

UGT13A3	1	-----	
UGT13B1	1	-----	MRSGLYAV
UGT16A1	1	-----	
UGT16C1	1	-----	
UGT16B1	1	-----	
UGT16D1	1	-----	
UGT17A1	1	-----	
UGT17B1	1	-----	
UGT14A1	1	-----	IFLFFVFF
UGT14D1	1	-----	MLLFFYF
UGT14C1	1	-----	MIIQSVF
UGT14E2	1	-----	MLLKFL
UGT14F1	1	-----	MIRMSVV
UGT15A2	1	-----	MKN---
UGT15B1	1	-----	MNL---
UGT15D1	1	-----	MR---
UGT15E1	1	-----	MFHIKRKMNNMINV
UGT15C1	1	-----	MKG---
UGT18A1	1	-----	
UGT18B1	1	-----	
UGT18C1	1	-----	
UGT18D1	1	-----	
UGT18E1	1	-----	
UGT18F1	1	-----	
UGT19A1	1	-----	
UGT19B1	1	-----	
UGT25A1	1	-----	
UGT25B1	1	-----	
UGT25C1	1	-----	
UGT25D1	1	-----	
UGT21A2	1	-----	
UGT21B1	1	-----	
UGT2A1	1	-----	
UGT2B1	1	-----	
UGT1A1	1	-----	
UGT35A1	1	-----	
UGT35B1	1	-----	
UGT31B1	1	-----	
UGT31C1	1	-----	
UGT31A1	1	-----	
UGT32A1	1	-----	
UGT76B1	1	-----	
UGT76C2	1	-----	
UGT76F1	1	-----	
UGT76D1	1	-----	

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UGT76E1      1 -----
UGT78B1      1 -----
UGT78C1      1 -----
UGT78D1      1 -----
UGT85A1      1 -----
UGT85B1      1 -----
UGT74B1      1 -----
UGT74F1      1 -----
UGT74D1      1 -----
UGT74E1      1 -----
UGT74C1      1 -----
UGT74A1      1 -----
UGT75B1      1 -----
UGT75D1      1 -----
UGT75C1      1 -----
UGT75A1      1 -----
UGT71A2      1 -----
UGT71B1      1 -----
UGT71C1      1 -----
UGT71D1      1 -----
UGT72A1      1 -----
UGT72D1      1 -----
UGT72E1      1 -----
UGT72C1      1 -----
UGT73A1      1 -----
UGT73B1      1 -----
UGT73C1      1 -----
UGT73D1      1 -----
UGT89B1      1 -----
UGT89C1      1 -----
UGT89A2      1 -----
UGT93A1      1 -----
UGT93B1      1 -----
UGT91B1      1 -----
UGT91C1      1 -----
UGT91A1      1 -----
UGT102A1     1 -----
UGT102B1     1 -----
UGT51B1      1 MILPYSDIENVYNLKGFRFGYSGLVIVIRAHEELFFFEFGSNE SRDDCDLFLKQLDFTKSHKNAHSE-----QKRKRNDS-----
UGT51C1      1 MVLPMTDIEEV RASRGLTYHGLRLIVRGSEELDLEFGSSKSRDDFQKVVLVLERLHSKEGFRPEPYQWGSNFEVELYKTRMEYSDSENREIQQYDNS
UGT51A1      1 MVLPLVDVETCYKEKGFRFGYFVLVIVIHGHEELFFFEFSTEVARDDIERILLKLLDNIYASSAEGSN-----ISSAS-----
UGT81A1      1 -----
UGT81B1      1 -----
UGT31D1      1 -----
UGT72B1      1 -----

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UGT77A1	1	-----
UGT8	1	-----
UGT84A1	1	-----
UGT84B1	1	-----
UGT88A1	1	-----
UGT90A1	1	-----
UGT79A1	1	-----
UGT79B1	1	-----
UGT22A1	1	-----MLHFLSVLRSEETNFLKI
UGT23	1	-----
UGT52A1	1	-----NNSNN
UGT86A1	1	-----
UGT87A1	1	-----
UGT92A1	1	-----
UGT83A1	1	-----
UGT82A1	1	-----
UGT80A2	1	-----MPEISPAELAKVSSSSSSSSSSSGRA
UGT9	1	-----
UGT24A1	1	-----
UGT26A1	1	-----
UGT20A1	1	-----
UGT104A3	1	-----
UGT106A1	1	-----
UGT106B1	1	-----
UGT103A1	1	-----
UGT105A5	1	-----
UGT10	1	-----
UGT27A1	1	-----
UGT101A1	1	-----
consensus	1	-----

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UGT13A3      1  -----MKLPFLLTLLLLLELVCSYKVLVFNPAFGASHSNF-----LGKISD
UGT13B1      9  VSLNIYSDVPGRDETDRAEEDVVSRRITPIMKFALILFFVLIHSTLTYKVLVFNPAFGASHSNF-----LGKISD
UGT16A1      1  -----MRK----LLNIFILTSIISCVSSYKILLYSNLFGHSHVVKV-----LAAAAD
UGT16C1      1  -----MGKNTFLLPLLLLLLGSFVGLTEPYKILMYTNLFGHSHIKM-----LGAVSD
UGT16B1      1  -----MQLLS-ALLLQILFNVSSPYKILVYSNLFGHSHIKF-----VGSVVD
UGT16D1      1  -----MNLVTTTFVFIFKLLNAALPYKILIYSNLYGHSHIKV-----LNTVAD
UGT17A1      1  -----MNFTICSFLLLILASFCFSVSNNIKGGKVLVYLPVTVGHSHLKF-----MSTTSN
UGT17B1      1  -----MSTFWYALLLIIVYYSQTINGIERPKKVLVFMPI SGHSHLKF-----MGTIAN
UGT14A1      8  DDFQGSVKWAGTDFEGINEEERLSEKVIIGYKMIRLHLLFLFLINQTLTINVLVLSPAFGGSHMNF-----MAHLAD
UGT14D1      8  -----LRFLLIQVN---SINVLVYSPAFAAASHTNF-----MARLAD
UGT14C1      8  -----ILLSVINVN---AFNILVYSPSFGGSHTNF-----MARLAD
UGT14E2      7  I-----FSSFFCST---SSLNILVYSPAFAAASHSNF-----LGKLAB
UGT14F1      8  S-----ISLVLCTLSLVSSLNILVHSPAYAASHTNF-----MARLAD
UGT15A2      4  -----TLFLCTLFLVGFVQPFNYLVFCPLYAHSHHKF-----LAKIAD
UGT15B1      4  -----LIILLVLSISNTSGFNLYVVSFAFGHSHSTF-----MGKLAB
UGT15D1      3  -----TFLVILSLIYSTYSYNFLVFCPLFGHSHTKF-----FATIAD
UGT15E1     15  ET-----NMKLLFCLFFALCSDSYNFLVFCPLFGHSHSTF-----FAKIAD
UGT15C1      4  -----FSLYLYLLLLISSTTSYNILVFCPLFGHSHSTF-----FGRLAD
UGT18A1      1  -----MNIHHVFLIFVLLFIKNVASYNFLVISPVGFSHMKS-----MAITIAN
UGT18B1      1  -----MLQIVLFLFISTLFGNAYSYKFLVISPVGFSHMKY-----MAELAN
UGT18C1      1  -----MSRVLCVLLFSVLVSHVESYKFLVISPVGYSHMKF-----MAITIAN
UGT18D1      1  -----MKLFLLVFLFFALYCNVLAYNYLVVAVVFGYSHMKF-----MNVKAD
UGT18E1      1  -----MRYLLLLAFFPVAFG---FNYLIIISPVGYSHMKF-----MGRIAD
UGT18F1      1  -----MHLNSIIFLFFIIGLIS-CKSILIFNPIFGFSHVVKF-----ISKMAD
UGT19A1      1  -----MQLLTLPTLIFIFLNYGTPCLSLRILVYSPRMIPSHVAF-----VANIAN
UGT19B1      1  -----MLWAFIVWLGALCIYGS---AFDILIYAPRMMQSHVYF-----TARIAN
UGT25A1      1  -----MKTLLG-----FLILPGFANCLNILFYVSVIAQSHIPF-----HNTAIK
UGT25B1      1  -----MRLLIIF-----LTVLINFSSCLNILFYAVIGPSHIAY-----LRNTIG
UGT25C1      1  -----MRQIHFCALT-----ILAVLPLFLNAANIVFFINAIGKSHLDF-----GDSLID
UGT25D1      1  -----MYLFFQIFFTPMTSPIRCLVFLFTLPRVIQTLHVLVFIILLGKSHIDF-----TDSLIE
UGT21A2      1  -----MRLIFVLLATFVNAAFYSYKILVFSFATSKSHLIS-----NGRLAD
UGT21B1      1  -----MFSPTASKSHMIS-----MFSPTASKSHMIS-----QGRID
UGT2A1       1  -----MLKNILLWSLQLSLLGMSLGGNVLWPMEG-SHWLN-----VKIID
UGT2B1       1  -----MSMKQTSVFLLIQLICYFRPGACGKVLVWPTHEY-SHWIN-----IKIILN
UGT1A1       1  -----MDTGLCAPLRGLSGLLLLLCALPWAEGGKVLVWPMEG-SHWLS-----MRDVVR
UGT35A1      1  -----MGGIFSVTGLGILLIGLIWLFAANADEGVQSSRILAVFPFPGRSQYIF-----AEQFMK
UGT35B1      1  -----MLALRIGFLLLTLP---ASMQAARILAIFFPFGPSQYIN-----VVPYLK
UGT31B1      1  -----MGHLHIVHWRLTMNGAIAALFLCLVMVHQHAVRILAVFPTPAYSHHSV-----FKVYIE
UGT31C1      1  -----MTAY---LIVFCLCCWSAARSANILAYFPTPSYSHQLV-----FRAYVE
UGT31A1      1  -----MKMI---ILVVS LHLVRNSA AVRVL CMFPTPSYSHQTV-----FDVYVN
UGT32A1      1  -----MFIS---ILLLALAVR-ILCANILCVFPTPAYSHQSV-----FSAYID
UGT76B1      1  -----METRETKPVIFLFPFPLQGHLP-----MFQLAN
UGT76C2      1  -----MEEKRNGLRVILFPLPLQGCINP-----MLQLAN
UGT76F1      1  -----MEERKVK-RIIMFPLPFTGHFNP-----MIELAG
UGT76D1      1  -----MAEIR-QRRVLMVPAFPQGHLP-----MMNLAS

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UGT76E1      1  -----MEELGVKRRIVLVEVPAQGHVTP-----IMQLGK
UGT78B1      1  -----MSPVSHVAVLA-FPFGTHAAP-----LLTLVN
UGT78C1      1  -----MTTSQLHIAFLA-FPFGTHATP-----LLTLVQ
UGT78D1      1  -----MTKFSEPIRDSHVAVLAFFPVGAHAGP-----LLAVTR
UGT85A1      1  -----MGSQIIHNSQKPHVVVCPYPYPAQGHINP-----MMRVAK
UGT85B1      1  -----MGSNAPP-PPTPHVVVLPFPFGQGHVAP-----LMQLAR
UGT74B1      1  -----MAETTPKVKGHVVILPYPVQGHINP-----MVQFAK
UGT74F1      1  -----MEKMRGHVLAVPFPSQGHITP-----IRQFCK
UGT74D1      1  -----MGEKAKANVLFVFSFPIQGHINP-----LLQFSK
UGT74E1      1  -----MREGSHVIVLPPFPAQGHITP-----MSQFCK
UGT74C1      1  -----MSEAKKGHVLFPPYPLQGHINP-----MIQLAK
UGT74A1      1  -----MAPHVLVVFPFPQGHMNP-----MVQFAK
UGT75B1      1  -----MAP-----PHFLLVTFPAQGHVNP-----SLRFAR
UGT75D1      1  -----MANNNSNSPTGPHFLFVTTFPAQGHINP-----SLELAK
UGT75C1      1  -----MATSVNGSHRRPHYLLVTFPAQGHINP-----ALQLAN
UGT75A1      1  -----MENLKN----ECHVLIALFPGQGHINP-----SLQFSK
UGT71A2      1  -----MGHLVS-----MGHLVS-----AVETAk
UGT71B1      1  -----MKVELVFIIPSPGVGHIRA-----TTALAK
UGT71C1      1  -----MGKQEDAELVIIPFPFSGHILA-----TIELAK
UGT71D1      1  -----MRNVELIFIPTPTVGHLVP-----FLEFAR
UGT72A1      1  -----MGSTDLSKPHIVLLSSPGLGHLIP-----VLELGK
UGT72D1      1  -----MDQPHALLVASPGLGHLIP-----ILELGN
UGT72E1      1  -----MFASPGMGHIIP-----VIELGK
UGT72C1      1  -----MELHGALVASPGMGHAVP-----ILELgK
UGT73A1      1  -----MG-----QLHIFFFPVMAGHMIP-----TLDMAK
UGT73B1      1  -----MGTPVE--VSKLHFLIFPFMAAGHMIP-----TLDMAK
UGT73C1      1  -----MASEFR--PPLHFVLFPFMAQGHMIP-----MVDIAR
UGT73D1      1  -----MESKIVSKAKRLHFVLIPLMAQGHIP-----MVDISK
UGT89B1      1  -----MKVNEENKPTKTHVLIFFPFAQGHMIP-----LLDFTH
UGT89C1      1  -----MTTTTTTKKPHVLVIPFPQSGHMVP-----HLDLTH
UGT89A2      1  -----MTEVLLLPGTKSENSKPPHIVVFPFPAQGHLLP-----LLDLTH
UGT93A1      1  -----MALNDETKVVVLLLPFPVQGHINP-----FLQLSH
UGT93B1      1  -----MAVDTMSVAVVAVPFPFAQGHINQ-----LLHLsL
UGT91B1      1  -----MAEKP-----KLHVAVFPWLALGHMIP-----YLQLSK
UGT91C1      1  -----MVDKREE----VMHVAMFPWLAMGHLLP-----FLRLSK
UGT91A1      1  -----MTNFKDNDGDGDKLHVVMFPWLAFGHMVP-----YLELSK
UGT102A1     1  -----MSHFAIVAPPLYSHAVA-----LHALAL
UGT102B1     1  -----MSHFAAIAPPFYSHVRA-----LQNLAQ
UGT51B1      76  --IKLAESVQLADARLRYFETRIESDIGREVP IILEENQYSTSEIRSKRRYKFVLLTIGSRGDVQP-----YISLAK
UGT51C1     101  IDIKFAEK-KIEMARVRMFEDRLMAASGLDVP IILEDSPFFKTELRPSTSYNITLLTIGSRGDVQP-----YIALGK
UGT51A1      73  ---LGDVQHNPDSAKLKLKFEDKIN-AEGFEVPLMIDENPHYKTSIKPNKSYKFGLLTIGSRGDVQP-----YIALGK
UGT81A1      1  -----MQNPSTVTQESAAPVDFDFPRLRGLTSRNRSPCSNSDGYALSSSNALYFNGFRTLPSRRMGKTLASLSF
UGT81B1      1  -----MMKVVSPrTRS-----
UGT31D1      1  -----MASLLIALTLAADAQTANILAVLPTPAYSHHAV-----YKAYVH
UGT72B1      1  -----MEESKTPHVAIIPSPGMGHLIP-----LVEFAK

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UGT77A1      1  -----MAPADGESSPPPHVAVVAFPFSSHAAV-----LLSIAR
UGT8         1  -----MKSYPYFMLLWSAVGIARAAKIIIVPPIMFESHLYI-----FKTLAS
UGT84A1     1  -----MVFETCPSPNP IHVMLVSFQGGHVNPN-----LLRLGK
UGT84B1     1  -----MGSSEGOETHVLMVTLPFQGHINP-----MLKLAK
UGT88A1     1  -----MGEEAIVLYPAPP IGH LVS-----MVELGK
UGT90A1     1  -----MSVSTHHHHVVLFPPFMSKGH IIP-----LLQFGR
UGT79A1     1  -----MENEMKHSNDALHVVMFPFFAFGH I SP-----FVQLAN
UGT79B1     1  -----MGVFGSNESSMSIVMYPWLAFGHMTP-----FLHL SN
UGT22A1     19 SKLKKLKTCILNFSIKYGLFEFVKVNHQISILGMYTFLFLLLSLLAVDAGKILVYSPSISRSHLIS-----NGRIAD
UGT23       1  -----MHYSQMRWMMFFCLTALLHGSFIVN-----AAKILV
UGT52A1     6  NNNNNNTNNTNKSNSFIGNVEEDVDKIKRSIKSLPILKIHSAQQQQQQPKTTTTTTSTTTTNLIS-----PRLITP
UGT86A1     1  -----MERA SRKPHIMMIPYPLQGHVIP-----FVHLAI
UGT87A1     1  -----MPWPGRGHINP-----MLNLCK
UGT92A1     1  -----MAEAKPRNLRIVMFPFMGQGH IIP-----FVALALRIEK
UGT83A1     1  -----MDNNSNKRMRPHVVPYPAQGHVLP-----LISFSR
UGT82A1     1  -----MKVTQKPKIIFIPYPAQGHVTP-----MLHLAS
UGT80A2     28 SVKIEEIEGAAASGVVIVSELETNPKTVVASIADETVAESSGTGNKSFSRVWMPLEGSSSSDRAESS-----TNQPRIDK
UGT9        1  -----MKSLLLLLGTIGVVTAGDVLFI PSTLYPVHAQT-----MSVLAR
UGT24A1     1  -----MKLIALFLLLLGAVSAYKYAVFVPMANSQVQF-----CTRVAE
UGT26A1     1  -----MYLP IFCIFLSVVD SLRILQIVPGFTNSHVLFN-----YRLAE
UGT20A1     1  -----MTQFLFKILLVCTIINEFYTLNILFYVPTLSHSH I SFN-----TKLAQ
UGT104A3    1  -----MKFAVASYGTRGDIEP-----CLAIGR
UGT106A1    1  -----MNTNKRVLILTANYGNHIVQV-----AKTLYE
UGT106B1    1  -----MVTQNKKIL IITGSFGNGHMQVT-----QSIVN
UGT103A1    1  -----MHAILIAIGSAGDVFP-----FIGLAR
UGT105A5    1  -----MRVLIITGCGSRGDTEP-----IVALAA
UGT10       1  -----MRILILLGLTQIVTSLN I LVFL LGTNQFERN-----IFEFLAQ
UGT27A1     1  -----MIKTSILYLFLLFPNFCDSAKVLLTVMDQGRSHATS-----ITPLMH
UGT101A1    1  -----MTTQTTPAH I AMFSIAAHGHVNP-----SLEVIR
consensus   101  .....

