

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	-----	

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-----QKRKRNDSE-----
UGT51C1	1	MVLPMTDIEEVVRASRGSRLTYHGLRLIVRGSEELDLEFGSSKSRDDFQKVVLSVLERLHSKEGFRPEPYQWGSNFEVELYKTRMEYSDSENREIQQYDNS
UGT51A1	1	MVLPLVDVETCYKEKGFRFGYFVLVIVIHGHEELFFFEFSTEVARDDIERILLKLLDNIYASSAEGSN-----ISSAS-----
UGT81A1	1	-----
UGT81B1	1	-----
UGT31D1	1	-----
UGT72B1	1	-----

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  -----MNLVTTTFVFIKLLNAALPYKILIYSNLYGHSHIKV-----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  -----MNIHHVFLIFVLLFIKNVASYNFLVISPVYGFSSHMKMS-----MAITIAN
UGT18B1      1  -----MLQIVLFLFISTLFGNAYSYKFLVISPVYGFSSHMKY-----MAELAN
UGT18C1      1  -----MSRVLCVLLFSVLVSHVESYKFLVISPVYGYSHMKF-----MAITIAN
UGT18D1      1  -----MKLFLLVFLFFALYCNVLAYNYLVVAVVFGYSHMKF-----MNVKAD
UGT18E1      1  -----MRYLLLLAFFPVAFG---FNYLII SPVFGYSHMKF-----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  -----MRLIFVLLATFVNAAFYSYKILVFSVSPATSKSHLIS-----NGRLAD
UGT21B1      1  -----MFSPTASKSHMIS-----MFSPTASKSHMIS-----QGRID
UGT2A1       1  -----MLKNILLWSLQLSLLGMSLGGNVLWPMEG-SHWLN-----VKIID
UGT2B1       1  -----MSMKQTSVFLLIQLICYFRPGACGKVLVWPTHEY-SHWLN-----IKIILN
UGT1A1       1  -----MDTGLCAPLRGLSGLLLLLCALPWAEGGKVLVWPMEG-SHWLS-----MRDVVR
UGT35A1      1  -----MGGIFSVTGLGILLIIGLIWLFAANADEGVQSSRILAVFPFPGRSQYIF-----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  -----MGSQIIHNSQKPHVVCVFPYPAQGHINP-----MMRVAK
UGT85B1      1  -----MGSNAPP-PPTPHVVLPFPFGQGHVAP-----LMQLAR
UGT74B1      1  -----MAETTPKVKGHVVILPYPVQGHINP-----MVQFAK
UGT74F1      1  -----MEKMRGHVLAVPFPSQGHITP-----IRQFCK
UGT74D1      1  -----MGEKAKANVLFVFSFPIQGHINP-----LLQFSK
UGT74E1      1  -----MREGSHVIVLPPFPAQGHITP-----MSQFCK
UGT74C1      1  -----MSEAKKGHVLPFPYPLQGHINP-----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-----QLHIFFFPVMAHGHMIP-----TLDMAK
UGT73B1      1  -----MGTPVE--VSKLHFLIFPFMAHGHMIP-----TLDMAK
UGT73C1      1  -----MASEFR--PPLHFVLPFMAQGHMIP-----MVDIAR
UGT73D1      1  -----MESKIVSKAKRLHFVLIPLMAQGHIP-----MVDISK
UGT89B1      1  -----MKVNEENKPTKTHVLIFPFPQGHMIP-----LLDFTH
UGT89C1      1  -----MTTTTTTKKPHVLVIPFPQSGHMVP-----HLDLTH
UGT89A2      1  -----MTEVLLLPGTKSENSKPPHIVVFPFPAQGHLLP-----LLDLTH
UGT93A1      1  -----MALNDETKVVVLLLPFPVQGHINP-----FLQLSH
UGT93B1      1  -----MAVDTMSVAVVAVPFPQGHINQ-----LLHLsl
UGT91B1      1  -----MAEKP-----KLHVAVFPWLALGHMIP-----YLQLSK
UGT91C1      1  -----MVDKREE----VMHVAMFPWLAMGHLIP-----FLRLSK
UGT91A1      1  -----MTNFKDNDGDGDKLHVVMFPWLAFGHMVP-----YLELSK
UGT102A1     1  -----MSHFAIVAPPLYSHAVA-----LHALAL
UGT102B1     1  -----MSHFAAIAPPFYSHVRA-----LQNLAQ
UGT51B1      76  --IKLAESVQLADARLRYFETRIESDIGREVP IILEENQYSTSEIRSKRRYKVVLLTIGSRGDVQP-----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  -----MSVSTHHHHVVLFPPFMSKGHIIP-----LLQFGR
UGT79A1     1  -----MENEMKHSNDALHVVMPFFAFGHISP-----FVQLAN
UGT79B1     1  -----MGVFGSNESSMSIVMYPWLAFGHMTP-----FLHLISN
UGT22A1     19 SKLKKLKTCILNFSIKYGLFEFVKVNHQISILGMYTFLFLLLSLLAVDAGKILVYSPSISRSHLIS-----NGRIAD
UGT23       1  -----MHYSQMRWMMFFCLTALLHGSFIVN-----AAKILV
UGT52A1     6  NNNNNNTNNTNKSNSFIGNVEEDVDKIKRSIKSLPILKIHSAQQQQQQPKTTTTTTSTTTTNLIS-----PRLITP
UGT86A1     1  -----MERAksRkPHIMMIPYPLQGHVIP-----FVHLAI
UGT87A1     1  -----MPWPGRGHINP-----MLNLCK
UGT92A1     1  -----MAEAKPRNLRIVMFPFMGQGHIP-----FVALALRIEK
UGT83A1     1  -----MDNNSNKRMGRPHVVVIPYPAQGHVLP-----LISFSR
UGT82A1     1  -----MKVTQKPKIIFIPYPAQGHVTP-----MLHLAS
UGT80A2     28 SVKIEEIEGAAASGVVIVSEELTNPKTVVASIADETVAESSGTGNKSFSRVWMPLEGSSSSDRAESS-----TNQPRIDK
UGT9        1  -----MKSLLLLLGTIGVVTAGDVLFIPTSTLYPVHAQT-----MSVLAR
UGT24A1     1  -----MKLIALFLLLLGAVSAYKYAVFVPMANSQVQF-----CTRVAE
UGT26A1     1  -----MYLPIFCIFLSVVDLSRILQIVPGFTNSHVLFN-----YRLAE
UGT20A1     1  -----MTQFLFKILLVCTIINEFYTLNIFYVPTLSHSHISFN-----TKLAQ
UGT104A3    1  -----MKFAVASYGTRGDI EP-----CLAIGR
UGT106A1    1  -----MNTNKRVLILTANYGNHIVQV-----AKTLYE
UGT106B1    1  -----MVTQNKKILIIITGSFGNGHMQVT-----QSIVN
UGT103A1    1  -----MHAILIAIGSAGDVFP-----FIGLAR
UGT105A5    1  -----MRVLIITGCGSRGDTEP-----IVALAA
UGT10       1  -----MRILILLGLTQIVTSLNIVFLLGNTQFERN-----IFEFLAQ
UGT27A1     1  -----MIKTSILYLFLLFPNFCDSAKVLLTVMDQGRSHATS-----ITPLMH
UGT101A1    1  -----MTTQTPAHIAMFSIAAHGHVNP-----SLEVIR
consensus   101  .....

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UGT13A3 41 ILIDAGHDVITMLIPVCMES-KKDLV-----GSKKVKKIIIRIDQEPKSKLMQEEAKTEEMIKKQIWKLD-ADITIFFSMIKNFSIASGYQCENI
 UGT13B1 81 ILIDAGHNVITMLIPEYLIT-KKDFV-----GSKKVKDVVRIGRDERAGKLFEEEGIEHMGRARVVRMD-PEMMSLVTIVGSMNLAIGYQCEYI
 UGT16A1 43 ILTDAGNNVITVLMVDFDNN-LRNKT-----SLKSTKNTIFVEAGPN---VEELMSDMRQFLANAWKEDTGNPITMMKAAQDMGTAFAEQCTKV
 UGT16C1 47 TLTDAGHDLTVLMPVIDFK-QENKT-----AMKSTKNIKIIPGQD---ISKTIETMEKFMTQLWTTDNSNPLFMVVFHAPAMSAIFASQCRKV
 UGT16B1 42 TLVDAGHDVITVVLVIDST-QKNRT-----SIKSGAKQIIIDADEE---VVEIFSQTEKFLSNMWTMEMSNPLMMWMPNRIITQLFGKQCTKV
 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---SVPFDDSMAYWTEETHSSNVGESFQWFFDGMKLGCEENLL
 UGT14C1 41 TLTEAGHNVITFVVPVADEARKGQ-L-----GVKKTkdVIVEQDELMKSE---IKPLDDDMAQYWETDMDSSNADSFVFSADAMLLSCNNFM
 UGT14E2 41 TLTERGHNVITVLMVVDPEKRDECI-----GVKLTkdVIVEPDEEMMSFKKGSTPNGEIMELFWKSEMDSSNSRDMFSFFNSDMKLACRNFH
 UGT14F1 45 TLTEAGHNVITFLVPIALEERRDK-L-----GVKLTkdVIVEQDEEMKSK---LVPHSGSIEFLWIEEMDSSSIDAMFSWYNEIMILTCEENFM
 UGT15A2 42 TLTDAGHNVITFLAPIVLRKYENV-K-----YLESTKDIVYIQPSKELEALG---FTS---NYSKFWTEADATAIQFVPAVRTFVKMFVQLYEDLK
 UGT15B1 42 SLTEAGHNVITVLSIISSKFRNI-S-----YTKSTKDIVVETTTEQDQLT---ENMENDDFARYWTQEGTMLETIPSYLMFLKMAEDGYKCTFR
 UGT15D1 40 ALTDAGHNVITFFFTPTIVEKRYRNV-S-----YTKLTKDVVHMDAPKKLMEYG---EQMESADFSRFWTEDESSFYNVG-----AADLY
 UGT15E1 56 TLTYAGHNVITFFFTPTIVRKFSKI-Q-----YVKSITHVLQLDPDRLVKLG---SMFEKDVSKFWYRDSLSSEMLPMIDTFNNMFVEQAAVIS
 UGT15C1 43 ILTEAGHNVITLFSPTIIDEFRNY-S-----YTKLTKDVAYLDPSPELKAIG---DLIAGN---KRWWNQEFVSVEIPQTTFRFFKSITREQNNVLA
 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---ADQSIPIINFWSMRNEPEEQKKVMKQLGIFLEQCKYLV
 UGT19B1 42 VLAARGHKVTVIDNVFVRYD-VDNEL-----S-SDIHEIISVEPSPEVTKLL---NTGSLPTILWNSKASPEEQRTIMEGLGHVHRLQCTHLI
 UGT25A1 40 VLLDRGHTVDLVIAQLNEMVKLKFPP-----NGVGKNYTFGYE-----DPNFYRKNAGHLSDFIVEKPIPMAEFLTFDDMTFNLCEIV
 UGT25B1 40 KLLARGHNVDDVFAVYNELANLDF-----PDVRRIIYYNRHA-----DPDYWKKNANHFNSMFEKSPTPLGEFEIFHESGYQLCKIA
 UGT25C1 45 SLKEKGHTVDLVIAINDLAKGNEN-----SKADRFYTLGFK-----NGSSWHK-LNHLTSPFENNPFIDGFRQYTLIGNQLFAL-
 UGT25D1 55 SLVENGHTVDLIIARMNSHVKSNGT-----NMVTRKYTYGFQ-----EESPWNK-APHLLNPFKGRERTWNEHTYYMDIVTDLCEIG
 UGT21A2 41 ELARAGHDVITVLELDFLGISQTTNS-----VKVAKKRIIDGFQESTNFKN---VLHGFSETVMEEPSFTDEIKG---WWAYQNVYNDLCAEF
