

# Contrasting Health Effects of *Bacteroidetes* and *Firmicutes* Lies in Their Genomes: Analysis of P450s, Ferredoxins, and Secondary Metabolite Clusters

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**Supplementary Dataset S1: P450 sequences identified in *Bacteroidetes* species are presented along with their annotated name, followed by protein ID (in parenthesis) and species name.**

>CYP236A2 Zunongwangia profunda (FP476056.1\_prot\_CAZ98812.1\_4632)

MKKSELPDPFEKARESKGYGEMNDQDDPVTMLLRHKDVRKSAHNYKTFQSGAVPGRIVIPSEVDIRDTRQIPFEVDPPVHGKY  
RAIVEPWFKRPLQAQEYQEKLTAQISEIVEETLLKGSVEVVTDFALRLQSRALTLLNTPFSESETWISWGTHVFRSEGEALDG  
DKANILYHYIDEQIDRASENPQDDMYSVLLNSEFEGRKLTKEEVKGVMVLTFAGGRDTVINAVTNSIAYLAEHPEALERLRKE  
PEITGRAVEEMIRYFSPLTMGRVVTEDTHVCEHAVKADSRISLCWASANRDAAFENPNEIVLDRKVNPVGFHNSHHNCLG  
ATHARQILKILLQTLAQKVASFEILDYKENIEDLDFQQRKVGFHNIQIKFNPLTK

>CYP236A21 Tenacibaculum jejuense (LT899436.1\_prot\_SNR16610.1\_2800\_)

MKSEFSDPFEEARKKTGLGHIDDQNPDVAMILRHKDVRKTAHNWKTYQSSAVPGRIVVPSEVNIRDTRQIPFEVDPLHKDFR  
DLLEGWFKRPNREEQKTLKNQVSNLIDDVLSDEIEVVHDFSLKLQSRALTILNTEYESDFTFISWGTHVFRSEGDSLADAS  
KANVLYDYLDAKINGARENLGEDLYSVLLQAEVNGKKLTHDEIKGIMILTFAGGRDTVINAVNTVAYFADHPKSLLDIKNNP  
EKINKAVEELIRYFSPLTHMGRVVTEDTQVCEHAVKNDTRVSLCWASANRDETUVFENPNQNFDRKINPHVAFGFSHHNCLGA  
THARQIMRTLLQLLADKVSSIDIIDSRENIEEWGEFKRKVGHELKVFKNK

>CYP236A23Wenyingzhuangia fucanilytica (CP014224.1\_prot\_ANW97227.1\_2616\_)

MEKSKISDPFEKARVEKGYGNMDQNDPVTILLRHKDVRKTAHNWKTFQSGGDEVGRIVIPSEVAIRDTRQIPFEVDPLHKE  
FRNLLDGWFKRPNGEYQAKLAAQIETLVNEVLNKDEEVVRDFSLKLQSRALTLLNTPFSESETWISWGTHVFRSEGESLD  
ADKANVLYNYIDEKIIEASKNPGEDLYSVLLNSEVNGNKLTHEEVKGIMILTFAGGRDTVINALTNSIAYFAEPKSLQAIKE  
NPEMINNAVEELIRYFAPLTHMGRVVTEDTQVCEHAVKANTRVSLCWASANRDATAVFENPNEVDFNRKMNPVSGFGTHNCL  
GATHARQIMRTLLIEILANKVATIDIVDTDENIEELGEFNRKVGYNISITVKFNKY

>CYP236A26 Cellulophaga lytica DSM7489 (CP002534.1\_prot\_ADY30302.1\_2467)

MAKCKFADAFKEEREKSGIGKMDQGDPPVMLLNHKDVRKAHNYKAFSSEAVPGRIVVPSEVNIRTTRQIPFEVDPPMHKEY  
RSLLEAWFKRPLQDTYKEKLTTIIGTVLDDVLSKDKVDDVSLALVIQSRAILTLLNVPFDKSVKWIWGTHVFRSEGEALDG  
DKAAILYNYIDEIIDNAIANPTDNLYSTLLAAEVNGKKLTKEEVKGVLILTFAGGRDTVINALTNMMSYFSANKKALDYIRSK  
PEIIKTAVEEFIRYFSPLTHMGRVVTEDTTVCEHAVKADSRISLCWASANRDEKFENPDEVILERKVNPVGFHNSHHNCLG  
ATHARQIMRTLKLLAEKVSDITVLEAENIENLGEFTRKVGYNISLKFKCR

>CYP236A32 *Cellulophaga algicola* (CP002453.1\_prot\_ADV50295.1\_2933)

MKESIFTDPFKKARQETGIGEMDDQNQDPVAMILGHKEVRRAAHWKSYSSGAVPGRIVIPSEVNIRSIRQIPFEVDPPQHGAY  
REVVEKWFKRPLEKKYEEELTLQIEALVTKVLDQDSFEVIHDFALVLQSQALTLLFNVSFEEAQTWISWGTHVFRSKDSALDG  
AKATVLYDYIDLKLAESSSNPGKDFYAVLLAAEVGKKLTAAEAKGVILTFAGGRDTVINAVTNSIAYFAEHPKSLEWLKE  
PELLPTAIEELIRYFSPLTQMGRVAMQDTMVCQHAVKADSRISLCWASANRDETVFENADEVVLDRKANPHVAFGFTHNCLG  
ATHARQVMKVLLRTLIAKVKSIDIHEAKDNIEDLGDFKRKGFDLTVKFNL

>CYP288B4 *Runella slithyformis* (CP002859.1\_prot\_AEI46894.1\_446)

MDISACPYHSQSLSKFPFDLTDPPVYKKAREEEPVYSEELGYVVSVRYADIQEIFRNWQVFTSENQTPPKPVPDAVRQI  
MVEGGIVGLSGLSGRIPPDHTRIRRVMAFTPDKRLRKLEPDIFRALKIEMIEKFQDKKHAEVKEVLYDLPAFVIFMLLGVPK  
EEVTQVKAWAISRMMLTFSDTSEEQLFHARQVVKYWDYCKEMVARRKQQLGDDFPSDLVRLQQEGYEISDREIAAMCYNQLF  
AGHETTSLMGNNGIRELLKYRHNWEKLCADASLIPGAIEEILRFNPSITWRRKATEEATIGGFTFPKGADILLMGSGNRDE  
AVFENGETLDIERKNAKEHLSFGSGIHYCLGAPLAKLEFKIVLELTQRIPNLQLTPDQTFFAYNTSFRAPVALEVEW

>CYP1099C1 *Kordia* sp. SMS9 (CP031153.1\_prot\_AXG69493.1\_1675)

MPYHYPNTIPFYKILFKSSSI TRNPPIPFHKENFEKHGDTFAISPPFSKRIMLTCDAEIIYLRLRNHRNYKKSKIQT KFLSKY  
VGKGLLTSSGEYWLQRRLIQPAFHKEKQKLVTIMESTIETQLQNLPKNTKVDSY PIMNELAFHVVAKSLFNYSSDEHTMHR  
LQEIIETLQDFIIREIRQPHQWWYKASGLVKKHMTLVKESRDINTVIDERRNSDKEHDDLLDMLLKAKYEDDGTSMTNEQL  
IDEILIFFVAGHETTANALTFTFHLLIAKNPEVYAKVLTEIDAIDDAISPMEKIAKLNVYKNCVEESMRLYPPAWITDRVALED  
DSFGGFNVQKGT MIGISFYELHRNKKYWNPNDFIPERFSDENRKATTGYYFPFGAGPRMCIGNNFAMYEMILAVTEMVSRFKIT  
IATDPKKVIAPIPLTLPKIDLPLTFTKRTV

>CYP1103A8 *Dokdonia donghaensis* (CP015125.1\_prot\_ANH59975.1\_1031)

MSNDIPAVSVLKFLANAGSILKNPLPFHHDNFESKGDTFKLQLGFGNEVVFSRDPGFAKYALQKNQRNTKSPIQT KDLAKYV  
GEGLLTSEGS LWKKQQRKLIQPAFHKKQLAQLIEAMHTVIKEELQNIKTGEAFDVFEIFNDLAFNTVAKSLFQTEVDRKKINRL  
QYITEQAQKMLVKELRQPYKSWYFKYAGPIDKHLALTQEARDILMELVEERRASHQKVGDLLDMLESTYEDGTGMNDEQLID  
EILILFTAGHETTSNALTFAASLLARHPEWQDKIYEYAFAKANSTSNEFLRHCTVTQVLEETMRLYPPAYFIDRVNLEED  
EYNGMKIPAGSNLLFSCIEIHKHDDFWKDPLQFNPTRFDENAGMYHDAYFPFGAGPRMCIGNNFAMYEMILAVTEMVSRFKIT  
PINTPIEILPLITLKPKNAILEFTAR

>CYP1103A13 *Salegentibacter* sp. T436 (CP012872.1\_prot\_AP538407.1\_1110\_)

