGRDRQVEDSDINNLYVYQAIKETMRMKPAGRLIERMTKEDCEVGGGFHVS
AGTRLMVNVWVKIQRDPNVWKDPLEFRPERFLTDNAEIDLRGQHFELIPFGMGRRICPGVS
FSLQMLHALARLLHSFEFASPMDAKIDMTEAPGFISHMVNPLEVIMTPRLDSKLYA*

>CyCYP82D1

MAFLIPHEYYSLFPTAISSTITIPFFTIVLFYCLISWIPKLLRQKHKLKEPPQPSGSWP
VIGHLHLLAGPTLPHLTGSIADKHGPIFKIRLGVRKAVVSSWELAKECFTTHDRIFST
RPRSLASKLLSYDYAMFGLSPYGPYWRELRRISMQELLSNSRLEMLKHVWGSEINMCLKE
LYENWSLNAGCKGVLVDMKRWFGDLTLNMTVRMVVGKRLFFGAATYDQKIHEDEVRRFQK
GLRDIFRLMGMFVVSISPWLGWLDLGGYEKEMKRVAKEIDVLLQRWLDEHKEMKKINGG
GEKDFMGVLEILDEDATLSADSEYDADTINKSTCLNIFLGGIDTTMVS�VWALALLNN
PHVLKKAQDELDIHVGERQVDESIDKNLIYQAIKETMRLYPAGPLSGPREASEDCTL
AGYHVQAGTRLIVNLGKIQRDPVWSDPNEFKPERFLTSPHVDMEVKGQTFELIPFGSGR
RSCPGTSFALQVVHLTLAHLQGFEFKTSCEPVDMTEGAGLTNLKATPLEVMVTPRLSS
QLYAML*

>CyCYP82D2

MASLIPHEYYSLFPTAISTITIPFFAIVLFYCLISWIPKLLQKHKLKEPPQPAGSWPV
IGHLHLLAGPTLPHLTGSMADKHGPIFKIRLGVRKAVVSSWELAKECYTTHDRIFATK
PRSLASKLLGYDYAMFGISPYGPYWREVRISMQELLSNSRLEMLKHVWGSEIKMCLKEL
YENWRNLNAGCKGVLVDMKRWFGDLTLNMTVRMVVGKRLFFGAATYDQKIHEDEVRRFQKG
LRDFFRLMGMFVVSDFIPCLGWLDLGGYEKEMKGAAKEMDVLLQRWLDEHKEMKKINEGG
EKDFMGVLEILDEDATLSADSEYDADTINKSTCLMLILGGSDDTTMVS�VWALALLNNP
HVLKKAQDELDIHVGERQVDESIDKNLYLQAIKETMRLNPAGQLSAPREASEDCTLA
GYHVQAGTRLIVNLGKIQRDPVWSDPYEFKPERFLTSPHVDMDVKGQTFELIPFGSGRR
SCPGISFALQVVHLTLAHLQGFEFETGCEPVDMTEGAGLSNVKATPLEVMVTPRLPSQ
LYEP*

>CyCYP82N27

MVIQMMWSSGGGNEKVLSSGRVGGWRESLLFWWRSGSSTAALLALAFlyKLWSKPRTFKNGK
SALQAPVAAGAWPVLGHLHLFSGGELPHKMLAAMADKYGPAFTMKFGTHRTLVSVDTKIV
KECFTTNDTLFANRPSTTAFHLMTYDNESVAFTPYGPFWRRLRKISTLKLLSNHRLQAIK
DVRASEVNLCFRTLYNRWRINKSETVETGGHQGPFLVDMKKWFEEVSNNVVIRVIVGKHN
FGSKIARGEGEALNYKKVMDEVQRLVAVSMLSDVAPLLGWFDHFQGHKSAMKRNAKEVDI
LLCSWMEHRKRTSDGNDGVEQDFIDVLLSIMEENKFSGHDSNTVIKATVMAMIMGGTD
TTAVSLTWIVSLLMNNRHVLRREELDTHVGKDRQVDDSDLKNLVYLNAIVKETMRLYP
IGALLERETKEDCEVGGFHVKAGTRLLNVVWKLQRDPNFWIDPTEFKPERFLTENANIDV
GGQHFELLPGAGRRVCPAVSFALQFMHLVLARLIHGVELDTPMNANVDMTESTEGHVN
KASALDLLITPRLQSTLYDY*

>CyCYP82N28

MDSLLFQWFPASMAAALVALAFlyKLWGAPKITKNGKTGTQAPMAAGAWPVLGHLHLFG
GGELPHKMLAGMAEKYGAFTMKFGMHRTLVSVDTKIVRECFTTHDTLAFANRPSTTAFH
MTYDQESVAFTPYGPFWRRLRKISTLKLLSNHRLQAIKDVRTSEVNVCFRELYNIWQTNK
NEQGGTVSDHPPVLIDMKKWFEESNNVVIRVIVGKQNFSGKIVRGEAAVKYKKIMDE
VLRLAAVSMLSDVAPLLGWLDLFQGNLSAMKRNAKEVDNMLNAWVEEHRRKRLAASSTNS
TKVEATDHVEQDFDVMLSIMEENKLTSHVDNDTVIKATVLAMIMGGTDTTAVSLTWTVS
LLMNNRHVLLKKAQEEIDQYVGKERQVEDSDLKNLVYLNAIVKETMRMYPLGTLLERETKE
DCEVGGFHVKGGRTRLLNVVWKLQRDPNVWIDPTEFKPERFLAENANIDVGGQHFELLPG
AGRRVCPGVSFALQFMHLVLARLIHGFELETPMNADVDLTESPEGHVNHKASPLDLLAP
RLNSKLYEF*

>CyCYP82N29

MESLLLLQWQPTSIAVLLVAIAIFlyTFTKSPPKTHKKLAPEATGGRPLMGHLHLFNSNE
LTHRILGSMADKYGPAFNIRFGSHKTLVVSSWEIVKECFTINDRLFSNRPGTLYIKLMFY
NEDSVGYAPYGPYWRDLRKLSTLKLLSNHRLSLKHLRISEMNAFCQLYEMCTKGGGST
ESVAAAVIRMDNWFGLDFNVVARIVAGKRSFASDSNDVGAMKYKTAMDEAFRLMGIFS
FSDVIPSLGWLNDLRLVGGMKKAGKEIDAVVSGWVEEHREKRKRSSSGGGHGGELEE
EEDFIDITLSILETSSLLPGDDPDITIKSTCLDMILGGSDDTTVTLTWALSLLNNPHAL
KRAREELDLHVGRDRQVEDSDINNLYIQAIKETMRLYPAGPLIERMTKEDCEVGGFHI
PAGTRLLVNLWKMQRDPNVWEDPLEFRPDRFLTDNAEIDLKGQHFELIPFGTGRRICPGV
SFALQLMHLALARLLHSFEVASPMDAKIDMTETAGLISHKVTPLEVLMTPRLDSKLYNYQ
*

>CyCYP82N30

MKMESLLLLQWEPTSIVVLLAITIFlyTFTKSSPKTHKKLAPEATGGRPVMGHLHLFNS
NELKHQTLGSMADKYGPAFNVRFGSHKTLVVSTWEIVKECFTTSDRLFSNRPGTLYVKHM
FYDEDAIGYAPYGPYWRDMRKLSTLKLLSNHRLSLKHLRISEMNGCFKKLYEMCTKGGG
STESVGIRMDNWFGLDFNVVARIVAGKKNFSSVSNDGAMRYKTAMDEALRWMSFFSF
SDLIPSLGWLNDLRLGIVGGMKKAGKEIDSVVSGWVEEHREKRKRSSSGVGHGGELEEE
EEDFIDITLSILETSSLLPGDDPNMTMKVLCLDMILGGSDDTTSVTLAWALCLLLNNPHVLK
KAREELDLHVGRDRQVEDSDINNFVYIQAIKETMRMKPAGRLIERMTKEDCEVGGFHVS
AGTRLMVNVWVKIQRDPNVWKDPLEFRPERFLTDNADIDLRGQHFELIPFGMGRRICPGVS
FSLQLMHLALARLLHSFEVASPMDAKIDMTAPGFISHMVTPLEVIMTPRLDSKLYA*