 UGT21B1 20 ELANAGHEVNVNFEPDFLNLTKDFVP-----CKKCRRWVPTGLNN-YKFKK---IQNGLSGDVQFQSSIWSKIFNTSDPYQDEYTNMCEEM
 UGT2A1 42 ELLRKEHNVITVLVAGALFITPSVS-----PSLTFEIPVPPFGKEKIESVIKDFVLTWLENRPSPTIWTIFYKEMAKVIEEFHLVSRGICDGV
 UGT2B1 45 ELAQRGHEVITVLVSSASILIEPTKE-----SSINFEIYSVPLSKSDLEYSFAKWIDEWTRDFETLS-IWTYYSKMKQKVFNEYSDVVENLCKAL
 UGT1A1 49 ELHARGHQAVVLAPEVTVHMK--GE-----DFFTLQTYAFPTYKEEYQR---EILGNAKKGFEQHFVKTFFETMAS-IKFFFDLYANSCAAL
 UGT35A1 55 ELAHRGHNVITVINTFG-----SDK-----NEPNFRVIGAKKIHIEIMAAFAGNADYQTASQWQMLTMTTQFLNLLTTSILDDAAVKD-LLNSG
 UGT35B1 43 ELANRGHQVITSVNAFP-----QKK-----PVVNFDRDVFIPDVFNNYKELIN-ELSGPMNLWQENNFINKFFVSVTRCVLTNKEVTETLLAPG
 UGT31B1 56 ALAERGHDDVVIKS-TDRINYANRN-----GLRGNVSEIDA-SLSQEYYGR-----LMRHAGVFRKRGIIVADSSTVTAHNYMGLVRMMSDQF
 UGT31C1 42 LLAERGHAVTVIRP-LTRVDFN-RN-----AGNLTID-LDGDGLLL-----LMKASTTHRKRGIIVADTDTVTADNYEALVRMVDROI
 UGT31A1 42 ALLRRGHSLVVISPKIHNHNHGRH-----HRHENLTEIDVGSVTNNFFKR-----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-LLEFVLELNSVCEPLI

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UGT76E1 30 ALYSKGFSTIVVLTQYNRVS-----SSKDFSDFHFLTIP-----GSLTESD-----LKNLGL-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---NDVGGLVDSLAKNCLHPFRALL
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 RLKIRT--GARVTFVTCVSVF-----HNSMIANHN--KVENLSFLTFSDFDGGGIS-TYED--RQKRSVN----LKVNGDKAL
UGT75D1 34 RLAGTISGARVTFFAASISAY-----NRRMFSTEN---VPETLIFATYSBGHDDGFKSSAYS--KSRQDATGNFMSEMRRRGKETL
UGT75C1 34 RLIIHG--ATVYSTAVSAH-----RR--MGEPP---STKGLSFAWFTDGFDDGLKS--FED---QKIYMS-----ELKRCGSNAL
UGT75A1 30 KLINLG--VKVTLSLSSLSAF-----NR--IKNLP--KIEGLTFAPFSDGYDGNFKG-SFDD--YHLFNSA-----IKSHGSEFI
UGT71A2 13 LLLSRCH-SLSITVLIFNNS-----VVTSKVHNYVDSQIASS-NRLRFIYLP-RDETG-----ISSFSSLIEKQKPHVKESV
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-VTSVVFPPPHP-SLSPGVENVKDVGNSGNLPI-----MASLRQL
UGT93A1 31 LIAAQN--IAVHYVGTVTH--IR-----QAKLRYH---NATSNIHFHAFVPPYVSPNPED--DFPSHLIPSFEA-----SAHL
UGT93B1 31 LIASRG--LSVHYAAPPVH--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-----IDSETIGFHSVGTDSHPGALTRVLHLAAHPLGP-----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-----YEKESRLRKRGLG--DKEEVMEMEQMGAERIKTVLILMSDTGGGHRA
UGT31D1 41 ALAKNCHNVTAVKPRLLDYA-----LLNECGRIEQIDADMSLEQYQKLMAGSGAFRKRGVVADETTVTADNYMSLIEMFKDQF
UGT72B1 29 RLIVHLHGLTVTFVIAGEGPP-----SKAQRVLDLSLSSISSVFLPPVDLTDLSSTRIESR-----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-----TEKLPSMSLFPVFFTRAT
UGT79A1 34 KLSYGVKVSFFFTASGNASR-----VKSMNSAPTTHIVPLTLPHVEGLPPGAESTAELTPASAELLKVALDLMQPOIKTL
UGT79B1 34 KLAEKGHKIVFLLPKKALN-----QLEPLNLYPNLITFHTLISIPQVKGLPPGAETNSDVPFFLTHLLAVAMDQTRPEVETI
UGT22A1 91 ALVDACHDVVMFITEYEPLT-----EFTGTKKAKVITMKGFSSTKFAEDMDGIGEYLLSSSRLSFLERLMFEKTCTGACDDL
UGT23    31 YCPSISKSHVLFIPSYSKLLDNYDG-----AKHAKVWRLHNVTEAYDTKLGTLANVMENSHIGFIDRLTFDADFWMCADLLGKLPQMHI
UGT52A1 78 LTITQSPGFSLLVNSPILPVKPLRI-----TILTIGSRGDIQPFIALSLGLKEYGHNVTLATHELRYDLISKEFGLNYQPLGGDPRELMDLCV
UGT86A1 31 KLAHGFTITFVNTDSIHHS-----ISTAHQDDAGDIFSAARSSGQHDIRYTTVSDGFPLDFDRSLNHDQFFEGILHVFSAHV
UGT87A1 18 SLVRRDPNLTVTFVVTEEWLG-----FIGSDPKPNRIHFATLPNIIPSELVRANDFIAFIDAVLTRL
UGT92A1 35 IMIMNRANKTTISMINTPSN-----IPKIRSNLPESSISLIELPFNSSDHGLPHDGEN---FDSLPLVSLVISLLEASRSLREPF
UGT83A1 34 YLAKQGIQITFINTEFNHNR-----IISLSPNSPHEDYVGDQINLVSIPDGLSDSPEER-----NIPGKLSVLRFMPPKKV
UGT82A1 29 AFLSRGFSPVVMTPESIHR-----ISATNEDLGITFLALSDGQDRPDAPPSD-----FFSIENSMENIM
UGT80A2 107 SKTERQQKVTHILAEDAANKIFDDKISAGKKLKLLNRIATVKHGDGTFEVEVPADAIPQPIVDRGESKNGVCADESIDGVDLQYIPPMQIVMLIVGTRGDV
UGT9     40 ELAERCHKVITWLEIGPERSD-----IVLHQQVSREFWPAQFGDRTLQEIYQFKNHTSHSELWNPQYTNENEQTTGWLASIRLCDSV
UGT24A1 40 VLANGGHDVTMIHLSHLPDYKT-----DVKIPKNIKVHRVEAYVEGLTKALLEKEQSAFIFKDTGLKDMPPAMMSMFSRFGKMFQDGCRLI
UGT26A1 39 TLRFLGHDVKMWTQMEMAMLDTGNN-----KLPEGVSEYR
UGT20A1 44 LLATSGHQVTVLLAQVDDAL-----LIENATDFAVLRKKVGVPRGHLRQVLWSNPGPYEDSSPLNPRIFYKLLKVSGTFVTACQNM
UGT104A3 23 ELMRRGHSVRMAVPPNLVDLAEAAAG-----LSAIAYGPDMDHDFWSDEFIRDFFKNFLRGPVTLIREAWEPVL
UGT106A1 28 QCVRLGFQHVTVSNLYQESN-----PIVSEVTQYLYLKSFSIGKQFYRLFYYGVDKI
UGT106B1 29 QINDMNLDHLSVIEHDLFME-----AHPILTSICKKWIINSFKYF
UGT103A1 23 TLKLRGHRVSLCTIPVFRDA-----VEQHGIAFVPLSDELTyrRTMGDPRLWDPKTSFGVLWQTI
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	-KDL SVLDELKNR--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-----	DYLEMPAII SVFTGN
UGT18B1	129	FEDTELHYDLKSRQ--FDVVLSEAFDFCGLYLA-----	SYLEMP SII STFTGN
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 TDPVFP CGAL-----	LAKYLQIPAVFFLRSVP
UGT35A1	136	-----EKFDLVI--MEAVQTEALFG-----	LIQHFGAETIGISSYGT
UGT35B1	124	K-----DHFDLII--VEALRSDAYYG-----	FAAHFNAPIIGISTFGT
UGT31B1	136	DLPIVKSFIIEAHKHKFDLLITEAYIDYPLVFS-----	HLFGDLPVVQISSGY
UGT31C1	117	HSEPFQRHLKSARRG-YDLLVVEAFVDYALIAS-----	HLFGDVPVVQISSGH
UGT31A1	124	EHEQVKRLLRS--NQTFDVIVIEAFVSYPLILS-----	YFFKDTPVQISSGH
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---TKNGDSPVTCLIYTIILLNWPVKVARRF-----	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-----PRPRVFVVDLLGTEALEVAKELG-----	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--DVLI ES PSAMAGIHI-----	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 FRTIKPDLVIFYDSAHWIPEIAKPIG-----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-----VYSVIFASGAFGLGCY
UGT83A1 106 EELIERMMAETSGGTIIISCVVADQSLGWAIEVAAKFG-----IRRATFCPAAAASMVLG
UGT82A1  89 PPQLERLLLLEEDLD--VACVVVDLLASWAIGVADRCG-----VPVAGFWPVMFAAYRLI
UGT80A2 207 QPFVAIAKRLQDYGHRVRLATHANFKEFVLTAGLEFYPLGGDPK-----VLAGYMKVKNKGFLPSGPS
UGT9     121 LSRSKSKFDKMVEKQFSTVIVDDLYNSCGVLMAG-----LKKSVYIYWSMTGLRTE
UGT24A1 125 VRNKEFMKWLENEK--FDVAYSIIYSSCPIG-----LIHAAKIPSWVWLNLSGA
UGT26A1  74 IPIHFTDTLKTTEGLKVFQSMFESGDAHDLWWTG-----QEFKDMRVEACEQ
UGT20A1 125 AFDHLFLSSLQQQK--FDVGLVEQYDSCGFG-----IFKSI GIENTVWLSATA
UGT104A3 90 KNWQEMSSALMSVGAGADLLFTGQLYQDLAIN-----VADYYGIPMAT
UGT106A1 80 YNKRKFNIIYFKMGNKRLGELVDEHQPDIIIN-----TFPMI
UGT106B1 69 RNMYKGFYYSRPAK--LDKCFYKYYGLNKLIN-----LLIKEKPDILLTFPTP
UGT103A1 83 AGMIEPVYEVYSAQRHDDIVVVGSLWALGARIAHEKYG-----IPYLSAQVSPSTLLSA
UGT105A5 59 AGAREPGELPPGAAEVVTEVVAEWFDKVPAAIEG-----CDAVVTTGLLPAAV
UGT10    130 KKESLDLAIVYSGNPCLNALTHLVAVPTIYFDTEGLT-----DETLIAAGAPIDLLTTP
UGT27A1 114 LKHQKNRYLEIANENWDLFLSDSLFSPCGYAMAEITG-----KPHVMMHSSDVESAHG
UGT101A1 58 VLYHSTLPGPDADPEAWGSTLLDNRRTFLNDAIQALP-----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-THGERMTIWQRFMNHLHFLMGDFLFSYIGDEDFKVAKEIIPGV-----RSWR
UGT16B1	172	RMDHVSVDLG-----QPIAPSYVPGTQS-LYSDRMTMTQRFLNYLQFLNGNSMFSIDIGDYESANAKKLLGVERSWR-----
UGT16D1	172	RFDHVSVDILG-----QPIAPSYVPGTQS-FFNDRMTMKERLLNFIQFYGRFTFANILDQEYEMAKDILGIQRSWRVSNIFSHSRNIVFIFQ
UGT17A1	183	GLEGPKIAHG-----FPVTSSYLPAAFS-ESSDHMSFVERTRSLYETYLNKRFARLIHNKEIDAMKGVYKKG-----STWE