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UGT13A3 41 ILIDAGHDVITMLIPVCMES-KKDLV-----GSKKVKKIIRIDQEPKSKLMQEEAKTEEMIKKQIWKLD-ADITIFFSMIKNFSIASGYQCENI
 UGT13B1 81 ILIDAGHNVITMLIPEYLIT-KKDFV-----GSKKVKDVVRIGRDERAGKLFEEEGIEHMGRARVVRMD-PEMMSLVTIVGSMNLAIGYQCEYI
 UGT16A1 43 ILTDAGNNVITVLMVDFDNN-LRNKT-----SLKSTKNTIFVEAGPN---VEELMSDMRQFLANAWKEDTGNPITMMKAAQDMGTAFAEQCTKV
 UGT16C1 47 TLTDAGHDLTVLMPVIDFK-QENKT-----AMKSTKNIKIIPGQD---ISKTIETMEKFMTQLWTTDNSNPLFMVFHAPAMSAIFASQCRKV
 UGT16B1 42 TLVDAGHDVITVVLVIDST-QKNRT-----SIKSGAKQIIIDADEE---VVEIFSQTEKFLSNMWTMEMSNPLMMWMPRIILTQLFGKQCTKV
 UGT16D1 43 TLTDAGHNVITIFRPIIESS-QLDKS-----SVKT-KNVIYIEPDEE---VVEKMSKIDQFSGSLWTFDSTHPSAMIAKSNALVGFQCTCKV
 UGT17A1 50 ILQEEGYNVTLILPLIDIT-LNNTN-----IPIVKKIKHRINLDIHPGVMRTI IKMGGMASRRQTWTMGSGIYGFDDGISHLLSDLYSNICDNI
 UGT17B1 49 ILQDEGYNVTLILPLIDEG-LRDT-----TPLVRKIKNRILVEQSEELIEANAQFRAGGGRENTWVMNSGIIGFLKLGTKVANICKASCKNV
 UGT14A1 80 TLTEAGHNVITFLIPVADETRKNQ-L-----GVKITKDVVLVEQDEIMSRD---TLIVDDHMDMMWTLDTHEPNFEEMFSWFNKMELSCANFL
 UGT14D1 42 TLTEAGHNVITFLVPIVDVARTKQ-L-----GVHVTTDVIVIVEKDEHTTQE---SVPFDDSMAYWTEETHSSNVGESFQWFFDGMKLGECENLL
 UGT14C1 41 TLTEAGHNVITFVVPVADEARKGQ-L-----GVKKTkdVIVEQDELKSE---IKPLDDDMAQYWETDMDSSNADSFVFSADAMLLSCNNFM
 UGT14E2 41 TLTERGHNVITVLMVVDPEKRDECI-----GVKLTkdVIVEPDEEMMSFKKGSTPNGEIMELFWKSEMDSSNSRDMFSFFNSDMKLACRNFH
 UGT14F1 45 TLTEAGHNVITFLVPIALEERRDK-L-----GVKLTkdVIVEQDEEMKSK---LVPHSGSIEFLWIEEMDSSSIDAMFSWYNEIMILTCENFM
 UGT15A2 42 TLTDAGHNVITFLAPIVLRKYENV-K-----YLESTKDIVYIQPSKELEALG---FTS---NYSKFWTEADATAIQFVPAVRTFVKMFVQLYEDLK
 UGT15B1 42 SLTEAGHNVITVLSIISSKFRNI-S-----YTKSTKDIVVETTTEQDQLT---ENMENDDFARYWTQEGTMLETIPSYLMFLKMAEDGYKCTFR
 UGT15D1 40 ALTDAGHNVITFFFTPTIVEKYNRV-S-----YTKLTKDVVHMDAPKKLMEYG---EQMESADFSRFWTEDESSFYNVG-----AADLY
 UGT15E1 56 TLTYAGHNVITFFFTPTIVRKFSKI-Q-----YVKSITHVLQLDPDRLVKLG---SMFEKDVSKFWYRDSLSSEMLPMIDTFNNMFVEQAAVIS
 UGT15C1 43 ILTEAGHNVITLFSPTIIDEFRNY-S-----YTKLTKDVAYLDPSPELKAIG---DLIAGN---KRWWNQEFVSVEIPQTTRFFKSITREQNNVLA
 UGT18A1 44 QLADAGHQVITYFQPFVVELFKDHDHDL-----IKNPNIEMINYFHDEEGKNI---PGHSVLSDAWTSYKYQSDVQKIFAPRILHQSFQEMCRHM
 UGT18B1 43 HLAAGNDVITYFQPFVVEYHHDHDL-----IKEKSIKIWNYYHDELGRQHI---PSQGCMRDAWSSWYQSDAGAAILLSKYLFPFAFEHMCRKM
 UGT18C1 43 QLADAGHQVITYFQPFVIEAYLDHKL-----LNNSLIDVINYWHDEEGRRI---PPSNDLHDAWYSSKYQSALSAVFDMPQFLVSAWEHMCRKI
 UGT18D1 43 TLANGKHN-TLLQTYIYEHWGKIRI-----VKNKNIEIIDYHNSENVPSNE---QSASAFKFFWDNEIVNPNITGAMAPMFIYNEFKPMCDRI
 UGT18E1 39 ILADAGHNVITLFPPIIYDYAHKKI-----VKNPNIEVINYEVEDEEKAAA---SEASVFKFFWKAKGSKNPISSAKITSEKLYKEFEHICRKM
 UGT18F1 42 ILADAGHNVITLFPFHLALKNADKL-----VKNQNIKIINYYPDHYDELLK---TEKKTFFPMLWDSQLMNNPILCSFMPNIMEDSWEKTATQL
 UGT19A1 46 LLGQRGHNVVVVDNVLRS-DISNKL-----DLKVIKVVVKVETSANVAKLL---ADQSIPIINFWSMRNEPEEQKVMKQLGIFLEQCKYLV
 UGT19B1 42 VLAARGHKVTVIDNVFVRYD-VDNEL-----S-SDIHEIISVEPSPEVTKLL---NTGSLPTILWNSKASPEEQRTIMEGLGHVHRLQCTHLI
 UGT25A1 40 VLLDRGHTVLDLVIAQLNEMVKLKFPP-----NGVGKNTYTFGYE-----DPNFYRKNAGHLSDFIVEKPIPMAEFLTFDDMTFNLCEIV
 UGT25B1 40 KLLARGHNVDDVFAVYNELANLDF-----PDVRRIIYYNRHA-----DPDYWKKNANHFNSMFEKSPTPLGEFEIFHESGYQLCKIA
 UGT25C1 45 SLKEKGHTVLDVIARINDLAKGNEN-----SKADRFYTLGFK-----NGSSWHK-LNHLTSPFENNPFPIDGFRQYTLIGNQLFAL-
 UGT25D1 55 SLVENGHTVLDLIARMNSHVKSNGT-----NMVTRKYTYGFQ-----EESPWNK-APHLLNPFKGRERTWNEHTYYMDIVTDLCEIG
 UGT21A2 41 ELARAGHDVITVLELDFLGISQTTNS-----VKVAKKRIIDGFQESTNFKN---VLHGFSETVMEEPSFTDEIKG---WWAYQNVYNDLCAEF
 UGT21B1 20 ELANAGHEVNVNFEPDFLNLTKDFVP-----CKKCRRWVPTGLNN-YKFKK---IQNGLSGDVQFQSSIWSKIFNTSDPYQDEYTNMCEEM
 UGT2A1 42 ELLRKEHNVITVLVAGALFITPSVS-----PSLTFEIPVPPFGKEKIESVIKDFVLTWLENRPSPTIWTIFYKEMAKVIEEFHLVSRGICDGV
 UGT2B1 45 ELAQRGHEVITVLVSSASILIEPTKE-----SSINFEIYSVPLSKSDLEYSFAKWIDEWTRDFETLS-IWYYSKMKQKVFNEYSDVVENLCKAL
 UGT1A1 49 ELHARGHQAVVLAPEVTVHMK--GE-----DFFTLQTYAFPTYKEEYQR---EILGNAKKGFEQHFVKTFFETMAS-IKFFFDLYANSCAAL
 UGT35A1 55 ELAHRGHNVITVINTFG-----SDK-----NEPNFRVIGAKKIHIEIMAAFGNADYQTASQWQMLTMTTQFLNLLTTSILDDAAVKD-LLNSG
 UGT35B1 43 ELANRGHQVITSVNAFP-----QKK-----PVVNFVDVFPDPVFNKYKELIN-ELSGPMNLWQENNFINKFFVSVTRCVLTNKEVTETLLAPG
 UGT31B1 56 ALAERGHDDVVIKS-TDRINYANRN-----GLRGNVSEIDA-SLSQEYYGR-----LMRHAGVFRKRGIIVADSSTVTAHNYMGLVRMMSDQF
 UGT31C1 42 LLAERGHAVTVIRP-LTRVDFN-RN-----AGNLTTID---LDGDGLLL-----LMKASTTHRKRGIIVADTDTVTADNYEALVRMVDROI
 UGT31A1 42 ALLRRGHSLVVISPKIHNHNHGHHRH-----HRHENLTEIDVGSVTNFFKR-----LLQDSKVSRRKRGIIVSDSSTVTRVNYLGLARMI SAQF
 UGT32A1 41 KLSWAGHNVITVITPMPRAVDHV-----HQVVSSLS-----VHYFNN-----LIKNSTMIKKRGVVADETTVTKENYMGILNVAHEI
 UGT76B1 30 IFFNRGFSITVIHTEFNPN-----SS-NFPHFTFVSSIP-----DSLSEPE-----SYPD---VIEILHDLNSKCVAPF
 UGT76C2 30 ILHVRGFSITVIHTRFNAPK-----AS-SHPLFTFLQIP-----DGLSETE-----IQDG---VMSLLAQINLNAESP
 UGT76F1 29 IFHNRGFSVITILHTSFNFPD-----PS-RHPQFTFRITHK-----NEGEEDPLSQSE-----TSSGKDLVVLISLLKQYYTEPS
 UGT76D1 29 YLSSQGFSTIVIRNEFNFKD-----ISHNFPGIKFFTIK-----DGLSESD-----VKSLG-LLEFVLELNSVCEPLL

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UGT76E1 30 ALYSKGFSTIVVLTQYNRVS-----SSKDFSDFHFLTIP-----GSLTESD-----LKNLG-PFKFLFKLNQICEASF
UGT78B1 27 RLAAASAP-DIIFSFFSTSSS-----ITTIFSPTNLISIGSN---IKPYAVWDGSPEGF-----VFSGNPREPIEYFLNAAPDNF
UGT78C1 28 KISPFLPSSSTIFSFFNTSSS-----NSSIFS---KVPNQEN---IKIYNVWDGVKEGN-----DTPFG-LEAIKLFIQST-LLI
UGT78D1 34 RLAAASP-STIFSFFNTARS-----NASLFS---SDHPEN---IKVHDVSDGVPEG-----TMLGNPLEMVELFLEAAPRIF
UGT85A1 34 LLHARGFYVTFVNTVYNHNR-----FLRSRGSNALDGLPS----FRFESIADGLPETDMDAT---QDITALCESTMKNCLAPFRELL
UGT85B1 33 LLHARGARVTFVYTQYNYRR-----LLRAKGEAAVRPPATSSARFRIEVIDDGLSLS--VPQ---NDVGGLVDSLKRNCLHPFRALL
UGT74B1 32 RLVSKN--VKVTIATTTYTA-----SSITT-PS-----LSVEPISDGFDFIPIGIPGFS--VDTYSES-----FKLNGSETL
UGT74F1 28 RLHSGK--FKTHTLTTFFIF-----NTIHLDPSS-----PISIATISDGYDQGGFSSAG-S--VPEYLQN-----FKTFGSKTV
UGT74D1 29 RLLSKN--VNVTFLLTTSSTH-----NSILRRAITGGATALPLSFVPIDDGFEEDHPSTDT----SPDYFAK-----FQENVSRSL
UGT74E1 27 RLASKS--LKITLVLVSDKP-----SPPYKTEHD-----TITVVPISNGFQEGQERSED----LDEYMER-----VESSIKNRL
UGT74C1 29 RLSKKG--ITSTLIIASKDH-----REPYTSDDY-----SITVHTIHDGFFP-HEHPHA----KFVDLDR-----FHNSTSRSL
UGT74A1 25 RLASKG--MATTLVTTRFIQ-----RTADVDAH-----AMVEAISDGHDEGGFASAAG---VAEYLEK-----QAAAASASL
UGT75B1 26 RLIKRT-GARVTFVTCVSVF-----HNSMIANHN--KVENLSFLTFSDFDGGGIS-TYED--RQKRSVN----LKVNGDKAL
UGT75D1 34 RLAGTISGARVTFAAISAY-----NRRMFSTEN--VPETLIFATYSBGHDDGFKSSAYS--KSRQDATGNFMSEMRRRGKETL
UGT75C1 34 RLIIHG--ATVTYSTAVSAH-----RR--MGEPP--STKGLSFAWFTDGFDDGLKS--FED---QKIYMS-----ELKRCGSNAL
UGT75A1 30 KLINLG--VKVTLSLSSLSAF-----NR--IKNLP--KIEGLTFAPFSDGYDGNFKG-SFDD--YHLFNSA-----IKSHGSEFI
UGT71A2 13 LLLSRCH-SLSITVLIFNNS-----VVTSKVHNYVDSQIASS-NRLRFIYLP-RDETG-----ISSFSLIEKQKPHVKESV
UGT71B1 25 LLVASN-RLSVTLIVIP-----SRVSDDASSVYTNSEDRLRYILLPARDQT-----TDLVSYIDSQKQVRAVV
UGT71C1 29 RLISQDNPRIHTITILYWGL-----PFIPQADTIAFLRSLVKNPRIRLVTLPEVQDPPPMELFVEFAESYILEYVKKMVPPIREAL
UGT71D1 26 RLIEQDD-RIR-ITILLMKL-----QGQSHLDT--YVKSIASSQPFVRFIDVPELEEKPTLG-STQSVEAYVYDVIERNIPLVRNIV
UGT72A1 32 RIVTLCNFDVTIFMVGSDT-----SAAEPQVLRSAMTPKLCI IQLPPPNIISCLIDPEAT-----VCTRLFVLMREIRPAFRAAV
UGT72D1 26 RLSSVLNIHVTLAVTSGSS-----SPTETEAIHAAAARTICQITEIPSVDVDNLVEPDAT-----IFTKMVVKMRAMKPAVRDAV
UGT72E1 19 RLAGSHGFDVTIFVLETDA-----SAQSQFLNSPGCDAALVDIVGLPTPDISGLVDPSAF-----FGIKLLVMMRETIPTIRSKI
UGT72C1 25 HLLNHHGFDRTVFLVTDV-----SRSKSLIGKTLMEEDPKFVIRFIPLDVSGQ-DLSGS-----LLTKLAEMMRKALPEIKSSV
UGT73A1 26 LFASRG--VKATIITPLN-EFVF-----SKAIQ--RNKHLGIE-IEIRLIKFPVAVENGLPEECERLDQIPSDEKLPN-----FFKAVAMM
UGT73B1 32 LFATKG--AKSTILTTPLNAKLFF-----EKPIKSFNQDNPGLEDITIQILNFPCTELGLPDGCENTDFIFSTPDLNVGDL SQKFLLAMKYF
UGT73C1 31 LIAQRC--VTITIVTTPQN-AGRF-----KNVLSRA-IQS-GLP-INLVQVKFPPSQESGSPGQENLDLLDSLGLASLT-----FFKAFLSL
UGT73D1 34 ILARQG--NIVTIVTTPQN-ASRF-----AKTVDRARLES-GLE-INVVKFPIPYKEFGLPKDCETLDTLPSKDLLRR-----FYDAVDKL
UGT89B1 35 RLALRGGAAKITVLVTPKN-----LPFLSPL--LSAVVNIPLILPFPSPH-SIPSGVENVQDLPPSGFPLM-----IHALGNL
UGT89C1 31 QILLRG--ATVTVLVTPKN-----SSYLDALRSLHSPEHFKTLILPFPSPH-CIPSGVESLQQLPLEAIVHM-----FDALSRL
UGT89A2 40 QLCLRG--FNVSVIVTPGN-----LTYLSPLLSAHPSS-VTSVVFPPPH-LSLSPGVENVKDVGNNGNLP I-----MASLRQL
UGT93A1 31 LIAAQN--IAVHYVGTVTH--IR-----QAKLRYH--NATSNIHFHAFVPPYVSPNPED--DFPSHLIPSFEA-----SAHL
UGT93B1 31 LIASRG--LSVHYAAPP--VR-----QARARVHGWDPRALGSI RFHDLVPPYDSPAADLAAPSPFPNHLMPMFEAF-----AAAA
UGT91B1 30 LIARKG--HTVSFISTARN-----ISR-LPNISSDLS--VNFVSLPLSQTVDHLPENAEAT--TDVPETHIAYLKKAFDGLSEAF
UGT91C1 31 LIAQKG--HKISFISTPRN-----IER-LPKLQSNLASSITFVSFPLPP-ISGLPPSSESS--MDVPYNKQQLKAAFDLLQPP
UGT91A1 36 LIAQKG--HKVSFISTPRN-----IDRLLPWL PENLSSVINFKVLSLPVGDNKL PEDGEAT--TDVPFELIPYLKIAIDGLKVPV
UGT102A1 24 EMAQRGHRVTFITG-NVASL-----AEQET--ERVAFYPLPASVQQAQRNVQQQSN-----NLLRLIAAM
UGT102B1 24 ELVARGHRVTFIQYDIKHL-----IDSETIGFHSVGTDSHPPGALTRVLHLAAHPLGP-----SMLKLINEM
UGT51B1 146 GLLAENHKVKIVTHEEFKPW-----VESYGIEFATIAGN--PAELMSLMVTHKSLSVG-----FLKEAKEKF
UGT51C1 172 GLVKEGHNVTIATHAEFGDW-----IKTFGLGFKEIAGD--PAELMSFMVTHNSMSVG-----FLKNAQQKF
UGT51A1 141 GLIKEGHQVLIITHSEFRDF-----VESHG IQFEEIAGN--PVELMSLMVENESMNVK-----MLREASSKF
UGT81A1 70 NTKSSAGSSLRRFISDFNSFIRFHC-----DKVVPESFASVGGVGLSSDENGIRENGTGGVLGEEGLPLNGVEADRPKKVLILMSDTGGGHRA
UGT81B1 12 --DSITEKVFRRVYSNFN--ISTVE-----DEYIHRQRSSD-----YEKESRLRKRGL E--DKEEVMEMEQMGAERIKTVLILMSDTGGGHRA
UGT31D1 41 ALAKNCHNVTAVKPRLLDYA-----LLNECGRIEQIDADMSLEQYQKLMAGSGAFRKRGVVADETTVTADNYMSLIEMFKDQF
UGT72B1 29 RLIVHLHGLTVTFVIAGEGPP-----SKAQRTVLDSLPSISSVFLPPVDLTDLSSTRIESR-----ISLTVTRSN