>CyCYP82C8

MDIKFQTITVGGLICIFLLCVHLWRKEKKSMPPELQGGWPIIGNLHQLGRDGGSNNTDQ
LLHRRFFGSLADKLGPAFTIRIGMRRALVVSSWEITKECFTTNDRIPTRPNSIGAKLMGY
DSAMFGLAPYGPYWREMRKLTLELLSNRRLEMLKGIRDTEIKISVKELYEIWVENGGKN
PVLVEMKRWFGDLTFNVTVMMIAGKRYLGRNCDCDEDETRRAQKAFSEFMRLG VFVISD
AIPFLRFFDIQGYEKEMKRNGEDIDLVLGKWWSEHRDRKKKRD LGEEEEEQKDFIDVM
LSILDEDEKFFGRDVTVIKSTCISLILGGYETSLVTLTWALSLLNNPHILRKAQAELD
IHVGKDRRVEDSDVKNLVYIQAIVKETLRLYPAGPITPPRQAMEDCTVAGFHIPKGTQLM
VNLWLKQRDPRVWSDPSEFKPERFLNGNSHADIDVRGQHFELIPFSSGRRGCPGISFAMQ
VLHLTLARLLHGFDFSTPSDKPIDMTESLGLTCPKATPLEVLLAPRLPTMLYATE*

>CyCYP82D3

MLIKEPPQPSGSWPVIGHLHLLTGPTLPHLTGTLADKHGPIFKIWLGVKRTVVVSSWEL
AKECYTTHDRIFASRPRSLATKLLSYDYAMFGLSPYGPYWRELRRISMQELLSNSRLEML
KHVWGSEINMCLKELYENWRLNAGCKGVLVDMKRWFGDLTNMTVRMVVGKRLFFGAATY
DQKIHEDVRRFQKGLRDFRMLGMFVVSDFIPCLGWLDLGGYEKEMKRVSKEMDVLLQR
WLEEHKEMKKINEGGGEKDFMSVLEILDEDATLSADSEYDADTIKSTCLVLILGGGDT
TMVSLVWALALLNNPHVLKKAQDELHVGKERQVDESDIKNLTYLQAIVKETMRLYPA
GPLSGPREASEDCTLAGYHVQAGTRLIVNLGKIQRDPRVWSDPNEFKPERFLTS PHVDM
VKGQTFELIPFGSGRRSCPGTSFALQVVLHLTLAHLQGFEEKTSGSEPVD MTEGAGLTNL
KATPLEVMYKKLVKAVGPMWDPPTWTLPTLNRVDKCFRPTKLIDSDPNSRLKWGPP*

>CyCYP82N31

MADKYGPAFNIRFGSHKTLVVSSWEIIECFTINDRLFSNRPGTLYIKLMFYNEDSVGYA
PYGPYWRDLRKLSTLKLLSNHRLESLKHLRISEMNAFCQLYEMCTKGGGSTESVVA
IRMDNWFGLDFSNVVARIVAGKRSFASDSNDVGAMKYKTAMDEAFRLMGIFSFS
DVIPSLGWLDNLRGLVGGMKKAGKEIDAVVSGWVEEHREKRKRRRSSSGGHGGELE
EEDFIDITLSILETSSLLPGDDPDITIKSTCLDMILGGSDDTTVTLTWALSLLNNPH
ALKRAREELD LHVGRDRQVEDSDINNLYYQAIKETMRLYPAGPLIERMTKEDCEVGG
FHIPAGTRLLVNLWKMQRDPNVWEDPLEFRPDRFLTDNAEIDLKGQHFELIPFGT
GRRICPGVSFALQLMH LALARLLHSFEVASPMDAKIDMTETAGLISHKVTPLEVLMT
PRLDSKLYNYQ*

>CyCYP82N32

MESLLLLQWQPTSIVVLLAITIFLYTFTKSSPKTHKKLAPEATGGRPVMGHLHLFNSNE
LKHQTLGSMADKYGPAFNVRFGSHKTLVVSTWEIVKECFTTNDRLFSNRPGTLYVKHMFY
DEDAIGYAPYGPYWRDMRKLSTLKLLSNRLESLKHLMISEMNGCFKKLYEMCTKGGSTE
SVGVIRMDNWFGEFSFNVVARIVAGKKNFSSVSNDGAMRYKTAMDEALRMMSFFS
FSDLIPSLGWLDNLRGIVGGMKKAGKEIDSVVSGWVEEHREKRKRRRSSSGVGHGGELE
EEEEEDFIDITLSILETSSLLPGDDPNMTMKVLCLDMILGGSDDTSTLAWALCLLN
NPHVLKKA REELDLHVGRDRQVEDSDINNLYYQAIKETMRMKPAGRLIERMTKEDCEVGG
FHVVSAGTRLMVNVWKIQRDPNVWWDPLEFRPERFLTDNADIDLRGQHFELIPFGM
GRRICPGVSFS LQLMLHALSRLHSFEFASPMDAKIDMTETAGLISHKVTPLEVLMT
PRLDSKLYA*

>CyCYP82C9

MDIEFQTITVGGLICIFLLCVHLWRKEKKSMPPELQGGWPIIGNLHQLGRDGGSNNTDQ
LLHRRFFGSLADKLGPAFTIRIGMRRALVVSSWEITKECFTTNDRIPTRPNSIGAKLMGY
DSAMFGLAPYGPYWREMRKLTLELLSNRRLEMLKGIRDTEIKISVKELYEIWVENGGKN
PVLVEMKRWFGDLTFNVTVMMIAGKRYLGRNCDCDEDETRRAQKAFSEFMRLG VFVISD
AIPFLRFFDIQGYEKEMKRNGEDIDLVLGKWWSEHRDRKKKRD LGEEEEEQKDFIDVMLS

ILDDEDKYFGRDVTVIKSTCISLILGGYETSLVTLTWALSLLLNNPHILRKAQAELDIH
VGKDRRVDES DVKNLVYMQAIVKETLRLYPAGPITPPRQAMEDCTVAGFHIPKGTQLMVN
LWLKQRDP RVWSDPSEFKPERFLNGNSHADIDVRGQHFELIPFSSGRRGCPGISFAMQVL
HLTLARLLHGFDFTSPDKPIDMTESLGLTCPKATPLEVLLAPRLPTMLYATE*

>CyCYP82N33

MTMESLLLLQWQPTSIVVLLAITIFLYTFTKSSPKTHKKLAPEATGGRPVMGHLHLFNS
NELKHQTLGSMADKYGPAFNVRFGSNKTLVVSTWEIVKECFTTSDRLFSNRPGTLYVKHM
FYDEDAIGYAPYGPYWRDMRKLSTLKLLSNNRLES LKHLMISEMNGCFKKLYEMCTKGGG
STESVGVIRMDNWFGE LSFNVVARIVAGKKNFSSVSND DGAMRYKTAMDEALRWMSFFSF
SDLIPSLGWLDNLRGIVGGMKKAGKEIDSVVSGWVEEHREKRKRSSSGVGHGGELEEE
EEDFIDITLSILETSSLPGDDPNMTMKVLC LDMILGGS DTTSVTLAWALCLLLNNPHVLK
KAREELDLHVGRDRQVEDSDINNFVYIQAIKETMRMKPAGRLIERMTKEDCEVGGFHVS
AGTRLMVNVWKIQRDPNVWKDPLEFRPERFLTDNAEIDLRGQHFELIPFGMGRRICPGVS
FSLQLMHLALARLLHSFEFASPMDAKIDMTEAPGFISHMVT PLEVIMTPRLDSKLYA*

>CyCYP82C10

MFGLAPYGPYWREMRKLTLELLSNRRLEMLKGIRDTEIKISVKELYEIWVENG GKNPVL
VEMKRWFGDLTFNVTVMMIAGKRYLGRNCDCDEDETRRAQKAFSEFMRL LGVFVISDAIP
FLRFFDIQGYEKEMKRNGEDIDLVLGKWWSEHRDRKKRDLGEEEEEQQKDFIDVMSLI
LDDEDKFFGRDVTVIKSTCISLILGGYETSLVTLTWALSLLLNNPHILRKAQAELDIHV
GKDRRVDES DVKNLVYMQAIVKETLRLYPAGPITPPRQAMEDCTVAGFHIPKGTQLMVNL
WKLQRDP RVWSDPSEFKPERFLNGNSHADIDVRGQHFELIPFSSGRRGCPGISFAMQVLH
LTLARLLHGFDFTSPDKPIDMTESLGLTCPKATPLEVPRTTAPYNALCYRIASQNKIEQ
GG*

>CyCYP82D4

MASLIPHEYSLFPTAISTITIPFFAIVLFYCLISWIPKLLQQKHKLIEPPQPAGSWPV
IGHLHLLAGPTLPHLTGSMADKHGPIFKIRLGVRKAVVSSWELAKECFTTHDRIFATK
PRSLASKLLGYDYAMFGISPYGPYWREVRISMQELLSNRLEMLKHVWGSEIKMCLKEL
YENWRNLNAGCKGVLVDMKRWFGDLTNMTVRMVVGKRLFFGAATYDQKIHEDVRRFQKG
LRDFFRLMGMFVVSDFIPCLGWLDLGGYEKEMKGAAKEMDVLLQRWLDEHKEMKKINEGG
EKDFMGVLL EILDEDATLSADSEYDADTINKSTCLMLILGGS DTTMVSLVWALALLNNP
HVLKKAQDELDIHV GKERQVDES DIKNLTYLQAIVKETMRLNPAGQLSAPREASEDCTLA
GYHVQAGTRLIANLGKIQRDP RVWSDPNEFKPERFLTSPHVDMDVKGQTFELIPFGSGRR
SCPGISFALQVVHLTLAHL LQGFEFETGSGEPVDMTEGAGLSNVKATPLEVMVTPRLPSQ
LYEL*