UGT17B1	181	GLEVSKIAHG-----ASISTSYLPVAFS-SGSERMTLIGRAKNYVESYFNYYFNSKIYENELAGIEGIYKNG-----KGWR
UGT14A1	209	LYDFILPDIG-----EPEDHSYVPSLSS-QSGDQMSFYERYKNYRFSRVT-----
UGT14D1	171	YYDYLFRRHIG-----EPDVHSYLPPLMS-TTGDVMTTFERLENHRVAEAMATAMYKMFDESEKAIYRKHFGEI-----PDWR
UGT14C1	170	LYDGTVAAG-----EPIDFSYVPGSMS-KSGEKMSLFEKLENYRLSMASSRMQYQWQDKETEIYKHLGNDI-----PHWR
UGT14E2	174	FYDAVMDYIG-----EPLDYSYVPSGFS-VTGDVMTMAERYENWMVVEINIALHDMFDGEMKSYREFLGEDL-----PNWR
UGT14F1	174	HYDFMLPHIG-----EPEDFSSVPTLSS-KVGEEMSMTEKWENYRLVAETKASLAKLFDAETRIYRESFGSDI-----PDWK
UGT15A2	221	HHTQMSRWIG-----EPSSPTVLPSPMS-SFGDDMNFWERLGNLGDVFFTLF-----VDMPRMTSFSQPERK-----IDFY
UGT15B1	175	HDYRFAELIG-----EPVS---PRYFT-NFGNIMNFQERLNTNISYYLGQIL-----IAFPNWKTLQDPSKD-----LLVE
UGT15D1	142	HDVYLSKAIG-----EPVMPVSVSDVCS-PFGDKLSLLERAFNAFAVPIYDIV-----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-----EPSSLHYIPAPSSDNFGSSASIFDRINDLYHKYVFGSGYSIFDQWYNQIARLTHGKVR-----HWK
UGT18D1	173	KNVPGSHAIG-----EPSLLNYAPSLYT-NFGSDQTVWDRIQDITAFTSFHAFSNLFERQYRQAYDLLNGDVR-----TWR
UGT18E1	168	RCGAASYAVG-----EPIPLNYLPTEGS-NYGKKSASIDRLSDMLGLTGYHFQFGILFDKQYDQAYRLTGGNVR-----TWQ
UGT18F1	173	RFVYPYNEAFG-----QPSTVGYIPQOGS-QLAPEAGFLDRLNDVYRNYFYTLTMKRASQLQNTFIEKAIGRPVP-----NWK
UGT19A1	175	MRDIVNEALG-----ISSQLQDASILSD--YGNSIPFYGIRRNLKFKHSAWRNFFEVQSKTLEPLFETTSSFEN-----
UGT19B1	169	PMDVVPITLG-----ISDTLNTPSLSD--YGSYLSFFEKRRNLKFLSGMLNFHEMQDSMISPLFKKYYGLKPP-----TG
UGT25A1	156	-----ATVLY--PKGDDSFNRLFHLIRHTYNIYFVAPRLMEKYNNLLLETFGPTFP-----SAE
UGT25B1	163	IFLPHIVSAG-----LPTVASVYGTSLY--PEHDSSLYDKIFNLIRLTYHYAISPDMDRKYNLLITKRFGNFP-----DVG
UGT25C1	165	LMSIQTVTIG-----LPNIASQVVPFLFY--TFDLATLSGKLWNLITWAHINFHQIPTLRKEQELLFQKVYGPSFS-----INE
UGT25D1	177	ILDRQSLAAG-----MPNSPAVTQALFE--AEDLTTYWGKFRNFLNWAHITLIINPYCEKHQSEVIKHLGENFD-----TSN
UGT21A2	168	FAAPVYDFTG-----LPMPSTVAFAD--LSISPT-YTERARNLFVAVLTKLEFTLLNRLQAHFQHKFGEHFP-----SLY
UGT21B1	148	MSVSMRDSL G-----IPTPSSLIPFMST-LDATPAPFWQRAKNFVLQMAHIRDEYRDVVLTDNMFKKNFGSDFP-----CVE
UGT2A1	176	ASTVEKHCGK-----VPFPSSYVPAIIS-ELTDQMSFADRVRNFI SYRMQDYMFETLW-KQWDSYYSKALGRPTT-----LC
UGT2B1	178	GYRCEKFSGG-----LPLPPSYVPPVLS-ELSDRMTFVERVKNMLQMLYDFDFWFQPFKEKSWSQFYSDVLGRPTT-----LT
UGT1A1	177	CG-IDYEATQ-----CPKPSYIPNLLT-MLSDHMTFLQRVKNMLYPLTLKYI CHLSI-TPYESLASELLQREMS-----LV
UGT35A1	171	DTHIDELMGN-----IS-PLSYNPLLS-SRTEQMDFKDRVMNVFEASVMWLHKRIVHLP SQRDLYAKYFPTARK-----SLD
UGT35B1	160	DWNIDALVGN-----ES-PLSYTPLATG-GLTDRMTFLERLSNFVDTTVAWLNYRFVHMSEQEKMYAKYFPEASKR-----VQLT
UGT31B1	184	AVAENFETMG-----AVSRHPVYYPNLWR-DKFSGLNVWKQSMKCTLSWRYRMLNVNWPDEQNALLKRQFGESTPTI-----Q
UGT31C1	164	ATAENFETMG-----ATSRHPRYYPNLWR-FNFGPLSVWDGVRELYTELRLQREFGLLADRQDALLKRRFGPEAPGL-----R
UGT31A1	170	GTAENFETMG-----AVARHPVYYPNMWR-DRFKGLSVWQTVRQVFTEIRLYMEFSQLDADQSAMMKRQFGSKVPDV-----D
UGT32A1	159	AIPENFETVGG-----EVARNHIKHPNIWR-SDFS---KSNFEQLMTENYLKNEWALLEKEQENMLKRDFG-YHDM-----C
UGT76B1	141	SKFHVLRK-----GYL--SLQETKADSPVPELP-YLRMKDLPWFQTED--PRSGDKLQIGVMKSLKSSS---GIIFN-----AIE
UGT76C2	144	PSLPLIRTK-----GYLPVSVLESEAEDSVPEFP-PLQKRDLSKVFGF--GEKLDPFLHAVVETTIRSS---GLIYM-----SCE
UGT76F1	147	TAFPLLDK-----GYLP--IQGSRLDELVTLP-PLKVKDLPVIKTK--PEGLNRIILNDMVEGAKLSS---GVVWN-----TFE
UGT76D1	139	CVLMEQNQS-----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-LCRPLFELISSQFVNVDDI---DFFLVN-----SFD
UGT74E1	140	-YYHVFKGSFVSPSTKYG-----HSTLASFPPLP-ILNANDLPSFLCESS-SYPYILRTVIDQLSNIDRV---DIVLCN-----TFD
UGT74C1	141	-YYHINEGTVDVPVDRHE-----NPTLASFPGFP-LLSQDDLPSFACEKG-SYPLLHEFVVRQFSNLLQA---DCILCN-----TFD
UGT74A1	138	-YYHFSQGR LAVPPGAAADGSDGGAGAAALSEAFGLP-EMERSELPSFVFDHG-PYPTIAMQAIKQFAHAGKD---DWVLFN-----SFE
UGT75B1	145	YTHFMGNK-----SVFELPNLS-SLEIRDLP SFLTP-SNTNKGAYDAFQEMMEFLIKETK-PKILIN-----TFD
UGT75D1	161	YHYFNGYEDAISEMANTP-----SSSIKLP SLP-LLTVRDIPSFIVS-SNVYAFLLPAFREQIDSLKEEIN-PKILIN-----TFQ
UGT75C1	152	YYYFNTSYKHLFD-----VEPIKLPKL P-LITTDGLPSFLQP-SKALPSALVTLREHIEALETESN-PKILVN-----TFS
UGT75A1	146	YYRFTNFANYFKN-YDSQ-----DQI IELPGLP-SLSSDFPSFVFDVKSNDWAVESIKRQIEILNSEEN-PRILVN-----TFD
UGT71A2	135	LHVQKIHDE-----ENFNPTFEFNASDGELQVPGLVNS-FPSKAMPTAILSKQWFPPLLENTTRYGEAK---GVIIN-----TFF
UGT71B1	142	FHVQSLYDE-----KELDVSEFKDTEMKFDVPTLTQP-FPAKCLPSVMLNKKWFYPVVLGRARSFRATK---GILVN-----SVA
UGT71C1	163	KYLPERHR-----EIKSEFNRSFNEELNLI PGYVNS-VPTKVLP SGLFMKETYEPWVELAERFPEAK---GILVN-----SYT
UGT71D1	154	QYLADRHS-----RDTSVFVRNS-EEMLSIPGFVNP-VPANVLP S ALFVEDGYDAYVKLAILFTKAN---GILVN-----SSF
UGT72A1	151	IYVPI LDK-----EVEGEFVLQKEPMKIPGCRPVRTEEVVDPMLDRTNQYSEYFRLGIEIPTAD---GILMN-----TWE
UGT72D1	147	VYLPVLDT-----VVEGEYVDIKEPLKIPGCKPVGPKELMETMLDRSGQQYKECVRAGLEVPMSD---GVLVN-----TWE
UGT72E1	139	LFFPTLDK-----DMEEHIIK KQPMVMPGCEPVRFEDTLETFLDPNSQLYREFVFPFGSVFPTCD---GIIVN-----TWD
UGT72C1	145	VYMASLDK-----QELYKQLSSIGALLIPGCSVPKFERAQDPRK--YIRELAESQRIGDEVITAD---GVFVN-----TWH
UGT73A1	151	NSVRLNK-P-----FKNVSSDSETFVVPDL PHEIKLTRTQVSPFERSGEETA-MTRMIKTVRESDSKS--YGVVFN-----SFY
UGT73B1	167	HCIRLP-----KNVATSSEPFI PDLPGDILITEEQVMETE---EESV-MGRFMKAIRDSEKDS--FGVLVN-----SFY
UGT73C1	158	HIMHQNHFF-----LETIESDKEYFPIPNFPDRVEFTKSQLP-MVLVAGD---WKDFLDGMEGDNNTS--YGVIIVN-----TFE
UGT73D1	162	HNIHLHSPH-----LS-VSSAVEPFP I PGMPHRIE IARAQLPGAFEKLAN---MDDVREKMRSESEA--FGVIIVN-----SFQ
UGT89B1	155	NTLWIEMPT-----KINEDDDNEILHFPIKIPNCPKYRFDQISSLYRSYVHGDPAWEFIRDSFRDNVAS--WGLVVN-----SFT
UGT89C1	130	---WINK-----VADAFS IKS I SFLP-----INAHSISVMWAQEDRSFFNDLETATTES--YGLVIN-----SFY
UGT89A2	162	QFCFENID-----LIKSTDPIHLLDLPRAPIFKEEHL P--SIVRRSLQTPSPDLESIKD-FSMNLLS--YGSVFN-----SSE
UGT93A1	135	NVERYCFQV-----FSALNTAGDFWEQMGKPLADFHFPDIPSLQGCISAQFTDFLTAQNEFRKFN---NGDIYN-----TSR
UGT93B1	142	NADAFGLQC-----VAISYNVG--WLDPGHRLLSDYGLQFLP-PDACMSREFVDLVFRMEEEEQ GAPV--AGLVMN-----TCR
UGT91B1	150	GPASVMIQGH-----DPRKTAEDLIVPPPWPVFFETNIVYRLF EAKRIMEYPTAGVTGVELNDNCRLGLAYVGVSEVIVIR-----SCM
UGT91C1	152	-PSSSLIE-----EIRSTPEDFTVPPWPVFKSNIVFRYHEVTRYVEKTEEDVTGVS--DSVRFGYSIDESDAVFVR-----SCP
UGT91A1	159	PPGFEEYR-----TSPADFMKPPKWPVFFETSVAFKLFECRFIFKGFMAETTEGNVPDIHRVGGVIDGCDVIFVR-----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-----HAFIVPDQKRGGNYNLTHVLFENVFWKGISGQVNKWRVETLGLGKTNLFL LQQ-----NNV
UGT81A1	213	GTSPIRVHQS-----NFAATSTFIAREIAQGLMKYQPDIIISVHPLMQHVPLRVLR SKGLLKKIVFTTVITDLSTCHP-----TWF
UGT81B1	144	GTSPKWIHKS-----YLSALAAAYAKEIEAGLM EYKPDIIISVHPLMQHIPLWVMKWQGLHKKVIFVTVITDLNTCHR-----TWF
UGT31D1	165	GLAENFDAAG-----AVARHPVHYPN IWRSSFSGEAAGALSEWRLLNEFELLASQRSNELLKQFGLDTP-----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 EIPSFLHPSRFTGFRQAILGQFKNLSKSFVCLIDS-----FD
UGT84B1 142 YRYYMKTNSFP-----DLEDLNQTVELPALPLLEVRDLP SFMLPSGGAHFYNLMAEFADCLRYVKWVLVN-----SFY
UGT88A1 151 FYLPTIDETT-----PGKNLKD IPTVHIPGVPPMKGSDMPKAVLERDDEVYDVFIMFGKQLSKSS----GIIIN-----TFD