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UGT77A1  34 ALAAAAAPSGLTSLFLSTAS-----SLAQLRKASSASAGHGLPGNLRFVEVPDGAPAAEETVP-----VPRQMQLFMEAAEAGG
UGT8     44 ALHERGHHTVFLLESEGRDID-----PSNHYSLQRYPGIFNSTTSDAFLQSKMRNIFSG-----RLTAVELVDILDHYTKNCDMM
UGT84A1  34 LIASKGLLVTFVTTELWGKK-----MRQANKIVDGELKPVGSGSIRFEFFDEEWAEDDDR-----RADFSLYIAHLESVGI
UGT84B1  31 HILSLSSKNLHINLATIESAR-----DLLSTVEKPRYPVDLVFFSDGLPKEDPKAP-----ETLLKSL
UGT88A1  26 TILSKNPSLSIHIILVPPPY-----QPESTATYISSVSSSFPSITFHHLPAVTPYSSSSTSRHHHESLLEILCFSNPSVHRTL
UGT90A1  30 LLLRHHRKEPTITVTVFTTP-----KNQPFISDFLSDTPEIKVISLPPFENITGIPPGVEN-----TEKLPSMSLFPVFPTRAT
UGT79A1  34 KLSYGVKVSFFFTASGNASR-----VKSMNSAPTTHIVPLTLPHVEGLPPGAESTAELTPASAELLKVALDLMQPQIKTL
UGT79B1  34 KLAEKGHKIVFLLPKKALN-----QLEPLNLYPNLITFHTLISIPQVKGLPPGAETNSDVPFFLTHLLAVAMDQTRPEVETI
UGT22A1  91 ALVDACHDVVMFITEYEPLT-----EFTGTKKAKVITMKGFSSTKFAEDMDGIGEYLLSSSRLSFLERLMFEKTCTGACDDL
UGT23    31 YCPSISKSHVLFIPSYSKLLDNYDG-----AKHAKVWRLHNVTEAYDTKLGTLANVMENSHIGFIDRLTFDADFWDICADLLGKLPQMHI
UGT52A1  78 LTITQSPGFSLLVNSPILPVKPLRI-----TILTIGSRGDIQPFIALSLGLKEYGHNVTLATHELRYDLISKEFGLNYQPLGGDPRELMDLCV
UGT86A1  31 KLAHGFTITFVNTDSIHHS-----ISTAHQDDAGDIFSAARSSGQHDIRYTTVSDGFPLDFDRSLNHDQFFEGILHVFSAHV
UGT87A1  18 SLVRRDPNLTVTFVVTEEWLG-----FIGSDPKPNRIHFATLPNIIPSELVRANDFIAFIDAVLTRL
UGT92A1  35 IMIMNRANKTTISMINTPSN-----IPKIRSNLPESSISLIELPFNSSDHGLPHDGEN---FDSLPLVSLVISLLEASRSLREPF
UGT83A1  34 YLAKQGIQITFINTEFNHNR-----IISLPSNPHEDYVGDQINLVSIPDGLSDSPEER-----NIPGKLSVLRFMPPKKV
UGT82A1  29 AFLSRGFSPVVMTPESIHR-----ISATNEDLGITFLALSDGQDRPDAPPSD-----FFSIENSMENIM
UGT80A2  107 SKTERQQKVTHILAEDAAKIFDDKISAGKKLKLLNRIATVKHGDGTFEVEVPADAIPQPIVDRGESKNGVCADESIDGVDLQYIPPMQIVMLIVGTRGDV
UGT9     40 ELAERCHKVITWLEIGPERSD-----IVLHQQVSREFWPAQFGDRTLQEIYQFKNHTSHSELWNPQYTNENEQTTGWLASIRLCDSV
UGT24A1  40 VLANGGHDVTMIHLSHLPDYKT-----DVKIPKNIKVHRVEAYVEGLTKALLEKEQSAFIFKDTGLKDMPPAMMSMFSRFGKMFQDGCRI
UGT26A1  39 TLRFLGHDVKMWTQMEMAMLDTGNN-----KLPEGVSEYR
UGT20A1  44 LLATSGHQVTVLLAQVDDAL-----LIENATDFAVLRKKVGVPRGHLRQVLWSNPGPYEDSSPLNPRIFYKLLKVSGTFVTACQNM
UGT104A3 23 ELMRRGHSVRMAVPPNLVDLAEAAAG-----LSAIAYGPDMDHDFWSDEFIRDFFKNFLRGPVTLIREAWEPVL
UGT106A1 28 QCVRLGFQHVTVSNLYQESN-----PIVSEVTQYLYLKSFSIGKQFYRLFYYGVDKI
UGT106B1 29 QINDMNLDHLSVIEHDLFME-----AHPILTSICKKWIINSFKYF
UGT103A1 23 TLKLRGHRVSLCTIPVFRDA-----VEQHGIQVPLSDELTYRRTMGDPRLWDPKTSFGVWLWQTI
UGT105A5 23 RLRELGADARMCLPPDYVER-----CAEVGVMPVPVGRAVR
UGT10    40 QLALRHHNVISIKPVLIPPEPRLVKP-----KLHLVREKVIKNVLNKDLFKPLEDAVPNAAWRSTYDFDNYLEPYKKAHNASCYKLLNSNLVDSL
UGT27A1  43 RLQKNDHTTALEMATYKPDIDFG-----MEERFINMSGFENNFIKDFFKIAFEDEFTFVHQAVPFIKSGSISCDRI
UGT101A1 30 ELVARGHRVTYAIPPVFADK-----VAATGPRP
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UGT13A3	127	FKQTAILEQLRNEH--FDLGITESLFCGFP-----	LLDSIGVKTIINADSVL
UGT13B1	167	FQKDIIDRLRNEH--FDLAIITESLFCPFA-----	LFDHIGIKNVINAESNL
UGT16A1	127	ISEPGLLEKLKAEN--YDLAITEPFDTGCGYA-----	LFEAINIRAHVAILTAN
UGT16C1	131	LEDKELIERLRAEN--FDLAIITEPFDTCAAYA-----	LFEAIKIRAHVAVLSCS
UGT16B1	126	MKLSELLDQLKSEK--FDLAIITEAFDSCGYG-----	IFEYLQIPAHVSILSCA
UGT16D1	126	MRQQKILDQLRDEN--FDLAIITEPVDGCAYA-----	IFEYLKIRDHVTVLSCV
UGT17A1	137	FHMPGLLDRLKAEK--YEMGMSEPFVFCGFA-----	LFDHLGIDKIIISVDSHI
UGT17B1	135	FQNEDLINYLDRQR--FDVAISEPLYTCGFA-----	LFDHLGIETTISTDSHL
UGT14A1	164	-RNTEVFELMKSRN--FDVAILEPLSVCGLG-----	FFKKLGIEKTILASSCS
UGT14D1	126	-RRHEILDQLKSRN--FDVAIVEPLSVCGLG-----	LAKKLEIGKTILASSCA
UGT14C1	125	-RNKKVFNELKSRN--FDVGIYEPLSVCGLG-----	YMHAIGINKLIMSSCA
UGT14E2	129	-KRRDIFEQMKSRN--FDVAILEPVTICGLG-----	FVKALGIEKTILASSST
UGT14F1	129	-RNKQVMSELKSRH--FDVAIAEPFTICGLG-----	LFEELNIKKTILVSSCA
UGT15A2	124	-KDLSVLDELKNR--NFDVAIVFEFLCPTAFRKCIIHILGNSHRTFLAFFSYIPRMLRLSSQELVVHSSYIPRNL RGM YDKG TTP	IAEYLGIKALLP SLSMT
UGT15B1	127	DHALPQMDYLKNNRPQYDAVFFESFF-----FMG-----	KAIQEYLEIPVFLPVTISIT
UGT15D1	112	-RCSIRLNGLFKF-----	TLMDYLNIKTFIPSLSLT
UGT15E1	141	-RNLHVLDDLKEMN--FDVMI FEHFVEPAY-----	LVL DYLEIQKFIPATSLA
UGT15C1	126	-NNLALLDGLKQKK--FDLILFESVFTCAL-----	PLMEYLEIKSFAVAQ SIA
UGT18A1	130	FEDEALHRQLKDKK--FDVVLSETDFCGLYLA-----	DYLEMPAIIISVFTGN
UGT18B1	129	FEDTELHYDLKSRQ--FDVVLSEAFDFCGLYLA-----	SYLEMP SIIISTFTGN
UGT18C1	129	FQDSELHKILKDKD--FDVVIAETDFCGLYLA-----	DYIQSKSIVSVFTGS
UGT18D1	128	LTDKELHQWILSNK--FDGYVAESFDFCSLYLG-----	DHLKLN-LLPMFSTI
UGT18E1	125	LLDKELHRWILSKN--FDSHISEAFDFCGLYF-----	LKLSPIPLYSGV
UGT18F1	128	LKDQKVIEDLKNQK--FDVVLSETFELTGIYLA-----	YLLEIP-NIPIMSAV
UGT19A1	129	SKEETVFNELKHLE--FDFGIHEVFDICGIG-----	IFEKLGIRKSVILSSTG
UGT19B1	124	EN-STLIPKLQEIK--FDFAIHEVFDSCGVG-----	ILEVIGVQKTIVVSSTG
UGT25A1	117	VKDPNLLNYIKQGN--YDIGLSSDYDPCANI-----	LMHAGGVPSK-----
UGT25B1	117	INDLKLIEFLKSGK--YDIGFSSDYDPCGNI-----	LMTAAGIPSIGSLIATP
UGT25C1	120	-HDEKLHQFLSEKS--YDVGVVSVFDYCGIG-----	ILNKAGVSSITTFNAV P
UGT25D1	131	LSDAGLHAFISSQK--YDIGIATEYENCGVA-----	LMKYYKIPSIVSVSSLP
UGT21A2	122	LKMDDIFNELKNAK--FDGFFAEQINLCGFG-----	YAHALEIPRHFLISSCP
UGT21B1	102	VTNKELIEKLLKKEK--FDAYFGEQIHLCGMG-----	LAHLIGIKHRFWIASCT
UGT2A1	130	LKNEKLMTKLQRGK--FEVLLSDPVFPCGDI-----	VALKLGIPFIYSLRFSP
UGT2B1	132	IWNKSLMKKQLQGSQ--FDVILADAVGPCGEL-----	LAELLKTPLVYSLRFCP
UGT1A1	131	LHNKTLIQQLNSSS--FDVVL TDPV FPCGAL-----	LAKYLQIPAVFFLRSVP
UGT35A1	136	-----EKFDLVI--MEAVQTEALFG-----	LIQHFGAETIGISSYGT
UGT35B1	124	K-----DHFDLII--VEALRSDAYYG-----	FAAHFNAPIIGISTFGT
UGT31B1	136	DLPIVKSFIIEAHKHKFDLLITEAYIDYPLVFS-----	HLFGDLPVVQISSGY
UGT31C1	117	HSEPFQRHLKSARRG-YDLLVVEAFVDYALIAS-----	HLFGDVPVVQISSGH
UGT31A1	124	EHEQVKRLRS--NQTFDVIVIEAFVSYPLILS-----	YFFKDTPVIQISSGH
UGT32A1	113	KSPNVTRLLRN-KGNKFDLIVCEAYVSYILVFG-----	AIY-DAPVIQFSSGY
UGT76B1	90	GDCLKKLISEE--PTAACVIVDALW-YFTHDLTEKF-----	NFPRIVLRVTNLSAFVAV
UGT76C2	90	RDCLRKVLLESKESERVTCIIDDCGW-LFTQSVSESL-----	KLPRLVLCTFKATFFNAY
UGT76F1	98	---LAEVGEV---GTVCCLVSDALWGRNTEIVAKEI-----	GVCTMVMRTSGAATFCAY
UGT76D1	91	K----EFLTNH--DDVDFI IYDEFV-YFPRRVAEDM-----	NLPKMFVSPSSAATSISR

UGT76E1	92	KQCIGQLLQEQ--GNDIACVVYDEYM-YFSQAAVKEF-----	QLPSVLFSTTSATAFVCR
UGT78B1	97	DKAMKKAVEDTG--VNISCLLTDAFLW-FAADFSEKI-----	GVPWIPVWTAASCSLCLH
UGT78C1	94	SKITEEAEEETG--VKFSCIFSDAFLWCFLVKLPKKM-----	NAPGVAYWTGGSCSLAVH
UGT78D1	99	RSEIAAAEIEVG--KKVTCMLTDAFFW-FAADIAAEL-----	NATWVAFWAGGANSLSLCAH
UGT85A1	109	QRIN---AGDNV--PPVSCIVSDGMS-FTLDVAEEL-----	GVPEVLFWTTSGCAFLAY
UGT85B1	110	RRLGQEVVEGQDA--PPVTCVVGDVVMT-FAAAAAREA-----	GIPEVQFFTASACGLLGY
UGT74B1	94	TLLIEK---FKSTDSPIDCLIYDSFLPWGLEVARSM-----	ELSAASFFTTNNLTVCSV-
UGT74F1	92	ADIIRK---HQSTDNPITCIVYDSEMPWALDLAMDF-----	GLAAAPFFTQSCAVNYIN
UGT74D1	98	SELISS---MDPK---PNAVYVDSCLPYVLDVCRKHP-----	GVAAASFFTQSSTVNAT-
UGT74E1	90	PKLIED---MKLSGNPPRALVYDSTMPWLLDVAHSY-----	GLSGAVFFTQPWLVSAL-
UGT74C1	91	TDFISS---AKLSDNPPKALIYDPFMPFALDIAKDL-----	DLVVVAYFTQPWLASLV-
UGT74A1	88	ASLVEA---RASSADAFTCVVYDSYEDWVLPVARRM-----	GLPAVPFSTQSCAVSAV-
UGT75B1	94	SDFIEA---TKNGDSPVTCLIYTIILLNWAPKVARRF-----	QLPSALLWIQPALVFNIY
UGT75D1	110	TELIED---NRKQNRPFCTCVVYTIILLTWVAELAREF-----	HLPSALLWVQPVTVFSIF
UGT75C1	98	RDIIKANLDATTETEPITGVIYSVLVVPVSTVAREF-----	HLPTLLWIEPATVLDIY
UGT75A1	95	ANLIKS---KAKNGYPFTRVIYITILMDWAGSVAKKL-----	HIPSTLFWIQPATVFDIY
UGT71A2	83	MKITEFGSSVES--PRLVGFIVDMFCTAMIDVANEFG-----	VPSYIFYTSGAAFLNFM
UGT71B1	90	SKVAGDVSTRSD--SRLAGIVVDMFCTSMIDIADEFN-----	LSAYIFYTASNAYLGLQ
UGT71C1	111	STLLSSRDESGS--VRVAGLVLDFFCVP MIDVGNEFN-----	LPSYIFLTCSAGFLGMM
UGT71D1	103	MDILTSLALDG--VKVKGLVVDFFCLPMIDVAKDIS-----	LPPYVFLTTNSGFLAMM
UGT72A1	107	SALK-----FRPAAIIVDLFGTESLEVAKELG-----	IAKYVYIASNAWFLALT
UGT72D1	102	KLMK-----RKPTVMIVDFLGTELMSVADDVG-----	MTAKYVYVPTHAWFLAVM
UGT72E1	95	EEMQ-----HKPTALIVDLFGLDAIPLGGEFN-----	MLTYIFIASNARFLAVA
UGT72C1	100	MELE-----PRPRVVFVVDLLGTEALEVAKELG-----	IMRKHVLVTTSAWFLAFT
UGT73A1	101	QEPLEQLIEECR---PDCLISDMFLPWTTDTAAKF-----	NIPRIVFHGTSFFALCVE
UGT73B1	117	EEPLEELLVTMR---PDCLVGNMFFPWSTKVAEKF-----	GVPRLVFGHTGYFSLCAS
UGT73C1	106	EEPVEKLLKEIQPR--PNCIIADMCLPYTNRIAKNL-----	GIPKIIFHGMCCFNLLCT
UGT73D1	110	QEPMERFLEQQDIP--PSCII SDKCLFWTSRTAKRF-----	KIPRIVFHGMCCFSLSS
UGT89B1	107	HAPLISWITSHSP--PVAIVSDFFLGWTKNLG-----	IPRFDFSPSAAITCCIL
UGT89C1	102	HDPLVDFLSRQPPSDLPDAIIGSSFL-----	SP-----
UGT89A2	110	REPIINWFQSHPNP--PIALISDFFLGWTHDLCNQI-----	GIPRFAFFSISFFLVSVL
UGT93A1	98	REPVGKLLQSLSSQAKRVVLIINDSLMASVAQDAAN-----	FS-----
UGT93B1	105	RAPLAALLQRLSTSYRRVAVVFDRLNPFPAATEAAR-----	LA-----
UGT91B1	103	TEFLEA-----SKPNWIVYDILHHWVPPIAEKLG-----	VRRAIFFCTFNAASIIIG
UGT91C1	105	KEFLRR-----SSPDWIIYDYASHWLP SIAAELG-----	ISKAFFSLFNAATLCFMG
UGT91A1	112	TEFLES-----SKPDWVLQDFAGFWLPPISRRLG-----	IKTGFFSAFNGATLGILK
UGT102A1	82	SSLTDVLCQQLP--AILQRLAVDALIVDEM EPAGSLV-----	AEALGLPFI SIACALPVN
UGT102B1	87	ARTTDMLCRELP--QAFNDLAVDGVIVDQMEPAGALV-----	AEALGLPFI SVACALPLN
UGT51B1	206	TGWIGELLQSSW--DACQDA--DV LIESPSAMAGIHI-----	AEKLQIPYFR-AFTMPWT
UGT51C1	232	RSWISKLLTTSW--EACQGS--DILIESPSAMSGIHI-----	GEALGIPYFR-AFTMPWT
UGT51A1	201	RGWIDALLQTSW--EVCNRRKFDILIESPSAMVGIHI-----	TEALQIPYFR-AFTMPWT
UGT81A1	158	SAEAIRAAFNQEFQDEYQVFIITDLWTDHTPWPFNQLPR-----	SYNFLVKHGTLWKMTYY
UGT81B1	89	SAEAIRDAFKIEFGDDYRII IKDVWKEYTGWPLNDMER-----	QYKFMVKHVGLWSVAFH
UGT31D1	119	DNANVRHFLASNRT--FDAVVVEASADYELVFG-----	HLFRPATVIQIAPGY
UGT72B1	95	PELRKVFDSFVEGGRLPTALVVDLFGTDAFDVAVEFH-----	VPPYIFYPTTANVLSFF

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UGT77A1 108 VKAWLEAARAAAGGARVTCVVGDAFVWPAADAAAASAG-----APWVPVWTAASCALLAH
UGT8     118 VGNQALIQLKKEK--FDLLLVDPNMCGFV-----IAHLLGKVKYAVFSTGLW
UGT84A1 105 REVSKLVRRYEEANEPVSCLINNPFIIPWVCHVAEEFN-----IPCAVLWVQSCACFSAY
UGT84B1  88 NKVGAMNLSKIIIEEKRYSCIISSPFTPWVPAVAASHN-----ISCALLWIQACGAYSVY
UGT88A1 105 FSLSRNFN-----VRAMIIDFFCTAVLDITADFT-----FPVYFFYTSGAACLAFS
UGT90A1 103 KLLQPFEEETLKTLPKVSFMVSDGFLWWTSESAKFN-----IPRFVSYGMNSYSAAVS
UGT79A1 110 LSHLKP-----HFVLFDFFAQEWLPKMANGLG-----IKTVYYSVVVALSTAFI
UGT79B1 110 FRTIKPDLVFYDSAHWIPEIAKPIG-----AKTVCFNIVSAASIALS
UGT22A1 167 MTRREELEQLRAYN--FDVAFSEQIDLCGVG-----IVRYLGIKNHLWISTTP
UGT23    119 DYKFDLVIYNEIDPCTPAIVSLQVVQHPKDSATLQRG-----HHGQGCVEPRQADDDVCR
UGT52A1 166 RNGIFTPKFIKEALSFRFSFIDLLLLTCWKAVQNSNT-----QVLIATPGCFAGPHIGEVLQIP
UGT86A1 109 DDLIAKLSRRDDPP--VTCLIADTFYVWSSMICDKHN-----LVNVSFWTEPALVLNLY
UGT87A1  80 EEPFEQLLDRLNSP--PTAIIADTYIIWAVRVGTGRN-----IPVASFWTTSATILSLF
UGT92A1 112 RDFMTKILKEEQS--SVIVIGDFFLGWIGKVCKEVG-----VYSVIFASGAFGLGCV
UGT83A1 106 EELIERMMAETSGGTIIISCVVADQSLGWAIEVAAKFG-----IRRATFCPAAAASMVLG
UGT82A1  89 PPQLERLLLLEEDLD--VACVVVDLLASWAIGVADRCG-----VPVAGFWPVMFAAYRLI
UGT80A2 207 QPFVAIAKRLQDYGHRVRLATHANFKEFVLTAGLEFYPLGGDPK-----VLAGYMKVKNKGFLPSGPS
UGT9     121 LSRSKSKFDKMVEKQFSTVIVDDLYNSCGVLMAG-----LKKSVYIYWSMTGLRTE
UGT24A1 125 VRNKEFMKWLENEK--FDVAYSIIYSSCPIG-----LIHAAKIPSWVWLNLSGA
UGT26A1  74 IPIHFTDTLKTEGLKVFQSMFESGDAHDLWWTG-----QEFKDMRVEACEQ
UGT20A1 125 AFDHLFLSSLQQQK--FDVGLVEQYDSCGFG-----IFKSI GIENTVWLSATA
UGT104A3 90 KNWQEMSSALMSVGAGADLLFTGQLYQDLAIN-----VADYYGIPMAT
UGT106A1 80 YNKRKFNIIYFKMGNKRLGELVDEHQPDIIIN-----TFPMI
UGT106B1 69 RNMYKGFYYSRPAK--LDKCFYKYYGLNKLIN-----LLIKEKPDILLTFPTP
UGT103A1 83 AGMIEPVYEVVSAQRHDDIVVVGSLWALGARIAHEKYG-----IPYLSAQVSPSTLLSA
UGT105A5 59 AGAREPGELPPGAAEVVTEVVAEWFEDKVPAAIEG-----CDAVVTTGLLPAAV
UGT10    130 KKESLDLAIVYSGNPCLNALTHLVAVPTIYFDTEGLT-----DETLIAAGAPIDLLTTP
UGT27A1 114 LKHQKNRYLEIANENWDLFLSDSLFSPCGYAMAEITG-----KPHVMMHSSDVESAHG
UGT101A1 58 VLYHSTLPGPDADPEAWGSTLLDNRRRTFLNDAIQALP-----QLADAYADDIPDLVLHDI
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UGT13A3	173	YLDVVKHALG-----EPASTSYYPGVYA-KNIDRMSFRERVRNLFGMAFSWYFSWTRFQGELEAIKPYYNKS-----LTWE
UGT13B1	213	FKDAVKYAHG-----EPAAISYYPGLFS-PHDDKMSFVARVKNMITMLFTKYLYGSRYEKELEMIKPYNGT-----ETWE
UGT16A1	173	RFDHVTDVIG-----QPIASSYVPGTQS-ETGDRMTMGERLGNFYQFLLPKVLYP-----SRDLGG-----Q
UGT16C1	177	RLDHVSKAIG-----QPIAPSYVPGTQS-THGERMTIWQRFMNILHFLMGDFLFSYIGDEDFKVAKEIIPGV-----RSWR
UGT16B1	172	RMDHVSVDVLG-----QPIAPSYVPGTQS-LYSDRMTMTQRFLNYLQFLNGNSMFSIDIGDYESANAKKLLGVERSWR-----
UGT16D1	172	RFDHVSVDILG-----QPIAPSYVPGTQS-FFNDRMTMKERLLNFIQFYYGRFTFANILDQEYEMAKDILGIQRSWRVSNIFSHSRNIVFIFQ
UGT17A1	183	GLEGPKIAHG-----FPVTSYSLPAAFS-ESSDHMSFVERTRSLYETYLNRKFARLIHNKEIDAMKGVYK GK-----STWE
UGT17B1	181	GLEVSKIAHG-----ASISTSYLPVAVFS-SGSERMTLIGRAKNYVESYFNYYFNSKIYENELAGIEGIYKNG-----KGWR
UGT14A1	209	LYDFILPDIG-----EPEDHSYVPSLSS-QSGDQMSFYERYKNYRFSRVT-----
UGT14D1	171	YYDYLFRRHIG-----EPDVHSYLPPLMS-TTGDVMTTFERLENHRVAEAMATAMYKMF DSEKAIYRKHFGEI-----PDWR
UGT14C1	170	LYDGTVA AIG-----EPIDFSYVPGSMS-KSGEKMSLFEKLENYRLSMASSRMQYQGWDKETE IYKKHLGNDI-----PHWR
UGT14E2	174	FYDAVMDYIG-----EPLDYSYVPSGFS-VTGDVMTMAERYENWMV VKEINIALHDMFDGEMKSYREFLGEDL-----PNWR
UGT14F1	174	HYDFMLPHIG-----EPEDFSSVPTLSS-KVGEEMSMTEKWENYRLVAETKASLAKLFDAETRIYRESFGSDI-----PDWK
UGT15A2	221	HHTQMSRWIG-----EPSSPTVLP SMIS-SFGDDMNFWERLGNLGDVFFTLF-----VDMPRMTSFS DPERK-----IDFY
UGT15B1	175	HDYRFAELIG-----EPVS---PRYFT-NFGNIMNFQERLNTNISYLLGQIL-----IAFPNWKTLQDPSKD-----LLVE
UGT15D1	142	HDVYLSKAIG-----EPVMP SVVSDVCS-PFGDKLSLLERAFNAFAVPI DIV-----LGYPVHNTLSAPYTE-----IDIR
UGT15E1	186	FDYNMVKSIG-----EPLMLSTVPLPTS-EYSDRMSLPQRLINAINPLIFDNL-----IPKNKYRSYRPPYAP-----INTK
UGT15C1	171	YEPITLGALG-----DTVMTSHIPNLMA-QSSDKMSLCERMLNTLIQAMLVNYG---MTPEYYQSYTNPEKK-----IYTL
UGT18A1	176	RLNAITNALG-----EPSFLHYLPSPSS-SFNANMSLYDRFNNFWHKILSSSTFGELFDRQYADVRLTNGKAR-----HWK
UGT18B1	175	RLNALAPVLG-----EPSFLHYLPAPTS-QYGHESTIFDRLNDVWHKIWSSYGFAQLFEMQYQVSKLTNGKVK-----HWK
UGT18C1	175	RLIAITDPLG-----EPSSLHYIPAPSSDNFGSSASIFDRINDLYHKYVFGSGYSIIFDQWYNQIARLTHGKVR-----HWK
UGT18D1	173	KNVPGSHAIG-----EPSSLNYAPSLYT-NFGSDQTVWDRIQDITAFTSFHAFSNLFERQYRQAYDLLNGDVR-----TWR
UGT18E1	168	RCGAASYAVG-----EPIPLNYLPTEGS-NYGKKSSAIDRLSDMLGLTGYHFQFGILFDKQYDQAYRLTGGNVR-----TWQ
UGT18F1	173	RFVYPYNEAFG-----QPSTVGYIPQOGS-QLAPEAGFLDRLNDVYRNYFYTLTMKRASQLQNTFIEKAI GRPVP-----NWK
UGT19A1	175	MRDIVNEALG-----ISSQLQDASILSD--YGNSIPFYGIRRNLKFHSAWRNFFEVQSKTLEPLFETTSSFEN-----
UGT19B1	169	PMDVVPITLG-----ISDTLNTPSLSD--YGSYLSFFEKRRNLKFLSGMLNFHEMQDSMISPLFKKYYGLKPP-----TG
UGT25A1	156	-----ATVLY--PKGDDSFNRLFHLIRHTYNIYFVAPRLMEKYNNLLLETFGPTFP-----SAE
UGT25B1	163	IFLPHIVSAG-----LPTVASVYGTSLY--PEHDSSLYDKIFNLI RLTYYHYAISPDMDRKYNNLITKRFGNNFP-----DVG
UGT25C1	165	LMSIQTVTIG-----LPNIASQVVP LFY--TFDLATLSGKLWNLITWAHINFHQIPTLRKEQELLFQKVYGPSFS-----INE
UGT25D1	177	ILDRQSLAAG-----MPNSPAVTQALFE--AEDLTTYWGKFRNFLNWAHITLIINPYCEKHQSEVIK KHLGENFD-----TSN
UGT21A2	168	FAAPVYDFTG-----LPMPSTVAFAAD-LSISPT-YTERARNLFVAVLTKLEFTLLNRLQAHFQHKFGEHFP-----SLY
UGT21B1	148	MSVSMRDSL G-----IPTPSSLIPFMST-LDATPAPFWQRAKNFVLQMAHIRDEYRDVVL TNDMFKKNFGSDFP-----CVE
UGT2A1	176	ASTVEKHCGK-----VPFPSSYVPAILS-ELTDQMSFADRVRNFI SYRMQDYMFETLW-KQWDSYYSKALGRPTT-----LC
UGT2B1	178	GYRCEKFSGG-----LPLPPSYVPPVLS-ELSDRMTFVERVKNMLQMLYDFDFWFQPFKEKSWSQFYSDVLGRPTT-----LT
UGT1A1	177	CG-IDYEATQ-----CPKPSYIPNLLT-MLS DHMTFLQRVKNMLYPLTLKYI CHLSI--TPYESLASELLQREMS-----LV
UGT35A1	171	DTHIDELMGN-----IS-PLSYNPLLLS-SRTEQMDFKDRVMNVFEASVMWLHKRIVHLP SQRDLYAKYFPTARK-----SLD
UGT35B1	160	DWNIDALVGN-----ES-PLSYTPLATG-GLTDRMTFLERLSNFVDTTVAWLNYRFVHMSEQEKMYAKYFPEASKR-----VQLT
UGT31B1	184	AVAENFETMG-----AVSRHPVYYPNLWR-DKFSGLNVWKQSMKCTLSWRYRMNLVNW PDEQNALLKRQFGESTPTI-----Q
UGT31C1	164	ATAENFETMG-----ATSRHPRYYPNLWR-FNFGPLSVWDGVRELYTELRLQREFGLLADRQDALLKRRFGPEAPGL-----R
UGT31A1	170	GTAENFETMG-----AVARHPVYYPNMWR-DRFKGLSVWQTVRQVFTEIRLYMEFSQLDADQSAMMKRQFGSKVPDV-----D
UGT32A1	159	AIPENFETVGG-----EVARNHIKHPNIWR-SDFS---KSNFEQLMTENYLKNEWALLEKEQENMLKRDFG-YHHD M-----C
UGT76B1	141	SKFHVLREK-----GYL--SLQETKADSPVPELP-YLRMKDLPWFQTED--PRSGDKLQIGVMKSLKSSS---GIIFN-----AIE
UGT76C2	144	PSLPLIRTK-----GYLPVSVLESEAEDSVPEFP-PLQKRDL SKVFGF--GEKLDPFLHAVVETTIRSS---GLIYM-----SCE
UGT76F1	147	TAFPLLDK-----GYLP--IQGSRLDELVTLP-PLKVKDLPVIK TKE--PEGLNRIILNDMVEGAKLSS---GVVWN-----TFE
UGT76D1	139	CVL MENQSN-----GLLPPQDARSQLEETVPEFH-PFRFKDLPFTAYGS--MERLMILYENVSN-RASSS---GIIHN-----SSD