MTEDGKIPAVEVSLLKFLKHSANILKNPLPFHHNNFQKKGDTFRNIGFNKSVIFSRDAGLVEYVLQKNQNFVKSEIQT KDLVK  
YVGKGLLTSEGEHWKKQQRKLIQPAFHKKQLANLLDSIKQAILLEYKKITVNEELDIFPIYNDLAFQTVVKSLFSSAANQEEIN  
RLQYITEETQKMLVKELRQPYLGWWFKASGKIDSYKLTAEARNLRKIVQERRESNEKYDDLLDMLEAKYDDGNFMDEEQ  
IDEILILFTAGHETTSNSLTFTAQLLALNPEWQEKIYEISSLKEQDLDLMSYVIKCQITQQVIEESMRLYPPAYFIDRVNLE  
EDEFEGKYFQPGSNLLFSIHEVHRHPDLWEDPDAFKPERFAEGGRKYSSQYFPFGAGPRKCIGNNFAMFEMIIAVTELVSQYK  
IVPGFDEIDIKPLITLKPKNAILKFQSRS

>CYP1103C12 *Arenibacter algicola* (CP022515.1\_prot\_AS005733.1\_2230)

MPFHHENFEAYGDCFRVQLSTKEIVLFTRNPGLIKHILQKQHRKYEKSPLOQTVDLAKYIGHGILTSSGEHWRTHRRMVQPAFH  
KKKLQNLGMVMREAILMELERIEPDKVQDVPLMGDLAFQVVAKSLSFSSSDIREKMSRLQHITEANQRMLIKEMRQPYLKWWY  
RLSGKIDKHLKMGAEKRLLLDIEERRSSGLEKDDLLDMLLRARYEDGSPMPDGQLLDEVLILFTAGHETTANALSFTLFL  
AKNPAIQDQVYEEVSKVDFEDSNIDLLQGVMQLQFVKQCIEEALRLYPPAYVIDRVATEDDTFEDILLLKGTMVLMSSIYELHR  
YSNFWERPLEFDPSRFKETDKKDYGDYYPFGAGPRMCVGNNFAMYEMIIALAEIVKKYSISSDLKNIEINPLISLKPKA  
VPLMFTER

>CYP1103C16 *Cellulophaga algicola* (CP002453.1\_prot\_ADV49365.1\_2003\_)

MKQTPIISQFEVLMNSKRILKNPLPFHRENFEKHGDLFRVPVGIRNELAFTRDPKLIKHI LQKQHRKYQKSTLQTKDLAKYIG  
HGILTSNGEHWRT HRRMVQPAFHKKKLRNLMGTIREAILLEIDGLSTSNTIDVYPI MSNLAFQVVAKSLSFSSDDIQKEMSELQ  
YITETNQRMLIKE MRQPYLNWWFQLSGKIKKHLNLAKDGQAILHQ LIEERRNSEIEKDDLLDMLLQARYEDGTAMAKEQLIDE  
VLILFTAGHETTANALSFLVFLLAKHPDIQEKayQEVKNISLEGDDVLTQILELK YIQQC VEEAMR LYPPAYIIDRV SIEDDE

FEGLQIPKDSLVLMSIYELHRNEDFWEKPNEFNPERFDASRKKEYQEYYYYPFGAGPRMCVGNNFAMYEMVIAVTELLQKYKMT  
TPLKAVTVNPLISLKPVDVLINFRNRM

>CYP1139B1 *Pedobacter cryoconitis* (CP014504.1\_prot\_AMQ01269.1\_4293)

MDTGIILDWNTIEPYTFYTQRATHPLYYAKAQQSWSLIYAYPOAKEVLLHQDALIPELNTSQTGLNKNQVQLIQQLARLNNE  
QHQQSRAALQIYNQMQPVATQDLLLKPVITGIPVDWVEVCKRLPALYILKSLNVEAKDCTFLIDHLPVLVKIMSPQQN  
PATIKQNLNELLNIFPLLEKYLPDGAFAPNYIAAEEWETLLVSNLIGLLIQSYDAGRGLLTNTLLQLSNQQLSLSEAENYFEQ  
AVVETLRFDPPIHLTRRVAGKDLLINDQLIKKGEMIIILLAAANLDPQIFESPPLYNPSRGNNKAHTFGAGHHQCLAKHLM  
RLTAETFKILYHQIQILPQSFTYEPLLARLVKNLFIIFKNQEK

>CYP1144A1 *Hymenobacter* sp. DG25B (CP010054.1\_prot\_AIZ63510.1\_1220)

MDTQASDTAAKPFPPWVPRWRTLLSSVAMARDPIGNLDRAHAHHGDTVMHLLGGVRPIIVTRDPVLAQHILQKNHRRYLKS  
HGLIRYIGRGLLTNEGADWLRQRRLIQPGFHRQRLAGLTRLMQAAAEEWTQELRRTAAGPALLDIHEAMTRVAFRIISQATF  
GTGMSEALERERLSDILTQIQAFYVRTIRQPYLRPWHLTGSYRYHDALSQELRELVRGYIRRQAAPNSQTHDLLQMLLDAR  
YEDTGEPMTEDRLLDEANILLLAGHETSANALSWLFYLLATHPQEAVKLREELQAGLANRPPAFDESLRPLPYSQVIQETMR  
LYPPAWIVDRVAQEDEYQGQRIPKGTLFSVYLYGLHRHPQLWSAPNEFRPERFAPHAQPPVPAYGYLPFGAGPRLCIGNHFA  
LTEIQLVVLVLELRHFTLELPPTASVPVPLITLRPPHGMVLRFLSV

>CYP1144A3 *Hymenobacter* sp. DG25A (CP012623.1\_prot\_ALD21354.1\_1672)

MDTRTTDTAAEPFPWVPRWRTLLSSVAMARDPIGNLDRAHGRGDTVMHLLGGIRPIIMTRDPALAQHILQKNHRCYLN  
HGLIRYIGRGLLTNEGADWLRQRRLIQPGFHRQRLAGLTRLMQAAAEEWTQELRRTAAGPALVDIHEAMTRVAFRIIAQATF  
GTSMGDTERERLSTILTQIQAFYVRTIRQPYLRPWHLTGSYRYHDALSQELRELVRGYIRRRAASNSQPHDLLQMLLDAR  
YEDTGEPMTEDRLLDEANILLLAGHETSANALSWLFYLLAHPEAAKVRAELQSGAGLANRPPVDELPLRPLPYSQVIQETMR  
LYPPAWILDRALEEEDEFQGQRIPKGTLFSIYLYGMHRHPQLWAEPDEFRPGRFAPHAQPPVPAYGYLPFGAGPRMCIGNHFA  
LTEIQLMLVETLRHFSIELPPDTASVPVPLITLRPPHGMLLRFQQIQ

>CYP1144A4 *Hymenobacter* sp. APR13 (CP006587.1\_prot\_AII50755.1\_395)

MSEFPELPPAALAGPLPRVPRWRTLLGSLAMARQPIRNLDRALAHGDTVGLHLLGGVRPCIVTRDPALTQHILQKNHRRYLKS  
DLTHGLIRYIGRGLLTNEGADWLRQRRLIQPGFHRQRLAALTRLMQAAAEEWSQELRARLAAAGGLTVDIHAEMTRVAFHII  
AQATFGTSMTDAERDRLSEVLTQIQAFYVRTIRQPYLRPWFTARGAFRRHDALSQELRELVRGYIRWRQAAPGTLASPEIAAP  
FTNNPPPVTNPNLSPVTPTPPNDLQMLLDARYEDTGEGMSEEQLLDEANILLLAGHETSANALSWMLYLLARHPEAAQVRQE  
RTAAGLARRPPEFAELAQLPYSMQVQETMRLYPPAWILDRALEDDFRLPIPKGTLFSLYIHGIHRHPGLWPEPNAFRPE  
RFAPGQEPPIPAYAYLPFGGGPRLCVGSHFALTEIQLVLEALRHFTFVVAEAPAATDPLITLRPKGWLAVGSA

>CYP1144A5 *Hymenobacter* sp. PAMC26554 (CP014771.1\_prot\_AMR26880.1\_1392\_)

MVDTPLPTPAWPRIPRLITLRSSLQAARDPVGNLNKLLAHYGDtvHFLGGARPSVTRDPALTQHILQKNHRRYAKSDLTHG  
LVRYLGRGLLTNEGADWLRQRRLIQPGFHRQRLAGLTRLMRRAAAEWQDLATQLTDQQAELDAHAAMTRVAFRIVARSVF  
GDSLGEQLTRLSDWLTAIQAFYVGTIRQPYLRPWHLVVRGSYGRHDQLARNLRELVRGAILRHEAALAAAPADALPPDDLLQM  
LLDARYEDDGTAMSENQLDELNILLAGHETSANALAWAFAALLAHPEKQDKLAAEIERELPGQPVFEDLPLRPLPYALHVV  
QEAMRLYPPAWIIDRTATEADEFEGVPIAKGTIFSILYIYGLHHHPGLWPEAEVFQPERFAPGAEPVPPPGYLPFGGGPRLCV  
QQQFALTELQLVLIQUALREFRVEPANAPIPGMNPLITLRPAGELRLRFRRVTG

>CYP1144A7 *Hymenobacter* sedentarius (CP013909.1\_prot\_ALW86816.1\_3553)