>CyCYP82N34

MDFSLIQWYTASTAALLALAFLYKLWSKPRTFKNGKSALQAPVAAGAWPV LGHLHLFSGG
ELPHKM LAMADKYGPAFTMKFGTHRTLVS DTKIVKECFTTNDTLFANRPSTTAFHLMT
YDNESVAFTPYGPFWR ELRKISTLKLLSNHRLQAIKDVRASEVNLCFRTLYNRWRINKSE
TVETGGHQGPFLVDMKKWFEEVSNNVVIRVIVGKHNFSGSKIARGEALNYKKVMDEVQR
LVAVSMLSDVAPLLGWFDHFQGHKSAMKRNAKEVDILLCSWMEEHRKKRTSDGNDGVEQD
FIDVLLSIMEENKFSGHDSNTVIKATVMAMIMGGDTTAVSLTWIVSLLMNNRHVLRRAR
EELDTHVGKDRQVDDSDLKNLVYLNAIVKETMRLYPIGALLERETKEDCEVGGFHVKAGT
RLLVNVWKLQRDPNFWIDPTEFKPERFLTENANIDVGGQHFELLPGAGRRVCPAVSFAL
QFMHLVLARLIHGYELDTPMNaNVDMTESTEGHGNYEDEDKKDHSNNLINS*

>CyCYP82N35

MGYHASMAAALVALAFLYKLWGAPKITKNGKTGKTQAPMAAGAWPVLGHLHLFGGGELPH
KMLAGMAEKYGPAFTMKFGMHRTLVSVDTKIVRECFTTHDTLFANRPSTTAFHLMTYDQE
SVAFTPYGPFWRRLKISTLKLLSNHRLQAIKGVRTSEVNVCFRELYNIWQTNKKEQGV
VSDHPPPVLDIMKKWFEEVSNNVMIRVIVGKQNFSGKIVRGEEAVKYKKIMDEVLR
VSMLSDVAPLLGWLDLFQGNLSAMKRNAKEVDNMLNAWVEEHRIKRLAASSTNSTE
VATDHVEHDFVDVMLSIMEENKLTSVHDNDTVIKANVLMIMGGNDTTAVSLTWTVSLLM
NHRLHVLKKAQEEIDQHVGKERQVEDSDLKNLVYLNAIVKETMRMYPLGTLLERETKED
CEVGGFHVKGGTRLLVNVWKLQRDPNVWIDPTEFKPERFLAENANIDVGGQHFELL
PFGAGRRVCPGVSFALQFMHLVLARLIHGFELETPMNADVDLTESPEGHVNHKASPLD
LLAPRLNSKLYEF*

>EcCYP82AT1

MAGSLFDQLYFSTNPITIAIISSILAAALLYFPLFLWRSKRSSITSSSDKELREPP
EPASWPILGHLPHLLAGSKQLPHIFLGAMADKYGPAFIVRVGVHKAIVSSWEV
VKECFTTNDGAWASRVKLI
ALEHMGFNHSLFGFAPYGPYWREMRKV
VNQELLSNNRLDMLQH
VWDSEINSSIKKLYQIWRNGGGTTSQ
PALLEMKQWFADLT
LNIMVKLVAGKPGYF
HEDRYTSKSP
TTNIGDKVAEGARKYHQFRDYFGLVGQF
ILGDALPFLRWLDLGGYEKKMIYIKREL
GALMDEWLEGHKQKRLVPGGDHEEEKAG
RESEDFLDVMMSVLEKKTMLLDYFDS
DTINKSTCLGIIAGGS
DTPMVILVWALTLLLNNPVTLKKAYDE
LDIHVGRERQVKEAD
MENLVYLQAIVK
ETMRLYSGP
LTGLRVSTKDCVVS
GYHIPAGTGLIVN
LHKIHRDPRVWSD
PLEFKPERFLT
NHHKIDIMKGN
NFELLPFGAGRRM
CPAASF
AIRMVQLALV
RTIHGFDFKLP
NDVPTDTS
ESAGLTNLKATP
LEVIIAPRLS
LELYI

>EcCYP82AT2

MESEFSQHHL
SKTSIVVLIS
SFLIASALLFF
KLFWSRSKR
SSKSSNRDNL
KQPPEPAGA
WPIVGHLP
HLMAGGRDL
PHVTLAAMA
DKYGPAFIV
RMGT
YKALIVSSWE
IEKECYTTN
DRVAFASRP
RLIALEHLG
YNHSLFGF
APYGPYWRE
MRKIITQEL
LSNSRLDLF
KHVWDSEIN
SSSIKKLYE
IWEKSSSSG
DGGGAQP
VLVEMKHW
FADLT
LNIIVKLVAG
KPGLYRVDK
YTSSTISNIA
IEDKVAEAA
RRYHKQFR
DFFRLVGQF
ILGDALP
FLRWLDLGG
YEKEMKRTR
KELGVLMDE
WLEAHKIKR
LTPMENEGD
KGREHKDF
MDVMSVLD
NNNTELSKY
FDADTINK
STCLGMIA
GSDTPMVIL
VWALTLLV
NNPHLLKKA
QDEL
DIHVGRERQ
VQESDIKNL
LYLQAVVK
ETLRLYSG
PITGLREA
DEDCVVAGY
HIPAGTRLI
VNTWKIHR
DPRVWSDP
MEFQPERF
LTTHKDM
DVKGKNFEL
LPFATGRR
SCPAMSLAL
QIVHLSLV
RTIHAFDFK
LP
TANWYALG
YDRQFRTN

>EcCYP82AT3

MDFEFPLHYSKPPITTMVLIS
SFLLASALFI
FFFKVFTWRSKRSSAVSSKNP
PEPAGAWP
IVGHLP
LLMAGGKDL
PHVTLAAMA
DKYGP
AFIIRMGT
YKALIVSSW
EVEKECYTT
NDRVAFSRP
RLIALEHLG
YNHSLFGF
APYGPYWRE
MRKIVNQEL
LSNSRLDLF
KHVWDSEIN
SSIKKLYE
IWEKTSVGG
AEPVLVEMK
HWWADLT
LNIIVKLVAG
KPGLYQV
DKYTTSTTIS
NMKIEDKVAE
AARRYHKQFR
DYFRLVGQF
VVGD
AVPFLRWLDL
GGYEKEMKT
TRRD
LGVLMDEW
LEGHKRKSL
ADDDSNKGR
EHKDFMDV
MSVLDN
NNKVL
SQYFDADT
INKSTCVGM
IAGGSDTPM
VILVWALTLL
VNNPHFLKKA
QDEL
DIHVGRERQ
VQESDIKNL
LYLQAVVK
ETLRLYSG
PITGLREA
DEDCVVAGY
HIPAGTRLI
VNTWKIHR
DPRVWSDP
LEFQPERF
LTTHKDM
DVKGKNFEL
LPFATGRR
SCPAMSLAL
QIVHLSLV
RTIHAFELK
LPTDIPMDMT
DSAGLTN
LKATPLEVLL
TPRLPPHLYN

>EcCYP82AU1

MNFYQDVLSSQFSATNMVYVTLFALGLYYTLAGKRPSKSSSTFEMIKKTNEAPPEPAGSWP
VIGHLHLLRGYPVHIILGDMADKHGPVFTINIGVHKTIVSDWEVANEIFTTHDKVFSS
RTPQTAAGKYIGYNDAMLRFASDAPYWTEIRKIMKQDLLSNNRVELLKHAWAFEINSSIR
EVYKVNQGGQPAVLVEMKQWLSDLTLNMSAKMIAGKRCFGVGSVACPKAQKGLREFVRLMG
QIVVSDGVPLLGLLGLDGPVVKDMKTTGKELDRILGEWLEEHKEKKRVSSDVNDWMDVML
NVLQDDNKLSQYYDVTITKATCMALMQGVSVWTMFTLVWAMALLANNPGVLKKAHDELD
NHVGRERNVEESDIKNLVYLQAIKETTRLYPVSMRQLESNEDSTVANYYVPAGSRLIVN
TWKIHRDPKVVPEPAEFKPERFLTTHAHIEFKPQNFQLIPFGSGRRSCPGNSLGLEMLHL
TIARLVHGFDIKTPSGAPVDMTVSPGVNDNMVKATPLEVKLIPRLASDAFYVSA