UGT76E1	144	SVLSRVNAE-----SFLLDKMDPKVSDKEFPGLH-PLRYKDLPTSFAFGP--LESILKVYSETVN-IRTAS---AVIIN-----STS
UGT78B1	149	VYTDEIRSR-----FAEFDIAEKAEKTIIDFIPGLS-AISFSDLPEELIMEDSQSIFALTLHNMGLKHLKAT---AVAVN-----SFE
UGT78C1	147	LYTDLIRS-----NKETSLKIPGFSSTLSINDIPPEVTAEDLEGPMSSMLYNMALNLHKAD---AVVLN-----SFQ
UGT78D1	151	LYTDLIRET-----IGLKDVS--MEETLGFIPGME-NYRVKDIPEEVVFDLDSVFPKALYQMSLALPRAS---AVFIS-----SFE
UGT85A1	158	LHFYLFIEKGLCPLKD-ESYLTKEYLEDTVIDFIPTMK-NVKLKDIPSFIRTTNPDDVMISFALRETERAKRAS---AIILN-----TFD
UGT85B1	162	LHYGELVERGLVPFRD-ASLLADDDYLDTPLEWVPGMS-HMRLRDMPTFCRTTDPDDVMVSATLQQMESAAGSK---ALILN-----TLY
UGT74B1	144	-LRKFSNGDFPLPADP-----NSAPFRIRGLP-SLSYDELPSFVGRHWLTHPEHGRVLLNQFPNHENA---DWLFDVN-----GFE
UGT74F1	143	YLSYINNGSLTLP-----IKDLP-LLELQDLPTFVTPTG-SHLAYFEMVLQQFTNFDKA---DFVLVN-----SFH
UGT74D1	146	-YIHFLRGEFKEFQND-----VVL PAMP-PLKGNLDPVFLYDNN-LCRPLFELISSQFVNVDI---DFFLVN-----SFD
UGT74E1	140	-YYHVFKGSFVSPSTKYG-----HSTLASFPPLP-ILNANDLPSFLCESS-SYPYILRTVIDQLSNIDRV---DIVLCN-----TFD
UGT74C1	141	-YYHINEGTVDVPVDRHE-----NPTLASFPGFP-LLSQDDLPSFACEKG-SYPLLHEFVVRQFSNLLQA---DCILCN-----TFD
UGT74A1	138	-YYHFSQGR LAVPPGAAADGSDGGAGAAALSEAFGLP-EMERSELP SFVFDHG-PYPTIAMQAIKQFAHAGKD---DWVLFN-----SFE
UGT75B1	145	YTHFMGNK-----SVFELPNLS-SLEIRDLP SFLTP-SNTNKGAYDAFQEMMEFLIKETK-PKILIN-----TFD
UGT75D1	161	YHYFNGYEDAISEMANTP-----SSSIKLP SLP-LLTVRDIP SFIVS-SNVYAFLLPAFREQIDSLKEEIN-PKILIN-----TFQ
UGT75C1	152	YYYFNTSYKHLFD-----VEPIKLPKL P-LITTDLP SFLQP-SKALPSALVTLREHIEALETESN-PKILVN-----TFS
UGT75A1	146	YYRFTNFANYFKN-YDSQ-----DQI IELPGLP-SLSSDFPSFVFDVKSNDWAVESIKRQIEILNSEEN-PRILVN-----TFD
UGT71A2	135	LHVQKIHDE-----ENFNPTFEFNASDGELQVPGLVNS-FPSKAMPTAILSKQWFPPLLENTTRYGEAK---GVIIN-----TFF
UGT71B1	142	FHVQSLYDE-----KELDVSEFKDTEMKFDVPTLTQP-FPAKCLPSVMLNKKWFPYVVLGRARSFRATK---GILVN-----SVA
UGT71C1	163	KYLPERHR-----EIKSEFNRSFNEELNLI PGYVNS-VPTKVLP SGLFMKETYEPWVELAERFPEAK---GILVN-----SYT
UGT71D1	154	QYLADRHS-----RDTSVFVRNS-EEMLSIPGFVNP-VPANVLP SALFVEDGYDAYVKLAILFTKAN---GILVN-----SSF
UGT72A1	151	IYVPI LDK-----EVEGEFVLQKEPMKIPGCRPVRTEEVVDPMLDRTNQYSEYFRLGIEIPTAD---GILMN-----TWE
UGT72D1	147	VYLPVLDT-----VVEGEYVDIKEPLKIPGCKPVGPKELMETMLDRSGQQYKECVRAGLEVPMSD---GVLVN-----TWE
UGT72E1	139	LFFPTLDK-----DMEEHIIKKQPMVMPGCEPVRFEDTLETFLDPNSQLYREFVFPFGSVFPTCD---GIIVN-----TWD
UGT72C1	145	VYMASLDK-----QELYKQLSSIGALLIPGCSVPKFERAQDPRK--YIRELAESQRIGDEVITAD---GVFVN-----TWH
UGT73A1	151	NSVRLNK-P-----FKNVSSDSETFVVPDL PHEIKLTRTQVSPFERSGEEETA-MTRMIKTVRESDSKS--YGVVFN-----SFY
UGT73B1	167	HCIRLP-----KNVATSSEPFI PDLPGDILITEEQVMETE---EESV-MGRFMKAIRDSEKDS--FGVLVN-----SFY
UGT73C1	158	HIMHQNHFF-----LETIESDKEYFPIPNFPDRVEFTKSQLP-MVLVAGD---WKDFLDGMEGDNDS--YGVIIVN-----TFE
UGT73D1	162	HNIHLHSPH-----LS-VSSAVEPFPPIPGMPHRIE IARAQLPGAFEKLAN---MDDVREKMRSESEA--FGVIIVN-----SFQ
UGT89B1	155	NTLWIEMPT-----KINEDDDNEILHFPIKIPNCPKYRFDQISSLYRSYVHGDPAWEFIRDSFRDNVAS--WGLVVN-----SFT
UGT89C1	130	---WINK-----VADAFSIKSISFLP-----INAHSISVMWAQEDRSFFNDLETATTES--YGLVIN-----SFY
UGT89A2	162	QFCFENID-----LIKSTDPIHLLDLPRAPIFKEEHL P--SIVRRSLQTPSPDLESIKD-FSMNLLS--YGSVFN-----SSE
UGT93A1	135	NVERYCFQV-----FSALNTAGDFWEQMGKPLADFHFPDIPSLQGCISAQFTDFLTAQNEFRKFN---NGDIYN-----TSR
UGT93B1	142	NADAFGLQC-----VAISYNVG--WLDPGHRLLSDYGLQFLP-PDACMSREFVDLVFRMEEEEEQAPV--AGLVMN-----TCR
UGT91B1	150	GPASVMIQGH-----DPRKTAEDLIVPPPWPVFETNIVYRLF EAKRIMEYPTAGVTGVELNDNCRLGLAYVVGSEVIVIR-----SCM
UGT91C1	152	-PSSSLIE-----EIRSTPEDFTVPPWPVFKSNIVFRYHEVTRYVEKTEEDVTGVS--DSVRFGYSIDESDAVFVR-----SCP
UGT91A1	159	PPGFEEYR-----TSPADFMKPPKWPVFETSVAFKLFECRFIFKGFMAETTEGNVPDIHRVGGVIDGCDVIFVR-----SCY
UGT102A1	135	REPGLPLPV-----MPFHYAEDKRALRRFQVSEIYDALMYP--HGQTI LRHAQRFGLPERRRLDECL-----SPL
UGT102B1	140	REPDMPLAV-----MPFEYGTSDAARERYAASEKIYDWLMRR--HDRVIAEHSHRMGLAPRQKLHQCF-----SPL
UGT51B1	256	RTRAYP-----HAFVVP EQKRGGSYNYLTHIIFENVFWKGISGEVNKWRVEQLMMLPKTNLERLEQ-----NKV
UGT51C1	282	RTRAYP-----HAFVVP EQKRGGSYNYLTHVLFENIFWKGISGQVNKWRVEELDLPKTNLYRLQQ-----TRV
UGT51A1	253	RTRAYP-----HAFIVPDQKRGGNYNLTHVLFENVFWKGISGQVNKWRVETLGLGKTNLFLQQ-----NNV
UGT81A1	213	GTSPIVHQ S-----NFAATSTFIAREIAQGLMKYQPDIIISVHPLMQHVPLRVLR SKGLLKKIVFTTVITDLSTCHP-----TWF
UGT81B1	144	GTSPIKWIHKS-----YLSALAAAYAKEIEAGLM EYKPDIIISVHPLMQHIPLWVMKWQGLHKKVIFVTVITDLNTCHR-----TWF
UGT31D1	165	GLAENFDAAG-----AVARHPVHYPNIRWSFSGEEAAGALSEWRLLNEFELLASQRSNELLKQFGLDTP-----TIR
UGT72B1	149	LHLPKLD ETVS-----CEFRELTEPLMLPGCVPVAGKDFLDPAQDRKDDAYKWL L HNTKRYKEAEG---ILVN-----TFF