MGEVETLEKAVAPFSLPRVPRWRSLLRSFALAKDPLPVLDATLARYGDTVELFIGGVEKSILTRDAGLTQHVLQKNSRNYAKS  
KFTQGFSRYVGHLITNEGADWLRQRRLIQPGFHRQRVAGLTGLMQEITAETLAPLAAQAAAGGGAVAVPVHELMTRLTFRRI  
ARSVFSTNFPEAELDRLAQLITEIQAFFVRSIRQPYLKPFWRLRGRFRYHDALSAELRALLGRYIAQRQQANAQPNTAPPDDL  
LQMLLDVRYEDTGEPMTPDRVLDEALILLAGHETSANALTWLIYLLAHPEEAASIRAETEAVLAGRSPTFDDLPRLGRALY  
AVQEAMRLYPPAWMDRVALADDHYQGLHIPKGTIFSILYFYGLHHDAKYWANPHEFRPARFAPGQARALQPFAYVPFGGGPRL  
CIGMQFALTEMQLVTLALLRQFEVEWVEGQPAVTMQLITLRPKNDFRVRLRLR

>CYP1144A8 *Hymenobacter* sp. PAMC 26628 (CP014304.1\_prot\_AMJ65095.1\_1186)

MADDTLGPRPHAPLPQVPRWHSIRGSLRLVADPIGALDAVHADYGSTARLYIGGVQPSVLTRDPGLVQHILQKNHRRYAKSK  
FTLGFARYIGHLLTNEGADWLRQRRLIQPGFHRQRVAGLTGLMQEVVADTGLPLAQAAARAGGAVAVPAHALLTRLTFRRI  
A

RSVFSTRFAEAELDRLAQLITEIQAFYVRIIRQPYLNWWRRLRGQFRHDLTAELRALLGRYIAQRQAASAAPGAPAPPDDL  
LQMlldaryedtgePMAPARVLDEALILLVAGHETSANALTWLLYLLAHHPAEAQAIQAETAAVLGTRAPTFADLPRLGRALQ  
AVQETMRLYPPAWMDRVALADDYQGLRIPKGTLFSLYLYGLHRDPQHWDAPAEFRPARFAPDAPRPLVPFAYAPFGGGPRL  
CVGLQFALTEMQFVAVELLRTFDVEWPAGQPLVVKQPLITLRPRGDFQVRLRLREGPRAAG

>CYP1144A10 *Hymenobacter nivis* (CP029145.1\_prot\_AWM35248.1\_4395)  
MADDLGGRVPRWALPQVPRWVSLRNSLKVADPLGALDAIHARFGATARLYIGGVQPSVLTRDPGLVQHVLQKNHRNYAKSR  
FNLGFARYIGHLLTNEGPDWLRQRRLIQPGFHRQRVAGLTGLMQEIVADTLGPLAQDATRLGGAVALPAHALMTRLTFRIIA  
RSVFSTSFAEADLRLAQLITEQGFYMSTIRQPYLNGWRWLQFRYHDARTAELRALLGRYIAQRQAASAAPGAPAPPDDL  
LQMlldaryedtgcQMAPDRVLDEALILLVAGHETSANALTWLLYLLAHHPAEAQAIQHETAEVGNRAPTFADLPRLGRALH  
AVQETMRLYPPAWMDRVALADDYQGLRIPKGTLFSLNLYGLHHDPQHWDAPAEFRPARFAADAPRPLVPFAYAPFGGGPRL  
CIGLQFALTEMQLVVVELLRVFDVEWPVGQPPVAKQPLITLRPRGDFQVRLRL

>CYP1209C1 *Runella slithyformis* (CP002859.1\_prot\_AEI47158.1\_716)

MKYSKSGVSTIPQAKKNPFFGNTPDFVRNPLRFLEKMKEFGHVGVVKLSLVNRDFFLVLTPEDTKHVLQENNRYHKSEAYK  
VLAIFLGNGLLTSEGDFWRRQRKLTQPAFYKQRLALMVEMMNREVATAVEGWERKNGEAAFDTTEEMLNLTALKVTRALFSTD  
VKHRLGGISESLSNEIMHFADSTLKSFIRLPLTVPTPRNLRFKRAVAKVEAVIYIIIEGRREEIKQNAHVRYNDLLDMLIHTRD  
EETGETMTDQQVRDEVTTIFMAGHETTANALSWALYLLSKHRDVHLKLRREEVKMVLGEEGMPTFETIRELKTYLQVQEVML  
YPPAWVMGRKALGDDQLSGYSSIAAGTYLLPIYLLHRDPKYWQKPNEFYPDHFLPENIKARPTYSYIPFGGGPRMCVGNNFAL  
MEMQIVLALWVRRLDFTLIDQKAMEADPLVTLRPKKSLKMYVKAFRQT

>CYP1252B2 *Flavivirga eckloniae* (CP025791.1\_prot\_AUP81007.1\_4099)

MTDNQLVEVRELKSPKGAFLLGHLPQFNNTYNKHQVLERWVEECGDLFKIHFGKEFWVSANPDINNKMLRLRPEGFKRFSKID  
EILKEMGVDFVNAEGDTWKHRKRPIAEALSVKNKAYYPIILDKTNRILEKFKNYSQQKTIVDVQKEFMAFTIDITTEIAFG  
HKLDTINRADSFQKHLEVIYPMINTRTVTAPIPIWRYFKRKKDKTLDSLKAIEKVIYEFIDGAKKRIAENPKLKEHPSNFLE  
ALLVENGDVNFTDKEIYGNVFTMALLAGEDTTSNSLSWAMFYLAQHPETVEKVREAKRVYTEDAPNNYENVEDLKYANAVAQE  
TMRLKPTTPQOLYLESNDDIIVEHVVIPKGTSIILQNKVAQTQDDYFSSPDDFVPERWLSGGCPMHENAPVMRAFGGGARYC  
PGMHLAKTEMVVLISTLCKHFNFELEVAPEDVREKFEFTMYPGNLKVTFTPVVD

>CYP1318B1 *Sphingobacterium* sp.\_21 (CP002584.1\_prot\_ADZ77824.1\_1231)

MDLLTDKNIPFGPKEASEVEEGPQALSNILNLFHQYGDYKIYSERRNNYTYVISDPEMVKHVLITNNRNYEKVGVIDRVKIL  
LGNNGIMVSEGNYWKQRQRMQPAFKRVIAKLTDIAQANETMLSNLGNKEINLTAELSSVTLRIVLQALFSVDFQQLEKR  
EGVNPFAALLTEVHERNLVFAMKFRALAKTIQEIIINLRRKEHRVEEDFLSMIMEAKNDEGQGMSDREIIDEMMTLIVAGHETTA  
SALTWAHYLLHKHPEVYARAKQEALQVQNVHLGFHHLEQLPYIRQVIEETMRILYPPGWLTRRAMQDDVIGGYHVPPKTDIFI  
SPYVIHRHPRYWEQPDLFNPERFDASYRERHRFEYFPFSGGPRQCIGDFFALVEMQLHLALILRTTDMEIFLVDEPISMEAQI  
NLRPDKPLFARLINPRN

>CYP2220A1 *Pedobacter cryoconitis* (CP014504.1\_prot\_AMP98147.1\_1172)

MTTNADEPRYSVADPYPWYKVVQQKKPIYRTPEGMWMITGYEDAMMLSDPRCSHWGQDSKTFQYLSPVEKAIQTLHALAPG  
NTPAFRKQIMHQLAARTLQIDEDEDMKRQADEILDGLRSSSGMEFMNDYAHPTFTGTICSVMGVPQEEVGAFSKIVGRLQGGYL  
SFIDEKWSNGEDEQKKIFIDLRLIGLKRQTPGKDLCAILSVAVVPADEQDDSYLISLMVLLFYAGHQNMNFMGNALVALQ  
DRVEDQSQLMRESLPFAITSVDELIRYDSDLQSVLITQESINLHGTIIPAGSQLVSIGAANRDAKFDDPDQLILARRPNHL  
GFGAGAFRCIGARLAQIQGGIGLHRFFAHVNSYAPVADPISWSHFSVQRGPSSIIDINWNHER

>CYP2312A1 *Pedobacter* sp. PACM 27299 (CP012996.1\_prot\_ALL05083.1\_1150)

MSTTPVKVHKLPRLLALLANHDRALFYRKLNETHGDAFLIEEDRHWLINSPLNITQLFHEPSLDSNRQNLKKLLIGQGTPDSIN  
FFYQNWLWYMSGAEHQFWREKFIACFPKRMELSYKYFDMANAIGTSIKEFDLIKQVINPYVHMLCEIAGMKVTAFQNAYHLI  
NPILOLLHGRGQVDNPTTKHNADEWSTIIERLTREQKLTKQGFLSQLAKTGKGLAVGLPFLDVVDALIALCGRVVIDYAA  
LKQQONIKIQQEKLLDLIKLYSPFQVCNRKVINPITHFPELDFQYGDVKSLMIGAANSNTPKRDVAEIQSIPNLKNFSFGIGQ  
HSCPGRNWSITIVMEFYKSLDNYLTEYKASIKVKNINHREEFGFQGIQNMIVLLKLP

>CYP152AP2 *Pontibacter actiniarum* (CA264\_05980\_K15629\_)

MKNIPHNTLDSSISLLLEGYPFLKKMEDHQTDIFQTRLLGEKVICIHGKEAAALFYDNAYFWREGVLPKRVQQTLMGKNGV  
QMLDGEAHRHRKALFMSFMSRDRIDDLMLGLMLRYWRAYARKWEKMERVVLFDEAREVLCLAACEWAGVPLKPTEVREHAQEYI  
EMIYFGGGATTRYWRGIHARNVSEKWNNKIIIEDIRSRLKEVPENSAAYQIAWFRDLDGELLDLHVATVELMNVVRPIVIAIATY  
VAFSALALHEHPEQVEKIRTGEEKYAQLFVQEVRRFYPFTPFLGARPHRDFEWKGHQFKEGTLVLLDVGMLHDPEMWPDY