>EcCYP82AV1

MQAIEPKGALPIIHLHLLGSSKVIARTLGAMADECGPVFMIRLGTRRALVVSNSKVAK
ECLSKNDSVLATRPSLIAGEHLGYNYTAISFSSNGPTLRSMRKIAKTELLSTKRIQILKP
FIDSEIDMCIRDLYEMWVTNIGEEKKISQDMGMPILVEMKEWFENLTNLNIVRVLAGKK
HFASLLGNENEEDSKICKKAAIEFLFMGVFVVGDAFPCLRWVDWGGHEGAMKRIMKELD
SSILDKWVEEHLLKRSSASSPQSFSSTRKSENNSDGGGETDFIDAMISIMEENDAAQSAGLK
SLDVATAVKSICISLLPAGSDGAAITLIWTLSELLNHSHVIKKAQEELDKQVGKDRRVND
SDIKNLVYLQAIVKESMRLYPVAPISLPHEAMEDTNIAGFDVPKGTIVLTNLWKIHRDSS
IWGIDALEFKPERFLNYCNKSQEDMELKGDLLFLSLGRRMCPGRAFALHILHVTLARLLH
EFKLSTPSDLPVDMSEGFGLTLPKTTPLDVLLPRLPSTMYVQYYNLNY

>EcCYP82B2

MDVPIFLHLQGIIGLLALVSFLFYLIKLSLRSYKANQVRRLEATGAWPIVGHLPQLVGS
RPLFRVLGDMADKFGPIFMVRFGVYPTVVVSSWEMAKECFTSNDKFLASRPSSAAGTYMA
YDYAMFGLAFYDPYWREIRKISTLQLSPRRLELLKDIPHTEIDIFIKGLYRIWEETQPR
KDSVKLEMRQLFGYLTNLVNLVVGKRVCKYGDSTDEDGEENEGQKLYKLINEFFKLGS
ISTASDTLPFLSWFDLDGQKKNMKKVAKEIDEVAEKWLQDKKLSLLSRSSKLSNGEGDG
NDFMDVLISVLPDDDEEGPLFIKHSRDTVIKATTLNMILAASDSTSLSLTWALSLLNDK
RVLNKAQDELDTKVGRDRRVEVKDIGNLVYLQAIKETFRMYPAGPLSVPHEATEDCNIG
GYQVKAGTRVLTNVWKLHRDPRVWSNPSEFRPERFLDGEGEGSKMDFRGQHFEYIPFGSG
RRMCPGINFAMQILHMTLARFLQAYDLSSPSSSSVDMTEDSGLIMPRANPLEVLLSPRLP
LPLYDY

>EcCYP82B3

MDMPISLQLQSIVGLLAFISFFFYLIKPLLSYKATQVRCPEATGSWPIVGHLPQLVGS
QPPFRVLGDMADKFGPIFMVRLGVCPTLVVSSWEMAKECFTSNDKFLASRPSSAAGTHMT
YDHAMFAIAFYDPYWREIRKISTSQLLSPRPFELLKHIPHSEINIFIKGLYQTWEKVHLR
NDSVKVEMEQLFGYLTNLITNLVVGKRVKNYGDSSHDDGEENEGRRLYKVISEFFKLCG
VSTISDALPFLSWFDLDGQKKNMKKVAKEINLVAEKWLQDKKTSSLLSRSSKHNNGEENG
NDFMDVLISVLPDDDAEGPLFTKHSRDTVIKATALNMIVAATDTTSVSLTWALSLLNDK
RVLKKAQDELDTKVGRDRGIEDKDIKNLVYLQAIKETLRMYAAPLLIPHEAIEDCNIG
GYQVKAGTRVLMNVWKLHRDPRVWSNPSEFRPERFLDNEGEGSKMDFRGQHFEYMPFGSG
RRMCPGISYAIQILHMTLARLLQAFDLSSPSSSLVDMTEEGSGLTMPRATPLEVLLSPRL
PHSLYDYVETSARK

>EcCYP82B4

MATEVRCPEATGSWPIVGHLPQLVGSQPPFRVLGDMADKFGPIFMIRQGVYPTLVVSSW

EMEKECFTTNDKFLASRSSSAAGNHMTYDYAFLAFYGPYWREIRKISTLQLSPRRLE
LLKHIPHTIDIFIKGLYRIWEDTQPRNGPVKLEMGGIFGYLTNIVLNLVVGKRCVNYG
DSNHDDAEEAEGQKLYKTVDFFKLSGVSAASDALPFLSWFDLDGQKKNMKKVAKEMDIV
AEKWLDQDKSSLLSRSSKRSNGEGEGNDFMDVLISILPDDNEKGPLFIKHSRDAVIKAT
ALSMILGASDTSLSLTWALSLLLNEKRVLKKQAQDELDTKVGRDRRVEDKDIKNLVYLQA
IVKETLRMYPAVPVAPRETIKDCNIGGYKVKEGTRVLMNIWKLHRDPRVWSNPSEFRPER
FLDREGEGSKMDFRGQHFEYLPFGSGRRMCPGINFASQILHMTLARLLQGFDLSSPSSSP
VDMTEGSGTLPRATPLEVLISPRPLPLYDY
>EcCYP82B5
MEKPILFQLQAGILGLLALICFLYYVIKVSLSRNCNQLVRHPPEAAGSWPIVGHLPQLV
GSGKPLFRVLGDMVDKFGPIFMVRFVHPTLVVSSWEMAKECFTSNDKFLASRPPSAASI
YMAYDHAMLGFSSYGPYWREIRKISTLYLLSHRRLELLKHVPHIEIHNFIKGLYGIWKDH
QKQQQQPTARDDQDSVMLEMSQLFGYLTNIVLSLVVGKRCVNYHADSHLDDGEEAGQGQ
KLHQTITDFFKLSGVSVASDALPFLGLFDLDGQKKIMKRVAKEMDFVAERWLQDKKSSLL
LSSKSNNKQNEAGEGDVDDFMDVLMSTLPDDDSLFTKYSRDTVIVKANSLMVVAGSDTT
SVSLTWALSLLLNDKQVLRKAQDELNDKVGRGRHVEEKDIDNLVYLQAIVKETLRMYPAG
PLSVPHEAIEDCSVGGYHIKTGTRVLANIWKLQRDPRVWSNPSEFRPERFLDNESNGTKL
DFRGQHFEYIPFGSGRRMCPGVNLATPILHMTLARLLQSFDLTPSSSPVDMTEGSGLTM
PKVTPLEVLLTPRLPLPLYNY
>EcCYP82D170
MNFSSLNYHHPFSIPYTIIVATLFIALLYFLHLFWSTTKSKTWVPEAAGGWPIIGHLLV
LARSNNLPHITFGSMADKYGPAFTIRIGLHRSLSVSSEVLKDIFITNDITFSSRPKVIA
MKYMGYNYANFGFAPYGPYWQKVHKIVNHELLSKSRLESQHVWVSEIQTSIKQLYKLWV
KGTKEEEVKPVLIELKKWVSDMLNISRVIIVGKRFEFGSNTSGCDEAVKFQKALRELF
LMGMFVLSDAMPFLGWLDLGGYEKEMKKTARELDCLLEGWLEEHKRKRYGEIKHEKDDEI
TDFMGVLISILGDGKLHGFDVDVIKSTCLTLLGGSDTTMVSLVWTIASLVNHPHVLKK
MKDELVDVHIGRDRRVEDSIKNLVYLQAVVKETMRLYPPGPLAGPRESTKDCIVAGYHIP
VGTRLIVNTWKIQRDPMVWSDPLEYKPERFLEDQHGNMDVAGQNFEPFGSGRRSCPGS
SFALQVVHLTLAYLIHGFELKTSCGAPDMMTESPGLTNVKATPLEVLLIPRLASKLYL
>EcCYP82D171
MASNLSTNLILSSIFTAFLLYFLLKMRPFRSSKNKSRKQAPKPTGSWPVIGHLLQLQGPN
LPHINLAALADKYGPVFNFIQIGLRPAIVVSSWEIAKECLGTNDRVFSRPPLVAMKHMGY
GHALSGFSPYGPYWRELRLKLVNQELLSSTRIELIKHVWDTEINTFINDLYEVVVMKSNEG
GGDVVVMKQCLYDFTLNLTLKILTGRYFGGGGGGGEELREEAGRCQKAVRNFLRLVG
TFTAQDVIPFLEGWLDLGGHEKEMKITGKELDSLQKWLEEHKVRKSTVGEEGQEKGYDD
EQDFMGVMLTKLRDHEKLLRYDADTINKATCLTVILGGSDTTMMTLVWALALLVNHPHV
MKKLQDELDTHTVSKERQVEESDIKNLAYLQSVMKETMRRYPGTPLYVRESIEDCTIAGYD
VPTGTRLVVNAWKIQHDPQVWSNPFEFNPERFLTTHKDIDVRGQNFELIPFGAGRRMCPG
ASLGLQVVHLTLARLVHGFEEKTPDGEPMDMMTESIGLTNLKATPLEIMLTPRLSSKLYVC
>EcCYP82D172
MDSELFKFSSTFTILITSFFALLLHFLLSWRSSSKTSNISLSRKQAPEAAGSWPFLGH
LHVLAGPDLPHINLAVLADKYGPAFTIRIGQNPALVSSWEIAKECFTTNDKLFASHPK
QKAMQHLGYDYAMFGFSPYGPYWRELRKIMNQEVLSHTRLESQHIWDSEIKTSLRELYE
SLISKNNEKSSSNGEVVDMKKWFADLVLNITVKMVVGKRLFGSDNNHDYNQVAITKLKG