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UGT77A1 162 IRTDALREDVG-----DQAANRVDGLLISHPGLASYRVRDLPDGVVSGDFNYVINLLVHRMGQCLPRSAAAVALN-----TFP
UGT8     164 YPAEVGAPAP-----LAYVPEFNS-LLTDRMNFLERMKNTGVYLI SRMGVSFLVLPKYERIMQKYNLLPAK-----SMY
UGT84A1 159 YHYQDGSVSFP-----TETEPELDVKLPCVPVLKND EIPSFLHPPSSRFTGFRQAILGQFKNLSKSFVCLIDS-----FD
UGT84B1 142 YRYYMKTNSFP-----DLEDLNQTVELPALPLLEVRDLP SFMLPSGGAHFYNLMAEFADCLRYVKWVLVN-----SFY
UGT88A1 151 FYLPTIDETT-----PGKNLKD IPTVHIPGVPPMKGSDMPKAVLERDDEVYDVFIMFGKQLSKSS----GIIIN-----TFD
UGT90A1 157 ISVFKHEL FTE-----PESKSDTEPVTVPDFPWIKVKKCDFDHGTTEPEESGAALELSMDQIKSTTTSHGFLVN-----SFY
UGT79A1 153 TCPARVLEPKK-----YPSLEDMKKPP LGFPQTSVTSVRTFEARDFLYVFKSFHNGPTLYDRIQSGLRGCSAILAK-----TCS
UGT79B1 152 LVPSAEREVID-----GKEMSGEELAKTPLGYPSSKVVL RPHEAKSLSFVWRKHEAIGSFFDGVVTAMRNCDAIAIR-----TCR
UGT22A1 213 IMDAVSYNLG-----IPAPSSYVPTIEENDNGDKMDFWQRTFNLYMKIGSILIHRYGTDGTTTEVFRKYIPDFPNVR-----
UGT23    174 KLIRPQGQISG-----LPTLPSYVPSVEENPNHDRMSFFERMSNVYKFFQSIVVHYLQDIHVLNLF RKEVSSDFPS-----IA
UGT52A1 225 FFNAFTMPFTR-----TRTYPNPFAPFASHQMGGVFN LATHVMMEKVLWQPI SGQINQWRTETLKI PPWNSSVSIN-----
UGT86A1 161 YHMDLLISNG-----HFKSLDNRKDV IDYVPGVKAIEPKDLMSYLQVSDKDVD TNTVVYRILFKAFKDVKRADFVVCN-----TVQ
UGT87A1 132 INSDLLASHG-----HFPIEPSESKLDEIVDYIPGLSPTRLSDLQILHGYS HQVFNIFKKSFGELYKAKYLLFP-----SAY
UGT92A1 164 RSIWLNLP HK-----ETKQDQFLLD DFPEAGEIEKTQLNSFMLEADGTDDWSVFMKKIIPGWSDFDGF LFN-----
UGT83A1 160 FSIQKLIDDG-----LIDSDGTVRVNKTIQLSPGMPKMETDKFVWVCLKNKESQKNIFQLMLQNNNSIESTDWLLCN-----SVH
UGT82A1 141 QAIPELVRTGLVS-----QKGCPRQLEKTI VQPEQPLL SAEDLPWLIGTPKAQKKRKFQWQRTLERTKSLRWILTSSFKD-----EYE
UGT80A2 269 EIPIQRNQMKDIIYSLLPACKEPDPDSGISFKADAI IANPPAYGH THVAEALKIPIHVFFTMPWTPTSEFPHPLSRVKQPAGYR-----LSYQ
UGT9     172 SAWANQSPSP-----PSYLPVAGTGLTDDLTFSQRLYNVASYFKQLYIHQHI VQPRIDAVFQKYYPGVES-----TF
UGT24A1 171 LMDFVAETVG-----VPIIPSYVPLMMESDDEMGGFFR MKSFIGHTLMTVLHRRM TSNGETQIFRDELNDPNFP-----HTM
UGT26A1 121 MLRHDETGFS-----QLFLDRVQNTLWHL SLLDFVNL PQNLLVDENLFYREFV GADQDD-----LWD
UGT20A1 171 IYRPQAEALG-----VHLPYSYVPELFAHFSDKMSFFQKV INILIGQATSFVLDV FVQGFQSRIFGFEQGLG-----
UGT104A3 133 LHYPMPRPN G-----QLLPRVPGPLVRTGM AVYDWMCW RMNKKAE DRQRRELGLPTATVASPRRIAE-----R
UGT106A1 116 VVPEYRRRTG-----RVIPTFNVM TDFCLHKI WWHENVDKYYVATDYVKEKLEIGTHPSNVKITGIP IR-----P
UGT106B1 116 VMSVLTEQFN-----INIPVATVM TDYRLHKNWITPYSTRYYVATKETKQDFIDV GIDPSTVKVTGIPIDN-----
UGT103A1 137 HLPVHPKFN-----VPEQMPLAMRKL LWRCIERFKLDRTCAPDINAVRRKVGLETPVKRIFTQWMHSP-----Q
UGT105A5 107 AVRSM AEKLG-----IPYRYTVLSPDHL PSEQSQAERDMYNQGADRLFGDAVNSHRASIGLPPVEHLYDYG-----
UGT10    184 SHCFIAESKG-----YPILNLYKNSVCYFQEMIAQLGLPAVSSLVSSRHRL LDEPITNIFRTDYTIKKRFKNFPN-----VN
UGT27A1 167 SFGKFSRNYA-----IMVPNFLPYSMSNFTIEKYWHRV VSTVDWFGSAFITGAVAGFAQK WALRSIIPFPFFS-----FY
UGT101A1 113 TSYPARVLAR-----RWGVPVAVSLSPNLVAWKGYEE EVAEPMWREPRQTERGRAYYARFEAWLKENGITEHP-----DTF
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UGT13A3 243 DHINGAAYYFINSNQYLDYPSPTLPKTVFIGGMQVNTNK-HGK-----VKLEKEWDDLNLNR-----KQNVLVSFSGSNAFSCDMPDEFKESFLKVFASM
 UGT13B1 283 DLFTGVAFNLINSNQYIDYPSPALPKTVFVGGMQVNTN--EAK-----TKLSDEWNNILNIR-----KQNVLISFSGSNAFSEMPEEFKKSFLYVFGNM
 UGT16A1 229 EVLPEASFILTNQIPLLDPAFTFDKIVPIGGLSVKTE--KKN-----LKLDEKWSKILGIR-----KNNVFIISFSGSNAKSVDMPDEFKNSLADVFKSM
 UGT16C1 247 EVLPEASFIFTNHIPLMDFPAPTFDKIPIIGGISVKTQ--KKS-----LELPEKWNKILGLR-----KKNILVIFSGSNARSADMPEHFQKQNVLKVAESM
 UGT16B1 242 EILPESSFLLTNHIPVLEFPAPTFDKIVPIGGISVNKN--KET-----LKLEHYFDTMVSMR-----KKNVLIISFSGSNIKSMDMPDEYKKSALAEFLQIM
 UGT16D1 258 EVLPEASFIFSNHIPVLDFFSPTFDKIPIIGGFTVKTN--EKS-----LKIDKKWDAILNIR-----KKNVLIISFSGSNAKSKDMPPEEYKKTLLRVFSSM
 UGT17A1 253 EIMRPLPAYMFTNSNPILDFFPYPRPSKFIIEIGGIAADEK--KHD-----EVLPESEYDHILNLR-----NRTVLIISFSGSNAKSIFMPDHMRSLIIALGMM
 UGT17B1 251 ELSRKNAYMFVNSNPQMDIPSPRTSKFIEIIGGISSGPV--KQ-----ERLPEEYDRVLSLR-----KKNVLIISFGTNAKSMFMSDDMKESLIKTFESM
 UGT14A1 253 -VLPKVCMYLFFN--FLGHK--VIQKTVAIGGISVNMGKIKSQ-----KLDDHWDVILDQR-----NNNMLIISFSGSMVKSSTMPIDWKMNILKVIKSE
 UGT14D1 242 DLLPAASLYFTNSNPYLDFFPRPILQKTVSIIGGISVDTKKIKSQ-----ELDKENWHILNKR-----NLNMLIISFSGSMIHS SHMLDDAKKNLIKVIKSE
 UGT14C1 241 DLMPSSSVAFTNSIPYVDFPRSITQKTVPPIGGISVDMEMIKSQ-----KLSIEWSTVLDER-----PHNMLIISFSGSMVRSMDMPLKWRNGLLEAIKSE
 UGT14E2 245 ELLSSASIFFVNANPFLDFPRAVLQKTVPPIGGISINLKWIKSQ-----KLTQDWEDILEKR-----TKTVLIISFSGSMVKSAYMPKIWRNGLLEVIKSM
 UGT14F1 245 ELMSSASLYFTNSNPYIDYP-----HFQQIKSE-----KLNKEWEEVLNKR-----QKSMLIISFSGSNVPSDKMPAAWKAGIFETIKSM
 UGT15A2 287 EMSVRAPFMFMNSNPYLDYARPIILTKTVLIGGISVNVTLQKQK-----KLNEKYDKILSER-----QQNILIISFSGSMIFSKDMPDVYKNTLVQVIKSF
 UGT15B1 237 SEYHRAPYVFINSNPYIDFPRPLLTKTIEIIGGITVDVKKLKSE-----KVDEKWDNILLKRR-----PHNVLIISFSGSMFKSIYMPDFYKKNMVMKVMKSF
 UGT15D1 208 TIEPEASVFLFLNSNPFLDFPRPTLTKTVEIIGGITVDLNLKLSQ-----QLDSKWSDIILNLR-----EKTMLVIFSGSVFFSKDMPLENKKNVIANSMTTEF
 UGT15E1 252 SIEPFCSAVFTNSNPYIDYPRATLEKNVQVGGISVDIDKLKSQ-----KVSNEWDAVILNLR-----PKTVLVIFSGSIMLSKDMPIINNKITITATVLGKF
 UGT15C1 238 EKLSEASFIFMNSNPFLDFPRATITKNIQIIGGISVNLDTLKSS-----GKLTEEWDQILNLR-----EKTLLVIFSGSVILSQDMPFAYKVGLTNAKMQQL
 UGT18A1 247 QILNDVITYHFSNSNPYLDFFVIPTIAKVPIIGGYTMDYKQVPP-----VSKDLDTILNLR-----SSTVFIISYGTMISAKYMPDEYKQSMIDFFKDN
 UGT18B1 246 DIIHDVITYHFSNSNPYLDFFVIPTIPKVVPPIGGITVDHDYWSTN-----GNHSELLEHVILNAR-----KHNVFIISFSGSMVRSVDMPKPEFKKSMMKVFSDH
 UGT18C1 247 KILKDVITYHFANSNPYLDFAAPTISKVPIIGGYDMDKSIQTK-----IPDEFDSILNER-----SLTVYVIFSGSMVKAQFMPEYKEAMLRMFTAN
 UGT18D1 244 EILQATATYFFYNMNPYIGFAMPTLEKSVEIIGGFTIDPPHD-----LSLNEEFDKLLDLR-----KSTVLIISFGTIVVQSADMPENFKSGLIKMFAKL
 UGT18E1 239 EILQSSTFFLTNSNPYLSFSTPTISKVQIIGGFTIESFKT-----TTLDEEFNKILSLR-----NNTILVIFSGTIVIQSSDMPDDFKTGLIEAIFRRM
 UGT18F1 244 DIVTRSPIYITNSNPYLDFAVPTTATIVHVGGITIDLEKMRHV-----AALTEEYENIFAER-----ESTVLIISFSGSVIRSYEMPDNFKAGIINMFKSL
 UGT19A1 241 -LLRFSNLMFLNTHELADAHRPWSRRVHEIIGGISFKFPM-----PLKNEYINLNFNKY-----NSIILVIFSGTTTTPSFLMPEKYKNTLINTFQRF
 UGT19B1 238 EIMRQANLLFYNIHEGSDGMRMRGRRSFDIIGGIAFKDQK-----NLTMEYQTLISDP-----RPKVLVIFSGTAATSSHMPQNLKNSLMTAMKQM
 UGT25A1 209 EIERNVDIILVNSNEIEKPRPVSHKIKYIIGMGKKAQK-----LNKEFNDILATS-----NKGVVLFIFSGTQVATSKVPIEIRKNFVTAFKHF
 UGT25B1 234 TIERGIDIIIFVNSHDFLEQQRPMSPKIKYIIGMAIRKAKQ-----LPDEFEKILSVP-----KSAYVLFIFSGTQVPTAKMPLPIRRNFVGAFFKFF
 UGT25C1 236 VIDK-VDLDFVNSNEIMETPMLINHRIQYIIGGINLKTTPK-----VDHHLDNLLSKS-----SNGTIIIFSGTQIPGAVYPRYAVRNFVKVFKKY
 UGT25D1 248 LIES-LDLAFVNSNELIETPRVSSHKIKYIIGGINLKKSKDR-----LDEEVEKVIITQKP-----IGNGIVVFCFGTQVPSLFPPIEVRRAFQAQAFRHF
 UGT21A2 238 SVTSDVDVIFVATDEIIDISTTTLQNIHVHGGGLGVDDDV-----AEMDNVFASEM SKGK--E--GVITYFSLGTIANTTKIDSKVMRTVLDIVKKF
 UGT21B1 219 FLAKTSDLIFVSTDELLEIQAPTLSNVVIHGGGLSSEG-----GGLDEKFVKIMEK GK-----GVILFSLGTIANTTNLPPTIMENLMKITQKF
 UGT2A1 246 ETMGKAEIWL MRTYWDFFPRPYLPNFVFEVGGHLCKPAK-----PLPKEMEEFVQTSG-----EHGVVVFSLGS--MVKNLTEEKANVIASALAQI
 UGT2B1 249 EMMGKADIWLIRTFWDLFEFPHFPLPNFDFVGGHLCKPAK-----PLPREMEEFVQSSG-----EHGVVVFSLGS--MVKNLTEEKANVVASALAQI
 UGT1A1 246 EVLSHASVWLFRGDFVFDYPRPIMPNMVFIIGGINCVIKK-----PLSQEFEAYVNASG-----EHGIVVVFSLGS--MVSEIPEKKAMEIAEALGRI
 UGT35A1 242 EVLDSFALMLLQGHFSLSYPRPYLPNMIIEVGGHLHLQQRKV-----QPLAKELSEFVEQS-----EKGVIFYFSGSNIKS KDLPPSTRKMLMETTFASV
 UGT35B1 233 DLNRNFSLVLLNQHFSLSFPRPYVPMIEVGGHLHISHKP-----APLPKDLEEFIQGSG-----EHGVIFYFSLGSNVL SKDLPADRKELILKTFGSL
 UGT31B1 256 ELNRNVELL FVNTHAIFDNNRPVPPSVQYLGALHLH---DKRP---DSMYGMVREFLDNA---TTGAIYVIFSGSAISSDMEPEFIEMLLRVFEKL
 UGT31C1 236 ELRSRVRLLFVN VHSVFDNNRPVPPSVQYLGGLHLH---DRRA---EPLSEAVARFLDES---RRGVVYVIFSGSGLATEDMDADMAAALLDAFKMM
 UGT31A1 242 ALRKNVHMMFVNTHPVFDNNRPVPSNVQYLGGLHIDPAVTSVA---DEIDNDLAEFLENS---TMGVVYVIFSGSVRVSMDSNMLNVFVETFRSI
 UGT32A1 227 QLKSRVLMFLINVPVAVFDNNRDVSNNIQYLGGLHILK---KPR---TVRDSRLLSFMKHK---HI-IVYASFGSGIDVLNMDANLIAEFVRVFNISI
 UGT76B1 209 DLET---DQLDEARIEFPVPLFCIGPFHRYVSASS--SLLAHD-----MTCLSWLDDKQ---ATNSVIYASLGSIA-SIDES---EFLEIAWGLR
 UGT76C2 214 ELEK---DSLTL SNEIFKVPVFAIGPFHYSYFSASS--SSLFTQD-----ETCILWLDLDDQ---EDKSVIYVSLG SVV-NITET---EFLEIACGLS
 UGT76F1 215 DLIER---HSLMDCRSKLQVPLFPIGPFHKHRTDLP-PKPKNKDKD---DDEILTDLWLNKQ---APQSVVYVIFSGSLA-AIEEN---EFFEIAWGLR
 UGT76D1 208 CLLEN---SFITTAQEKWGPVYPVGPLHMTNSAMSCPSLFEFE-----RNCLEWLEKQ---ETSSVIYIISMGSLA-MTQDI---EAVEMAMGFV

UGT76E1 213 CLES---SSLAWLQKQLQVPVYPIGPLHIAASAPS--SLLEED-----RSCLEWLNKQ---KIGSVIYISLGSLSA-LMETK---DMLEMAWGLR
 UGT78B1 222 EID--P-IITNHLRSTNQLNILNIGPLQTLSSSIPP-----EDNECLKWLTQ---KESVYVYLSFGTVI-NPPPN---EMAALASTLE
 UGT78C1 211 ELDRDP-LINKDLQ-KNLQKVFNIGPL-VLQSSRKL-----DESGCIQWLDKQ---KEKSVYVYLSFGTVT-TLPPN---EIGSIAEALE
 UGT78D1 222 ELE--P-TLNYNLR-SKLKRFLNIAPLTLSSSTSEKE-----MRDPHGCFAWMGKR---SAASVAYISFGTVM-EPPPE---ELVAIAQGLE
 UGT85A1 238 DLEH----DVVHAMQSILPPVYVSGPLHLLANREIEEGSEIGMSSNLWKEEMECLDWLDTK---TQNSVIYINFGSIT-VLSVK---QLVEFAWGLA
 UGT85B1 242 ELEK----DVVDALAAFFPPIYTVGPLAEVIASSDSASAGLAAMDISIWQEDTRCLSWLDGK---PAGSVYVYVNFSGMA-VMTAA---QAREFALGLA
 UGT74B1 214 GLEETQDCENGESDAMKATLIGPMIP SAYLDRMEDDKDYGASLL--KP-ISKECMEWLETK---QAQSVAFVVSFGSFG-ILFEK---QLAEVAIALQ
 UGT74F1 204 DLDLHE--EELLKSKVCPVLTIGPTVPSMYLDQQIKSDNDYDLNLF--DLKEAALCTDWLDRK---PEGSVYVYVAFSGMA-KLSSE---QMEEIASAIS
 UGT74D1 211 ELEVEV--LQWMKNQWPVKNIGPMIPSMYLDKRLAGDKDYGINLF--NAQVNE-CLDWLDSK---PPGSVIYVVSFGSLA-VLKDD---QMIEVAAGLK
 UGT74E1 211 KLEEK---KWIKSVWPVLNIGPTVPSMYLDKRLAEDKNYGFSLF--GAKIAE-CMEWLNKSK---QPSSVYVYVVSFGSLV-VLKDD---QLIELAAGLK
 UGT74C1 212 QLEPKV--VKWMNDQWPVKNIGPVVPSKFLDNRLPEDKDYELEN--KTEPDESVLKWLGNR---PAKSVYVYVAFGTLV-ALSEK---QMKEIAMAIS
 UGT74A1 218 ELETEV--LAGLTKYLKARAIGPCVPLPTAGRTAGANGRITYGAN--LVKPEDACTKWLDTK---PDRSVAYVVSFGSLA-SLGN---QKEELARGLL
 UGT75B1 207 SLEPEA--LTAFP-NIDMVAVGPLLPTEIFSGSTNKS-----VKDQSSSYTLWLDKSK---TESSVIYVVSFGTMV-ELSKK---QIEELARALI
 UGT75D1 234 ELEPEA--MSSVPDNFKIVPVGPLL-----TLRTDFS-----SRGE---YIEWLDTK---ADSSVLYVVSFGTLA-VLSKK---QLVELCKALI
 UGT75C1 220 ALEHDA--LTSVE-KLKMIPIGPLVSSSEKTDLFKS-----SDED---YTKWLDKSK---LERSVIYISLGTTHADDLPEK---HMEALTHGVL
 UGT75A1 219 ALELNA--LRVLK-NVTMVGIGPLIPSSFLDEKDRKDNFFAAD---MIESENMYMEWLDAR---ANKSVIYIYAFGSYA-EISSQ---WMEELISQGLL
 UGT71A2 205 ELES HA--IESFKD-----PPIYPVGPILDVRSNG-----RNTNQEIMQWLDQ---PPSSVYVFLCFGSNG-SFSKD---QVKEIACAILE
 UGT71B1 212 DMPEQA--LSFFSGGNGN---TNIPPVYAVGPIMDLESSGD-----EKRKEILHHLWKEQ---PTKSVYVFLCFGSMG-GFSEE---QAREIAVALE
 UGT71C1 232 ALEPNG--FKYFDRCP-----DNYPTIYPIGPIILCSNDRPN--LD--SSERDRIITWLDQ---PESSVYVFLCFGSLK-NLSAT---QINEIAQALE
 UGT71D1 222 DIEPYS--VNHFLQE-----QNYPSVYAVGPIFDLKAQPHPEQD--LTRRDELKWLDDQ---PEASVYVFLCFGSMA-RLRGS---LVKEIAHGLE
 UGT72A1 219 ALEPTT--FGALRDVKFLGRVAK--VPVFPPIGPIRRQAGPC-----GSNCELLDWLDQ---PKESVYVYVVSFGSGG-TLSLE---QMIELAWGLE
 UGT72D1 215 ELQONT--LAALREDEELSRVMK--VPVYPIGPIVTRTNQHV-----DKPNSIFEWLDEQ---RERSVYVYVCLGSGG-TLTFE---QTVELALGLE
 UGT72E1 207 DMPEKT--LKSLODPKLLGRIAG--VPVYPIGPIVSRPVDPDPS-----KTNHPVLDWLNKQ---PDESPLYIYVSFGSGG-SLSAK---QLTELAWGLE
 UGT72C1 211 SLEQVT--IGSFLDPENLGRVMRGPVYVPGVPLVPAEP-----GLKHGVLWLDLQ---PKESVYVYVLLGVVG-ALTFE---QTNELAYGLE
 UGT73A1 221 ELETDYVEHYT--KVLGRR-AWAIGPLSMCNRDIEDKAERGK---SSIDKHECLKWLDKSK---KPSSVYVYVCFGSVA-NFTAS---QLHELAMGVE
 UGT73B1 231 ELEQAYSDFYK--SFAKR-AWHIGPLSLGNRKFEEKAERGK---ASIDEHECLKWLDKSK---KCDSVIYMAFGTMS-SFKNE---QLIEIAAGLD
 UGT73C1 226 ELEPAYVRDYK--KVKAGK-IWSIGPVSLCNKLGEDQAERGNK---ADIDQDECIKWLDKSK---EEGSVLYVCLGSIC-NLPLS---QLKELGLGLE
 UGT73D1 230 ELEPGYAEAYA--EAINKK-VWFVGPVSLCNDRMADLFDGRSNGN--IAISETECLQFLDSM---RPRSVLYVSLGSLC-RLIPN---QLIELGLGLE
 UGT89B1 227 AMEGVYLEHLK-REMGHDR-VWAVGPIIPLS-GDNRRG-----P--TSVSVDHVMSWLDAR---EDNHVYVYVCFGSQV-VLTKE---QTLALASGLE
 UGT89C1 185 DLEPEFVETVKTRFLNHHR-IWTVGPLLFPKAGVDRGG-----Q--SSIPPAKVS AWL DSCP---EDNSVYVYVGFSGSI-RLTAE---QTAALAAALE
 UGT89A2 230 ILEDDYLQYVK-QRMGHDR-VYVIGPLCSI GSGLSKN-----S--GSVDPS-LLSWLDGS---PNSVLYVYVCFGSQK-ALTKD---QCDALALGLE
 UGT93A1 205 VIEGYPVELLERFN--GGKEVWALGPFTPLAVEKKDSIG-----FSHPCMEWLDKQ---EPSSVIYVVSFGTTT-ALRDE---QIQELATGLE
 UGT93B1 211 ALEGEFLDVVAAQPPFQGRFFAVGPLNPLLLDADAPTPPGQ-----ARHECLEWLDKQ---PPESVLYVVSFGTTS-CLHAD---QVAELAAALK
 UGT91B1 227 ELEPEWIQLLSKLGKQKVPVPIGLIPATPMDDADDEGTWLD-----IREWLDLDRH---QAKSVYVYVVALGTEV-TISNE---EQIQLAHGLE
 UGT91C1 224 EFPEPEWFLKDLRKPVPVPIGFLPPVIEDDDAVDTTWVR-----IKKWLDKQ---RLNSVYVYVSLGTEA-SLRHE---EVTALALGLE
 UGT91A1 231 EYEAEWLGLTQELHRKVPVPGVLPKPKDEKFEEDTDTWLS-----VKKWLDKSK---KSKSIVYVAFGSEA-KPSQT---ELNEIALGLE
 UGT102A1 199 AQISQVSPALDFPRRALPNCFHVYG-----ALRYQPP-----PQVERS---P--RSTPRIFASLGLTQGHRLR---LFQKIARACA
 UGT102B1 204 AQISQLVPELDFPRKALPACFHAVG-----PLRETHA-----PSTSSRYFTS---SEKPRIFASLGLTQGHRYG---LFKTIKACE
 UGT51B1 319 PFLYNVSPVTFPPSMDPFWVWVGVYVWFLDEGEADSYDPPK-----PLLEFMKAKT---DGKKLIVYIGFGSIVVSDPKQ---LTEAVIDAVL
 UGT51C1 345 PFLYNVSPAILPPSVDVDFDWIKVTGYWFLDEGSGD-YKPPE-----ELVQFMKKASR---DKKKIVYIGFGSIVVKDAKS---LTKAVVSAVR
 UGT51A1 316 PFLYNVSPVTFPPSIDFSEWVRVTGYWFLDD--KSTFKPPA-----ELQEFISEARS---KGKKLIVYIGFGSIVVSNAKE---MTEALVEAVM
 UGT81A1 289 HKLVTRCYCPSTEVAKRAQKAGLETSQIKVYGLPVRPSFVKPVRP-----KVELRRELGMDE---NLPVLLMGGGEGMGP IEATARALADALYDKNLG
 UGT81B1 220 HHGVSRCYCPSTEVAKRALVDGLDSDQIRVFGPLPVRPSFVPTILN-----KNELRKELEIDL---NLPVLLMGGGEGMGPVQKTALALGDSLYNSKES
 UGT31D1 233 QLRDNVQLLLNLHPVYDNNRPVPPSVQYLGGLHLSQAPSHK-----LTAALERRINES---VDGAIYVVSFGSSIDTNSIHAEFIQMLLESFVQL
 UGT72B1 217 ELEPNAIKALQEPG-LDKPPVYVPGVPLVNI GQKQEAQTE-----ESECLKWLDNQ---PLGSVLYVVSFGSGGTLTCEQ---LNELALGLA