FKPERFTEWSGSPFDFIPQGGGDHYTGHRCAGEWITIKAMKVALQFLTQEVKYIVPEQDLEVDIHKMPTLPKGFEISDVQYT  
GSNVYAEV

>CYP109AE2 (Cpin\_4098) **Chitinophaga pinensis**

MTPSTLKSPLSWHQQLQDEQAVYFDPAFRFYFGGQGAWQVFRHKEVQRVLSDHEVFSNEY  
MPKSDDNLLGSNLNQTDPPRHRQLRALVSKAFAPAVIAKLEAWIHHECKELLQTVLAKGE  
MDFKVVFISIPLPGRVTAQLLGVPDQDHQDVNAISSDPAVIGMDAYFQAQQEMGRLF  
TALLEERAKTPQSDLISHLLHAEIDGERLSMPDTLAFCIALIAGNETTNGFLANAMYTF  
ATTPDVQSHLQAHIEDLPSALNEVLRYAPPVQSMCRIAQMVELGGQLIRKGDLINAWLS  
AANRDPSVFRNPDTFDIHRNNIKMVSFGHGAHYCIGAMLARMEAKIAFEIIFSAKNVTL  
KPGVTPARNPSTIVAGFLDLPIVFEPK

>CYP107DB1 (Cpin\_5300) **Chitinophaga pinensis**

METTTQTAKCPFAGKAIPIIDFSDSAFIKNPFATYAAARDEAPVHRVAFSSGQPFWLITR  
YEDAMLVFKDPRTKDICKTLPPDHKAPASPLAMSQFLSHVLYMDPPDHTRMKQLVQKA  
FTPPLVEGMRAHIQDITNNLLDKHIPSGRIDIINDYALPLPISIISGLLGipeKDQQLFR  
RWSNIILNIDINVTRRERMQMMPAIGGFTNYLREIFASKQVHPADDLITHLVQAKEGSD  
KLNETELMSTVFLFAAGYETSVNLIGNGVLALLQYPEQQQLALRNDPALINTAIDEVRL  
DPPVSLASERYTLEDVEMNGVTIPKGELVHICITAANRDPRRFESPDAFDITRKDNKHLS  
FGQGTHYCVGSALGKLEGEIAINTLLKRIPAFSVEGGDIDALKYKNNNSVMRGLEALPIVF

>CYP2726A1 (FLA\_4362) **Filimonas lacunae**

MSISNSLKVWVSSAPVIRPVFSILRKYKPVARIGKTVVVTRYKDVMVDVLKRETDFTVYEI  
DGYKMERMGNPFLGMDASPETTRDRDILRQVIKREDLKTIRVMIRHIANDLLEQAQPNH  
TIDTVNGYARLASVRVVAQYFGVPADEATMMRWQRSIFSEAFANLNDNAIRERGMIAAK  
EIAAHLNQLIQQRQQQTTPLEDNVLNRLIQLQPYNSWLNNDAVRRNIILCILGVVENTSKV  
VTHIIDQQLKRPDIMKACQQAVHANDMETLRSYCFDILRFNPHNPIILRYCKHGAVIGKD  
TPYERRVPAGSTIYAATLSAMFDEDIVHNAKQIDPNRNVEYMHFGYGHVCSGKYISEVT  
VPELVAGLLRLKNLQRAPGKAGKIQYEEVVFPKSLSLTFN

>CYP2727A1 (D3H65\_00195) **Pseudoflavitalea sp. 5GH32-13**

MQHHTKQKTFMQPVLFPQSTVNNPFEIYARKLQESPVYRDEAQVWGIYSYEHCLQLLTG  
NDAHIPALPVLPGATLNDQVLTIIEHHTRLNNNTAHRSTREIAMGLYNARLPISPIGLLA  
TSLSHKNLRNEIDWVQEVGKQLPLACMLQEFQFNEKDRESILMYIAVLVKIMVPDKTAQQ  
IAAINAATREVYQLTERHILHTPSLYIAHNVSKVSFPTALAMTVANILVGLMIQSYDAGR  
GILCNTLQLQHRELQGKEMGQLVMETLRYDPPVHTRRVLTNDVLLHGQELKK  
GDTAILVLAANRDAMHFERPDAFDIYRANNEAHLTFGAGAHRCMANHSTVRFATEILNY  
LLTRYPRLQLLTTEITYEPAMNVRLPKEMMLSLS

>CYP102AQ1 (SGRA\_1002) **Saprospira grandis**

MKSPVSKPIPHPIYPIVKSVSLDIKRPVQSMMALAEKYGGIYRLEVNDLSLIVSGLE  
YVQEFCDEDERFDKKVFSALEKVRDLTGDLFTAHTEEPNWGKAHRILTPAFGPHAMQDMF  
DKMYDVAEQLCVKLERLGPDEPFNVPANMTRLTLDTIALCAF DYRFNSFYKNEMHPFVEA  
MLFILHEANQHMRRLPIMNRLMYKTKERYNKDIQYMYTVAQKILDQRRKADKAEQVDDLL  
GRMLEGVDPDTGEKLSQDNIIYQMVTFIAGHETTSSMMAFTFYEMLKQPHILARVQAEV  
DEVLGQEKLQFHHSKLYMDMVLKECLRLWPIASGFNLRSFKDEQVGEYLIKPTDSIFI  
FLPSLHRAPIWGDPKLFNPENFSPEAKIIPPSAYLPFGNGRRSCIGRPFAFQEAKLAI  
AMILQRFDISLADPNELVLDETLTIKPDNYFLKFKKRPGFKPVENGPKVPASQSLKLKG  
GKQIYVQNKPLLYLAYGSNMGSSKKFIQQLAETAQALGYQPSVHSLNETKALMAQNKGHY

VIITASYEGQPTHDAAEEFVDWIVEQPEGSLDQVQYSLFCGCGNSDWIHSYQAVPRKIDAQL  
KRLGAQPFLAPGEGNAKQNFFASFNQWHDELWPALAKSLQDAISPINKKSYKVQLLHDW  
HAQTLGENDFVRAQLLSKKELVQQESPFASSKIELQIEVPEGQSYQTGGYIDILPQNSPA  
TIQRVLRHFMQHDPYIKLESEEQSVALKPLDQHIRLTLLKYYVELQRPAGKKWLEEV  
LAQTRCPFSAQGLQQFIEQYESEVILQKNRSLLSIIEQFPGAKIDLQFISALPAMRPTY  
SISSSVKQSTDKASLUVVSCIKGAAWSQGEYQGLASGYLSQLEEGQLLWLRFSPNLPNFP  
APKSEDKLILIAAGTGIAPFRFMQRSLEKTPEKAVFFYGCRAKEVDQLYAEEFAQWEK  
EGWLDRPVYSKAPEKEGQTYVQHRLWADRAFWAAWEAGAKIYICGDGEGMAPAVRQCL  
MDIYQEKAQATEAQALDWLMQIAGKDKEYFTDIFS

>CYP1072A1 (Dfer\_0326) **Dyadobacter fermentans**

MQAIPEFKISSVPLVSPIRFARDPLRFLRQGFECGDTFKIKLFREFIVTRDPAFFRHVL  
QOHHKNFKKGNNSVKMLRPVLGNGLVISDGFWRQRRLVQPAFHRERLQELFVTMGLTA  
AFLDEMEQFRGKAPVVDAKMMGITSIALKTLFGNMNTEDKEQIYNQVSRTQTYLVTRV  
RKPYRLPLMAINGEDERFKSDLAYFNSLVDFIRKRRLSGETPNDLQLLLDSTDEETGE  
QMTDEQIRDEAITMFAGHETSATGLSWLLWELSAQPEIVARIRQESSIFETVPSFEQLI  
QMPYTRQVVEEGLRLYPPAWTMRESTVDQKIEDYPVPRGSSVMSIFELHRNPNLWHNP  
AAFDPERFQPEAVKNRAKFNYLPFGAGPRICIGQQFALMEMQLVLAALKRFDFVREPGY  
SVGMHPQIVLKSTNGIKLNIR

>CYP1071A1 (Dfer\_1634) **Dyadobacter fermentans**

MQTPLMSATSIWSAKKEVNQNYTELIADVRKSDPLHINMFGDLVAMDYANVKKILADSDN  
FKNFDFTERFKVVSALSNDPGLLEFGESLRWLLFMNGEKAHEHRRFVNQKFYQANYEQ  
ITLDAITEVIAALDGQEEADLVEMARQFSFLIISKIIDLDKADFDFIQKFSYVITFIFEK  
TLSVTTELLECASMSRTFHYSYLSETFSRHEREATNSLLLEMREVMSARAPQLIGTWEFLV  
NAATETTTLLLTKSIAALIENRDKVINWNAHNECAIAVEELIRYVSPVNWI PRQVAEEME  
FEGLQLRKQTVLLGLASANRDPAVFQNPDTFTPTRKPNPHIGFGFMHHCLGARLSRFE  
LQKFLPRFMAAFPDIRLHPTKAPQWDSKIFFRGFKTLPVLLK