UGT90A1 157 ISVFKHEL FTE-----PESKSDTEPVTVPDFPWIKVKKCDFDHGTTETEPEESGAALELSMDQIKSTTTSHGFLVN-----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 TNTVYRILFKAFKDVKRADFVVCN-----TVQ
UGT87A1 132 INSDLLASHG-----HFPIEPSESKLDEIVDYIPGLSPTRLSDLQILHGYS HQVFNIFKKSFGELYKAKYLLFP-----SAY
UGT92A1 164 RSIWLNLP HK-----ETKQDQFLLDDFPEAGEIEKTQLNSFMLEADGTDDWSVFMKKIIPGWSDFDGF LFN-----
UGT83A1 160 FSIQKLIDDG-----LIDSDGTVRVNKTIQLSPGMPKMETDKFVWVCLKNKESQKNIFQLMLQNNNSIESTDWLLCN-----SVH
UGT82A1 141 QAIPELVRTGLVS-----QKGCPRQLEKTI VQPEQPLL SAEDLPWLIGTPKAQKKRKFQWQRTLERTKSLRWILTSSFKD-----EYE
UGT80A2 269 EIPIQRNQMKDIIYSLLPACKEPDPDSGISFKADAI IANPPAYGH THVAEALKIPIHVFFTMPWTPTSEFPHPLSRVKQPAGYR-----LSYQ
UGT9     172 SAWANQSPSP-----PSYLPVAGTGLTDDLTFSQR LYNVASYFKQLYIHQHI VQPRIDAVFQKYYPGVES-----TF
UGT24A1 171 LMDFVAETVG-----VPIIPSYVPLMMESDDEM GFFFRMKSFIGHTLMTVLHRRM TSNGETQIFRDELNDPNFP-----HTM
UGT26A1 121 MLRHDETGFS-----QLFLDRVQNTLWHL SLLDFVNL PQNLLVDENLFYREFV GADQDD-----LWD
UGT20A1 171 IYRPQAEALG-----VHLPYSYVPELFAHFSDKMSFFQKV INILIGQATSFVLDV FVQGFQSRIFGFEQGLG-----
UGT104A3 133 LHYPMPRPN G-----QLLPRVPGPLVRTGM AVYDWMCW RMNKAEDRQRRELGLPTATV ASPRRIAE-----R
UGT106A1 116 VVPEYRRRTG-----RVIPTFNVM TDFCLHKI WWHENVDKYYVATDYVKEK LLEIGTHPSNVKITGIP IR-----P
UGT106B1 116 VMSVLTEQFN-----INIPVATVM TDYRLHKNWITPYSTRYYVATK ETKQDFIDV GIDPSTVKVTGIP IDN-----
UGT103A1 137 HLPVHPKFN-----VPEQMPLAMRKL LWRCIERFKLDRTCAPDINAVRRKV GLETPVKRIFTQWMHSP-----Q
UGT105A5 107 AVRSM AEKLG-----IPYRYTVLSPDHLPSEQSQAERDMYNQGADRLFGDAVNSHRASIGLPPVEHLYDYG-----
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 DHINGAAYFYINSNQYLDYPSPTLPKTVFIGGMQVNTNK-HGK-----VKLEKEWDDLNLNR-----KQNVLVSFSGSNAFSCDMPDEFKESFLKVFASM
 UGT13B1 283 DLFTGVAFNLIINSNQYIDYPSPALPKTVFVGGMQVNTN--EAK-----TKLSDEWNNILNIR-----KQNVLISFSGSNAFSEMPEEFKKSFLYVFGNM
 UGT16A1 229 EVLPEASFILTNQIPLLDPAFTFDKIVPIGGLSVKTE--KKN-----LKLDEKWSKILGIR-----KNNVFIISFSGSNAKSVDMPEDEFKNSLADVFKSM
 UGT16C1 247 EVLPEASFIFTNHIPLMDFPAPTFDKIPIIGGISVKTQ--KKS-----LELPEKWNKILGLR-----KKNILVIFSGSNARSADMPEHFQONVLKVAESM
 UGT16B1 242 EILPESSFLLTNHIPLVLEFPAPTFDKIVPIGGISVNKN--KET-----LKLEHYFDTMVSMR-----KKNVLIISFSGSNIKSMDMPDEYKKSALAEFLQIM
 UGT16D1 258 EVLPEASFIFSNHIPVLDFFPSPTFDKIPIIGGFTVKTN--EKS-----LKIDKKWDAILNIR-----KKNVLIISFSGSNAKSKDMPPEEYKKTLLRVFSSM
 UGT17A1 253 EIMRLLPAYMFTNSNPILDFFPYPRPSKFIIEIGGIAADEK--KHD-----EVLPESEYDHILNLR-----NRTVLIISFSGSNAKSI FMPDHMRRLI IALGMM
 UGT17B1 251 ELSRKNAYMFMVNSNPQMDIPSPRTSKFIIEIGGISSGPV--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 SEYHRAPYVFINSNPYIDFPRPLLTKTIEIGGITVDVKKLKSE-----KVDEKWDNILLKRR-----PHNVLIISFSGSMFKSIYMPDFYKKNMVMKMSF
 UGT15D1 208 TIEPEASVFLFLNSNPFLDFPRPTLTKTVEIGGITVDLNLKLSQ-----QLDSKWSDIILNLR-----EKTMLVIFSGSVFFSKDMPLENKKNVIANSMTFET
 UGT15E1 252 SIEPFCSAVFTNSNPYIDYPRATLEKNVQVGGISVDIDKLSQ-----KVSNEWDAVILNLR-----PKTVLVIFSGSIMLSKDMPI NNKI T IATV LGKF
 UGT15C1 238 EKLSEASFIFMNSNPFLDFPRATIITKNIQIGGISVNLDTLKSS-----GKLTEEWDQILNLR-----EKTLLVIFSGSVILSQDMPFAYKVGLTNA MKQL
 UGT18A1 247 QILNDVITYHFSNSNPYLDVFIPTIAKVPIIGGYTMDYKQVPP-----VSKDLDTILNLR-----SSTVFIISYGTMISAKYMPDEYKQSMIDFFKDN
 UGT18B1 246 DIIHDVITYHFSNSNPYLDVFIPTIPKVVPPIGGITVDHDYWSTN-----GNHSELLEHVILNAR-----KHNVFIISFSGSMVRSVDMPKPEFKKSMMKVFS DH
 UGT18C1 247 KILKDVITYHFANSNPYLDFAAPTISKVPIIGGYDMDKSIQTK-----IPDEFDSILNER-----SLTVYVIFSGSMVKA KFMPE SYKEAML R MFTAN
 UGT18D1 244 EILQATATYFFYNMNPYIGFAMPTLEKSVEIGGFTIDPPHD-----LSLNEEFDKLLDLR-----KSTVLIISFGTIVVQSADMPENFKSGLIKMFAKL
 UGT18E1 239 EILQSSTFFLTNSNPYLSFSTPTISKVQIIGGFTIESFKT-----TTLDEEFNKILSLR-----NNTILVIFSGTIVIQSSDMPDDFKTGLIEA FRRM
 UGT18F1 244 DIVTRSPIYITNSNPYLDFAVPTTATIVHVGGITIDLEKMRHV-----AALTEEYENIFAER-----ESTVLIISFSGSVIRSYEMPDNFKAGI INMFKSL
 UGT19A1 241 -ILLRFSNLMFLNTHELADAHRPWSRRVHEIGGISFKFPM-----PLKNEYINL FNKY-----NSIILVIFSGTTTTPSFLMPEKYKNTLINTFQRF
 UGT19B1 238 EIMRQANLLFYNIHEGSDGMRMRGRRSFDIGGIAFKDQK-----NLTMEYQTLISDP-----RPKVLVIFSGTAATSSHMPQNLKNSLMTAMQM
 UGT25A1 209 EIERNVDIILVNSNEIEKPRPVSHKIKYIGGMGKKAQP-----LNKEFNDILATS-----NKGVVLFIFSGTQVATSKVPIEIRKNFVTAFKHF
 UGT25B1 234 TIERGIDII FVNSHDFLEQQRPMSPKIKYIGGMAIRKAKQ-----LPDEFEKILSVP-----KSAYVLFIFSGTQVPTAKMPLP IRRNFVGA FKKF
 UGT25C1 236 VIDK-VDLDFVNSNEIMETPMLINHRIQYIIGGINLKT PKP-----VDHHLDNLLSKS-----SNGTIIIFSGTQIPGAVYPRYAVRNFVKVFKKY
 UGT25D1 248 LIES-LDLAFVNSNELIETPRVSSHKIKYIIGGINLKKSKDR-----LDEEVEKVIITQKP--IGNGIVVFCFGTQVPSLFP I EVRRAFAQA FRHF
 UGT21A2 238 SVTSDVDVIFVATDEIIDISTTTLQNIHVHGGGLGVDDDV-----AEMDNVFASEMSK GK--E--GVITYFSLGTIANTTKIDSKVMRTVLDIVKKF
 UGT21B1 219 FLAKTSDLIFVSTDELLEIQAPTL SNVVIHGGGLSSEG-----GGLDEKFVKIMEK GK-----GVILFSLGTIANTTNLPPTIMENLMKITQKF
 UGT2A1 246 ETMGKAEIWL MRTYWFDFEFP RPYPILPNFEFVGGHLCKPAK-----PLPKEMEEFVQTSG-----EHGVVVFSLGS--MVKNL TEEKANVIASALAQI
 UGT2B1 249 EMMGKADIWLIRTFWDFLEFPHFPFLPNFDVGGHLCKPAK-----PLPREMEEFVQSSG-----EHGVVVFSLGS--MVKNL TEEKANVVASALAQI
 UGT1A1 246 EVLSHASVWLF RGDVFVDYPRPIMP NMVFI GGINCVIKK-----PLSQEFEAYVNASG-----EHGIVVVFSLGS--MVSEIPEKKAMEIAEALGRI
 UGT35A1 242 EVLDSFALMLLQGHFSLSYPRPYLPNMI EVGGLHLQQRKV-----QPLAKELSEFVEQS-----EKGVIYFSGSNIKSKDLPPSTRKMLMETFASV
 UGT35B1 233 DLNRNFSLVLLNQHFSLSFPRPYVPMIEVGGGLHISHKP-----APLPKDLEEFIQGSG-----EHGVYIYFSLGSNVL SKDL PADRKELILKTFGSL
 UGT31B1 256 ELNRNVELL FVNTHAIFDNNRPVPPSVQYLGALHLH---DKRP----DSMYGMVREFLDNA-----TTGAIYVIFSGSAISSDMEPEFIEMLLRVFEKL
 UGT31C1 236 ELRSRVRLLFVN VHSVFDNNRPVPPSVQYLGGLHLH---DRRA----EPLSEAVARFLDES-----RRGVVYVIFSGSGLATEDMDADMAAALLDAFKMM
 UGT31A1 242 ALRKNVHMMFVNTHPVFDNNRPVPSNVQYLGGLHIDPAVTSVA---DEIDNDLAEFLENS-----TMGVVYVIFSGSVRVSDMDSNMLNVFVETFRSI
 UGT32A1 227 QLKSRVLMFLINVPVAVFDNNRDVSNNIQYLGGLHILK---KPR----TVRDSRLLSFMKHK-----HI-IVYASFGSGIDVLNMDANLIAEFVRVFN SI
 UGT76B1 209 DLET---DQLDEARIEFPVPLFCIGPFHRYVSASS--SLLAHD-----MTCLSWLDDKQ---ATNSVIYASLGSIA-SIDES---EFLEIAWGLR
 UGT76C2 214 ELEK---DSLTL SNEIFKVPVFAIGPFHYSYFSASS--SSLFTQD-----ETCILWLDLDDQ---EDKSVIYVSLGSV--NITET---EFLEIACGLS
 UGT76F1 215 DLER---HSLMDCRSKLQVPLFPIGPFHKHRTDLP-PKPKNKDKD-----DDEILTDWLNKQ---APQSVVYVIFSGSLA-AIEEN---EFFEIAWGLR
 UGT76D1 208 CLLEN---SFITTAQEKWGPVYPVGPLHMTNSAMSCPSLFEFE-----RNCLEWLEKQ---ETSSVIYIISMGSLA-MTQDI---EAVEMAMGFV

UGT76E1 213 CLES---SSLAWLQKQLQVPVYPIGPLHIAASAPS--SLLEED-----RSCLEWLNKQ---KIGSVIYISLGSILA-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--LQWMKNQWPVKNI GPMIPSMYLDKRLAGDKDYGINLF--NAQVNE-CLDWLDSK---PPGSVIYVVSFGSLA-VLKDD---QMIEVAAGLK
 UGT74E1 211 KLEEK---KWIKSVWPVLNIGPTVPSMYLDKRLAEDKNYGFSLF--GAKIAE-CMEWLNSK---QPSSVYVYVVSFGSLV-VLKDD---QLIELAAGLK
 UGT74C1 212 QLEPKV--VKWMNDQWPVKNI GPVVPSKFLDNRLPEDKDYELEN--KTEPDESVLKWLGNR---PAKSVYVYVAFGTLV-ALSEK---QMKEIAMAIS
 UGT74A1 218 ELETEV--LAGLTKYLKARAIGPCVPLPTAGRTAGANGRITYGAN--LVKPEDACTKWLDTK---PDRSVAYVVSFGSLA-SLGN---QKEELARGLL