LFKLLGTFVLGDAIPSLGFLDFGGHEKEMKSTAKELDSLMEEWLQEHRKRLLSGEMKKG
EEQDFMDVMLTILDGDTKLTEFYDADTINKATCLGLITGAGDTTAAIGVWVLSLLVNNQD
KLLKVHDELDIHVGRDRQVEESDMKNLTYIQAVLKEAFRLHGAVPLSGFRVAAEDCTLGG
YHVPAGTRLIINAWKIHNDPRIWTDPSFEKPERFLTTHKDIDVRGHNPLIPFGMGRRGC
PGVPMALQVLHLALARTIHGFETLSGRPTDMTGTAGLTNMKATPLEVLLTPRLPPKFY
V

>EcCYP82N1

MDSLILTNWFPISIASVLTFLYKVLSSRTLKDKKIKTSPMANGAWPILGHLHLFGSG
ELPHKMLATMADKYGSAFRMKFGRHTTLVVSDTRIVKECFTTNDTLFSNRPSTKAFQLMT
YDNESVAFTPYGPPYWRELKISTLKLLSNHRLQAIKDVRASEVNVCFKSLYDQCKNPSGA
PILIDMKKWFEVSNVVMRVIVGRQNFSGKIVQEEEEAMQYKKVMDELLRLASLSMFSD
FAPLLSFLDIFQGNLSAMKRNAKKVDAILENWLEEHRKKKNSVAESEQDFMDVMLSIANE
SKLSGHDADTVIKATCLAMIMGGTDTTAVSLTWIISLLMNNRHALKKAREELDALVGKDR
QVEDSDLKNLVYMNAIVKETMRMYPLGTLLERDTKEDCEIGGFHVKGGRLLVNVWKLQR
DPNVWVDPTEFRPERFLTENADIDVGGQHFELLPGAGRRVCPGVSFALQFMHLVLARLI
HGYDLNTLNEENVDLTESPEGHVNHKASPLDLILTPRLHSSLYDY

>EcCYP82N2v2

MDSFMLAYWVPISVASIIAFVFLYNLFSSRTLQNKKIRTAPMAMGAWPILGHLHLFGSGE
LPHKMLAAMADKYGSAFRMKFGKHTTLVVSDTRIVKECFTTNDTLFSNRPSTKAFQIMTY
DNESVAFTPYGPPYWREIRKISTLKLLSNHRLQAIKDVRASEVNVCFKTLYDQCKNPSGSA
PILIDMKKWFEVSNVVMRVIVGRQNFSGKIVQEEEEAIHYKKVMDELLRLASLSMFSD
FAPLLGFVDIFQGNLSAMKRNAKKVDAILENWLEEHRKKKNSVAESQQDFMDVMLSIVEE
SKLSGHDADAVIKATCLAMIMGGTDTTAVSLTWIISLLMNNRHALKKAREELDALVGKDR
QVEDSDLKNLVYMNAIVKETMRMYPLGTLLERETKEDCEIDGFHVKGGRLLVNVWKLQR
DPNVWVDPTEFRPERFLTENADIDVGGQHFELLPGAGRRVCPGVSFALQFMHLVLARLI
HGYDLNTLNEENVDLTESPEGHVNHKASPLDLILTPRLHYKLYE

>EcCYP82N2v3

MDSFMLAYWVPFSIASIIAFVFLYNLFSSRSTLKNKKIRTAPMATGAWPVLGHLHLFGSG
ELPHKMLAAMADKYGSAFRMKFGKHTTLVVSDTRIVKECFTTNDTLFSNRPSTKAFQLMT
YDNESVAFTPYGPPFWREIRKISTLKLLSNHRLQAIKDVRASEVNVCFKSLYDQCKNPSGS
APILIDMKKWFEVSNVVMRVIVGRQNFSGKIVQEEEEAIHYKKVMDELLRLASLSMFS
DFAPLLGFLDIFQGNLSAMKQNAKKVDAILENWLEEHRKKKNSVAESEQDFMDVMLSIAN
ESKLSGHDADTVIKATCLAMIMGGTDTTAVSLTWIISLLMNNRHALKKAREELDAIVGKD
RQVEDSDLKNLVYMNAIVKETMRMYPLGTLLERDTKEDCEIGGFHVKGGRLLVNVWKLQ
RDPNVWVDPTEFRPERFLSENADIDVGGQHFELLPGAGRRVCPGVSFALQFMHLVLARLI
IHGYDLNTLNEENVDLTESPEGHVNHKASPLDLILTPRLHYKLYE

>EcCYP82N2v4

MDSFMLAYWVPFSIASIIAFVFLYNLFSSRSTLKNKKVRTAPMATGAWPVLGHLHLFGSG
ELPHKMLAAMADKYGSAFRMKFGKHTTLVVSDTRIVKECFTTNDTLFSNRPSTKAFQLMT
YDNESVAFTPYGPPFWREIRKISTLKLLSNHRLQAIKDVRASEVNVCFKTLHDQCKNPSGS
APILIDMKKWFEVSNVVMRVIVGRQNFSGKIVQEEEEAIHYKKVMDELLRLASLSMFS
DFAPLLGFLDIFQGNLSAMKQNAKKVDAILENWLEEHRKKKNSVAESEQDFMDVMLSIAN
ESKLSGHDADTVIKATCLAMIMGGTDTTAVSLTWIISLLMNNRHALKKAREELDAIVGKD
RQVEDSDLKNLVYMNAIVKETMRMYPLGTLLERDTKEDCEIGGFHVKGGRLLVNVWKLQ

RDPNVWVDPTEFRPERFLSENADIDVGGQHFELLPGAGRRVCPGVSFALQFMHLVLARL
IHGYDLNTLNEENVDLTESPEGHVNHKASPLDLILTPRLHYKLYE

>EcCYP82N5

MEQFQPFSAFLLASFIFYKLCNFGKRNTKNGKPTAPEASGGRLIMGHLHLFNGTELT
HRTLGSMAADTYGPAFNIRFGSHKTLVVSSWKIIECFTTNDRFFSNRPGSLAIKLMFYDA
DSVGYAPYGSYWRELKISTLKLLSNHRLET LKHLRTSEVDSCFNQLMNSWAENKNRGDS
DFAPVRMDDWFGDLTFNVVARIVAGKKNFAGGAARGDAGAQRYSAMDEAFRLMTIFAYS
DVIPSLGWLDKLRGLVGDMKRCGSEIDSVVESWVDEHRLKRRVSKKGELDLEQDFIDVC
LDIMEHSSLPGDDPEIVIKSTCLDMILGGSDDTTVTLTWALSLLLNHPQVLKRAKEELDS
QVGKERQVEDSDIPNLPLIQAIKETMRLYPAGPLIERRTMEDCEVAGFHVPAATRLLVN
LWKMQRDKEVWSEEPLEFRPERFLTSNTEVDLKGQHYELIPFGAGRRICPGVSFAVQLMH
LVLARLLHGFEMTTMPMGEKVDMTESAGLISHKITPLEVLIKPLRV

>EcCYP82N6

MLKTLSDKYGPAPIIKLGQRKSLVSDPRVVKECFTTNDTLFSNRPSTKAFDLMTYSPLS
LAFTPYSPYWRELKISTLKLLSNRHLQTIKKLRLDEVNVCFRRIYDLWKNETSKASVSN
FGENRVRVLVDMKKWFEEVSNNVAMRVIVGKHNFGTRIANGEDEEAIEYKTIMDKLLRLA
SFNLLSDMVP SLGWIDFFQGNIRLMKQNGKKLDILLQRWLDERRINKSSVAEEDQDFVDV
LLSVVEENKFSNYSDTVIKATCLAMIMGATDTTAVTLTWITSLLMNNRHVLRKAQEELD
THVGKDRQVEDSDLKDLVYLNAIVKETMRLYPLGALLERETKNDCQVGRFHIERGTRLLV
NVWMVQRPDSVWVDPNEFKPERFLNEKFDIDVGGQHFELIPFGVGRRVCPAVSFALQFLH
LVLARLIHGYDLSTLNDAVVDLTESTQGHTNHKATPLDLLSPRLDANLYGY