>CYP1209A3 (Slin\_0451) **Spirosoma linguale**

METTAAPTRPVPLHPGLPFLGNTIAFVRDPLSILHTLQRKQERIVHLRIGGRHQYLVFQP  
EDSKHILQENNRNYGRSPADEVLKIFLGNGLLTSRGDFWRQRRLAQPQAFHRQKLAALAD  
AMVAETADWLDTLNPSDIRQPINVSQAFMDVTMRIVCKTLFGSDTNGKLDGLSHALDSN  
YLANSRMLSPIRFPMSWPTPHNQRSKRAQRQVDEFIYGLIDQRRQQHEDKDDLLGMLLSA  
EDEETGERMSDQQLRDECVTLFSAGHETTAWSMAWTYLLTQNPDLARLQVESETILGD  
ARTPPADAFLRLTYTMQVVQESLRLLYPPAWIMSRRAREDDHIGPYTI PAGDTALVCYLL  
HRDPVNWPDPERFDPDRFAPGGPKDQLHSYAYLPFGGGPRLCIGNQFALMEMQILLALFV  
RKFSVSGPPNQRIVPKPLITLRPNQPIKAILSKP

>CYP1209A8 (SD10\_05640) **Spirosoma radiotolerans**

METSTAPTPVPLHPGLPFLGNTIAFLRNPLGTLDTLQRNHDRLVHLRIGGRHQYLVLP  
EDAHLILQENNRNYGRSPADEVLKIFLGNGLLTSRGDFWRQRRLAQPQAFHRQKLAALTQ  
TMISETADWIDELESGHNLKEPVNVSQAFMDVTMRIVCKTLFGSDTNGKLDGLSNALDTLN  
YLANNRMLSPLRFPYSWPTPNQNRSKRARMQVDSFIFGLIDERRKALDERDDLLGMLLSA  
EDEETGERMSNQQLRDESVTIFSAGHETTAWSMAWTIHLLTKHPDVRLKAESQSVLGD  
ARTPPPEAFRALTYTMQVVQESLRLLYPPAWIMSRRAHQNDHVGPYTI PAGDTALVCYLL  
HRDPANWPNPDRFDPERFAPGGPKDQLHSYAYLPFGGGPRLCIGNQFALMEMQILLALFV  
RRFTPKAAGNQRIVPKPLITLRPNQAIRAVLE

>CYP1209A10 (AWR27\_00395) **Spirosoma montaniterrae**

METLTSSTRPVPKHPGLPMLGNTLPFMRDPLAILEQTLQQRYDRLVHLNIGGRHQYLVMT  
EDAHLILQENNRNYGRSPADEVLKIFLGNGLLTSRGDFWRQRRLAQPQAFHRQRLAALAQ  
TMISETTDWITELSRLDKSKPVNISQAFMDVTMRIVCKTLFSSNVVGKLDGLSEALETLM  
HLSNNRMLSPFRFPMSWPTPPQRRFRRAQVVDTFIYGVIDQRRRSNERYDDLLDMLLYA

EDEDTGDWPNSGRMSDKQLRDECVTIFAAGHETTAWSMAWTMHLLTQHPDVQARLREVN  
ERLGDAATPAPETFRSLTYAMQVIQESMRLYPPAWIMSRLAHADDQIGPYTIAGDTALV  
SPYLLHHDPANWPDPERFDPERFAPGWEKERHSYAYLPFGGGPRLCIGNQFALMEMQILL  
TMLVRAFAFQPPIPQRVKPQPLITLRPKRPVWLMSNQIS

>CYP1209A9 (CWM47\_09250) *Spirosoma pollinicola*

METTVISTQPVPLHPGLPFLGNTLAFLRNPLGTLHTLQQNHARMVHLRIGGRNQYLVLP  
EDAKHVILQENNRRNYGRSFAFEVLKIFLGNGLLTSDGDFWRQRRLAQPAFHQRKLAALTQ  
TMIAESADWIDELKGHNPKEPVNVSQAFMDVTMRIVCKTLFGSDTTGKLDGLSTAIDTLN  
YLANKRMLSPLKFPYAWPTPNNLRSKRARMQVDTFIYGLIEQRRKASEERDDLLGMLLSA  
EDEETGEGMSDQQLRDECVTIFSAGETTAWSMAWTIHLLTNHPDVLARLKAESHSVLGD  
ARTPAPEVFRLTYTLQVVQESLRLYPPAWIMSRKAFNDDHIGFYTIAGDTALVCYLL  
HRDPANWPDPGRFDPDRFAPGGPKDSLHPYAYLPFGGGPRLCIGNQFALMEMQILLALFV  
RQFDLKAVPHQRIFPKPLITLRPNQSIWVTLN

>CYP288B2 (DR864\_05055) *Runella* sp. HYN0085

MSTCPYHKISEEFKPFDLTNPFYKKSRDEQPVFYSQELGYVVTRYEDIKAVFSNWKT  
YTSENAQSPFKPIAPKAKKLMEDQGMIGLSGLSGRIPPDHTRIRRIVSMAFNLSRFKKLE  
PGIRALATEMIEKFENEGBAEIVKQLAYDLPALVIFMLLGVPKEDVQQVKSWAESRLLIT  
WGDLTEEEQLVHAQNMVRYWEYCQNLLVALRKENPTDDLPGLVRLQAEGHEISDREIAAI  
CYSQLFAGHETTTSLMGNGIRELLHPDSWKAINCENPSLIPNAIEEILRFSPSIVSWRK  
ALDDSEIGGTIIPAGSNLLVMGSNRDEANFENGETFDIQRPNAKEHLSFGYGIHFCLG  
SPLAKLEFKIVLEELTRKIPHTIKENQVFQFALNTSFRAPVALEVEW

>CYP1209C2 (DR864\_21885) *Runella* sp. HYN0085

MLFLLDIKEHFLGVQKNVTKIGKENDISEGYSNILCTTIMRTIMMNYSKSALSTIPEAK  
KSPFFGNTSAFVRNPLGFLEKMQKEFRGAGLVRNLNVNRDFILVLNPEDTKHVLQENNRR  
YHKSEAYKVLIAFLGNGLLTSEGDFWRQRKLTQPAFYKQRLALMVAMMNDEVTNLVQRW  
EQHEKTETLNMSSEMLNLTICKVQALFSTDVKHRLGGISESLSNEIMHFADNTLKSFIRL  
PLYVPIPRNLRFKRAVKKVESVIASIIEGRRQELKHNPEVRYNDLLDMLIHTQDEETGET  
MTDQQLRDEVTTIFMAGHETTANALSWAFYLLTKNGDVLHKLREEVKTVLGEEGMPTFEN  
VRELKYTFQVVQEVVMRILYPPAVMGRRALGADQLSGHPIGPNTYLLLPIYLLHRDPLHWQ  
KPHEFYPDHFLPENVKQRPTYAYIPFGGGPRMCVGNNFALMEMQIVLALLVRKFDFLLVE  
RKDAVADPLVTLRPKKALKMNIKALSRLEVN

>CYP1072A4 (DTQ70\_11480) *Runella* sp. SP2

MPVLPTYKPSKIPLTIPLRFAKDPLSFIRSGFSACGDTFRLQLFRDIIFS RDPAF FRHVL  
QZNHRGYAKGKAFTELSKVLGKGLTSEGDFWLRQRRLIQPVFHRERMLGLYQIMAELTA  
QFVKDFEANRNQSAIDLDEKMMAITADIALRTLFTTITNEDKATIYQQINRTQEFTIANI  
RKPFLKPWMAINGANRRFRADLSYFNRLIFDIEQRRASSQFQDDLLQMLLDCTDEETGQ  
QMNDQQRDEAITMFAAGHETSANGLNWLLESLKHPEVVQKIREEC SIFDTVPTWEQLL  
QLTYTRQVVEEGLRLFPPAWAVAREAIADDVIEGFEIRKG TIVFLPMYELHRNPEFWHQ  
LSFDPSHFAPE NVKRNPKFAYLPFGAGPRICIGQQFALIEMQLILASLLKRFTFIPDDTH  
NPKMFPLITLKPMNGIKVWVK

>CYP288B3 (Emtol\_3245) *Emticicia oligotrophica*

MNTAIGCPYHKVSESFKPFDLTNPFYKQAREEEPIFFSEELGYVVTRFQDIKEIFGN  
WKVFTSENAQSPFKPIAPKAKALMEEGGLIGLSGLSGRIPP DHTRIRRIVSMAFNVRFR  
KLEPKIRELAINMIEDFAAKGKTNIIKDLAYDLPAYVIFMLLGVPNEEVQQVKSWAESRL  
LLTWGDLSEDDQLMHAQNMVKYWNYCQGLVAKRKENPTDDLPGLVRYQAEGYEISDREI  
AACMCYSAFAGHETTSSLNGNGIRELLIHRKSWE LCTNHEMIPNAVEEVLYSPSIVSW