 UGT75B1 207 SLEPEA--LTAFP-NIDMVAVGPLLPTEIFSGSTNKS-----VKDQSSSYTLWLDK---TESSVIYVVSFGTMV-ELSCK---QIEELARALI
 UGT75D1 234 ELEPEA--MSSVPDNFKIVPVGPLL-----TLRTDFS-----SRGE---YIEWLDTK---ADSSVLYVVSFGTLA-VLSKK---QLVELCKALI
 UGT75C1 220 ALEHDA--LTSVE-KLKMIPIGPLVSSSEKTDLFKS-----SDED---YTKWLDK---LERSVIYISLGTTHADDLPEK---HMEALTHGVL
 UGT75A1 219 ALELNA--LRVLK-NVTMVGIGPLIPSSFLDEKDRKDNFFAAD---MIESENMYMEWLDAR---ANKSVIYIAFGSYA-EISSQ---WMEELISQGLL
 UGT71A2 205 ELES HA--IESFKD-----PPIYPVGPILDVRSNG-----RNTNQEIMQWLDQ---PPSSVYVFLCFGSNG-SFSKD---QVKEIACAILE
 UGT71B1 212 DMPEQA--LSFFSGGNGN---TNIPPVYAVGPI MDLESSGD-----EKRKEILHHLWKEQ---PTKSVYVFLCFGSMG-GFSEE---QAREIAVALE
 UGT71C1 232 ALEPNG--FKYFDRCP-----DNYPTIYPIGPI LCSNDRPN--LD--SSERDRIITWLDQ---PESSVYVFLCFGSLK-NLSAT---QINEIAQALE
 UGT71D1 222 DIEPYS--VNHFLQE-----QNYPSVYAVGPIFDLKAQPHPEQD--LTRRDELKWLDDQ---PEASVYVFLCFGSMA-RLRGS---LVKEIAHGLE
 UGT72A1 219 ALEPTT--FGALRDVKFLGRVAK--VPVFP IGPLRRQAGC-----GSNCELLDWLDQ---PKESVYVYVVSFGSGG-TLSLE---QMIELAWGLE
 UGT72D1 215 ELQONT--LAALREDEELSRVMK--VPVYPIGPIVR TNQHV-----DKPNSIFEWLDEQ---RERSVYVYVCLGSGG-TLTFE---QTVELALGLE
 UGT72E1 207 DMPEKT--LKSLODPKLLGRIAG--VPVYPIGPI LSRPVDP-----KTNHPVLDWLNKQ---PDES VLYI VSFGSGG-SLSAK---QLTELAWGLE
 UGT72C1 211 SLEQVT--IGSFLDPENLGRVMRGPVYVPGPLV RPAEP-----GLKHGVLDWLDLQ---PKESVYVYVLLGVVG-ALTFE---QTNELAYGLE
 UGT73A1 221 ELETDYVEHYT--KVLGRR-AWAIGPLSMCNRIEDKAERGK---SSIDKHECLKWLDK---KPSSVYVYVCFGSVA-NFTAS---QLHELAMGVE
 UGT73B1 231 ELEQAYSDFYK--SFAKR-AWHIGPLSLGNRKFEEKAERGK---ASIDEHECLKWLDK---KCDSVIYMAFGTMS-SFKNE---QLIEIAAGLD
 UGT73C1 226 ELEPAYVRDYK--KVKAGK-IWSIGPVSLCNKLGEDQAERGNK---ADIDQDECIKWLDK---EEGSVLYVCLGSIC-NLPLS---QLKELGLGLE
 UGT73D1 230 ELEPGYAEAYA--EAINKK-VWFVGPVSLCNDRMADLFD RGSNGN--IAISETECLQFLDSM---RPRSVLYVSLGSLC-RLIPN---QLIELGLGLE
 UGT89B1 227 AMEGVYLEHLK-REMGHDR-VWAVGPI IPLS-GDNRRG-----P--TSVSVDHVMSWLDAR---EDNHVYVYVCFGSQV-VLTKE---QTLALASGLE
 UGT89C1 185 DLEPEFVETVKTRFLNHHR-IWTVGPLL PFKAGVDRGG-----Q--SSIPPAKVS AWL DSCP---EDNSVYVYVGFSGSI-RLTAE---QTAALAAALE
 UGT89A2 230 ILEDDYLQYVK-QRMGHDR-VYVIGPLCSI GSGLKS N-----S--GSVDPS-LLSWLDGS---PNGSVLYVCFGSQK-ALTKD---QCDALALGLE
 UGT93A1 205 VIEGYPVELLERFN--GGKEVWALGPFTPLAVEKKDSIG-----FSHPCMEWLDKQ---EPSSVIYVVSFGTTT-ALRDE---QIQELATGLE
 UGT93B1 211 ALEGEFLDVVAAQPPFQGRFFAVGPLNPLLLDADAPTTPPGQ-----ARHECLEWLD RQ---PPESVLYVVSFGTTS-CLHAD---QVAELAAALK
 UGT91B1 227 ELEPEWIQLLSKLGKPVPI IGLIPATPMDDADDEGTWLD-----IREWLD RH---QAKSVYVYVVALGTEV-TISNE---EQGLAHGLE
 UGT91C1 224 EFPEPEWFLKDLRKPVPFPI GFLPPVIEDDDAVDTTWVR-----IKKWLDKQ---RLNSVYVYVSLGTEA-SLRHE---EVTALALGLE
 UGT91A1 231 EYEAEWLGLTQELHRKPVIPVGVLPKPKDEKFE DTDWLS-----VKKWLD SR---KSKSIVYVAFGSEA-KPSQT---ELNEIALGLE
 UGT102A1 199 AQISQSVPALDFPRRALPNCFH YVG-----ALRYQPP-----PQVERS---P--RSTPRIFASLGLTQGHRLR---LFQKIARACA
 UGT102B1 204 AQISQLVPELDFPRKALPACFHAVG-----PLRETHA-----PSTSSRYFTS---SEKPRIFASLGLTQGHRYG---LFKTIVKACE
 UGT51B1 319 PFLYNVSPTVFPSPMDFPHWVKVVG YWFLDEGEADSYDPPK-----PLLEFM EKAKT---DGKKLIVYIGFGSIVVSDPKQ---LTEAVIDAVL
 UGT51C1 345 PFLYNVSPAILPPSVDFPDWIKVTGYWFLDEGSGD-YKPPE-----ELVQFMKKASR---DKKKIVYIGFGSIVVKDAKS---LTKAVVSAVR
 UGT51A1 316 PFLYNVSPTIFPPSIDFSEWVRVTGYWFLDD--KSTFKPPA-----ELQEFISEARS---KGKKLIVYIGFGSIVVSNAKE---MTEALVEAVM
 UGT81A1 289 HKLVTRCYCPSTEVAKRAQKAGLETSQIKVYGLPVRPSFVKPVRP-----KVELRRELGMDE---NLPAVLLMGGGEGMGP IEATARALADALYDKNLG
 UGT81B1 220 HHGVSRCYCP SKEVAKRALVDGLDSDQIRVFGPLPVRPSFPR TILN-----KNELRKELEIDL---NLPAVLLMGGGEGMGPVQKTALALGDSL YNSKES
 UGT31D1 233 QLRDNVQLLLNLHPVYDNNRPVPPSVQYLGGLHLSQAPSHK-----LTAALERRINES---VDGAIYVVSFGSSIDTNSIHAEFIQMLLESFVQL
 UGT72B1 217 ELEPNAIKALQEPG-LDKPPVYVPGPLVNI G KQEAQTE-----ESECLKWLDNQ---PLGSVLYVVSFGSGGTLTCEQ---LNELALGLA

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UGT77A1 235 GLDPPDVTAALAEILPNCVPGPYHLLLAEDDADTAAP-----ADPHGCLAWLGRQ---PARGVAVVSFGIVACPRPDE-----LRELAAGLE
UGT8     232 DLVHGSSLWMLCTDVALEFPRPTLPNVVYVGGILTKPAS-----PLPEDLQRWVDGA---QEHGFVLVSFGAGVKYLSSE-----IANKLAGALG
UGT84A1 228 SLEQEVIDYMSSSLCPVKTVGPLFKVARTVTSVSDVSGDICKS-----TDKCLEWLDNR---PKSSVVYISFGIVAYLKQEQ-----IEEIAHGVL
UGT84B1 210 ELESEIIIESMADLKVPVPIGPLVSPFLLGDGEETLDGKNLDFCK----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 -ETYRMPYLYCFYSKYLVKPPDWSGEIAITGYWTLKNQANSDS-----PPDDLIQFLNEESSTENDDIPIYIGFGSIVIDNPTALSLLLIEAIKLSGK
UGT86A1 237 ELEPDSLALQAKQPVYAIGPVFSTDSVVPTSLWAES-----DCTEWLKGR---PTGSVLYVSFGSYAHVGKKE-----IVEIAHGLL
UGT87A1 204 ELEPKAIDFFTSTKFDVYVSTGGLIPLLEELSVGNENRE-----LDYFKWLEDEQ---PESSVLYISQGSFLSVSEAQ-----MEEIVVGVV
UGT92A1 230 TVAEIDQMGLSYFRRITGVPVWVPGVPLKSPDKKVGSR-----TEEAVKSWLDSK---PDHSSVYVCFGSMNSILOTH-----MLELAMALE
UGT83A1 235 ELETAAFGLGNIVPIGPIGWAHSLGEGSTSLGSLPHDR-----DCLDWLDRQIP---GSVIYVAFSGFSGVMGNPQ-----LEELAIQLE
UGT82A1 219 DVDNHKASYKKSNDLNKENNGQNPQILHLGPLHNQEATNNITITKTSFWEEDMSCLGWLQEQ---NPNSVLYISFGSWVSPIGES---NIQTLALALE
UGT80A2 357 IVDSLIIWLGIRDMVNDLRKKKLLRVPVYLSGTQSGSNIPHG-----YMWSPHLVPKPKDWGPQIDVVGFVYLDLASNYEPPAELVEWLEAGDKPI
UGT9     239 EIERNASINFVNTPPIFDFSRPYMPRVNFIGAIQCRKPKE-----LPKEFTSWISAYP---DGFVVLSTGFTVQWNKSPEHIRQAYLDTFKYL
UGT24A1 244 DLGAKCPLVIVNSNELYDLPRPTLAKVVNIGGLGVGFDSAKP-----LTGEFKKISSETG---KGMIVVSFGSVAAAHDMPLEWKNSSILEAFSSL
UGT26A1 178 LAKTTVPSLLINGDRMLDFPRPLPIHIAFSGELGVSKGKK-----LVMEKWLEDIEKPK---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--LDNVYLGWLPQNELLDG-----	PRLSLFVTHGGLASVTE
UGT16B1	329	-PDVTFIWKYENL-----	ADKKYTCG--IMNINRVEWIPQTELLAD-----	SRVDAFITHGGLGSVTE
UGT16D1	345	-PDTTFIWKYED-----	PNVNIAKN--LDNVFISSWLPQNELLDAD-----	SRVTVFVTHGGLASVME
UGT17A1	340	-PDITFIWKYENSSI-----	DIVKEFDPT--IKNIVQVDWMPQQAALLAD-----	PRLDLFVTHGGMASVTE
UGT17B1	337	-PDTTFIWKYENTTV-----	DIVKQYNKR--INNVMLTDWMPQATALLAD-----	PRLTLFVTHGGLGSTNE
UGT14A1	336	-PNVTFIWKYETN-----	DTK-FADG--VDNVHFSKWVWPQTALLND-----	DRLTAFVTHGGLGSTNE
UGT14D1	330	-PNVTFIWKYETN-----	DTS-FAFG--IDNIYFSKWVWPQSKLLND-----	ARLTAFVTHGGLGSTNE
UGT14C1	329	-PNVTFIWKYEND-----	NLE-WAKG--IQNIYFSKWVWPQTALLND-----	ARLTAFVTHGGLGSTNE
UGT14E2	333	-PDVTFIFKYESD-----	EVS-FADG--ISNIHFSKWVWPQTALLND-----	PRLSAFVTHGGLGSTME
UGT14F1	318	-PNVTFIWKYESD-----	DVS-FADG--ISNIHFSKWVWPQTALLND-----	PRLSAFVTHGGLGSTNE
UGT15A2	375	-PNVTFIWKYEE-----	DVS-FAKH--LPNLHFSKWVWPQTALLAD-----	SRLSAFVTHAGLGSVTE
UGT15B1	325	-KNVSFIWKYESE-----	ETS-FANG--AENIIFSKWVWPQTALLAD-----	SRLSAFFTHGGLGSVNE
UGT15D1	296	-KNVTFIWKYEGN-----	DIEDFARG--IQNIHFKWVWPQTALLAN-----	RRLSAFFTHAGLGSINE
UGT15E1	340	-PDVTFIWKYETN-----	DTS-FANG--TENIHFVSNWVWPQTALLAD-----	PRLSAFFTHAGLGSVNE
UGT15C1	327	-NDVTFIWKYEGD-----	DKKEFANG--IKNIHFSKWVWPQRELLGNNAFNFTTEIHIYVTESDPRLSAFVTHGGLGSVNE	
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--PKNVHLKNWVWPQPSLLAD-----	KRLKLFVTHGGLGSTME
UGT19A1	324	-PDFLFIWKYEKD-----	DEFT-QKNK--KGNVVFKKFLPQVDLLES-----	RKIKLFITHGQNSLLE