>EcCYP82N7

MDTASSISLLLPWAVVPSIATLLALLFLSITSPKTPKRKTSSKPPPIVLPGAWPILGH
LHLFKEGELPHHMLKNLADKYGPAFVIFGQHRSLVVSNTKIVKECFTTNDTLFSNRPST
TAFDLMTYAHDSVAFTPYSPYWRELKISTLKLLSNRLKAIKKLRGEEVDVCFRGLYGL
WKNKTKNGAPVLVDMKKWFEEVANNVVIRVIVGKLSFGTKIVDGEAAVEYKTVMDPELLR
LASLSLLSDMAPILGWLDFFQGNVRKMKQNGKRLDVLEKWLGEHREKKNLVGEDEQDFM
DVMLSTVEESKLSGHEADAVIKATCLAMIMGTDTTAVALTWIISLLMNNRHALEKAREE
LETHVGKDRQVEDTDLQNLVYLSAIVKETMRLYPLGTLLERETKEDCEIGGFHIQGGTRL
LVNIWMVQRDPVWVNDPSTFKPERFLTDKSEIDVGGQHFELIPFGAGRRVCPAVSFALQF
LHLVLARLIHGYDLGTSNNVEVDLTESPEGHVNHKASPLELLLTPLRNPELY

>EcCYP82P1v1

MGLSFDLSSHNFLOFSNPTILIGLFGLLVYLLLVNLRKRISRKNEAPEVEGGWPIIGHLH
HFMGGKNKLLHVAFGAWADKYGPVYTLRMGLNKVLVNSAEVAKECSTTNDMLFMARPYR
VASEIMGYGYAMFPIAPYGPFLYKMRKMVTQELLSNSRVDSLKHVWGSEIKNAIQELHKK
VLSTKGGGPISMDMKGWVSNLTFRTAMKVICGGVGVDDGGGGGGGATSPATSIGEHNYDEV
GSFQKALKEFFVLLGEIRISDVIPFLGWLD MRTGYVEKMKDNGKFLDNLMEEMLEEHKRK
RRSLTEEEEDGGYVEQDFMDVMISKLNDPKLLSYDADTINKSTCLTLISGSETTMVS
IVWALALLVSHPHVLKKAQDELDTLVGRERQVDESDIKDLVYLQAVVKEALRLFPAPLS
TPRVATEDCVVSGYHVPAGTQLFVNTWKIQRNPEVWPEPSEFRPERFFTHKDFDVRGLH
YDLHPFGSGRRACPGAGFALQVVHLTLASLLHGFEIKNPSDEPIDMTESPGVTNLKATPL
KVLLTPRLFSKEYY

>EcCYP82P1v2

MGLSFDLSSCNFLQFSKPTILIGLFGLLVYLLLVNLRKRISRKNEAPEVEGGWPIIGHL

HHFMGGKNKLLHVAFGAWADKYGPVYTLRMGLNKVLVVNSAEVAKECSTTNDMLFMARPY
RVASEIMGYGYAMFPIAPYGPFLKMRKMVTQELLSNSRVDSLKHVWGSEIKNAIQELHN
KVSSTKGGGPISMDMKGWVSNLTFRTAMKVICGGVGVDDGGGGGGGGGGATSPATSIGEHN
YDEVGSFQKALKEFFVLLGEIRISDVIPFLGWLD MRTGYVEKMKDNGNFLDNLMEEMLEE
HKRRRRSLSEEEKDG CYVEQDFMDVMISKLN DPKLLSYDSDTINKSTCLTLILSGSET
TMVSIVWALALLVSHPDVLKKAQDEL DTHVGRERQVDESDIKDLVYLQAVVKEALRLFPP
APLSTPRVATEDCVVSGYHVPAGTQLFVNTWKIQRNPEVWPEPSEFRPERFFTHKDFDV
RGLHYDLHPFGSGRRACPGAGFALQVVHLTLASLLHGFEIKNPSDEPIDMTESPGVTNLK
ATPLKVLLTPRLFSKEGY

>EcCYP82P2

MVVL RANGTTLAPTNTIVPILADGFTFHETNNLFARTILGDYKTSFQEMSFSSMFSKPTM
VIGLFGLLIYVLLNLRRLPSSSNTRTAKYGKNEPPEVAGGWPIIGHLHHFMGGKNKL
VHEIFGAMADKYGPAFTIRMGLTKVLVVS GA EVAKECLTTNDMTFISRPPRIAIDLMGYG
SAMFAIAPYGPYYVQMRKIVTHEILSNSRVESLKHVWGSEINKAIQELYRKVVLVGGGGP
VSLEMKRWFSDLTRTTVKVICGKQYFGGGSASETITSNGDIASEDEAGRQKGLRDF
ALLGEFRVSDVIPFLGWLDLPTGYKEKMEKNRIFLDSLMEEWLEE HKRRRRSLSEAEKKD
GVIEQDFMDVMMSKLN DPKLLTYFDADTINKSTCLTLILGGSDDTMMVSLVWALALLMKHP
HELKKAQDEL DTHVGRERQVEETDIKDLVYLQAIKETLRLYPPGPLSAPRVSTKDCTVA
GYHIPAGTHLFVNTWKIQRNPEVWTEPSKFRPERFLTTHKDFDVKGQHYELLPFGSGRRA
CPGASFALQVLRRLTLARLLHGFEFKTPNDTPIDMTETPGITNVKATSLEVLTVPRLLEE
LYVYKEK

>CsCYP82D98

MPRSFIQGHYATLSLFSHFSTSGEGGYHSDPINVDCIALSHSSVLVRLSIHEIEMEH
PEIPSIGVISSYLSFGAGFFLLVLSFLVLKKATARKKEPPEVAGGWPIIGHLRLLKS
DSQLPHQTLGALADKYGPIFRIRVGAQPTLISSSELAKECHTTLDIVSSHPSVAGKL
LGYNYAAFGRTPYDSFYRRMRKIVASEVLSNRRLELQRDVRVSEVKKALKEVFNQWTKRE
EGSNHILVDVEELIGNINLKVVLMVMVSGKRFLGGSGEVEEMKRYRKVMRDFLDLLGKFVV
GDSIPFLRWLDVGGYEKAMKITSKELDSLLEEWLEDHRRKRNSGAIDGEHGDLM DVLLSN
LEGMDLGGYDANTVNKATCTSIITGGTDTVTISLAWAVSLLLNNREVLRRAQEELDIHVG
NKRLVDEL DISKLVYLQAVVNETLRLYPPGPLSGVRVFS EDCIVGGYNIAGGTHLITNLW
KIHTNPEVWAEPLFKPERFLNRNKQLDVKGQRFEFLPFGCGRRSCPGMNLGIQMTQLML
ASLIHSFELNTRSDEPVDMAASF GIAMYRTNPLEVLVKPRLASAYV

>CsCYP82D99

MADHIISPYGINISIVGLLFLFPI LIFSYYIILILKNKATTLPHKLRSQPPEVAGGWPII
GHLLLLRTHSMLPHETFGALADKYGPIFLRLGVHPTLVINNWEIAKECYTTLDIVSSR
PKTSIQKELSYNFAGFGFRPKYDAFYRNM RKMAVSEVLSNSRLEIQRDMRVYEVN RGVKE
IYNSWTEYRNEDLIAVDLDEWIGNINLVILRMVCGKRMAEGSEMERC RKAMRGFFELAG
QVTVGDAIPFLKFLDLGGYLKTTKEVFKELDCIMEEWLEEHRQKKRDAGASAGAAEKGLM
GVMPLLLKGMELDGYDADTVVKATCLTLISGGTDTMTVTITW AISLLLNNQDALRRVQEE
LDIHVG NKRVLNESDINKLVYLQAVIKETLRLYPAGPLSGAREVTE DCTIGGYNVASGTH
LITNIWKIQRDPRVWTEPSKFKPERFLSSHNYDYMDVKGQHFELSPFGYGRRVCPGLGIS
LMMTPLVLASLIHSFDVTTYDDEPVDMAANLGLTMRRVKPLHVLVKPRLATAYA