RRRSTEEATVGGITIPAGSNILLVMGSGNRDEAQFENGEDFDIERKNANQHLSMGSGIHF  
CLGAPLAKLEAKVVLEELTKRLPSLRLTPEQTFAFAQNTSFRAPVALEVEWDV

>CYP1209A2 (FAES\_4882) **Fibrella aestuarina**

MDAPIHPGLPVGNTLEIARDPLAMFGRLFQRYDRIVKINIGGRNQYLVFRPEDAKHVLQ  
ENHRNYGRSPAFLILKRLFGEGLLTSRGDFWRQQRRLAQPAFHRQKIALLGETMVQESAA  
WIDEAQHDLLTPVNTSQAFMDVTMRIVCKTLFSTDVTGSDALDGLSNALDTLNRLANDS  
LLSPIKPQHWPTPRNIRFRQARERVDKLIYSIADRQRTGERHDDLLDMILMYAEDEENG  
RMSEQQLRDECVTLFTAGHETTAWSMAWTYLLARHPDVLARLRAEVDATLGPYAPGTL  
SIAAFRAMPYTLQVQEGLRLYPPAWMSRMALGEDQIGPFRIPKGDTVLVSPYLLHRDP  
AHWPDPDRFDPDRFLPEKEKERPAYAYLPFGGGPRLCIGNQFALLEMQILLALLVQRFDF  
QPANTRLVRPKPLITLRPNRPIELHTARP

>CYP1209A7 (A6C57\_23025) **Fibrella sp. ES10-3-2-2**

METLVPVHPGLPLLGNALSLARDPLGLFTKLHRTYGRVVRISIGGRRQYVLFQPEDVKHV  
LQEENNRYVRSPA FMV LKRLFGEGLLTSRGDFWRQQRRLAQPAFHRQKITMLAETMVQES  
AAWVGDLRQLDLSKPVNISQS YMDVTM LIV CTKL FSTNVEGR LDGLSHSLETLNVLANKA  
LLSPIKVPTWPTPNIRYNQS LERVNALIYE FIHTRKQTGDRHDDLLDMLLHATDEDTG  
ESMSEQQLRDECVTLFTAGHETTAWSMAWTYLLAQHPDVVTRLTEADAVLGDNVPGKV  
PPVA AFRTMPYALQVQEA RL RLYPPAWMSRMALADDQ IGPYRIPKGDTVVVSPYLLHD  
PTNW PDPDRFD PDRFAEGRDKDRPTYAYLPFGGGPRLCIGNQFALMEMQILLTFVRTFD  
FQLVNAASIKPKPLITLRPNRPIQVKLTPRS

>CYP2230B1 (HME7025\_02477) **Allopseudarcicella aquatilis**

MDGKSTIKWNPFAPDYFNDPYPIYALCROHNPIOKDSFGNILLFRYRDIAPILDSTDDEV  
SSLVTYFESKESYIFKNSPQCPFLAKTTSKWLMYLNQDIHRKLRLIALGKVLFSYDFDRLI  
QEAVKDSVNFQDYQELDLVHFSKYFIFHILGQFIGLKDFASFEKVVEYSNLAARSQDIF  
VSKQMYLEINQCFLWGKGLFSETGFKA KLV KELDGFEFEEDDYYSSILA VTLM AFFETSKD  
NLALTLHSILSNSPLKEYVLNADQKA KLV SEE CIRYT SPLQFTV RISKNEVIIHGQQFA  
ASTRFVLGIASANRDEEIFESPDEILPNRKVNPHLAFGAGAHLCLGALIARKE MEFGLKP  
MVEFLQKFNI DST QPLEWGNQIFMRTLERAMVKMH

>CYP236A29 (DJ013\_00490) **Arcticibacterium luteifluviistationis**

MDKKISEFKDPFSTARKEKGIGEMDDQNDPVQMLLRLKDV RKT AHNWKT FQSGAKPGRIV  
IPSEVDIRETRQLPFE LPPEHTEFRGIVEDWFKR PQNEEYAQN VKKQISSAID DAMLKE  
SFDMVTDLALPIQSRALTLLFNIPLEEAKVWI SWGTHV FRSEGEALDKDNVLYDYIDE  
QLEKAAKNP GEDLYSVLLQSEYQGRKITKEEAKGVMLTFA GGRDTIIN ALTNATA YFAE  
HPESLNRLKEEPQLIGKAVEEFVRYFSPLTQMGRVVTEDTYVCEHAAKADTRVSLCWASA  
NRDET VFENPNEIQIDRKMNPHVGFGFSHHKCMGAPHARQVMKIFIEVLTEKVGQIEILD  
FKENIEELGEFERKVGFHNLQINLKPIA

>CYP1144A10 (DDQ68\_22250) **Hymenobacter nivis**

MADDLGGRVPRWALPQVPRWVSLRNSLKLVADPLGALDAIHARFGATARLYIGGVQPSV  
LTD PGLVQHVVLQKNHRYAKSRSFNLGFARYIGHGLLTNEGPDWLRQRR LIQPGFHRQRV  
AGLTG LMOEIVADTLGPLAQDATRLGGAVAVPAHALMTRLTFRRIIAR SVFSTS FADAELD  
RLAQ LITEI QGFYMS TIRQPYLNGWRWLRGQFRYHDARTAELR ALLG RYIAQRQAASAAP  
GAPAPP DDLI QMILL DARY E DTGQPMAPD RVLDE ALI LLLVAGHET SANAL TWLLYLAHHP  
AEAQAIQHETAEV LGN RAPT FADL PRL GRAL HAVQETM RLYPPAWM VARVAL ADDDYQGL  
RIPKGTLFSI NLYGLHHD PQHWD APAE F RPAR FAADAPRPLV PFAYAPFGGGPRLCIGLQ  
FALTEM QLV VVELL R VF DVE WPV GQPPV AKQPL ITLR PRG DFQV RLRLR

>CYP1144A6 (D3Y59\_07700) **Hymenobacter sp. sh-6**

MNASAPAASPTLPQVPRRLRAFRNSLALAENPIPVLTOYLDELGDTIGLHMGGIKPTLLTR  
DPGLIOHILQKNHRNYPKSEMSHGVARLYGHGLTSEGSYWLQQRRLIQPGFHRORIAAL  
TETMLQVIECLEPVAAQARQQGGATTAVHELMTTAFRVIARSVFSTMSEAELQOLA  
HLLTDIQAFYTRTLRQPYLPWLAVKGQFRYHDQLAAQMRLVLKYIQRQQEGGAGKDD  
LLQMLLDARYEDTHEPMTEAQVLDEAIIILVAGHETSANALSWLWYLLAQHPEVVTKLRA  
EMAAALGERRPTFQDLPQLPYSLQVIQETMRLYPPAWIVDRQALNDDEYNGLPLPKGTLI  
SAYIYGVHHLPLRWPEPEAFRPERFGKEQLREQPAYAYLPFGGGPRLCIGNQFALTEMQL  
VLLETLRRFEVEWEAQAPGMRPLITLRPRAEITLRFRVRA

>CYP152AP1 (PKOR\_18110) **Pontibacter korlensis**

MRKIPKERTIDNTLAVIMDGYPFLTKRMEKFNSKIFKTRLGEVICLYGKEAAALMYDN  
SYFWRQNVIPKRVQNTLMTNGVQMLDDEQHHHRKALFMSFMSRDKIQRLMELMLRYWRA  
YAQKWEKMERVVLFDEASEVMYLAASEWAGVADPTKVREHAQEYINMIFGFGGVAMRYL  
RGVKARNKREQEIGQVIENIRSGKLDVKNTAYQIAWFRDLGELLDTKIASVELINVI  
RPIVAIANYVAYSALALHEHPEQRNKLASGEDKYSQYFVQEVRRLYPFTPFLGARTRKGF  
EWNGYQFDEGKLVLLEDAYGMLHDPEIWPEPYEFKPERFSNWSGSPFDIIPQGGGDFYTT  
HRCAGEWITIEAMKVALKFLTLEVQYEVQQDLSISLVQIPTKPKSGIEISNIVYKGHGL

>CYP152AP2 (CA264\_05980) **Pontibacter actiniarum**

MKNIPHNTLDSSISLLLEGYPFLKKRMEDHQTDIFQTRLLGEKVICIHGKEAAALFYDN  
AYFWREGVLPKRVQQTLMGKNGVQMLGEAHRRKALFMSFMSRDRIDDLGMLRYWRA  
YARKWEKMERVVLFDEAREVLCIAACEWAGVPLKPTEVREHAQEYIEMIYGFGGATTRYW  
RGIHARNVSEKWNNKKIEDIRSKLEVPPNSAAYQIAWFRDLGELLDLHVATVELMNV  
RPIVAIATYVAFSALALHEHPEQVEKIRTGEEKYAQLFVQEVRRLYPFTPFLGARPHRDF  
EWKGHQFKEGTLVLLDVFGMLHDPEMPDPYAFKPERFTEWSGSPFDIIPQGGGDHYTGH  
RCAGEWITIKAMKVALQFLTQEVKYIVPEQDLEVDIHKMPTLPKSGFEISDVQYTGSNVY  
AEV

>CYP1252A5 (MY04\_1413) **Flammeovirga sp. MY04**

MNYSKTFKLDGPKGPKVGNIFDLEKERLHLQYEDWSRIYGKMYNLKFLSTNVTVCTDP  
DINAYILKNRPTKFRRILKKLADVINEVGVEGVFTAEDSWRKQRKVTKALDKRHIKTFF  
PKILLVASRLENWNEQLKIKKSHEDLPKDFIRATVDVTNLAFGYDMNTVENLENITQK  
HVEKIFPKMNQRVNNSPIPYKYFKSKSDKEFDESMSYLREMLGEIICKTKEKLNDQPELI  
EQPTNFLEAMIASQEKDNPFTWDEIFGNLYTMMLAGEDTTSNTLTWTSYFLSKYPDQVQNK  
IREEIALTLPNGEMNDIDQLKNLRYVNAVMKEVARLKPVTPNLYMQANEDIVINDILFPK  
GHFFITQLSFASRSEEFFEDALEFKPERWLTEPSVNVCVCPFGHMKPDAAKPFGGPRLC  
PGKYLAEEFAVFLVTLMKNFELGFAQSEDKVEEEFAFTMVPKNLHIVIKKIKTPQILRI  
KNWIILTLLIIILRY