UGT19B1	322	-NNVLFIWKYEME-----	DNFTKQEEL--TTNIIFKKFLPQTDLLAS-----	SKIDLFLVTHGQNSLLE
UGT25A1	294	-PDFSFLWKYDNL-----	TDDAELFAD--SSNIHRVEWLPQTDLLGD-----	NRVKAFLISHMGLNSFLE
UGT25B1	319	-PNVTFIWKYDSL-----	ELDADIFQG--VENIHRLEWLPQTELLHD-----	NRVKLFISHMGLNSYLE
UGT25C1	320	-PEYTFIWKYINVQ-----	PGEEKLFED--AENVILLDWLPQTDLLYD-----	PRVIGFISHVGLNSFNE
UGT25D1	335	-PDFTFVWKYEMQ-----	DGDEQIFAN--TTNLRLLKWLWPQTDLLND-----	ARTKAFLISHVGLNSYLE
UGT21A2	324	-PDYHFVIRADKYD-----	LSTREYAKS--VSNAFVSDWLPQPAILHH-----	PRLKLFITHSGYNSIVE
UGT21B1	304	-KDYEFIIKVDKFD-----	RRSFDAEG--LSNVLVVDWVWPQTAVLAH-----	PRLKAFITHAGYNSLME
UGT2A1	330	--PQKVLWRYK GK-----	IPATL--GSNTRLFDWIPQNDLLGH-----	PKTRAFITHGCTNGIYE
UGT2B1	333	--PQKVWRFDGK-----	KPDTL--GSNTRLKWIIPQNDLLGH-----	PKTKAFVAHGCTNGIYE
UGT1A1	330	--PQTLLWRYTGT-----	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	NSNQPFLLWVVRPGLIH-----	GKEWIEILPKGF IENLE--G-RGKIVKWAPQPEVLAHRATG-----	GFLTHCGWNSTLE
UGT76C2	292	NSKQPFLLWVVRPGSVL-----	GAKWIEPLSEGLVSSLE--E-KGKIVKWAPQPEVLAHRATG-----	GFLTHCGWNSTLE
UGT76F1	297	NSELPEFLWVVRPGMVR-----	GTEWLES LPCGFLENIG--H-QGKIVKWVWVQLETLAHPAVG-----	AFWTHCGWNSTIE
UGT76D1	287	QSNQPFLLWVIRPGSIN-----	GQESLDFLPEQFNQTVT--DGRGFVVKWAPQKEVLRHRAVG-----	GFWNHCGWNSCLE

UGT76E1	290	NSNQPFLLWVIRPGSIP-----GSEWTESLPEEFSRLVS--E-RGYIVKWPAPQIEVLRHHPAVG-----GFWSHCGWNSSTLE
UGT78B1	296	SRKIPFLWLSLR-----DEARKHLPENFIDRTS--TFGKIVSWAPQLHVLNPAIG-----VFVTHCGWNSSTLE
UGT78C1	285	TKKTPFIWLSLR-----NNGVKNLPGKFLERTK--EFGKIVSWAPQLEILAHKSVG-----VFVTHCGWNSILE
UGT78D1	298	SSKVPFVWLSLK-----EKNMVHLPKGFLDRTR--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-SLVLKWSPQLQVLSNKAIG-----CFMTHCGWNSSTME
UGT74D1	297	QTGHNFLWVRE-----TETKKLPSNYIEDICD--K--GLIVNWSQPQLVLAHKSIG-----CFMTHCGWNSSTLE
UGT74E1	295	QSGHFFLWVRE-----TERRKLPENYIEEIGE--K--GLTVSWSPQLEVLTHKSIG-----CFVTHCGWNSSTLE
UGT74C1	299	QTGYHFLWSVRE-----SERSKLPSGFIEEAE--KDSGLVAKWVPQLEVLAHESIG-----CFVSHCGWNSSTLE
UGT74A1	305	AAGKPFLWVRA-----SDEHQVPRYLLAEATA--TGAAMVVPWCPQLDVLAHPAVG-----CFVTHCGWNSSTLE
UGT75B1	285	EGKRPFLWVITDKSNRET-----KTEGEEETEIEKIAGFRHEL--EEVGMIVSWCSQIEVLSHRAVG-----CFVTHCGWNSSTLE
UGT75D1	305	QSRPFLWVITDKSYR-----NKEDQEKEEDCISSEKSF--DEIGMVSWCDQFRVLNHRSIG-----CFVTHCGWNSSTLE
UGT75C1	296	ATNRPFLWVIREKNPE-----EKKNRFLLELIRGSDR--GLVVGWCSQTAVLAHCAVG-----CFVTHCGWNSSTLE
UGT75A1	303	KCGRPFLWVIRETLNG-----EKPEEK--LTCKDEL--EKIGRIVRWCSQMEVLKHSVVG-----CFLTHCGWNSSTLE
UGT71A2	276	DSGHRFLWVSLADHRAPGF---LESPTS--DYEDLQEVLPPEGFLERTS--GIEKVIW-WAPQVAVLAHPATG-----GLVSHSGWNSILE
UGT71B1	291	RSGHRFLWVSLRRASPVG---KSNPPPGEFTNLEEILPKGFLDRTV--EIGKIIS-WAPQVDVLSNPAIG-----AFVTHCGWNSILE
UGT71C1	311	IVDCKFIWVFRTRNPK-----EYASPYEALPHGFMDRVM--DQGIVCG-WAPQVEILAHKAVG-----GFWSHCGWNSILE
UGT71D1	302	LCQYRFLWVSLRKE-----EVTKDDLPEGFLDRVD--GRGMICG-WSPQVEILAHKAVG-----GFWSHCGWNSIVE
UGT72A1	298	RSQQRFIWVVRQPTVKTGDAAFFTQGDG--ADDMSGYFPEGFLTRIQ--NVGLVVPQWSPQIHMSSHPSVG-----VFLSHCGWNSVLE
UGT72D1	294	LSGQRFVWVLRPPASYLG---AISSD--DEQVSASLPEGFLDRTR--GVGIVVTQWAPQVEILSHRSIG-----GFLSHCGWNSALE
UGT72E1	286	MSQQRVWVVRPPVDGSACSAYLSANSGBKIRDGTPDYLPPEGFVSRTH--ERGFMVSSWAPQAEILAHQAVG-----GFLTHCGWNSILE
UGT72C1	290	LTGHRFVWVVRPPAEDDPSASMFDKTKN--ETEPLDFLPNGFLDRTK--DIGLVVRTWAPQEEILAHKSTG-----GFWTHCGWNSVLE
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	KSSVRFIIWAVRDAAKVNV-----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-----GFWTHCGWNSAVE
UGT91C1	301	KSETPFFFWVLRNEPK-----IPDGFKTRVK--GRGMVHVGVWPQVKIILSHESVG-----GFLTHCGWNSVVE
UGT91A1	308	LSGLPFFFWVLKTRRGPWD-----TEPVELPEGFEERTA--DRGMVVRGWVQRLRILSHDSIG-----LVLTHPCWGTIIE
UGT102A1	267	SVGAEVTAH-----CDGLTPAQADSLYA--CGATEVVSFVDQPR--YVAEAN-----LVITHGGLNIVLD
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	NPIGQLIVICGRNKV-----LASTLASHAW--KIPVKVRGFETQMEKWMG-----ACDCIITKAGPGTIAE
UGT31D1	321	N-NYTVLWKVDDT-----VPASVKL--PSNVVTQKWFQRAVILHKK-----KVVAFVMQAGLQSSDE
UGT72B1	295	DSEQRFLWVIRSPSGIAN---SSYFDSHSQTDPLTFLPPGFLERTK--KRGFVIFWAPQAVLAHPSTG-----GFLTHCGWNSSTLE

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UGT77A1    315 DSGAPFLWLSLREDSWP-----HLPPGFLDRAAG--TGSLVVPWAPQVAVLRHPSVG-----AFVTHAGWASVLE
UGT8       314 RLPQKVIVRFSG-----TKPKNL--GNNTKLI EWL PQNDLLGHSNIR-----AFLSHGGGLNSIFE
UGT84A1    308 KSGLSFLWVIRPPPHDLK-----VETHVLPQELKESSA--KGKGMIVDWCPQE QVLSHPSVA-----CFVTHCGWNSTME
UGT84B1    296 NRGLPFLWVIRPKKAQN-----VAVLQEMVK--EGQGVVLEWSPQE KILSHEAIS-----CFVTHCGWNSTME
UGT88A1    297 KSGQRFLLWVVRNPPELEKT-----ELDLKSLLP EGF LSRTE--DKGMVVKSWAPQVPV LNHKAVG-----GFVTHCGWN SILE
UGT90A1    307 DSKVNFLWVTRKDV EEIIG-----EGFNDRIR--ESGMIVRDVWDQWEILSHE SVK-----GFLSHCGWN SAQE
UGT79A1    300 QTGLPFLLV LNF PANVDVS-----AELNRALPEGFL ERVK--DKGI IHSGWVQQQNILAHSSVG-----CYVCHAGFSSVIE
UGT79B1    303 STGFPELVAIKPPSGVS-----TV E EALPEGFKERVQ--GRGVVFGGWIQQPLV LNHPSVG-----CFVSHCGFGSMWE
UGT22A1    370 SDYHFLIKIAKGD-----NNTKKLVEG--IKNVDVAEWLPQVDILSH PRLK-----L FVMHGGINGLVE
UGT23      333 PDYHFVVKT TADD-----ESSAQFFST--VQNVDLVDWVPQKAVLRHANLK-----LFVSHGGMNSVLE
UGT52A1    388 RAIISQGWGGLS IDEHNN-----NNNNNNNNNGE--NSDSNKSSLQSNRIYLK KPV DHS-----WLF EKVS LVI SHGGAGTVA A
UGT86A1    312 LSGISFLWVLRPDIVGSN-----VPDFLPAGFVDQA--QDRGLVVQWCCQMEV I SNPAVG-----GFFTHCGWNSILE
UGT87A1    281 EAGVKFFWVARGG-----ELKLKEALE--GSLGVVSWCDQLRVL CHAAIG-----GFWTHCGYNS TLE
UGT92A1    310 SSEKNEFWVRPPIGVEVKS-----EFDVKGYLPEGFEE RITR SERGLLVK K WAPQVDILSHKATC-----VFLSHCGWNSILE
UGT83A1    313 LTKRPVLWVTGDQ-----QPIKLGSDRVKVVWRWAPQREVL SSGAIG-----CFVSHCGWNS TLE
UGT82A1    311 ASGRPFLWALNRVWQEG-----LPPGFVHRVTITKNQGRIVSWAPQLEVL RND SVG-----CYVTHCGWNS TME
UGT80A2    449 YIGFGSLPVQEPEK-----MTEIIVEALQRTKQRGI I NKGWGGLGNLKEPKDFVYLLDNVPHDWLFPRCKAVVHHGGAGTTAA
UGT9       324 -PNLLFLWQTGLP-----NSSNLPSNLLVKPWLPLQDLLGHQKCR-----CHVSHGGLNSVIE
UGT24A1    330 PDYQFLMRYVAD-----DLNDRLPKNVHLFKWLPQKDLL LHNKTK-----AFIITHGGYNSMQE
UGT26A1    265 -KTYTILWRMEKS-----VAGAEKYENLHLVKWLPQKD I MRHPKMK-----LMIAHGGYNSFLE
UGT20A1    324 -SHITFLVKYETS-----SNSTISVPDNLVILTPWIPQLPLMAHKNYK-----TIIITHGGWSSILE
UGT104A3   277 ELGERALICSGWS-----DFS NVPHADHVKVVGVVNYTKIFPACR-----AVVHHGGSGT TAA
UGT106A1   249 -----ALEAENG--DKL KVLGYVERIDE LFRIT-----DCMITKPGGITL TE
UGT106B1   254 LTRMYLILGYTKH-----MNEWMASSQLM-----ITKPGGITITE
UGT103A1   280 GARGIFLITGAG-----QEPLRGLPNHVLQRAYAPL GALLPSCAG-----LVHPPGGIGAMSL
UGT105A5   249 ASGRRIVLSRG-----WADLVL PDD--GADCFVVG EVNLQELFGR-----VAAAIHHD SAGTTLL
UGT10      341 N-DYRIYWRIGPN-----MHLDGIDIEKIPKHINL TTFIPQNDLLAHK SCK-----L FVINGGMSSVME
UGT27A1    323 -TEYRVIWSMKGD-----RPKGLGEHVKISSWV PQQI LNHKKT V-----LFLSHGG LKSVKE
UGT101A1   264 HLVLQIGRKVTP-----AELGELPDNVEVHDWVPQLAILRQAD-----L FVTHAGAGGSQE
consensus  601     . . . . . . . . . . . . . . . . . . . . . . . .