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UGT77A1 235 GLDPPDVTAALAEILPNCVPGPYHLLLAEDDADTAAP-----ADPHGCLAWLGRQ---PARGVAVVSFGIVACPRPDE-----LRELAAGLE
UGT8     232 DLVHGSSLWMLCTDVALEFPRPTLPNVVYVGGILTKPAS-----PLPEDLQRWVDGA---QEHGFVLVSFGAGVKYLSSE-----IANKLAGALG
UGT84A1 228 SLEQEVIDYMSSSLCPVKTVGPLFKVARTVTSVDVSGDICKS-----TDKCLEWLDNR---PKSSVVYISFGIVAYLKQEQ-----IEEIAHGVL
UGT84B1 210 ELESEIIIESMADLKVPVPIGPLVSPFLLDGEEETLDGKNLDFCK----SDDCCMEWLDKQ---ARSSVVYISFGSMLETLEN-----QVETIAKALK
UGT88A1 219 ALENR--AIKAITEELCFRNIYPIGPLIVNGRIEDRNDN-----KAVSCLNWLDSQ---PEKSSVFLCFGSLGLFSKEQ-----VIEIAVGLLE
UGT90A1 229 ELESFAVDYNNNSGDKPKS--WCVGPLCLTDPKQGSAPK-----AWIHWLDQKR--EEGRPVLYVAFGTQAEISNKQ-----LMELAFGLLE
UGT79A1 227 QMEGPYIKYVEAQFNKPVFLIGPVVDPDPPSGK-----LEEKWATWLNKF---EGGTVIYCSFGSETFLTDDQ-----VKELALGLLE
UGT79B1 227 ETEGKFCDYISRQYSKPVYLTGVPVLPQSQPNSLDP-----QWAEWLAKFN---HGSVVFCAFSGSQPVVKNID-----QFQELCLGLLE
UGT22A1 284 EIAANSSLCFVNSDEVLDLPRPTITKAIYVCGGLGIPKVSQP-----LDKKFTNIMSKG---KEGVVVISLGSIIIPFGDLPAAAKEGVLRAIQEI
UGT23    246 EIRNVSLVLVNTDEIFDLPRSYSSKFVYVCGMLEAGKDEN-----VTLPKKQDDYFKKG---KSGSVFVSFGIVTPFRSLPERIQLSILNAIQKL
UGT52A1 296 -ETYRMPYLYCFSKYLVPKPPDWSGEIAITGYWTLKNQANSDS-----PPDDLIQFLNEESSTENDDIPIYIGFGSIVIDNPTALSLLLIEAIKLSGK
UGT86A1 237 ELEPDSLALQAKQPVYAIGPVFSTDSVVPTSLWAES-----DCTEWLKGR---PTGSVLYVSFGSYAHVGKKE-----IVEIAHGLL
UGT87A1 204 ELEPKAIDFFTSTKFDVYVSTGGLIPLLEELSVGNENRE-----LDYFKWLEDEQ---PESSVLYISQGSFLSVSEAQ-----MEEIVVGVV
UGT92A1 230 TVAEIDQMGLSYFRRITGVPVWVPGVPLKSPDKKVGSR-----TEEAVKSWLDSK---PDHSSVYVCFGSMNSILOTH-----MLELAMALE
UGT83A1 235 ELETAAFGLGNIVPIGPIGWAHSLGEGSTSLGSFLPHDR-----DCLDWLDRQIP---GSVIYVAFSGFSGVMGNPQ-----LEELAIQLE
UGT82A1 219 DVDNHKASYKKSNDLNKENNGQNPQILHLGPLHNQEATNNITITKTSFWEEDMSCLGWLQEQ---NPNSVLYISFGSWVSPIGES---NIQTLALALE
UGT80A2 357 IVDSLIIWLGIRDMVNDLRKKKLLRPVTYLSGTQSGSNIPHG-----YMWSPHLVPKPKDWGPQIDVVGFVYLDIASNYEPPAELVEWLEAGDKPI
UGT9     239 EIERNASINFVNTPPIFDFSRPYMPRVNFIGAIQCRKPKE-----LPKEFTSWISAYP---DGFVVLSTGFTVQWNKSPEHIRQAYLDTFKYL
UGT24A1 244 DLGAKCPLVIVNSNELYDLPRPTLAKVVNIGGLGVGFDSAKP-----LTGEFKKISSETG---KGMIVVSFGSVAAAHDMPLEWKNSILEAFSSL
UGT26A1 178 LAKTTVPSLLINGDRMLDFPRPLPIHIAFSGELGVSKGKK-----LVMEKWLEDIEKP---SDGLIVFSLGTVSNTTNMPAQMINSFLGAFGKL
UGT20A1 238 AISQETSSVLINSVPPFDYSMPVSHQFSNIGGITVDKRDKK-----LDPYWQSIADSA---ENGFLVVSFGGIARTVDMTESMQRIFYDSFARF
UGT104A3 196 GSLEIQAYHEVCFPGLAEWAKWGGQRPVFGSLTMELPTD-----FDDEVLSWIGQG---TPPICFGFGSMPVAESPAET---IEIIGTACA
UGT106A1 182 QFEESMPVGPYKKNLSPNKKVLLIMAGAHGVLKN-----VKELCENLVKDD---QVQVVVCGKNTALKESLS-----
UGT106B1 182 KFETPINQKQWLIDNNLDPDKQTIILMSAGAFGVSKG-----FDTMITDILAKS---ANAQVVMICGKSKELKRSLT-----AKFK
UGT103A1 202 GVVCLFPAWFAPPQQDWPQPLHMTGFPLFDGSIPTGTP-----LDDELQRFLDQG---SRPLVFTQGSTEHLQGDFFY---AMALRALERL
UGT105A5 173 ----YTDQPWLAADPVLSPLRPTDLGTVQTGAWILPDERP-----LSAELEAFLAAG---STPVYVFGSSSRPATAD---AAKMAIKAVR
UGT10    256 TLKQQSAAYFVNTDPLLEPPRALPLNVI PVGGLHIDHPKP-----LFSPWNTTIIASAK---EGLIIVSFGTQADSSKMSEYHAKAILKALTNL
UGT27A1 237 DYNRRSSFSTDMPDPLYPVGARTNDYFSFGTYCTAQKK-----VLDEDWEQFVSDPK---SKGTILVAFGTIIDRWFAPEEKFEIFLNTLNRL
UGT101A1 183 ASHPPRSLVLI PKALQPHADRVEDVYTFVGACQGDRAEE-----GGWQRPAG---AEKVVLVSLGSAFTKQPAFYRECVRAFGNLPGW
consensus 501 ...
    
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UGT13A3	331	-PETTFIWKYEQ-----	ENATLADQ--LSNVKLTWMPQNDILAD-----	ERLTLFVTHGGLGSME
UGT13B1	370	-PEITFIWKYEE-----	ANATLTSH--LPNVKLTWMPQNDLLAD-----	DRLTLFVTHGGLGSTME
UGT16A1	316	-PDTTFIWKYEN-----	TSDP IVNH--LDNVHLGDWLPQNELLDAD-----	PRLSVFVTHGGLGSVTE
UGT16C1	334	-PDVTFIWKYEN-----	EKDTLADH--LDNVYLGDWLPQNELLDG-----	PRLSLFVTHGGLASVTE
UGT16B1	329	-PDVTFIWKYENL-----	ADKKYTCG--IMNINRVEWIPQTELLAD-----	SRVDAFITHGGLGSVTE
UGT16D1	345	-PDTTFIWKYED-----	PNVNIAKN--LDNVFISSWLPQNELLDAD-----	SRVTVFVTHGGLASVME
UGT17A1	340	-PDITFIWKYENSSI-----	DIVKEFDPT--IKNIVQVDWMPQQAALLAD-----	PRLDLFVTHGGMASTNE
UGT17B1	337	-PDTTFIWKYENTTV-----	DIVKQYNKR--INNVMLTDWMPQTALLAD-----	PRLTLFVTHGGLGSTNE
UGT14A1	336	-PNVTFIWKYETN-----	DTK-FADG--VDNVHFSKWVPQTALLND-----	DRLTAFVTHGGLGSTNE
UGT14D1	330	-PNVTFIWKYETN-----	DTS-FAFG--IDNIYFSKWVPQSKLLND-----	ARLTAFVTHGGLGSTNE
UGT14C1	329	-PNVTFIWKYEND-----	NLE-WAKG--IQNIYFSKWVPQTALLND-----	ARLTAFVTHGGLGSTNE
UGT14E2	333	-PDVTFIFKYESD-----	EVS-FADG--ISNIHFSKWVPQTALLND-----	PRLSAFVTHGGLGSTME
UGT14F1	318	-PNVTFIWKYESD-----	DVS-FADG--ISNIHFSKWVPQTALLND-----	PRLSAFVTHGGLGSTNE
UGT15A2	375	-PNVTFIWKYEE-----	DVS-FAKH--LPNLHFSKWVPQTALLAD-----	SRLSAFVTHAGLGSVTE
UGT15B1	325	-KNVSFIWKYESE-----	ETS-FANG--AENIIFSKWVPQTALLAD-----	SRLSAFFTHGGLGSVNE
UGT15D1	296	-KNVTFIWKYEGN-----	DIEDFARG--IQNIHFVKWVPQTALLAN-----	RRLSAFFTHAGLGSINE
UGT15E1	340	-PDVTFIWKYETN-----	DTS-FANG--TENIHFVSNWVPQTALLAD-----	PRLSAFFTHAGLGSVNE
UGT15C1	327	-NDVTFIWKYEGD-----	DKKEFANG--IKNIHFSKWVPQRELLGNNAFNFTTEIHIYVTESDPRLSAFVTHGGLGSVNE	
UGT18A1	333	-KNVTFIWKYEEP-----	EEKFIKENI--PDNVHLSTWFPQQSLLAD-----	KRVKLFITHGGLGSTME
UGT18B1	335	-PNITFLWKYELP-----	NDQEFRLIL--PTNVHVAKWFSQSALLSD-----	QRVNLVTHGGLGSTME
UGT18C1	333	TQNITFLWKYEDP-----	TDIFFKNRL--PKNVILKDWFPQRALLAD-----	KRVKLFITHGGLGSTME
UGT18D1	330	-PDTTFIWKYEV-----	EDAEFSKTL--SENVFLKKWIPQPALLAD-----	PRLNLFITHGGLGSTLE
UGT18E1	325	-PDATFIWKYEE-----	DDKTLKKNL--SENVVLSKWIPQPALLAD-----	SRLDLFVTHGGLGSTME
UGT18F1	333	-PEVTFIWKYEK-----	DDVEFQKRL--PKNVHLKNWVPQPSLLAD-----	KRLKLFVTHGGLGSTME
UGT19A1	324	-PDFLFIWKYEKD-----	DEFT-QKNK--KGNVVFKKFLPQVDLLES-----	RKIKLFITHGQNSLLE
UGT19B1	322	-NNVLFIWKYEME-----	DNFTKQEEL--TTNIIFKKFLPQTDLLAS-----	SKIDLFLVTHCGQNSLLE
UGT25A1	294	-PDFSFLWKYDNL-----	TDDAELFAD--SSNIHRVEWLPQTDLLGD-----	NRVKAFLISHMGLNSFLE
UGT25B1	319	-PNVTFIWKYDSL-----	ELDADIFQG--VENIHRLEWLPQTELLHD-----	NRVKLFISHMGLNSYLE
UGT25C1	320	-PEYTFIWKYINVQ-----	PGEEKLFED--AENVILLDWLPQTDLLYD-----	PRVIGFISHVGLNSFNE
UGT25D1	335	-PDFTFVWKYEMQ-----	DGDEQIFAN--TTNLRLLKWLTPQTDLLND-----	ARTKAFLISHVGLNSYLE
UGT21A2	324	-PDYHFVIRADKYD-----	LSTREYAKS--VSNAFVSDWLPQPAILHH-----	PRLKLFITHSGYNSIVE
UGT21B1	304	-KDYEFIIKVDKFD-----	RRSFDAEG--LSNVLVVDWVPQTAVLAH-----	PRLKAFITHAGYNSLME
UGT2A1	330	--PQKVLWRYK GK-----	IPATL--GSNTRLFDWIPQNDLLGH-----	PKTRAFITHGCTNGIYE
UGT2B1	333	--PQKVWRFDGK-----	KPDTL--GSNTRLKYWIPQNDLLGH-----	PKTKAFVAHGCTNGIYE
UGT1A1	330	--PQTLWRYTGT-----	RPSNL--AKNTIILVKWLPQNDLLGH-----	PKARAFITHSGSHGIYE
UGT35A1	330	--PQRVLWKFEDD-----	QLPEK--PDNVFISKWFPQPDILAH-----	PNVKLFITHGGLLSTIE
UGT35B1	320	--PQRVLWKFEDD-----	KLPGK--PSNVFISKWFPQPDILAH-----	PKVKLFITHGGLLSTIE
UGT31B1	343	--PYSILWKYDG-----	YMN--RM--PANVVFQSWFEQYNLLHH-----	KNVRAFVTQGGVQSTDE
UGT31C1	323	--PYDVLWKHDG-----	RVDGL-TI--PANVVFQKWFQFEVLOH-----	KNVKAFTVQAGVQSTDE
UGT31A1	332	--PYRVLWKVDK-----	SDKIFDNI--PSNVLIQRWFPQRRVLKH-----	RNVKVFITQGGVQSTDE
UGT32A1	312	--PYAVLWKVDS-----	SIHLKHNI--SSNVHTQSWFPQORDVLNH-----	PHIKVFITQGGVQSTDE
UGT76B1	287	NSNQPFVWVVRPGLIH-----	GKEWIEILPKGFLENLE--G-RGKIVKWAPQPEVLAHRATG-----	GFLTHCGWNSTLE
UGT76C2	292	NSKQPFVWVVRPGSVL-----	GAKWIEPLSEGLVSSLE--E-KGKIVKWAPQPEVLAHRATG-----	GFLTHCGWNSTLE
UGT76F1	297	NSELPELVWVVRPGMVR-----	GTEWLESPLCGFLENIG--H-QGKIVKWVWVQLETLAHPAVG-----	AFWTHCGWNSTIE
UGT76D1	287	QSNQPFVWVVRPGSIN-----	GQESLDFLPEQFNQTVT--DGRGFVVKWAPQKEVLRHRAVG-----	GFWNHCGWNSCLE

UGT76E1	290	NSNQPFLLWVIRPGSIP-----GSEWTESLPEEFSRLVS--E-RGYIVKWPAPQIEVLRHPAVG-----GFWSHCGWNSSTLE
UGT78B1	296	SRKIPFLWLSLR-----DEARKHLPENFIDRTS--TFGKIVSWAPQLHVLNPAIG-----VFVTHCGWNSSTLE
UGT78C1	285	TKKTPFIWLSLR-----NNGVKNLPGKFLERTK--EFGKIVSWAPQLEILAHKSVG-----VFVTHCGWNSILE
UGT78D1	298	SSKVPFVWLSLK-----EKNMVHLPGKFLDRTR--EQGIVVPWAPQVELLKHEAMG-----VNVTHCGWNSVLE
UGT85A1	325	GSGKEFLWVIRPDLV-----AGEEAMVPPDFLMETK--DRSMLASWCPQEKVLSHPAIG-----GFLTHCGWNSILE
UGT85B1	329	SCGSPFLWVKRPDVV-----EGEEVLLPEALLDEVA--RGRGLVVPWCPQAAVLKHAAVG-----LFVSHCGWNSLLE
UGT74B1	302	ESDLNFLWVIKE-----AHIAKLPEGFVEST-K--DR-ALIVSWCNQLEVLAHESIG-----CFLTHCGWNSSTLE
UGT74F1	291	--NFSYLWVRA-----SEESKLPPGFLETVDK--DK-SLVLKWSQPQLVLSNKAIG-----CFMTHCGWNSSTME
UGT74D1	297	QTGHNFLWVRE-----TETKKLPSNYIEDICD--K--GLIVNWSQPQLVLAHKSIG-----CFMTHCGWNSSTLE
UGT74E1	295	QSGHFFLWVRE-----TERRKLPENYIEEIGE--K--GLTVSWSPQLEVLTHKSIG-----CFVTHCGWNSSTLE
UGT74C1	299	QTGYHFLWSVRE-----SERSKLPSPGFIEEAE--KDSGLVAKWVPQLEVLAHESIG-----CFVSHCGWNSSTLE
UGT74A1	305	AAGKPFLWVRA-----SDEHQVPRYLLAEATA--TGAAMVVPWCPQLDVLAHPAVG-----CFVTHCGWNSSTLE
UGT75B1	285	EGKRPFLWVITDKSNRET-----KTEGEEETEIEKIAGFRHEL--EEVGMIVSWCSQIEVLSHRAVG-----CFVTHCGWNSSTLE
UGT75D1	305	QSRPFLWVITDKSYR-----NKEDQEKEEDCISSEKSF--DEIGMVSWCDQFRVLNHRSIG-----CFVTHCGWNSSTLE
UGT75C1	296	ATNRPFLWIVREKNPE-----EKKNRFLLELIRGSDR--GLVVGWCSQTAVLAHCAVG-----CFVTHCGWNSSTLE
UGT75A1	303	KCGRPFLWVIRETLNG-----EKPEEK--LTCKDEL--EKIGRIVRWCSQMEVLKHSVVG-----CFLTHCGWNSSTLE
UGT71A2	276	DSGHRFLWLSLADHRAPGF---LESPTS--DYEDLQEVLPPEGFLERTS--GIEKVIW-WAPQVAVLAHPATG-----GLVSHSGWNSILE
UGT71B1	291	RSGHRFLWLSLRRASPVG---KSNPPPGEFTNLEEILPKGFLDRTV--EIGKIIS-WAPQVDVLSNPAIG-----AFVTHCGWNSILE
UGT71C1	311	IVDCKFIWVFRTPNK-----EYASPYEALPHGFMDRVM--DQGIVCG-WAPQVEILAHKAVG-----GFVSHCGWNSILE
UGT71D1	302	LCQYRFLWLSRKE-----EVTKDDLPEGFLDRVD--GRGMICG-WSPQVEILAHKAVG-----GFVSHCGWNSIVE
UGT72A1	298	RSQQRFIWVVRQPTVKTGDAAFFTQGDG--ADDMSGYFPEGFLTRIQ--NVGLVVPQWSPQIHMSSHPSVG-----VFLSHCGWNSVLE
UGT72D1	294	LSGQRFVWVLRRPASYLG---AISSD--DEQVSASLPEGFLDRTR--GVGIVVTQWAPQVEILSHRSIG-----GFLSHCGWSSALE
UGT72E1	286	MSQQRVWVVRPPVDGSACSAYLSANSGBKIRDGTPDYLPPEGFVSRTH--ERGFMVSSWAPQAEILAHQAVG-----GFLTHCGWNSILE
UGT72C1	290	LTGHRFVWVVRPPAEDDPSASMFDKTKN--ETEPLDFLPNGFLDRTK--DIGLVVRTWAPQEEILAHKSTG-----GFVTHCGWNSVLE
UGT73A1	305	ASGQEFIWVVR---TEL-----DNEDWLP-----EGFEERTK--EKGLIIRGWAPQVLIIDHESVG-----AFVTHCGWNSSTLE
UGT73B1	315	MSGHDFVWVVR---KGSQV-----EKEDWLP-----EGFEERTK--GKGLIIRGWAPQVLIIEHKAIG-----GFLTHCGWNSLLE
UGT73C1	310	ESQRPFIWVIRGWEKYN-----ELLEWISE-----SGYKERIK--ERGLLITGWSPQMLIILTHPAVG-----GFLTHCGWNSSTLE
UGT73D1	316	ESGKPFIIWIKTEEKHMI-----ELDEWLKR-----ENFEERV--GRGIVIKGWSPQAMILSHGSTG-----GFLTHCGWNSSTIE
UGT89B1	307	KSGVHFIIWAVKEPVEKDS-----TRGN-----ILDGFDDRVA--GRGLVIRGWAPQVAVLRHRAVG-----AFLTHCGWNSVVE
UGT89C1	268	KSSVRFIIWAVRDAAKKVN-----SSDNSVEED--VIPAGFEERVK--EKGLVIRGWAPQTMILEHRAVG-----SYLTHLGLWGSVLE
UGT89A2	309	KSMTRFVWVVKKDP-----IPDGFEDRVS--GRGLVVRGWVSQLAVLRHVAVG-----GFLSHCGWNSVLE
UGT93A1	283	QSKQKFIWVLRDADKGI-----FDGS--EAKRYELPEGFEERVE--GMGLVVRDWAPQMEILSHSSTG-----GFMSHCGWNSCLE
UGT93B1	295	GSKQRFVWVLRDADRADI-----YAESGESRHAMFLSEFTRETE--GTGLVITGWAPQLEILAHGATA-----AFMSHCGWNSSTIE
UGT91B1	304	LCLRPFFFWTLRKRTRAS-----MLLPDGFKERVK--ERGVITWTEWVPQTKIILSHGSVG-----GFVTHCGWNSAVE
UGT91C1	301	KSETPFFFWVLRNEPK-----IPDGFKTRVK--GRGMVHVGVVVPQVKIILSHESVG-----GFLTHCGWNSVVE
UGT91A1	308	LSGLPFFFWVLKTRRGPWD-----TEPVELPEGFEERTA--DRGMVVRGWVQRLRILSHDSIG-----LVLTHPCWGTTIE
UGT102A1	267	SVGAEVTHIAH-----CDGLTPAQADSLYA--CGATEVVSFVDQPR--YVAEAN-----LVITHGGLNITVLD
UGT102B1	276	EIDGQLLLAH-----CGRLTDSQCEELAR--SRHTQVVDFAQSA--ALSQAQ-----LAITHGGMNTVLD
UGT51B1	401	SADVRCILNKGW-----SDRLG--KQTGVEV--ELPEEIIYNSGNVPHDWLFGKID--ASVHHGGSGTTGA
UGT51C1	426	RADVRCILNKGW-----SDRLDNKDKNEIEI--ELPPEIYNSGTIPHDWLFPRID--AAVHHGGSGTTGA
UGT51A1	396	EADVYCIILNKGW-----SERLGDKAACKTEV--DLPRNIIINIGNVPHDWLFPQVD--AAVHHGGSGTTGA
UGT81A1	380	EAVGQVLIICGRNKK-----LQSKLSSLDW--KIPVQVKGFIITKMEECMG--ACDCIITKAGPGTIAE
UGT81B1	311	NPIGQLVICGRNKV-----LASTLASHW--KIPVKVRGFETQMEKWMG--ACDCIITKAGPGTIAE
UGT31D1	321	N-NYTVLWKVDDT-----VPASVKL--PSNVVTQKWFQRAVILHKK--KVVAFVMQAGLQSSDE
UGT72B1	295	DSEQRFLWVIRSPSGIAN---SSYFDSHSQTDPLTFLPPGFLERTK--KRGFVIFWAPQAVLAHPSTG-----GFLTHCGWNSSTLE