>CYP236A22 (MY04\_2085) **Flammeovirga sp. MY04**

MEHQQTETQKKVKTSEFPDPFEQARIERGYGDIDDQNDPVTMLLRLKDVTKTAHNWKTFS  
GATPGRIVVPSEVAIRDIRQIPFVDPPEHKDYRNLLVEPWFKRPLEEYETAKMTKIIIEL  
VDEVIAKDDIEVVSDFSLKIQSRCLTLLNIPYYEAETWIGWGVHVFRSEESSTDADKAN  
ILFDYLDQIDRAAENPSDDLYSLLSSEVNGKMTKEEVKGVMILTFAGGRDTVINAVT  
NSLAYFAEHPKSLERLRQEPEIVGKAVEELVRYFSPLTHMGRVVTEDTKVCEHAIKNDSR  
VSMCWASANRDSAASFENPNEVVLDRKINPHVAFGFSHHNCLGATHARQILKVLINTLANK  
VGSIEIKNYKENIEEWGEFNRKVGFDNITMNIKGK

>CYP1252A3 (EI427\_08965) **Flammeovirga sp. L12M1**

MTNQDYTRTITDIKGPKGIPLFGNLFQIEREQIHLYYEKWAKEFGDFFFVNFLGKKILIS

SNPQNNANILKNRPTKFRRLSKMAEIIIEVGFYGVFTAESSEEWIKHRKVTTQQALSNKNVK  
SFFPQIVKVAERLDNFWESENLIDEVTKYQISNDFTRATVDVTNLAFGYDMNTVENHENE  
IQDHIAKIFPKVNERVNSPLPIWRYIKSSSDKGQMDALKITIGEFIKKAENNLEKDP  
SLKENPSNFIEALIASQDKENPFTWDEIFGNIYTMLLAGEDTTANSLSWLTYFIASDNEL  
QNKVYNEIKEVLGEKEQITTFFEEVARFKYLSAVLKEVRLKPVSPSLYFQANEDVVVGDL  
LIPKDTFVLTQLRVGALSDDNFENAEEFIPERWLSAKETTGGCPFTGKHKAEVAMPFGGG  
PRFCPGKFLESETEMILFAVTLFKKFELTLSVPKEDIKEKFAFTMSPENLAVNLKKRKQVS  
ISNLTKEKVSI

>CYP1252A4 (EI427\_08970) **Flammeovirga sp. L12M1**

MELTKDVHYKQTINDLKGPKGLPLVGNLFQLDKIKIHQNQYEDWADEFGELYALNFLGRKV  
VVSTSPINNDIFILKHRPTKFRRFSKMAEVIEVNGIDGVFSAEGDVWKQROVTQKALDSK  
NVKSFFPKIVLVANRLEEVWNTLIASSQNKHNHEIMHDFMRITVDITLIAFGYDMNTINN  
KTDPTQEIQIAKIFPKINERINSPLPFWKYIKTSDEFDQALAHIKSEFFGDFISNTNQKI  
EDNPELENPSNFLEAMLASQDKENPYTWEIFFGNIYTMLLAGEDSTSNTLSWVSYFLAS  
KKDVQIKVQKEISDLLAGNVELKSFDQLKLFKYTSAVIKEAMRMKPASPNLFMMEANEDVV  
IGDVLFPKNSLIITQLSKSARSEDHFENSQDFLPERWMQKEEGCPFTGRHNEKALKAFGG  
GTRTCPGKLLAETEILVFIITMMKNFDIKLSPKNLVEITPKKEKK

>CYP152A24 (D770\_07040) **Flammeovirgaceae bacterium 311**

MPKAINFRLTIDFISHQPIIAFFTQDLPMNNIPKDKNPDSTLSLMLEGFPFIRNRCQRYGS  
DIFETRLMLQKTVCLHGEEAAKIFYDPARFKRKGAAPKRIQKTLFGEKGVQTLGEAHRH  
RKAFAFMSLMTRDHIQLLMQMLENNWRLYIHKWETVDSLVLYDEVQELLCRASSKWAGVPM  
QESEVKNRRAKDYGLMVDAGFAIGPRHLRGRALARTRAENWMKGIVKQIRSGQLTPEPGTAA  
HLFSWHQDLKGKLLPEKVAAVEIINIIRPIVIAARYITFSALAMHEHPEYRQKLQTGEAD  
MEEIFAQEVRRFYPFGPFLGARVKDFEWGGYHFPKNRLVLLDIWGTNRDEKQWEEPDRF  
WPERFRNWNGSPFNFIQPQGGDFMANHRCAGEWITIEVMQAINILANKINYRVPEQDLG  
FSLVRMPTIPRSRFVISDVVKV

>CYP1103A11 (GFO\_0170) **Gramella forsetii**

MNNNNKIPEVSSLKFLKHSANILKNPLPFHHQNFTEKGDTFRLNIGFKKSVIFSRDAGFL  
EYALQKNQNYIKSEIQTQDKEIIFPILNDLAFQTVVKSLSAANQEEINRLQYITESAQKMLV  
KEAINTEYDKIQTDEIDIFPILNDLAFQTVVKSLSAANQEEINRLQYITESAQKMLV  
KELRQPYLGWWFKASGKIDSYKLTAEARLILKRVHERRESNTRYDDLLDMLLDAKYDD  
GNFMDEEQLIDEIILILFTAGHETTSNALTFISOLLALNPQWQDRILGEIQNLNTETDDLM  
GFVTQAKVTQQVIEEGMRLYPPAYFIDRVNVEQDEFGGMILLEPGENLLFSVHEIHRHPNL  
WEKPEEFLPERFEDGGKKYSSQYFPFGAGPRKCIGNNFAMFEMIIAVSELVSRFKIIISVA  
DEIDIKPLITLKPKNAILKFTKR

>CYP1103A12 (LPB144\_08270) **Gramella salexigens**

MGESRKIPEVPLFRFLKHSANILKNPLPFHHRNFEEKGDTFRLKIGYGTIVFSRDAGLA  
EYVLQKNQNYIKSEIQTQDKEIIFPILNDLAFQTVVKSLSAANQEEINRLQYITESAQKMLV  
KEAIHAEYQKIEDKEVDIFPVFNDLAFQTVVKSLSAANQEEINRLQYITESAQKMLV  
KELRQPYLGWWFKMSGKIDKYLDLTNEARLILKRVAKRNRSEERYDDLLDMLLDARYED  
GEFMDEEQLIDEIILILFTAGHETTSNALFTTELLALHPEWQEKIFKEVSELKKDEDLM  
SLVTGAKYTQQVLEEMRLYPPAYFIDRVNVERDEFEGKEFKAGSSLIFSIEIHRHPAL  
WDRPDDFLPERFEEGGRQYSSQYFPFGAGPRKCIGNNFAMFEMIIAVSELVSRFKITHIS  
GAIDIKPLITLKPKNAILKFKKR

>CYP1103A15 (GRFL\_1964) **Gramella flava**

MGKNDHIPEVSLFRFLKHSLEILKNPLPFHHQNFEQKGDTRLNIGPGKSVIFSRDPALA  
EYVLQKNQNYSKTEIQTQDKEIIFPILNDLAFQTVVKSLSFKAASSEEINRLQFITEAQKMLV  
QRAIQOELRRIEPEKSIDIFPIFNDLAFQTVVKSLSFKAASSEEINRLQFITEAQKMLV  
RELRQPYLGWWFKLSGKLESYLALTRESREILKKIVHDRRESGKKYDDLLDMLLDARYED  
GNFMDEEQLIDEIILILFTAGHETTSNALSFIAQLLAHHPEWQDKIFAEYAKLSSENDLMS

LVTQTPSTQMVIIESMRLYPPAYFIDRVNIEKDEFQNMKFEKGSNLLSIYEMHRHPDFW  
EDPDDFKPERFGGNSMKYSSQYFPFGAGPRKCIGNNFAMFEMILAVLEIISKYKIKPVKP  
QIDIPLITLKPKNAILKFEQRS

>CYP1103A16 (C7S20\_08530) **Gramella fulva**

MKQNELSMKKENNIPEVPLSKFLKHSANILKNPLPFHHENFEEKGDTFRLNIGIGKSVIF  
SRDAAFAEYVLQKNQKNYIKSTIQTCKDLAKYIGRGLLTSDEHWRKQRKLIQPAFHKKQL  
AKLLGAIKOAILEEIPKLKTDETFVFPPNDLAQTVVKSLFSSAATQEEINRLQFITE  
SAQKMLVRELRQPYLGWWFKISGKIEHYLKLTRERSQILQKIVDERRSDEKYDDLDM  
LEARYDDGNSMDDEQLIDEILVLFIAHGHTTSNALSFISQLLALNPEWQDKIFEETQNQA  
SEDLMAVVTNSPVTQQVIEEGMRLFPPAYFIDRVNIEDDEFNGKFFPAGSNLLFSIYEIH  
RHPDLWQRPDEFLPQRFSENPKQYSSQYFPFGAGPRKCIGNNFAMFEMIIAVQEISKYT  
ILPVKDEIEKPLITLKPKNALLKFMNR