>CsCYP82AG1

MVEFQFPFFNPKSITMLVFLFFISCYYLWQKWQYKSTEPKQAPAPP GAWPIIGHLHMLH

NVKLPHHALGAMADKYGPLFRLQLGSR SALVSSWEMAKESMCVNDAAAASRPGVSGTKH
FSYDFAAFLAPYSPYWREIRKVTHMELLSNPRVDQFKNTMFGEVKTSLRELHETWAAQK
DGSQQUEVEMKRWFGDVIVNMLLKIIIGKRCVGPNAEGGEKQAKDFQLAIRDSFHLMGQG
LLRDIPLIGRLGFNGQVKVMENIATRFDMVLREWLDEHKLNR TSSCCGRKDGDFMDALV
SLYDGKEIEGYDGD TTIKATTLNMVAGGTESTTVTLTWAMSLINNPHVLERAQQELDT
VVGRDRQLKESDIPNLVYLKSIKETMRMYPAGPLLGPREFYKDCIVAGYFVPKGTQLIP
NIWKIQTDP RVWPD PFEFKPERFLTTHKNVDLKGNNFELIPFGSGRRGCPGLAFGLQMVH
FALAGFLHSFDVKNPTKEPIDMSENFGMANEKVVPLNVSVTSRLPSHLYTIN

>CsCYP82AG2

MMDFPSP IIIFLFIFSSYYLWRKWQKNKKTGVSEGKKAPSPGGALPIIGHLHLLNKR GK
LPHHVLGSMADKYGP IFRNLGSRPALVVS NWEMAKESMCTNDAAAASRPELSVSKNFSY
NFAMFGLASYSSYWRDMRKITHLELLSNPRVDQVKSVM LGEMSTSLRELYTRWGGERKKL
EEISVEIKHWFGDATLNM LKIIIMGKRCVGPNA SEGNENDARTLQMGIRESFHLMGEGLL
RDYIPWWANL GFDGRVKAMEKIAEQMDAILQRWFEEHMHHRSTDDLDRRDGDFMDSLISL
GRANQLPTHHNQNTIVKATTLNMIAGGTESSTVTLTW AISLLLKNPCA LEKAYQELDQVV
GRDRKLNESDINN LVYLQAIVKETLR LYPAGPLLGPREFYKDCFVAGYFVSKGTQLIPNI
WKIQTDP RVWPD PFEFKPERFLTTHKDVDLKGNNFELIPFGSGRRGCPGVSFGLQMVHFA
LAGFLHSFHIKNPLGEEIDMREDFGMANEKVVPLNVLVT PRLPLHLHTPITV

>CsCYP82D101

MDLPLLLISSNFALPAILFTLLFFLYALFASFIHGRRNRLPPQPDGAWPVIGHLPLLTG
KELLHNTLGKFADNYGPIFMLRFGTKKTLIVSGWEVAKECFTTNDKIFASRPKFAAAQLL
GYNYAMFGTSPYGSWHRHIRKIVMLELLANHRMNRLQH IPRLEVQNSIEELHELCSRNKK
AVVEMEKWFGDITLNTIFKMVIGKRFSTTFEGCHGEEYQNALK DFFNLFI AFVPSDLFPF
LRWFDFGGYKKS MKKTAKIMDEMHDKW LREHREKRNSDGLVIEDQDLMDIMLSITKDEDF
SGYDVDTIKSTCLVVVNNFDENCHDIGWISHHHSTNGMGSFITSKT

>CsCYP82D104

MEQPSHAVAGVIFALAFIYLLFIMSRRSVAHPKRLPPEPDGAWPVIGHLHLLNASEPIH
ITLAKMADVYGPIFTFRFGTKRALIVSNWEIAKECFTTNDRIFASRPKQLASKLLAYDYA
MMAFSPYNPHWRYVRKLAMLGLFTNQRIEQLEHVRVVEVHSWMKELYDLYWLKNNNNKSE
KVVVEMKKWFVDITLNTMFKMVIGKRFSTAFDDHVSREKCRKALGGFFEFFMKFIPSESF
LFLSWDLGGHEKAMKSAQILDEVFHKFLQQHRERRDYSSNGQMEEKDFMDVMISSVED
DDGEQLNYDADTIKATCLNVILGGFDTTAVTMSWALSLLNNENALKKAQHELDEQVGR
ERQVKETDLKNLPYLQAIVKETLR LHPPGPLLPRESIEDCTIGSYHIPKGT RLIVNAQK
LQKDPHVWDDPCEFRPERFITNQKNFDVRGQNPQLIPFGNGRRICPAISFALQMIHLTLA
NLLHGFKIGRPSQELVDMEESGLASGRKAPLKVVLT PQLPAYAYE

>CsCYP82D102

MIVIRNMELLHFSPDVVARIFALIIFLYALFKIYRGRARAHHRKRLPPEVGGALPLIGH
LHLLDKNEPAHITFAKMADAYGPIFTLR LGLYTNLIVSNWEIARECFTTNDKIFASRPK
VASKLLGYDYAMLGLSPYGPHWRHVRKLTMLELLTSHRLQKLQH IRVSEVQTSIKNLYEL
CLKNKKNNEKNALVEMKTWFGDITLNTISRIVVGKQFSTAVDVSNTNENEEYRKALRDF
EWFVGFVPSDSFPLKWL DLGGHEKAMKTAQVLDEVFDKWIQEHQQKNNLGAVKMEEH
DFMDVMLS NVRDDGQLSKYDAHIVTKATCLALILAGSDTTT VTMIWALSLLNNQEV LKR
AQLELDEHVGRQRQVKESDVKNLLYLQAVVKETLR LYPAAPILIPHESIEDCVVAGYHIP
LGTRLIVNVQKLQRDPQIWEDPCEFHPERFLTSEKDFDVRGQSPQLIPFGSGRRMC PGIS

FALQVMHLALANLLHGFEISRPTKELLDMEESAGMTSIRKNPLEVVLTPLRPPQVYEL
>CsCYP82D103
MDLSQLSLSATVVTGIFSLLLFLYALFDISTRVAGARRNKLPELPGRWPVIGHLHLLNA
TEPAHITLAKFADTYGPIFTLKLGMNKALVVSSWEIAKECFTTNDRIFASRPKLVAASKLL
GYNYTMFGLSPYGSYWRHIRKLATLELLTNRRHLHQLQHIREFEVQTSIKKLYELCIRNKK
SLVEMNTWFGDITLNTIFRMVVGKRFSMAMDGSANGNDVYRMALRDFFEWFGVFVPSDSF
PFLKWFDLGGHEKAMKKTAKILDEVFDKWLQEHRLRRKFEESENFMDVLLSNVKDAEQF
SNYDADTVIKSSCLALILAGFDTTVMITWLSLLLNNPEALKRAQLELDEQIGRHKQVK
ESDIEKLKYLEAIVKEALRLYPPGPLGVPHSTDDCKIAGYHIPAGTRLMVNIQKLQKQV
CVWEDPCEFRPERFLTSHKDFDVRGKCPMLIPFGTGRRMCPASSFALQIMHLALANLLHG
FEIERPSQDLIDMEESAGMVSIKKEPLRVIISPLRQPQLYE

>CsCYP82D100
MEYLNLTFGIIFPLIFFYLLFTCSRRSVAQRKRLPPKAGGAWPVIGHLHLLNASEPTHI
TLAKMADAYGPMFTFRFGMKRALIVSNWDLAKEIFTTNDRIFASRPKLVAASKILAYDYAM
MGFSPYSPHWRYVRKIATLELLTNHRVDQLQYIRAFEVETWMEELYELWRLNNKGEKVVV
EMKKRLADVTLNTMFKMVIGKKFSSMEYGNEKFQKVLIEFFGLFGIFILSDSFPLSWLD
LGGHKKVMKKTAKIMDEVFDKFLKEHRERINNFGELPAAEKDFMDVMISTVEDDGQHFN
HVDTVIKATCLFNL

>CsCYP82D105
MELQFSASFSSPKIMISMSLFIFFLYTLFWLLNLTSLFTSQRKNNLQPLPVARGAWP
VIGHLHLLSSSEPGHKTGKMGADSNPFTLKLGIHRAIVVSNWEIAQECLTTNDIIFAS
RPKLTSAKLLGYNNMFGLAQYGPFWRHMRKVVSLELLSTHRLQQFQPIRISEIQSSINK
LYQLCTKEKPLVEMKAWFEDITLNIMFKIIFGKRFTDDLKGDQDHRKTFRNLMEFGVFV
PSDSLPLSWLDLGGYEKAMKTTSKVLDEVFDKWLEEHRQRKIENNNDGAEDFMDVMLSI
IKDDDEQLSGYVGDSVIKANCLAMILAGSDTTTTMTWTLSSLLNNQETLKAQIELEEQ
VGRQKQVTESDVKNLIYLQAIVKESRLYPALPISIPHESTEDCSIFGYHIPSRTLIVN
IQKLQRDPLVWEEPNEFRPERFLTTHKDFDVRGQNPQLIPFGNGRRMCPGTSFAFQIIHL
TLANLLHGFEIDRPSKDLLDMEESVGLTSTKKSPLVVLTPLPALGSH