UGT13A3	385	LAYQGGKPAVVIPLMADQPRNALMLTRHGGALQLDKTF-----LNNSEKIREAIQTVMEN-----PSYKKNAEKLANILSSQPH
UGT13B1	424	LAYQGGKPALIIPLMADQPRNAHMLKRHGGCLQYHKTM-----LGDSEQLLKAFKTVLTE-----RKYSENAQRLARILRDQPV
UGT16A1	370	LAMMGTPAVMIPLFADQGRNAQMLKRHGGAVVIEKNN-----LADTHFMKETLEKVIKD-----PKYLENSKRLAEMLTNQPT
UGT16C1	388	LALMGKPAVMVPLFADQARNANMLKRHGGAAVLHKTLD-----LGNAETIRNTIKKVLN-----EKYRVNAERLAEMLNNQPT
UGT16B1	384	LATMGKPAVVIPIFADQTRNAEMLKRHGGAEVLHKTLD-----LANPETLRKTLRKVMDD-----PSYRQNAQRLAEMLNNQPT
UGT16D1	399	LALMGKPAIMIPIFADQGRNAQMLKRHGGAAVLQKTD-----LSNFDLVRDTLNDVLTG-----PSYKLNAAKLAEMLNNQPT
UGT17A1	398	IAFSGKPAVMVPVFGDQTRNSRMLERHGGVLMRLKEN-----LEYPEIVIVETILSVLND-----PSYAERAQQIATLLRNHPE
UGT17B1	395	VAFSGKPSIMVPVFGDQTRNARMLERHEVALVLTKYD-----LTNFKKVVRGTIRKMLND-----KSYSMKAEKLAQMLRNQPE
UGT14A1	390	LAHWGKPAVTVPIFGDQVRNANMLTRHNGAIFVWKN-----LGNYGIVKEAVHQILYN-----EKYKRNAYKLAEDILENQPH
UGT14D1	384	LAHFGKPAVMVPIFGDQYRNGHMLQRHGCAIIVQKTE-----LSNWKIVSSAVKSVLYD-----ENYKKNAAHLADLLQNQPV
UGT14C1	383	LAFLGKPALMVPVFGDQDRNANMLARHGGVLVVHKKE-----LGNFKTIKSSIRSILHE-----EKYQKNARKLSELLNNQPL
UGT14E2	387	LAYSQKPGVVIPIVFGDQIRNARMIARHNGVIYLHKNS-----MENVKVTRKALTDVLYD-----ESYKKNAEKLTIDILMNQPY
UGT14F1	372	LAYCAKPAVMVPIYGDQTRNANMLARHGSVIVLHKKE-----LANVQRVKKAVHDILYN-----KQYTESAERIAEMIKNQPK
UGT15A2	429	LSYMGKPAVLIPLFADQLRNSKTLRHNHGSITLSKYD-----LSSFELKRFALNTILND-----ERYKINAEILSQQLQDQPV
UGT15B1	379	LSYLGKPALLCPLFADQIRNSKMLTRHNHGSIEISKFN-----LENYNTLRSAHSILFA-----ESYSENAEKLAKKLEYQPT
UGT15D1	351	VSYLGKPSILCPLFADQMRNAKMLVRHNHGSIELSKYD-----LGNYSKIIIEAFQAILFD-----SSYAENAQKLAEQLENQPI
UGT15E1	394	VSYLGKPTIMCPIFADQMRNAKMLARHNHGSIEISKYD-----LSNGDKIEEALSKILFD-----ESYKTAEEKLAHQLANQPV
UGT15C1	398	VSYFGKPTIMCPLSGDQMRNAKMLERHNHGSIEFSKYD-----LHNEKVVANAFRKLIDYD-----ESYTLAKRLESEHLQFQPV
UGT18A1	389	LAYSAKPAIVTPIPLFADQPSNAQMLERHGSVEVLSKHD-----IPNWKQSDLLKTMAD-----KKYQEAATRLADILNNQPI
UGT18B1	391	LARAAKPAIVIPLFADQPGNAKMIERHGSVEIFSKLD-----IPNSKKLSSLIQKMLNT-----KYYQQNANRLADTLRFQPI
UGT18C1	390	LAYAAKPAIVIPLIAEQPDNGKMLARHGSAEIYSKHD-----IPHWEKLNRLQKMLQH-----SSYQKAADRLARVLSNQPI
UGT18D1	385	VAYAGKPSLMIPIFGDQMLNAKMLSRHGGAISYDKYE-----LENYEKLTTETVKEAISN-----KEYNKKALLLAEILHNQPI
UGT18E1	380	VGYAGVSSIMVPVFSQDQVNAEMLARHGGAVYDKFD-----LVDSKKLMEIIMILNN-----SDYRKNKSKRLSDILHNQPM
UGT18F1	388	VAYTGKPALMIPIFGDQPNADMLSRHGGAVAYDKFE-----LADGDKLIKIVKDMVSN-----PKYEKNAQELLRVLNQPI
UGT19A1	379	TFHNSNTRTLITPLFGDQHRNAQIALENGLSHVLLKQDQ-----LANEELVYAAIKQGTES-----NKK-----
UGT19B1	378	AFNSGVRVLAVPLFGDQHRNAKLAFENGLIEILPKSD-----IETPAKIVKAVKTGLEP-----NAKYKIFSE-----
UGT25A1	350	TSAAGIPVLAVPLFIDQQHNALNAVSRDIGVIVERHQ-----LTV-ENLVNALQKLLYN-----PKYGENAKMISKMMNEKPE
UGT25B1	375	TATAGVPVLSIPLFADQONNAQNTRDRGMGLLLDRDK-----LTT-KNIESALHELLEN-----PKYLSNARSISKMILEKPD
UGT25C1	376	ASYAGKPIIAIPLFADQPHNARNGVARGTTYLLNKS-----LSE-ESIENGLRAILFD-----KSYTESARKLQKMLVEKPT
UGT25D1	391	SSYAGVPIIPLFADQPHNAFSGMSIGTTYMLDKTR-----LTT-PNIVKGLEAVLYD-----SSYTLNAKRISKMLHERPN
UGT21A2	381	AARAGVPLINIPFMFDQNLNSRAVEKKGWGIRRHKKQL-----LTEPEEIEKAISEIHN-----KKYSLKAQRIRDLIKSKPL
UGT21B1	361	SAYAGVPVILIPFMFDQPRNGRSVERKKGWILRDRFQL-----IKDPDAIEGAIKEILVN-----PTYQEKANRLKMLMRSKPQ
UGT2A1	381	AIYHGIPMVGVPMFADQPDNIAHMKAKGAAVEVNMNT-----MTSADLLSAVRVINE-----PFYKENAMRLSRIHHDQPV
UGT2B1	384	AIYHGIPIVGIPLFADQPDNINHMVAKGAAVRVDFSI-----LSTTGLLTALKIVMND-----PSYKENAMRLSRIHHDQPV
UGT1A1	381	GICNGVPMVMMLPLFGDQMDNAKRMETRGAGVTLNVLE-----MTADDLENALKTVINN-----KSYKENIMRLSSLHKDRPI
UGT35A1	381	SIYFGKPIILGLPIFYDQHLNVQRAKQAGYGLSADIWS-----VNATELTPLIQELLSS-----PSYAAAAQTKSKLFRDQKE
UGT35B1	371	SIHHGKPVLLGLPFFYDQFLNVRRTQAGFGLGLDHTT-----MTQQEFKETIEILLKE-----PRFAQIARQMSERYRDQPM
UGT31B1	393	AVEAIVPMVGMPPMGDQAYNMNKIVELGLGVVDTVR-----VNAEQLEIAIVDVAES-----PKYRKRLELRHMIHHQPM
UGT31C1	375	AVENLVPLVGVPLMGDQAFNAHRYVELGIGVALDATR-----LTAADLARAVEQVTS-----RAYRENLERLRLRLRHQCA
UGT31A1	385	AIDAGVPMVGVPIMGDQFYNVYMYETYGIGRVDTLT-----VDARQLTEIVMDVADN-----EKYKNGTLWLRDAIMDQPM
UGT32A1	365	AVNSGVPMIGIPIMGDQFYNVRYTELGIKEKVNILR-----LEEEGLDRKIKNLVHN-----KSYELNIKRLNLFISDTPV
UGT76B1	354	GICEAIPMICRPSFGDQRVNARYINDVWIKIGLHLEN-----KVERLVNIENAVRTLMT-----SSEGEEIRKRIMPMPKETVEQCLK
UGT76C2	359	SICEGVPMICLPGGWDQMLNSRFVSDIWKIGIHLEG-----RIEKKEIEKAVRVLME-----ESEGNKIRERMKVLKDEVEKSVK
UGT76F1	364	SICEGVPMICTPFCSDQHVNARYIVDVWRVGMMLERC-----KMERTEIEKVVTSVMM-----EN-GAGLTEMCLELKEKANVCLS
UGT76D1	355	SISSGVPMICRPSYSGDQRVNTRLMSHVWQTAYEIEG-----ELERGAVEMAVRRLIV-----DQEGQEMRMRTIILKEEVEASVT

UGT76E1 357 SIGEGVPMICRPFTGDKVNRARYLERVWRIGVQLEG-----ELDKGTVERAVERLIM-----DEEGAEMRKRVINLKEKLQASVK
 UGT78B1 357 SIFCRVPIGRPFPGDKVNRARMVEDVWIKVGVKGG-----VFTEDETTRVLELVLV-----SDKGKEMRQNVGRLEKAKDAVK
 UGT78C1 346 GISFGVPMICRPFFGDKLNSRMVESVWEIGLQIEGG-----IFTKSGIISALDTFFN-----EEKGKILRENVEGLKEKALEAVN
 UGT78D1 359 SVSAGVPMIGRPILADNRLNGRAVEVVWVGVMMMDNG-----VFTKEGFEEKLNDVFFV-----HDDGKTMKANAKKLKEKLQEDFS
 UGT85A1 390 SLSCGVPMVCWPFADQOMNCKFCCEDEWDVIGIEIG-G-----DVKREEVEAVVRELMD-----GEKGGKMKREKAVEWQRLAEKATE
 UGT85B1 395 ATAAGQPVLAWPCHGEQTTNCRQLCEVWNGAQLP-R-----EVESGAVARLVREMMV-----GDLGKEKRAKAAEWKAAAEAAAR
 UGT74B1 363 GLSLGVPMVGVQWSDQMNDAKFVEEVWVGVYRAKEEAGEVIV-----KSEELVRCLKGVME-----GESSVKIRESKSKWVDLAVKAMS
 UGT74F1 351 GLSLGVPMVAMPQWTDQPMNAKYIQDVWVGVVRVKAEEKESGIC-----KREEIEFSIKEVME-----GEKSKEMKENAGKWRDLAVKSLS
 UGT74D1 358 ALSLGVALIGMPAYSQDPTNAKFIEDVWVGVVRVKAD-QNGFV-----PKEEIVRCVGEVME-----SEKKEIRKNARRLMEFAREALS
 UGT74E1 356 GLSLGVPMIGMPHWADQPTNAKFMEDVWVGVVRVKAD-SDGFV-----RREEFVRRVEEVME-----AEQGKEIRKNAEKWKVLAQEAVS
 UGT74C1 362 ALCLGVPMVGVQWTDQPTNAKFIEDVWVGVVRVTD-GEGLS-----SKEEIIARCIVEVME-----GERGKEIRKNVEKIKVLAREAIS
 UGT74A1 368 ALSFGVPMVAMALWTDQPTNARNVELAWGAGVRARRDAGAGVF-----LRGEVERCVRAVMDG-----GEAASAARKAAEGWRDRARAAVA
 UGT75B1 358 SLVLGVVVAFPMWSDQPTNAKLLLEESWKTGVRVRENKDG-----LVERGEIRRCLEAVME-----EKSVELRENAKWKRLAMEAGR
 UGT75D1 376 SLVSGVPPVAFQWNDQMTNAKLLLEDCKWKTGVRVMEKKEEGEVV-----VVDSEEIRRCIEEVME-----DKAEEFRGNATRWDLAAEA VR
 UGT75C1 360 SLESGVPPVAFQFADQCTTAKLVEDTWRIGVKVVGEEGD-----VDGEEIRRCLEKVMMSG-----GEEAEMRENAEKWKAMAVDAAA
 UGT75A1 367 SLASGVPIVACPIWNDQICNAKLIQDVWKIGVRVNANKEG-----I IKRDEFQKCI EIVMGD-----AEEGEELRKNQOKWDLAKESTK
 UGT71A2 351 SIWFGVVPVATWPMYAEQQFNAFQMVIELGLAVEIKMDYRND---SGE---IVKCDQIERGIRCLMKHD-----SDR-RKKVKEMSEKSRGALM
 UGT71B1 368 SLWFGVPMMAAWPIYAEQQFNAFHVMDELGLAAEVKKEYRRDFLVEEPE---IVTADIEERGIKAMEQD-----SKM-RKRVMEMKDKLHVALV
 UGT71C1 378 SLGFGVPIATWPMYAEQQLNAFMTMVKELGLALEMRLDYVSE---DGD---IVKADEIAGTVRSLMDG-----VDVPKSKVKEIAEAGKEAVD
 UGT71D1 365 SLWFGVPIVTPWPMYAEQQLNAFMLMVKELKLAVELKLDYRVH---SDE---IVNANEIETAIRYVMDTD-----NNVVRKRVMDISQMIQRATK
 UGT72A1 378 SITAGVPIIAWPIYAEQRMNATLLTEELGVAVRPKNLPAGE-----VVKREEIERMIRRMVDE-----EGSEIRKRVRELKDSGEKALN
 UGT72D1 369 SLTKGVPIIAWPLYAEQWMNATLLTEEIGVAVRTSELPSE-----VIGREEVASLVRKIMAE-----DEEGQKIRAKAEVVRVSSERAWS
 UGT72E1 368 SVVGGVPMIAWPLFAEQMMNATLLNEELGVAVRSKKLPSEG-----VITRAEIEALVRKIMVEE-----EGAEMRKKIKKIKETAAESLS
 UGT72C1 370 SIVNGVPMVAVPLYSEQKMNARMVSGELKIALQIN--VADG-----IVKKEVIAEMVKKVMDEE-----EGKEMRKNVKELKKTAEALN
 UGT73A1 369 GVS GGVPMTWPFVFAEQFFNEKLVTEVLKTGAGVGSIQWKRASSEG---VKREAIAKAIKRVMS-----EEADGFRNRKAYKEMARKAIE
 UGT73B1 382 GVAAGLPMVTWPFVFAEQFYNEKLVTVLKTGVSVGVKMMQVVGDF---ISREKVEGAVREVMVG-----EER---RKRKELAEAMKNAVK
 UGT73C1 378 GITSGVPLLTWPLFGDQFCNEKLAQILKAGVRAGVEESMRWGEEEKIGVLVDKEGVKKAEEELMG-----DSNDAKERRKRVKELGELAHKAVE
 UGT73D1 385 AICFGVPMITWPLFAEQFLNEKLVIVELNIGVVRVGVIPVVRWGEERLGLVLVKKPSVVKAIKLLMDQDCQRVDENDDNEFVRRRRRIQELAVMAKKAVE
 UGT89B1 374 AVVAGVLMITWPMRADQYTDASLVVDELKVGVRACEGPDTPDPDE-----LARVFADSVTG-----NQTERIK-AVELRKAALDAIQ
 UGT89C1 341 GMVGGVMLLAWPMQADHFFNTTLIVDKLRAAVRVGENRDSVPDSK-----LARILAESARE-----DLPERT-LMKLREKAMEAIK
 UGT89A2 368 GITSGAVILGWPEADQFVNARLLVEHLGVAVRVCEGGETVPSDE-----LGRVIAETMGE-----GGREVAARAEIIRKTEAAVT
 UGT93A1 356 SLTRGVPMATWAMHSDQPRNAVLTDLKVLIVKDWQKSLVSAS-----VIENAVRRLMET-----KEGDIRKRAVKLKDIEHRSM
 UGT93B1 369 SLSHGKPVLAWPMHSDQPDWSELCKYFKAGLLVPRWEKHAEIVPAQ-----AIQKVEEAMLS-----DSGMAVRQRAKELGEAVRASVA
 UGT91B1 368 GLSFGVPLIMFPENLDQPLVARLLSGMN-IGLEIPRNERDG-----LFTSASVAETIRHVVE-----EEGKIYRNNAASQOKKIFGNKR
 UGT91C1 361 GLGFGKVPVIFFPVLNEQGLNTRLLHGKG-LGVEVSRDERDG-----SFSDSVADSI RLV MID-----DAGEEIR-AKAKVMKDLFGNMD
 UGT91A1 376 AIRFAKPMAMLVFVYDQGLNARVIEEKK-IGYMI PRDETEG-----FFTKE SVANSRLVMVE-----EEGKVYR-ENVKEMKGVFGDMD
 UGT102A1 324 ALAAATPVLAVPLSFDQPAVAARLVYNG-LGRRVSRFAR-----QQT LADEIAQLLGD-----ETLHQRLATARQQINDAGG
 UGT102B1 333 AINRTPPLALPLAFDQPGVASRIVYHG-IGKRASRFTT-----SHALARQMRSLTN-----VDFQORMAKIQ TALRLAGG
 UGT51B1 460 TLRAGIPTTIKPPFFGDQFFYANRVEDIG-VGIGLRKLN-----SKSLSKAIKEVTTN-----TRII EKAKEIGKQIQSENG
 UGT51C1 487 TMRAGIPTTIKPPFFGDQFFYATRIEDLG-AGIALKKL T-----AKTLGDALVKATHD-----LKIIDKAKRVSQKIKHEHG
 UGT51A1 457 SLRAGLPTVIKPPFFGDQFFYAGRVEDIG-VGIALKKL N-----AOTLADALKVATTN-----KIMKDRAGLIKKKISKEDG
 UGT81A1 439 AMIRGLPIILNGYIAGQEAGNVPPYVVENGCCKFSKSP-----KEISKIVADWFGP-----ASKELEIMSQNALRLAKPE
 UGT81B1 370 ALICGLPIILNDYIPGQEKGNVPYVVDNGAGVFTRSP-----KETAKIVADWFSN-----NKEELKMSENALKLSQPE
 UGT31D1 375 ALESRVPMVCLPMMGDQFHARKLQQFGVARTLDTAV-----VSAAQLTLAIGEVIAD-----AEAYRARIDDIRAVLEHDA
 UGT72B1 373 SVVSGIPLIAWPLYAEQKMNAVLLSEDIRAALRPRAGDDG-----LVRREEVARVVKGLMEG-----EEGKGVNRNKMKEKAEACRVLK