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UGT13A3	385	LAYQGGKPAVVIPLMADQPRNALMLTRHGGALQLDKTF-----LNNSEKIREAIQTVMEN-----PSYKKNNAEKLANILSSQPH
UGT13B1	424	LAYQGGKPALIPLMADQPRNAHMLKRHGGCLQYHKTM-----LGDSEQLLKAFKTVLTE-----RKYSENAQRLARILRDQPV
UGT16A1	370	LAMMGTPAVMIPLFADQGRNAQMLKRHGGAVVIEKNN-----LADTHFMKETLEKVIKD-----PKYLENSKRLAEMLTNQPT
UGT16C1	388	LALMGKPAVMVPLFADQARNANMLKRHGGAAVLHKTLD-----LGNAETIRNTIKKVLN-----EKYRVNAERLAEMLNNQPT
UGT16B1	384	LATMGKPAVVIPIFADQTRNAEMLKRHGGAEVLHKTLD-----LANPETLRKTLRKVMDD-----PSYRQNAQRLAEMLNNQPT
UGT16D1	399	LALMGKPAIMIPFADQGRNAQMLKRHGGAAVLQKTD-----LSNFDLVRDTLNDVLTKE-----PSYKLNNAKLAEMLNNQPT
UGT17A1	398	IAFSGKPAVMVPVFGDQTRNSRMLERHGGVLMRLKEN-----LEYPEIVIVETILSVLND-----PSYAERAQQIATLLRNHPE
UGT17B1	395	VAFSGKPSIMVPVFGDQTRNARMLERHEVALVLTKYD-----LTNFKKVRGTIRKMLND-----KSYSMKNAEKLQMLRNQPE
UGT14A1	390	LAHWGKPAVTVPIFGDQVRNANMLTRHNGAIFVWKN-----LGNYGIVKEAVHQILYN-----EKYKRNKYLADILENQPH
UGT14D1	384	LAHFGKPAVMVPIFGDQYRNHMLQRHGCAIIVQKTE-----LSNWKIVSSAVKSVLYD-----ENYKKNAAHLADLLQNQPV
UGT14C1	383	LAFLGKPALMVPVFGDQDRNANMLARHGGVLVVHKKE-----LGNFKTIKSSIRSILHE-----EKYQKNARKLSELLNNQPL
UGT14E2	387	LAYSGBKPGVVIPIVFGDQIRNARMIARHNGVIYLHKNS-----MENVKVTRKALTDVLYD-----ESYKKNNAEKLTDILMNQPY
UGT14F1	372	LAYCAKPAVMVPIYGDQTRNANMLARHGSVIVLHKKE-----LANVQRVKKAVHDILYN-----KQYTESAERIAEMIKNQPK
UGT15A2	429	LSYMGKPAVLIPLFADQLRNSKTLRHNHGSITLSKYD-----LSSFELKRFALNTILND-----ERYKINAEILSQQLQDQPV
UGT15B1	379	LSYLGKPALLCPLFADQIRNSKMLTRHNHGSIEISKFN-----LENYNTLRSAHSILFA-----ESYSENAEKLAKKLEYQPT
UGT15D1	351	VSYLGKPSILCPLFADQMRNAKMLVRHNHGSIELSKYD-----LGNSTKIIIEAFQAILFD-----SSYAENAAQKLAEQLENQPI
UGT15E1	394	VSYLGKPTIMCPIFADQMRNAKMLARHNHGSIEISKYD-----LSNGDKIEEALSKILFD-----ESYKTAAEKLAHQLANQPV
UGT15C1	398	VSYFGKPTIMCPLSGDQMRNAKMLERHNHGSIEFSKYD-----LHNEKVVANAFRKLILYD-----ESYTLNAKRLSEHLQFQPV
UGT18A1	389	LAYSAKPAIVTPIPLFADQPSNAQMLERHGSVEVLSKHD-----IPNWKQSDLLKTMAD-----KKYQEAATRLADILNNQPI
UGT18B1	391	LARAAKPAIVPIPLFADQPGNAKMIERHGSVEIFSKLD-----IPNSKKLSSLIQKMLNT-----KYYQQNANRLADTLRFQPI
UGT18C1	390	LAYAAKPAIVPIPLIAEQPDNGKMLARHGSAEIYSKHD-----IPHWEKLNRLQKMLQH-----SSYQKAADRLARVLSNQPI
UGT18D1	385	VAYAGKPSLMIPFADQMLNAKMLSRHGGAISYDKYE-----LENYEKLTTETVKEAISN-----KEYNKKALLLAEILHNQPI
UGT18E1	380	VGYAGVSSIMVPVFSQDQVNAEMLARHGGAVYDKFD-----LVDSKKLMEIIMILNN-----SDYRKNKSKRLSDILHNQPM
UGT18F1	388	VAYTGKPALMIPFADQPNADMLSRHGGAVAYDKFE-----LADGDKLIKIVKDMVSN-----PKYEKNAQELLRVLNQPI
UGT19A1	379	TFHNSNTRTLITPLFGDQHRNAQIALENGLSHVLLKQDQ-----LANEELVYAAIKQGTES-----NKK-----
UGT19B1	378	AFNSGVRVLAVPLFGDQHRNAKLAFENGLIEILPKSD-----IETPAKIVKAVKTGLEP-----NAKYKIFSE-----
UGT25A1	350	TSAAGIPVLAVPLFIDQQHNAALNAVSRDIGVIVERHQ-----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	AIYHGIPVIGIPLFADQPDNINHMVAKGAAVRVDFSI-----LSTTGLLTALKIVMND-----PSYKENAMRLSRIHHDQPV
UGT1A1	381	GICNGVPMVMMPLFGDQMDNAKRMETRGAGVTLNVLE-----MTADDLENALKTVINN-----KSYKENIMRLSSLHKDRPI
UGT35A1	381	SIYFGKPIILGLPIFYDQHLNVQRAKQAGYGLSADIWS-----VNATELTPLIQELLSS-----PSYAAAAQTKSKLFRDQKE
UGT35B1	371	SIHHGKPVLLGLPFFYDQFLNVRRTQAGFGLGLDHTT-----MTQQEFKETIEILLKE-----PRFAQIARQMSERYRDQPM
UGT31B1	393	AVEAIVPMVGMPPMGDQAYNMNKIVELGLGVVDTVR-----VNAEQLIEAIVDVAES-----PKYRKRRLRELRHMIHHQPM
UGT31C1	375	AVENLVPLVGVPLMGDQAFNAHRYVELGIGVALDATR-----LTAADLARAVEQVTS-----RAYRENLERLRLRLRHQCA
UGT31A1	385	AIDAGVPMVGVPIMGDQFYNVYMYETYGIGRVDTLT-----VDARQLTEIVMDVADN-----EKYKNGTLWLRDAIMDQPM
UGT32A1	365	AVNSGVPMIGIPIMGDQFYVRRYTELGIGEKVNILR-----LEEEGLDRKIKNLVHN-----KSYELNIKRLNLFISDTPV
UGT76B1	354	GICEAIPMICRPSFGDQRVNARYINDVWIKIGLHLEN-----KVERLVNIENAVRTLMT-----SSEGEEIRKRIMPMPKETVEQCLK
UGT76C2	359	SICEGVPMICLPGGWDQMLNSRFVSDIWKIGIHLEG-----RIEKKEIEKAVRVLME-----ESEGNKIRERMKVLKDEVEKSVK
UGT76F1	364	SICEGVPMICTPFCSDQHVNARYIVDVWRVGMMLERC-----KMERTEIEKVVTSVMM-----EN-GAGLTEMCLELKEKANVCLS
UGT76D1	355	SISSGVPMICRPSYSGDQRVNTRLMSHVWQTAYEIEG-----ELERGAVEMAVRRLIV-----DQEGQEMRMRATILKEEVEASVT

UGT76E1 357 SIGEGVPMICRPFPTGDKVNAVRYLERVWRIGVQLEG-----ELDKGTVERAVERLIM-----DEEGAEMRKRVINLKEKLQASVK
 UGT78B1 357 SIFCRVPIGRPFPGDKVNAVARMVEDVWIKVGVKGG-----VFTEDETTRVLELVLV-----SDKGKEMRQNVGRLEKAKDAVK
 UGT78C1 346 GISFGVPMICRPFPGDKLNSRMVESVWEIGLQIEGG-----IFTKSGIISALDTFFN-----EEKGKILRENVEGLKEKALEAVN
 UGT78D1 359 SVSAGVPMIGRPILADNRLNGRAVEVVWVGVMMMDNG-----VFTKEGFEEKLNDVFFV-----HDDGKTMKANAKKLKEKLQEDFS
 UGT85A1 390 SLSCGVPMVCWPFADQOMNCKFCCEDEWDVIGIEIG-G-----DVKREEVEAVVRELM-----GEKGGKMKREKAVIEWORLAEKATE
 UGT85B1 395 ATAAGQPVLAWPCHGEQTTNCRQLCEVWNGAQLP-R-----EVESGAVARLVREMMV-----GDLGKEKRAKAAEWKAAAEAAAR
 UGT74B1 363 GLSLGVPMVGVQWSDQMNDAKFVEEVWVGVYRAKEEAGEVIV-----KSEELVRCLKGVME-----GESSVKIRESKSKWVDLAVKAMS
 UGT74F1 351 GLSLGVPMVAMPQWTDQPMNAKYIQDVWVGVVRVKAEEKESGIC-----KREEIEFSIKEVME-----GEKSKEMKENAGKWRDLAVKSLS
 UGT74D1 358 ALSLGVVALIGMPAYSQDPTNAKFIEDVWVGVVRVKAD-QNGFV-----PKEEIVRCVGEVME-----SEKGGKIRKNARRLMEFAREALS
 UGT74E1 356 GLSLGVPMIGMPHWADQPTNAKFMEDVWVGVVRVKAD-SDGFV-----RREEFVRRVEEVM-----AEQGKIRKNAEKWKVLAQEAVS
 UGT74C1 362 ALCLGVPMVGVQWTDQPTNAKFIEDVWVGVVRVTD-GEGLS-----SKEEIIARCIIVEVME-----GERGKIRKNVEKIKVLAREAIS
 UGT74A1 368 ALSFGVPMVAMALWTDQPTNARNVELAWGAGVRARRDAGAGVF-----LRGEVERCVRAVMDG-----GEAASAARKAAEGWRDRARAAVA
 UGT75B1 358 SLVLGVVVAFPMWSDQPTNAKLLLEESWKTGVRVRENKDG-----LVERGEIRRCLEAVME-----EKSVELRENAKWKRLAMEAGR
 UGT75D1 376 SLVSGVPPVAFQWNDQMTNAKLLLEDCKWKTGVRVMEKKEEGEVV-----VVDSEEIRRCIEEVM-----DKAEFEFRGNATRWDLAAEAVER
 UGT75C1 360 SLESGVPPVAFQFADQCTTAKLVEDTWRIGVKVVGEEGD-----VDGEEIRRCLEKVMMSG-----GEEAEMRENAEKWKAMAVDAAA
 UGT75A1 367 SLASGVPIVACPIWNDQICNAKLIQDVWVIGVRVNANKEG-----I IKRDEFQKCIIEIVMGD-----AEEGEEELRKNAQKWKDLAKESTK
 UGT71A2 351 SIWFGVVPVATWPMYAEQQFNAFQMVIELGLAVEIKMDYRND---SGE---IVKCDQIERGIRCLMKHD-----SDR-RKKVKEMSEKSRGALM
 UGT71B1 368 SLWFGVPMMAAWPIYAEQQFNAFHVMDELGLAAEVKKEYRRDFLVEEPE---IVTADIEIRGIKAMEQD-----SKM-RKRVMEMKDKLHVALV
 UGT71C1 378 SLGFGVPIATWPMYAEQQLNAFMTMVKELGLALEMRLDYVSE---DGD---IVKADEIAGTVRSLMDG-----VDVPKSKVKEIAEAGKEAVD
 UGT71D1 365 SLWFGVPIVWPMYAEQQLNAFMLMVKELKLAVELKLDYRVH---SDE---IVNANEIETAIRYVMDTD-----NNVVRKRVMDISQMIQRATK
 UGT72A1 378 SITAGVPIIAWPIYAEQRMNATLLTEELGVAVRPKNLPAGE---VVKREEIERMIRRMVDE-----EGSEIRKRVRELKDSGEKALN
 UGT72D1 369 SLTKGVPIIAWPLYAEQWMNATLLTEEIGVAVRTSELPSE---VIGREEVASLVRKIMAE---DEEQKIRAKAEVVRVSSERAWS
 UGT72E1 368 SVVGGVPMIAWPLFAEQMMNATLLNEELGVAVRSKKLPSEG---VITRAEIEALVRKIMVEE---EGAEMRKKIKKIKETAAESLS
 UGT72C1 370 SIVNGVPMVAVPLYSEQKMNARMVSGELKIALQIN--VADG---IVKKEVIAEMVKKVMDEE---EGKEMRKNVKELKKTAEALN
 UGT73A1 369 GVS GGVPMTWPFVFAEQFFNEKLVTEVLKTGAGVGSIQWKRSASEG---VKREAIAKAIKRVMS---EEADGFRNRKAYKEMARKAIE
 UGT73B1 382 GVAAGLPMVTWPFVFAEQFYNEKLVTVLKTGVS VGVKMMQVVGDF---ISREKVEGAVREVMVG---EER---RKRKELAEAMKNAVK
 UGT73C1 378 GITSGVPLLTWPLFGDQFCNEKLAQILKAGVRAGVEESMRWGEEEKIGVLVDKEGVKKAEEELMG-----DSNDAKERRKRVKELGELAHKAVE
 UGT73D1 385 AICFGVPMITWPLFAEQFLNEKLVIVELNIGVVRVGVIPVVRWGEERLGLVVKKPSVVKAIKLLMDQDCQRVDENDDNEFVRRRRRIQELAVMAKAVE
 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---AIQKVIEEAMLS---DSGMAVRQRAKELGEAVRASVA
 UGT91B1 368 GLSFGVPLIMFPENLDQPLVARLLSGMN-IGLEIPRNERDG---LFTSASVAETIRHVVE---EEGKIYRNNAASQQKIFGNKR
 UGT91C1 361 GLGFGKVPVIFPVLNEQGLNTRLLHGKG-LGVEVSRDERDG---SFSDSVADSI RLV MID---DAGEEIR-AKAKVMKDLFGNMD
 UGT91A1 376 AIRFAKPMAMLVFVYDQGLNARVIEEK-IGYMI PRDETEG---FFTKE SVANSRLVMVE---EEGKVYR-ENVKEMKGVFGDMD
 UGT102A1 324 ALAAATPVLAVPLSFDQPAVAARLVYNG-LGRRVSRFAR---QQT LADEIAQLLGD-----ETLHQRLATARQQINDAGG
 UGT102B1 333 AINRYTPLLALPLAFDQPGVASRIVYHG-IGKRASRFTT---SHALARQMRSLTN-----VDFQORMAKIQTALRLAGG
 UGT51B1 460 TLRAGIPTTIKPFPGDQFFYANRVEDIG-VGIGLRKLN---SKSLSKAIKEVTTN---TRII EKAKEIGKQIQSENG
 UGT51C1 487 TMRAGIPTTIKPFPGDQFFYATRIEDLG-AGIALKKL---AKTLGDALVKATHD---LKIIDKAKRVSQKIKHEHG