>CsCYP82D106
MEPLFALVSSPHTGVGIMMAVFLFILFSFVLFRLSSQHGKKLQPPEAGGAWPVIGHLH
LLGGSEPHQKVLAAAMADAHGPIFTLKLGMHRAVVSNWEIAKECFTTNDRIFASRPKLTA
SKLLGYNNMFAFSEYGPYWRHMRKIAVHGLLASHYMKQQLQLESEIQSSVGKLYDLW
ANHTKRSEQALLVEMNTWFQDITLNTMFRMVVGKRFSTDMEGSGNQDYRKVFRDFVKFF
ADFVPADSFPLSWLDLGGYEKAMKKTSEALDEVLDKWIKEKNNSGDHQQDFMDILLSA
VEVDEELSDYDGDVVKANSLSMILAGSDTTAATMIWALSLLVNNEEALKKVQLEEEKV
GRQRKVKATDLNDLIYLQAIVKETLRLYPAGPLSPHESTEDCNILGYSISAGTRLIVNL
QKLQRDPLVWKPNEFKPERFLTGTDLDFKGLNNPQLIPFGSGRRACPLSLALEIMPL
TLANLINGFEIGRPSKELINMEEYFELISVRKVPLQVVLTPRLSAQDYK

>CsCYP82D107
MESYSKTAVAIPIPLLLFLFSFWVLSRRLFRSQQRNKKLQPPVASGAWPVIGHLHLLG
GSEPAYKTLGKMADAFGPIFTLKMGSRAVVSNWEIAKECFTTNDRVFASRPKLVAACH
MGYNNTMFAFTQYGPLWRHIRKIANHEILSNQRLDLFQHIYKSEVQVSIKKLYELWVTNG
SEKVLVEMKDWFGELTNTIFRMVLGKRFTTVEGSSNEGSDEGEQFRQALRDFLQLFMA
FVPSDSFPVSWLDLGGYEKAMKKTAKILDKTLHKWLEHQQKRNCNNCDDVVHKEEDFM

DVMLSTVQNVEELIGYDVGITKATCLTLILGGAESTQVTLTWALCLLNNNEDTLKKAQ
LELDEQVGRERLVLES DVKNLLYLQAIVKETMRLYPAAPLAALHEAMEDCNLVGYHIPAK
TRLIVNLKKLQKDPLVWEDPDEFRRPERFLTTHKDFDVRGQHPQFIPFGSGRRMCPCGVSA
SQVMHLTLANLLHGFEIRPSEELINMEEKVGLTSMKTTPLQIVLTPRLSAQVYV

>AtCYP82C3

MDTSLFSLFVSILVFVFIALFKKSKPKYVKAPAPSGAWPIIGHLHLLGGKEQLLYRTL
KMADHYGPAMSLRLGSSETFVGSSEFAKDCFTVNDKALASLMTAAAKHMGYVFWLEMRK
IAMIELLSNRRLQMLNNVRVSEISMGVKDLYSLWVKKGGSEPMVMDLKSLEDMIANMIM
RMVAGKRYFGGGGAESSEHTEEARQWRKGIKFFHLVGIFTVSDAFPKLGWLDLQGHEKE
MKQTRRELDVILERWIENHRQQRKVSQTKHNDSDFVDVMSLAEQGKLSHLQYDANTCIK
TTCLALILGGSETSPSTLTWASLNNKNDMLKKVQDEIDHVGDRDNVEDSDIKNLVYL
QAIKETLRLYPAAPLLGHREAMEDCTVAGYNVPCGTRLIVNVWIKRDPKVYMEPNEFR
PERFITGEAKDFDVRGQNFELMPFGSGRRSCPGPSLAMQMLHLGLARFLHSFEVKTVLDR
PVDMSSEPLTITKATPLEVLINPRLKRELFV

>AtCYP82C4

MDTSLFSLFVPILVFVFIALFKKSKPKYVKAPAPSGAWPIIGHLHLLGGKEQLLYRTL
KMADHYGPAMSLQLGSNEAFVSSFEVAKDCFTVNDKALASRPMTAAAKHMGYNFAVFGF
APYSAFWREMRKIATIELLSNRRLQMLKHVRVSEITMGVKDLYSLWFKNGGTPVMVMDL
SWLEDMTLNMIVRMVAGKRYFGGGGSVSEDETEAMQCKKAIKFFHLGIFTVSDAFPT
LSFFDLQGHEKEMKQTGSELDVILERWIENHRQQRKFSQTKENDSDFIDVMMSLAEQGKL
SHLQYDANTSIKSTCLALILGSDTSASTLTWASLNNKEMLKKAQDEIDHVGDRDN
VEDSDIENLVYLQAIKETLRLYPAGPLLGPREAMEDCTVAGYYVPCGTRLIVNVWIKR
DPKVYMEPNEFRPERFITGEAKDFDVRGQNFELMPFGSGRRSCPGSSLAMQVLHLGLARF
LHSFDVKTVMMPVDMSENPGLTIPKATPLEVLISPRIKEELFV

>AtCYP82G1

MTFLFSTLQLSLFSLALVIFGYIFLRKQLSRCEVDSSTIPEPLGALPLFGHLHLLRGKKL
LCKKLAAMSQKHGPIFSLKLGFYRLVVASDPKTVKDCFTTNDLATATRPNIAFGRYVGYN
NASLTLAPYGDYWRELKIVTVHLFSNHSIEMLGHIRSSEVNTLIKHLKNGGTSIVKI
DMLFEFLTNIILRKMVGKRIGFGEVNSDEWRYKEALKHCEYLAVIPMIGDVIPWLWGLD
FAKNSQMKRFLKELDSVNTKWLHEHLKKRSRNEKDQERTIMDLLDILPEDIVISGHVRD
VIVKATILALTGTSDSTSITLTWAVSLLNNPAALEAAQEEIDNSVGKGRWIEESDIQN
LKYLQAIVKETHRLYPPAPLTGIREAREDCFVGGYRVEKGTRLLVNIWKLHRDPKIWPDP
KTFKPERFMEDKSQCEKSNFEYIPFGSGRRSCPGVNLGLRVVHFLARLLQGFELHKVSD
EPLDMAEGPGLALPKINPVEVVMPRLDPKLYSL

>AtCYP82C2

MDTSLFSLFVPILVFVFIALFKKSKPKHVKAAPAPSGAWPIIGHLHLLSGKEQLLYRTL
KMADQYGPAMSLRLGSSETFVSSFEVAKDCFTVNDKALASRPITAAAKHMGYDCAVFGF
APYSAFWREMRKIATIELLSNRRLQMLKHVRVSEISMVMQDLYSLWVKKGGSEPMVMDL
SWLEDMSLNMMVIRMVAGKRYFGGSLSPEDAEEARQCRKGVANFFHLVGIFTVSDAFPKL
GWDFDQGHKEMKQTGRELDVILERWIENHRQQRKVSQTKHNDSDFVDVMSLAEQGKFS
HLQHDAITSIKSTCLALILGGSETSPSTLTWASLNNKNDMLKKAQDEIDHVGDRDNV
EDSDIENLVYIQAIKETLRLYPAGPLLGHREAIEDCTVAGYNVRRGTRMLVNVWIKRDP
PRVYMEPNEFRPERFITGEAKDFDVRGQNFELMPFGSGRRSCPGSSLAMQVLHLGLARFL
QSFDVKTVMMPVDMTESPGLTIPKATPLEILISPRLKEGLYV

>AtCYP82F1

MDLIMLFLLSALFIFPVILIKSRLRPKNKKSTAPMVPGAWPLLGHHLFDTVNPHTVTF
GAMADVYGPVFMALGSIKVMIIINSKEVAKEIYTVHDKLLERPELTASKLLGYNDSFLT
SPYGLYWREIRKIAVSELFSTSGVDMHMMVSRAREADLAFRALYVRWEKRGKPKGVLVDM
KQEFIDLTANISLMMVSGKRYFGENPNCEVKEARRCGKLIREFLDYFALFLLSDVAPVLG
FLDWKTKRGMKRTAKGLDKVAEGWIEEHKNKRSDHGRSENDYLDILIKILGQDKIPGLSD
THTKIKALCLNLVLAGSETAIVVLVWAVSLLLNNPHVLRKAQEELDSKIGKERVVEELDI
KDLVYLQAIVKETFRLYPPVPLVAYRAVVEDFDIAFCKCHVPAGTQLMVSAWKIHRDPNV
WSNPEQFEPERFLTSNRELDVGGQSYKFFPFGLGRRSCPAIPLGMRMVHYLLVRFLHSFD
LARPSSQDQDVMTESNGLVNHKATPLEVNIIPRLHKSLEYVDHIGTDN