UGT77A1	378	GLSSGVPMACRPF	FFGDMNARSVAHVWGF	GAAFEGA-----	MTSAGVATAVEELLRG-----	EEGARMRARAKEL	QALVAEAFG	
UGT8	367	TMYHGVPVVGIP	PLFGDHYDTMTRVQAKGM	ILLEWNT-----	VTEGELYDALVKVINN-----	PSYRQRAQKLS	EIHKDDQPG	
UGT84A1	376	SLSSGVPVVCCP	QWGDQVTDVAVYLIDVF	KTGVRLGRGATEER-----	VVPREEVAEKLLEATVG-----	EKAEELRKNALK	KWKAEEAAVA	
UGT84B1	358	TVVAGVPPVAYP	SWTDQPIDARLLVDV	FGIGVRRMNSVDG-----	ELKVEEVERCIEAVTEG-----	PAAVDIRRRAEL	KRVAR-LAL	
UGT88A1	368	AVCAGVPMVAW	PLYAEQRFNRMIVDEIKIAI	SMNESETG-----	FVSSTEVEKRVQEIIGCEP-----	VRERTMAMKNA	EALALT	
UGT90A1	369	SICVGVPLLAW	PMAEQPLNAKMVVEEIKV	GVRVETEDGSVKG-----	FVTREELSGKIKELMEG-----	ETGKTARKNVK	EYSKMAKAALV	
UGT79A1	370	ALVNDQCQVVML	PQKGDQILNAKLVSGD	MEAGVEINRRDEDG-----	YFGKEDIKEAVEKVMVDVE-----	KDPGKLI	RENQKKWKEFLLNKDI	
UGT79B1	370	SLMSDCQIVLVP	QHGEQILNARLMTEEME	VAVEVEREKKG-----	WFSRQSLENAVKSMEE-----	GSEIGEKVRKN	NHDKWRCVLT	
UGT22A1	427	TAIQAVPTVIV	VPVFAQFRNGRMVEKRG	IGKVLKLD-----	IGYESFKNTVLTVLTNT-----	PSYKKN	AIRIGKMMRDKPF	
UGT23	390	TMYGVPVMIMP	VFTDQFRNGRNVERRG	AKMVLRET-----	VVKETFFDAIHSVLEE-----	KSYSSSVKRI	SHLMKNKPF	
UGT52A1	462	SLLAAKPTIVV	PFFGDQFFWGERIKQT	GIGTSIPFDI-----	LTAKSLSSHIISILNE-----	PSVRAKVNKM	SHLLKREDG	
UGT86A1	378	SVWCGLPLL	CYPLLTQFTNRKLV	VDDWCIGINLCEKKT-----	ITRDQVSANVKRLMNG-----	ETSSELRNN	VEKVKRHLKDAVT	
UGT87A1	338	GICSGVPLLT	TFPVFDQFLNAKMIVE	EWRVGMGIERKKQ-----	MELLIVSDEIKELVKRFMDGE-----	SEEGKEMRRR	TCDLSEICRGAVA	
UGT92A1	384	SLSHGVPLL	GWPMAAEQFFNSILMEKH	IGVSVVEVARGKR-----	CEIKCDDIVSKIKLVMEET-----	EVGKEIRKKA	REVKELVRRAMV	
UGT83A1	367	GAQNGIPFLC	IPYFADQFINKAYICD	VWKIIGLGLERDARG-----	VVPRLEVKKKIDEIMRD-----	GGEYEERAMK	VKEIVMK.SVA	
UGT82A1	375	AVASSRRL	CYPVAGDQFVNCKYI	VDVWKIGVRLSGFG-----	EKEVEDGLRKVMED-----	QDMGERLRK	LDRDRAMGNEA	
UGT80A2	527	GLKASCPTT	IIVPFFGDQPFWGERV	HARGVGPSPIPVD-----	EFSLHKLEDAINFMLDD-----	KVKS	SAETLAKAMKDEDG	
UGT9	376	SVYHGVPVVG	VPLTSRGYDNLRL	RITARDSGVMVEKSE-----	FSGEILTAAINENVQIQ-----	IIVFRYKKE	MELIFQDMVIDVPY	
UGT24A1	383	AISAGVPLVT	IALFGDQPKNSKVA	KKHGFVNIQKGE-----	ISKKTIVKAIMEIVEN-----	DSYKQKVS	RLSAMVRAQPM	
UGT26A1	318	AAQAGIPAV	LMPPLFADQKINAK	RAQRYGMATVLDKLD-----	LTINNVYGAIKEALKP-----	EYSTNA	KKLSAMLSQVA	
UGT20A1	378	TTMHSKPMIL	MPLFADHAKNSKVA	ESKGVAVLLDKMR-----	LSRRRVHAIYITILTNT-----	PKYTQNC	EKFSRMFSDTPI	
UGT104A3	330	GLRAGIPSL	LILWTAGDQPLWGS	RILKQLKVGTSRRFSAT-----	TPETLVADLRKILAP-----	EYLTRARE	LSSRMSKPAE	
UGT106A1	289	ATAIGVPI	IYKVPVGOEKENAN	FFEDRGAAIVVNRH-----	EEILESVTSLIAD-----	EDTLHRM	KKNIKDLHLANSS	
UGT106B1	289	GFARCI	PMIFLNPAPGOE	LENAFYFEKGF	GKIADTP-----	EEAIKIVAS	LTTNG-----	NEQLTNNMISTMEQDKI
UGT103A1	331	ALAAAGVP	QVLLPCAHDQFDNA	ERLIVRLGCGMRLGVPLR-----	EQELRGALWRLLIED-----	PAMAAACRR	FMELSOPHSI	
UGT105A5	302	AMRAGIP	QIVVRRVVDNVVE	QAYHADRVAELG	VGVAVDG-----	PVPTIDSL	SAALDTALAP-----	EIRARATTVADTIRADGT
UGT10	399	AVAHGVP	IVGVPLYGSNRYN	LQKVS	SNKGLGIVIDKDD-----	LNEISLYG	AMKKVLES-----	AKYKNTAKEMSKEFKSRTT
UGT27A1	375	AVCSATP	SLFMPMFAEQMR	NAWLAKSKGFARIL	NKFFH-----	LSEQYLENH	IREVVEH-----	KSYQIQAEQFLSTFTDQPM
UGT101A1	315	GLATATP	MIAVPQAVDQFG	NADM	LQGLGVARKLATEEA-----	TADLLRE	TALALVDD-----	PEVARRLRRIQAEMAQEGG
consensus	701

UGT13A3 458 Q-PKDVVLKHCDFAVKHGDLK---TLNSEGRHLNVFQYYSIDIALAAGLFLVVTIISFIIFTIIFVFK-----KVYFMCERSD
 UGT13B1 497 S-PKDLVLKHCFAVEHAGLN---SLNSRGRYLNTFQFYSFDIASSIVMLALLVLFVIFFTLLFIFK-----LVARIFLSQ
 UGT16A1 443 N-PKETLIKHYVEFAARFGKLP---SLDNYGRHQSYIEYFFLDIIAILAVISLFSLYISYIILRAVIRK-----IFFSKCSEV
 UGT16C1 461 N-PKDTLIKHVFEFAAKFGQLP---SMDPYGRHQSYIEYYLLDIIISIALVLILTTSFISFQLIKCTFR-----MCCGSG
 UGT16B1 457 N-PKETLVKHVEFAARFGKLP---SMDPYGRHQNIIEYYNLDILAIATILLTLVVYLKI----FAVG-----VVVRCCCCKK
 UGT16D1 472 N-AKEVLVKHVEFAARFGKLP---MLDNYGRHQNIVEYFFIDILTIILSVLISVFYIFVRLLRFMLSRNRSTKDKRVTSRSMRILVKNGLSIIIRMCTKRY
 UGT17A1 471 S-PKQVFLKYFNFNVARFGKPT---GIDSNSINVDFIAYYYLDLIAFLLIVAYFAKFLVSHVYSYFCYLR-----
 UGT17B1 468 S-PKEIFIKYFNFNVARFGKPH---GLDSYAAEMSFIEFYIDFMAILSIFSVALYMIVSKVLRASHNLTN-----LVSI
 UGT14A1 463 Q-PKDLVVKHTEFLAKFGFPF---KMDPYGRSLNFFTRNLFDIHAAVVFTYFILATASFNIKFLLS-----KFSI
 UGT14D1 457 K-PKEIVVKYVEFVARFGFPF---EMDAYGRQLNFIQRNLLDVYLIELFGHFLLFFLIIFCLIPQLK-----RWLI
 UGT14C1 456 K-PKEQVVKYTEFVAKFGFPF---QMSYGRQLGFIQRNLIDIYAAISLSYLFVISLIYFVFKFVIS-----KTPL
 UGT14E2 460 S-PMENVIKYTEFVGEHGFPF---NTDPYGRHLNMFQKTFDDIYALFALFYISVGTIIAISIRFIYQKA-----RKYF
 UGT14F1 445 T-PKETVVRYTEFVAKYGFPP---QMAPHGRKLTIFYQKTFLDIYSLFALGVVSVLTVAFVIRYVLS-----CF
 UGT15A2 502 S-PHALLVKHAEFGAKYGEPL---NLDPCSRQMSFISFYMLDIIIVFVG-FILITTTIGIVLTVKWILKF-----CF
 UGT15B1 452 K-PKELFVRHAEFAARFGQEP---AQDSNLRMTMGFAAYYLLDVIAFLTSFVLLVIFVVFIMIRQIVKLL-----TI
 UGT15D1 424 K-PEKMMVKHAEFAARFGRLP---SLDPYSRKMSFVEYFLLDVATICVLVLACVVVFLTRVVQFLCRRF-----LV
 UGT15E1 467 K-PKELLVRHAEFAAQFGHLP---SLDPHSRQMSFIQYFLIDLTAIILSTVILFLFVLFKLGKLMYSKLP-----FNLISLV
 UGT15C1 471 K-PKELFLKHVEFAARFGKLP---SLDPYSRQMGFIQYFLIDIAFIVLTVVLTIVSVLYFVLFKVASCL-----KA
 UGT18A1 462 S-PREMLMKHAENAARFGKIP---SLTPFAKDMGFIIEFYNIDLIIYSVSFTLFAIYVTIEIFGIVKNCC-----KTR
 UGT18B1 464 T-PTDLMVKHAENAARFGKMP---NLVPHAKDMGFFEYNYDIIIFIVFLLVWLLFSVVAHVFSKLG-----LSL
 UGT18C1 463 K-PRELMIKHSEMAAMFGKMP---ELTPSVQDMSIIIEFYNLDIIFLFLIISIGTSVLLWKFLYFVLTDS-----GSF
 UGT18D1 458 D-PKQNLKHAFTAKFGRVH---ALEPYSVHYNFIKYYMLDAYAIIIFFLSILYVLNLIIFKVYR-K-----IFK
 UGT18E1 453 D-PKQVLLNHCEFAARFAQVD---NLEPYANKYNFIEFYCLDSLALVVCTISVVALVMFKILSFVVNSV-----IEK
 UGT18F1 461 D-PVMNLMKHLEFAME-----
 UGT19A1 -----
 UGT19B1 -----
 UGT25A1 422 Q-SERLFVDWVEYAAKNPGLHK---IMNLPGAELTPFWYYSVDVILIVVLSLTSSLIIIWKTLSFIKQISIR-----SVRSIEP
 UGT25B1 447 K-ANDTFIHWLEFTARNPGLGR---VLKLPGAELSPFYCYCGDILLLVFCIL-----FIILHTVLR-----TINLPSR
 UGT25C1 448 K-PKDRFVWEWMEYAAVNPGLHK---IFALPGAKMGNIIEYCVDTIVFIAFSCVTFTYIFFK-----MAKFSLS-----FIRLVK-
 UGT25D1 463 P-PKKIFVWEIEFASRNPLLRH---NLNLIGQNMSVFEYYCLDIISFCILLSSIVISVYFYLGTGWVSRMGRR-----VFGILK-
 UGT21A2 455 S-SSQLLIKTTTEWAIKNHGLD---EIKFESRQTTWTYYNLDVIIIPVFWLSISLVIPTIFGWYKFSFCFGHVEE-----KKG
 UGT21B1 435 S-ASERLVKMTNWNVLENDGVE---ELQYEGKHMDFFTFYNLDIIITA--ASIPVLIFIVLRISNISIIITSSP-----IGKTX
 UGT2A1 453 K-PLDRAVFWIEFVMRHKGAK---HLRVAAHDLWQYHSLDVIIGFLLACMASAILLVIKCCLFVVFQK-----TANMG
 UGT2B1 456 K-PLDRAVFWIEFVMRHKGAK---HLRVAAHDLWQYHSLDVIIGFLLACMASAILLVIKCCLFVVFQK-----TANMG
 UGT1A1 453 E-PLDLAVFWVEYVMRHKGAP---HLRPAAHDLTWYQYHSLDVIIGFLLAIVLTVVFIIVYKSCAYGCRKCFGG-----KGRVK
 UGT35A1 453 T-ALERAIIWTEYVLRHKGAK---HLRCASRDLDIIFQFHGLDWTGLLIAITFVSLIIVVILIKCLQRVFSL-----ISKIR
 UGT35B1 443 S-PLDTAIIWTEYVLRHKGAY---HMRVAGQDLGFFAYHSLDVIIGVLLGG---ALLLVAAIIVGVLG-----KLT
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 UGT31C1 447 S-PTHKAVWYTEHALRRDG---DALKTKAANVDYAEYCMSTCWRPC-----
 UGT31A1 457 R-PLEKAVWYTEHVARRKG---AKKHLGTRAANVTYSKYAMFDLILPMLITIFSTYLQKILSI-----
 UGT32A1 437 K-PLRKALWFTNYVLRNKD-----AIDKFK-----
 UGT76B1 429 --LGGSSFRNLENLIAYILSF-----
 UGT76C2 434 --QGGSSFQSIETLANHILLL-----
 UGT76F1 439 --EDGSSSKYLDKLVSHVLSFDSSAFAS-----
 UGT76D1 430 --TEGSSHNSLNNLVHAIMMQIDEQ-----

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UGT76E1 432 --SRGSSFSSLDNFVNSLKMMNFM-----
UGT78B1 433 --ANGSSTRNFESLLAAFNKLDS-----
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UGT78D1 435 --MKGSSLENFKILLDEIVKV-----
UGT85A1 465 H-KLGSSVMNFETVVSKFLLGQKSQD-----
UGT85B1 470 --KGGASWRNVERVVNDLLLVGGKQ-----
UGT74B1 443 --EGGSSDRSINEFIESLGK-----
UGT74F1 431 --EGGSTDININEFVSKIQIK-----
UGT74D1 439 --DGGNSDKNIDEFVAKIVR-----
UGT74E1 435 --EGGSSDKNINEFVSMFC-----
UGT74C1 441 --EGGSSDKKIDEFVALLT-----
UGT74A1 449 --PGGSSDRNLDEFVQFVRAGATEK-----
UGT75B1 436 --EGGSSDKNMEAFVEDICGESLIQNLCEAEVVKV-----
UGT75D1 458 --EGGSSFNHLKAFVDEHM-----
UGT75C1 440 --EGGPSDLNLKGFVDEDE-----
UGT75A1 447 --ENSSSNVNLKAYVNECLLGHC-----
UGT71A2 432 E-GGSSYCWLDNLIKDMIK-----
UGT71B1 453 D-GGSSNCALKKFVQDVVDNVP-----
UGT71C1 459 --GGSSFLAVKRFIGDLIDGVSISK-----
UGT71D1 447 N-GGSSFAAIEKFIYDVIG--IKP-----
UGT72A1 458 --EGGSSFNYSALGNEWEKSWKTQRSERSLW-----
UGT72D1 451 --KDGSSYNSL---FEWAKRCYLVP-----
UGT72E1 448 C-DGGVAHESLSRIADESEHLLERVRCMARGA-----
UGT72C1 448 --MTHIPSAYFT-----
UGT73A1 453 E-G-GSSYTGLTTLLEDISTYSSTGH-----
UGT73B1 463 E-G-GSSDLEVDRLMEELTLVKLQKEKV-----
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UGT73D1 485 E-K-GSSSINVSILIQDVLEQLSLV-----
UGT89B1 451 E-R-GSSVNDLDGFIQHVVSLGLNK-----
UGT89C1 418 E-G-GSSYKNLDELVAEMCL-----
UGT89A2 446 E-ANGSSVENVQRLVKEFEKV-----
UGT93A1 437 E-G-GVSRMEMASFIAHISR-----
UGT93B1 450 D-G-GNSRKDLDDFIGYITR-----
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UGT91A1 454 R-QDRYVDSFLEYLVTNR-----
UGT102A1 395 T-PRAATLIEQAIAGSESVS-----
UGT102B1 404 T-MAAADIEEQVMCTGQPVLSGGYATAL-----
UGT51B1 530 V-SAAIRCLYQEMEYAKKLSKSKQKY-----WDNQSEDISDD-----SVSGSWFEV-----
UGT51C1 557 V-LSAIESIYSELEYSRNLILIKDIHNQNYKRHHVPVSGVQTPAYDTSDDYDDDEDDDESDDKDEEEEEEEENSYDGYDGNGVNNSRSQNSSN-----
UGT51A1 527 I-KTAISAIYNELEYARSVTLRVKTP-----RKKEENVDATKLT-----AETTDEGWIMI-----
UGT81A1 508 A-VFKIVHDMHELVRKKNSLPQLSCTA-----
UGT81B1 439 A-VFDIVKDIHHLSSQQQRIPLFNEFSY-----
UGT31D1 448 P-AEKAVKFTERVIIFKHDMTRPARTLKTTSANIAYSDFLRFPL-----
UGT72B1 452 D-DGTSTKALSIVALKWKAHKKELEQNGNH-----

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UGT77A1 453 --PGGECRKNFDRFVEIVCRA-----
UGT8     439 H-PVNRTTYWIDYILRHDGAH--HLRSAVHQISFCQYFLLDIAFVLLLLGAVALYFIVSYVTKFIYRKVKSLCSRSTHSTVNGHYQNGILNGRYKGNNGHI
UGT84A1 457 P-GGSSDKNFREFVEKLGAGVTKTNDNGY-----
UGT84B1 437 A-PGGSSTRNLDLFDISDITIA-----
UGT88A1 444 E-TGSSHTALTTLQSWSPK-----
UGT90A1 451 E-GTGSSWKNLDMILKELCKSRDSNGASE-----
UGT79A1 453 Q-SKYIGNLVNEMTAMAKVSTT-----
UGT79B1 447 D-SGFSDGYIDKFEQNLIELVKS-----
UGT22A1 499 S-PEERLTKWTQFAIDHGVLEELHVEGSRNLNTIIYYNLDVIAFVLFVFAVLHVFVIYAFKFLCCDCYDLISYSSPSSCSFSSILVYSPSISRSHLISNGR
UGT23    462 T-SEERVTKWIDFVLKYETSEH--FDLESNNLSIIIEHNHLDLFFYLCCIISLLNFVVYRKIFKRKSQS-----
UGT52A1 534 V-KTAIDFIHRYLPFSFIPPREIPFSSAPNSCMGCKQPFTLLHVMKARVHCHCCGKIFCESCTSHKCPICKYRINTPVRVCDKCFNDLQSNPSSNSFILN
UGT86A1 455 T-VGSSETNFNLFVSEVRNRIETKLCNVNGLEISPSN-----
UGT87A1 421 K-GGSSDANIDAFIKDITKIV-----
UGT92A1 464 DGVKGS SVIGLEEFLDQAMVKKVEN-----
UGT83A1 444 K--DGISCENLNK FVNWIKSQVN-----
UGT82A1 446 R---LSSEMNF TFLKNELN-----
UGT80A2 599 VAGAVKAFFKHLPSAKQNI SDPIPEPSGFLSFRKCFGCS-----
UGT9     452 T-ELYHAAFVVEFIERHQEVP---HARSGADHLNFLQYFLVDVIAFFFFVIFCTLSIIYYTIRTVFRTIRSVVNG-----VRGVPKIVS
UGT24A1 455 K-PAERLLKWFSEFLAEFKTLDN---LEPAGQKLNFFQYHSLDVI TFLFIVIFIVFYIGYRFMRVIRCCFCK-----KCET
UGT26A1 389 R---KPYSALRYS LKLATSPKPSLFTLKSQHLSFLEFHNL DIFSIVLLTAFIVCF-----
UGT20A1 450 P-HEELIEWRIRQA AKPSRKAF AKHLRPKEPDFSYLKLGFLLIIPAMILYAKHGFSIWT-----
UGT104A3 401 S--AGRAVDLLEEFARSGRCIPRAEAQRSR-----
UGT106A1 359 EVILEDILKESEMMTAKQKAVLS-----
UGT106B1 355 KYATQTICRDLLDLIGHSSQPQE IYGVPLYARFFVK-----
UGT103A1 402 ACGKAAQVVERCHREGDARWLKAAS-----
UGT105A5 377 TVAAQLLFD AVSLEKPTVPA-----
UGT10    471 SPFAAALHVIDHIGRHHSFAYMQPAFQPIYTRVDFYLLLLLIILLPVIPLHLFFTF CIKSSAMNVQDNKVLEAER-----KFLPKKVP
UGT27A1 447 PALDEAAAFKFERLFKYNGKMP--KFFYPKTIDLSYLTALNLDI WVIVPLVLGYIISK-----
UGT101A1 387 T-RAADLIEAELPARHERQEPVGD RPNVGD RPAGVRS DRQRSAL-----
consensus 801 .

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UGT13B1	569	KTKME-----
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UGT16D1	568	LATFNMRPPMEPEPGLCCQEGCESCVWLIYAQELLDYYSKYPTNTLERVKEEIGDKIESPSVKEYVLMELISMSEKRYKDMAALGTRKKPGESK-----
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UGT17B1	538	KFKFD-----
UGT14A1	530	KLVKKAKKDL-----
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UGT14E2	529	TLEKSKKTE-----
UGT14F1	510	KLKKD-----
UGT15A2	568	KQKQKIQ-----
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UGT25C1	518	KPKHE-----
UGT25D1	537	KRKVE-----
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UGT80A2   -----
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consensus 901

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consensus 1001

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consensus 1101

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consensus 1201
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