 UGT51A1 457 SLRAGLPTVIKPFPGDQFFYAGRVEDIG-VGIALKKL---AOTLADALKVATTN---KIMKDRAGLIKKKISKEDG
 UGT81A1 439 AMIRGLPIILNGYIAGQEAGNVPPYVVENGCCKFSKSP---KEISKIVADWFGP---ASKELEIMSQNALRLAKPE
 UGT81B1 370 ALICGLPIILNDYIPGQEKGNVPYVVDNGAGVFTRSP---KETAKIVADWFSN---NKEELKKSSENALKLSQPE
 UGT31D1 375 ALESRVPMVCLPMMGDQFHARKLQQFGVARTLDTAV---VSAAQLTLAIGEVIAD---AEAYRARIDDIRAVLEHDA
 UGT72B1 373 SVVSGIPLIAWPLYAEQKMNAVLLSEDIRAALRPRAGDDG---LVRREEVARVVKGLMEG-----EEGKGVNRKMKELKEAACRVLK

UGT77A1	378	GLSSGVPMACRPF	FFGDQRMNARSVAHVWGF	GAAFEGA-----	MTSAGVATAVEELLRG-----	EEGARMRARAKEL	QALVAEAFG					
UGT8	367	TMYHGVPVVGIP	PLFGDHYDTMTRVQAKGM	ILLEWNT-----	VTEGELYDALVKVINN-----	PSYRQRAQKLS	EIHKDQPG					
UGT84A1	376	SLSSGVPVVCCP	QWGDQVTDVAVYLIDVFKT	GVRLGRGATEER-----	VVPREEVAEKLLLEATVG-----	EKAEELRKNALK	KWKAEEAAVA					
UGT84B1	358	TVVAGVPPVAYP	SWTDQPIDARLLVDVFGIGVR	MNRNDSVDG-----	ELKVEEVERCIEAVTEG-----	PAAVDIRRRAE	LKRVAR-LAL					
UGT88A1	368	AVCAGVPMVAW	PLYAEQRFNRMIVDEIKIA	ISMNESETG-----	FVSSTEVEKRVQEIIGCEP-----	VRERTMAMKNA	EELALT					
UGT90A1	369	SICVGVPLLAW	PMMAEQPLNAKMVVEEIKV	GVVRETEDGSVKG-----	FVTREELSGKIKELMEG-----	ETGKTARKNV	KEYSKMAKAALV					
UGT79A1	370	ALVNDQCQVVM	LPQKGDQILNAKLVSGDME	AGVEINRRDEDG-----	YFGKEDIKEAVEKVMVDVE-----	KDPGKLIRENQ	KKWKEFLLNKDI					
UGT79B1	370	SLMSDCQIVL	VPLQHGQIILNARLMT	EEEMAVEVEREKKG-----	WFSRQSLENAVKSVMEE-----	GSEIGEKVRKN	NHDKWRCVLT					
UGT22A1	427	TAIQAVPTVIV	PVFADQFRNGRMVEKR	GIGKVLKLD-----	IGYESFKNTVLTVLNT-----	PSYKKNAIRI	GKMMRDKPF					
UGT23	390	TMYGCVPMVIM	PVFTDQFRNGRNVERR	GAGKMLRET-----	VVKETFFDAIHSVLEE-----	KSYSSSVKRI	SHLMKNKPF					
UGT52A1	462	SLLAAKPTIV	VPFFGDQFFWGERIKQ	TGIGTSIPFDI-----	LTAKSLSSHIISILNE-----	PSVRAKVNKM	SHLLKREDG					
UGT86A1	378	SVWCGLPLL	CYPLLTQFTNRKL	VDDWCIGINLCEKKT-----	ITRDQVSANVKRLMNG-----	ETSSELRNN	VEKVKRHLKDAVT					
UGT87A1	338	GICSGVPLL	TFFVFDQFLNAKMIVE	EWRVGMGIERKKQ-----	MELLIVSDEIKEL	VKRFMDGE-----	SEEKEMRRRTCDLSEICRGAVA					
UGT92A1	384	SLSHGVPLL	GWPMMAEQFFNSILMEKH	IGVSVVEVARGKR-----	CEIKCDDIVSKI	IKLVMEET-----	EVGKEIRKKAREVKELVRRAMV					
UGT83A1	367	GAQNGIPFL	CIPYFADQFINKAYICDV	VWIKIGLGLERDARG-----	VVPRLEVKKK	IDEIMRD-----	GGEYEERAMKVKELVMK.SVA					
UGT82A1	375	AVASSRRL	CYPVAGDQFVNCKYIV	DVWIKIGVRLSGFG-----	EKEVEDGLR	KVMED-----	QDMGERLRKLRDRAMGNEA					
UGT80A2	527	GLKASCPTT	IIVPFFGDQPF	WGERVHARGVGP	PIPVD-----	EFSLHKL	EDAINFMLDD-----	KVKSSAETLAKAMKDEDG				
UGT9	376	SVYHGV	PVVGVLTSRGYD	NLLRITARDSG	VMVEKSE-----	FSGEILTAA	AINENVQIQ-----	IIVFRYKKEMLIFQDMVIDVPY				
UGT24A1	383	AISAGV	PLVTIALFGDQ	PKNSKVAKKH	GFAVNIQKGE-----	ISKKTIV	KAIMIIVEN-----	DSYKQKVSRLSAMVRAQPM				
UGT26A1	318	AAQAGI	PAVLMPLFADQ	KINAKRAQRY	GMATVLDKLD-----	LTINNV	YGAIKEALKP-----	EYSTNAKKLSAMLSAQVA				
UGT20A1	378	TTMHSK	PMILMPLFAD	HAKNSKVAES	KGAVLLDKMR-----	LSRRRV	VHAIYITILT-----	PKYTQNC EKFSRMFSDTPI				
UGT104A3	330	GLRAGI	PSLILWTAGD	QPLWGSRI	QKLVGTSRR	FSAT-----	TPETLVADLR	KILAP-----	EYLTRARELSSRMSKPAE			
UGT106A1	289	ATAIGV	PVILYKVPV	QKEKENAN	FFEDRGAAIV	VNRH-----	EEILES	SVTSLIAD-----	EDTLHRMKNKIKDLHLANSS			
UGT106B1	289	GFARC	IPMIFLNPAP	QELENAF	YFEEKGFG	KIADTP-----	EEAIKIV	ASLTNG-----	NEQLTNMISTMEQDKI			
UGT103A1	331	ALAA	GVQVLLPCA	HQFDNAERI	VRLGCGM	RLGVPLR-----	EQELR	GALWRLL	ED-----	PAMAAACRRFMELS QPHSI		
UGT105A5	302	AMRAGI	PQIVVRR	VVDNVVE	QAYHAD	RVAELG	VGVAVDG-----	PVPTID	SLSAALD	TALAP-----	EIRARATTVADTIRADGT	
UGT10	399	AVAHG	VPVIVGV	PVLYGSN	RYNLQK	VSNKGL	GIVIDKDD-----	LNEIS	LYGAM	KKVLES-----	AKYKNTAKEMSKEFKSRTT	
UGT27A1	375	AVCSAT	PSLFPMP	FAEQMR	NAWLAK	SKGFAR	IILNKFH-----	LSEQY	LENHIRE	VVEH-----	KSYQIQAEQFLSTFTDQPM	
UGT101A1	315	GLATAT	PMIAVPQ	AVDQFG	NADML	QGLG	VARKLATEEA-----	TADLL	RETAL	ALVDD-----	PEVARRLRRIQAEMAQEGG	
consensus	701

UGT13A3 458 Q-PKDVVLKHCDFAVKHGDLK---TLNSEGRHLNVFQYYSIDIALAAGLFLVVTIISFIIFTIIFVFK-----KVYFMCERSD
 UGT13B1 497 S-PKDLVLKHCEFAVEHGALN---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---EMDAYGRQLNFIQRNLLDVYLIELFGHFLLFIIFCLIPQLK-----RWLI
 UGT14C1 456 K-PKEQVVKYTEFVAKFGFPF---QMSYGRQLGFIQRNLDIYAAISLSYLFVISLIYFVFKFVIS-----KTPL
 UGT14E2 460 S-PMENVIKYTEFVGEHGFPF---NTDPYGRHLNYFQKTFDDIYALFALFYISVGTIIAISIRFIYQKA-----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-----FNLSLV
 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---ALEPYSVHYNFIKYYMLDAYAIIIFFLSILYVLNLIKIFVYR-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-PKDRFVEWMEYAAVNPLGK---IFALPGAKMGNIIEYCVDTIVFIAFSCVTFTYIFFK-----MAKFSLS-----FIRLVK-
 UGT25D1 463 P-PKKIFVWEIEFASRNPLLR---NLNLIGQNMSVFEYYCLDIISFCILLSSIVISVYFYLGTGWVSRMGRR-----VFGILK-
 UGT21A2 455 S-SSQLLIKTTTEWAIKNHGLD---EIKFESRQTTWTYYNLDVIIIPVFWLSISLVIPTIFGWYKFSFCFGHVEE-----KKG
 UGT21B1 435 S-ASERLVKMTNWNVLENDGVE---ELQYEGKHMDFFTFYNLDIIITA--ASIPVLIFIVLRISNISIIITSSP-----IGKTX
 UGT2A1 453 K-PLDRAVFWIEFVMRHKGAK---HLRVAAHDLWQYHSLDVIIGFLLACMASAAILLVIKCCLFVVFQK-----TANMG
 UGT2B1 456 K-PLDRAVFWIEFVMRHKGAK---HLRVAAHDLWQYHSLDVIIGFLLACMASAAILLVIKCCLFVVFQK-----TANMG
 UGT1A1 453 E-PLDLAVFWVEYVMRHKGAP---HLRPAAHDLTWYQYHSLDVIIGFLLAIVLTVVFIIVYKSCAYGCRKCFGG-----KGRVK
 UGT35A1 453 T-ALERAIIWTEYVLRHKGAK---HLRCASRDLDIIFQFHGLDWTGLLIAITFVSLIIVVILIKCLQRVFSL-----ISKIR
 UGT35B1 443 S-PLDTAIIWTEYVLRHKGAY---HMRVAGQDLGFFAYHSLDVIIGVLLGG---ALLLVAAIIVGVLG-----KLT
 UGT31B1 465 T-PLQKAVWYTEHVIESRRRVPTMLKTRAANVNYSDYIMSYVFPFIMFTVMNHLRQLLKMMNV-----
 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-----

UGT76E1 432 --SRGSSFSSLDNFVNSLKMMNFM-----
 UGT78B1 433 --ANGSSTRNFESLLAAFNLDS-----
 UGT78C1 422 --QMMEVQQKISRF-----
 UGT78D1 435 --MKGSSLENFKILLDEIVKV-----
 UGT85A1 465 H-KLGSSVMNFETVVSKFLLGQKSQD-----
 UGT85B1 470 --KGGASWRNVERVVNDLLLVGKQ-----
 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-----
 UGT73C1 468 E-G-GSSHSNITFLLQDIMQLEQPKK-----
 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-----
 UGT91B1 447 L-QDQYADGFIEFLENPIAGV-----
 UGT91C1 439 E-NIRYVDELVRFMRSKSSSSS-----
 UGT91A1 454 R-QDRYVDSFLEYLVTNR-----
 UGT102A1 395 T-PRAATLIEQAIAGSESVS-----
 UGT102B1 404 T-MAAADIEQVMCTGQPVLSGSGYATAL-----
 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---HLRSVHVQISFCQYFLLDIAFVLLLLGAVALYFIVSYVTKFIYRKVKSLCSRSTHSTVNGHYQNGILNGRYKGNNGHI
UGT84A1 457 P-GGSSDKNFREFVEKLGAGVTKTKDNGY-----
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 AKHLRPKEPDFSYLKLGF LII PAMILYAKHGFSIWT-----
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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UGT13A3	530	KQKVE-----
UGT13B1	569	KTKME-----
UGT16A1	516	KSKTE-----
UGT16C1	530	KVKKD-----
UGT16B1	526	KVKFE-----
UGT16D1	568	LATFNMRPPMEPEPGLCCQEGCESCVWLIYAQELLDYYSKYPTNTLERVKEEIGDKIESPSVKEYVLMELISMSEKRYKDMAALGTRKKPGESK-----
UGT17A1	536	KEKAE-----
UGT17B1	538	KFKFD-----
UGT14A1	530	KLVKKAKKDL-----
UGT14D1	524	KRT-----
UGT14C1	523	KLVKLVKKD-----
UGT14E2	529	TLEKSKKTE-----
UGT14F1	510	KLKKD-----
UGT15A2	568	KQKQKIQ-----
UGT15B1	519	KSKRD-----
UGT15D1	491	KIKTE-----
UGT15E1	539	KQKTN-----
UGT15C1	538	KIKTD-----
UGT18A1	530	KLKNE-----
UGT18B1	529	KIKVE-----
UGT18C1	531	KSKED-----
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UGT19B1		-----
UGT25A1	498	KSKSE-----
UGT25B1	511	KIKSE-----
UGT25C1	518	KPKHE-----
UGT25D1	537	KRKVE-----
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UGT2A1	522	KKNKRD-----
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UGT82A1		-----
UGT80A2		-----
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UGT24A1	527	KTKKD-----
UGT26A1		-----
UGT20A1		-----
UGT104A3		-----
UGT106A1		-----
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UGT27A1		-----
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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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