>CYP1099A4 (Fjoh\_1643) **Flavobacterium johnsoniae UW101**

MSEKQKHTYPEKLSILRFFRDAEGVRRNPIPFWKKYFDKLGDSFSIRIGFSKVIILSRDN  
EIAQYILVKNQKNYHKSKFQSVDLSKYLGKGLTSQDFWLQKQRRLIQPAFHKQKMNQLV  
DNMNAVIALELENLIEEKPIDLFPVMSNLAFNVVAKSLFQLSTAENKFQRIKFIIIEVQN  
FLIKEIRLPHKAWWFSLSGQVKHLKLAEEENNHIQEIIIEERKASGEEINDLLNMLETR  
YEDTGESMSVEQLIDEIKVLFIAHGHTTANALTFTLHLLGRNPEVQQKIFEIIIESQT  
DNVIEQLQKMTYTNAVLNESMRMLYPPAWITDRQNLLEDDSLAHFKIKKNTLIGVSFYELHR  
NPKYWKNPDEFIPIERFLGDQKCESMQYFYPFGAGPRMCIGTGFAYEMCLTIAQVVKKYI  
IKSNNDVIQFNPLITLKPKNALLKFMNR

>CYP1103A18 (ZPR\_0586) **Zunongwangia profunda**

MILIMKREIPEVSTLTFLKNAARIVKVNPLPFHHENFQKHGDIFRLNIGPKKSVIFCRDAE  
FAQYVLQKNQKNYIKSEIQTCKDLVKYVGNGLLTSNGEHWKQRKLIQPAFHKKHIANLLD  
TVLEAIRVEYVKIRAGKTIDIFPVFNDLAQTVVKSLFSSAASQEEINRLQYVTEENQKM  
LVKELRQPYKRLWFSLSGKLYHLKLSEESRLILRNIVHKRQNPCKRYDDLLDMDDARY  
EDGQPMREEQQLIDEILILFVAGHETTSNSLSFTTQLLAQNPQIQDKIYSEVKVASEATTS  
LMEFVQGCPYTQNVILESMRMLYPPAYFMDRVNLEEDEFNGIKLDKGSDLLFSFYEIHRS  
KHWEQPLEFNPDRFTSEKNPMAYFPFGAGPRKCIGSNFAMYEMILAVSELILNFKILSVK  
EDIEILPLITLKPKNAYVEFEKRA

>CYP152AQ1 (ZPR\_3345) **Zunongwangia profunda**

MVEESSIGFWFKGYDYFLDQFNATKNNVLKRRLLFKYYIILRGEEATALFYDQERFSRHK  
ATPKRFKKTILFGLNGVQGLDGEQHKARKQLFMHCMNVDLSNLQNTYFDEAWFEAVEDWKA  
KNTINYFDEMERILFKCACKWIGLPTKKDIVNQVPRISMISAGKIGIQHWRGRSARK  
ATENWVKSLIKNYRNKKNSDTIDHFIGYKNPKGKHLPDQIVAVEILNLLRPIAVARY  
MTFNLKALEDYPSYKEKLRENYEEYGENFIQEVRRFYPFFPVISGRIRKNFEFKGHKFTK  
GQRVLLDLYATNHAKIWKAPERFYPERFMNAQISPFLIPQGGGDHYKNHRCAGEWITI  
NLMKRNLFLYFLYDINYTVKSKNLRKKNQFPLPANGIKISKITKLRLME

>CYP236A34 (YQ22\_01795) **Maribacter sp. 1\_2014MBL\_MicDiv**

MFSDAFKDTRVSKGTCPNDQDDPVTMLLRFKDVTKTAHNAKDFSSAAKPGRIVVSEVN  
IRDARQIPFEVDPPEHTEYRALVEDWFKRPLDIDYEFKLTRIVEAIDRVLQKGAIEAIS  
ELSLPIQSKALTLLNISLSEAETWISWGTHVFRSEDSLDAKASILYDYIDAEDKAI  
AAPDDSLYSVLLNSEYQGRKMTKEVKGVILTFAGGRDTVINYLNTNTISYLAEPDAIE  
KLNDNPALVNTAIEFVRYFSPLTHMGRVVKEEQEISGHIAKEDTRVSLCWASANRDESI  
FENANKIVLDRKMNPHVAFGFGAHKCLGATHARQLMKVFLRVLTEKVSTIEIIDAVENIE  
DWGAHKRKVGFDKLTIRLNK

>CYP236A24 (EJ994\_03085) **Maribacter sp. MJ134**

MDESVFKDPFKTARIEEGIGHMTDQNEKVKMILRLKDLRKTAHNWKTQSGGKEIGRIVV  
PSEEKIRKTRQIPFEVDPPEHGQYRELLEAWFKRPLDSEYEKLRVQIATIIDSVIKKDR  
VEIVSELALLLQSRALTLLNIPPLEESEVWINWGTIVFRSEDTALDKDKANILYDYIDHQ  
IDKAIAANPGEDLYSVLLDADFGQRKLNKEEIKGVMILIFAGGRDTVINAITNTIAYFAEH  
PEALRRNLNEEPDVIGKAVEEFIRYFSPLTHMGRVTTEDTQICEHAVKANSKVSLCWASAN  
RDETVEFKPNDILLDRKMNPHVGFGBHKCLGATHARQLLKILISVLVQKIDNIQILDY  
KENIEDLEQFERKVGFDNIHVKFNSIQ

>CYP1103C14 (EJ994\_09855) ***Mariabacter* sp. MJ134**

MKKLPVVSRTHVFKNRQILKNPIFHHDFNRLGDTFEAVGLKKRIIFTRQAKFIKQI  
LQTKQKHYQKSSLQTVDLAKYIGRGLTSNGEHWRNHRRMIPAFHKRKLQGLLQIMYQA  
IKGELSKIKAGEIQDIYPLMGDLAFQVVATSLFSRDDIQVQMSALKEITEANQRMLIQEM  
RQPYLNWWYKFSGKINRHICKLSLEARAILSSIKERLAQDSEKDLMMDMLLKATYEDGSR  
MPEKQLIDEILILFAAGHETTANALGFILFLAKHPEKQGKAFAEINAIDWTEGIEMESL  
RKLGYVKQCIEEGMRLYPPAYYIDRESIIKDEIEDYEIPENSMLLAIYELHRDSRFWES  
PNAFKPERFDPANKRDYSYYFPFGGGPRMCIGNNFAMQEMILTVAEILRSYTLRPVDE  
VLINPLISLKVPSVKLHFIPR

>CYP236A26 (IX49\_12470) ***Cellulophaga lytica* HI1**

MAKCKFADAFKEEREKSGIGKMDDQGDPVVMLNNHKDVRKAHNKAFSSSEAVPGRIVVP  
SEVNIRTTRQIPFEVDPHMKEYRSRSLLEAWFKRPLQDTYKEKLTTIIGTVLDDVLSKDKV  
DVVSDLALVIQSRALTLLNVPDFDKSVKWISWGTHVFRSEGEALGDKAAILYNYIDEEI  
DNAIANPTDNLYSTLLAAEVNGKKLTKEEVKGVLILTFAGGRDTVINALTNMMSYFSANK  
KALDYIRSKPEIIKTAVEEFIRYFSPLTHMGRVTEDTTCEHAVKADSRISLCWASANR  
DEKVVFENPDEVILERKVNPVHGFFSHNCLGATHARQIMRITLKLLEAKVSDITVLEAE  
ENIENLGEFTRKVGYNSLKATFKKR

>CYP1103C15 (M667\_07630) ***Cellulophaga baltica* NN016038**

MQKTPIVSQFEVKNSRRILKNPLPFHRENFEKYGDVFRVKIGVKEELAFTRSPQLIKHI  
LQKQHKKYHKSSLQTKDLAKYIGHGILTSNGEHWRTHRRMVQPAFHKKKLQNLMATIREA  
ILLEIKNIPVTHPIDVYPMNSLNLFQVVAKSLSRDDIQEEMSQLQYITETNQRMLIKEM  
RQPYLNWWFQLSGQIRKHLNLAKDGQAILHQLIEGRRNSAVEKDLLDMILLQARYEDGTA  
MAKEQLIDEVLILFTAGHETTANALSFLVFLLAKHPEIQEKayQEMKNITLEGDDVLIQL  
LELKVVQQCIEEAMRLYPPAYIIDRAVIEDDEFEGLNIPKDSLVLMSIYELHRNENFWEA  
PNEFNPERFDASKKKEYQEYYYYPGAGPRMCVGNNFAMYEMI IAATELLQKYEMTTALPE  
VTINPLISLKPENVLISFTARN

>CYP236A32 (M667\_11705) ***Cellulophaga baltica* NN016038**

MKESIFTDPFKKARQETGIGEMDDQNDPVAMILGHKEVRRAAHNWKSYSSGAIPGRIVIP  
SEVNIRSIQIPFEVDPHQHGAYREVVEKWFKRPLEKKYEEELTLQIEALVIEVLEQDSF  
EVIHDFALVLQSQALTLLFNVPFEEAQWTWISWGTHVFRSKDSALDGAKANVLYDYIDQKL  
AESSSNPGKDFYAVLLAAEVDGKKLSAAEKGVILTFAGGRDTVINAVTNASIAYFAEHP  
KSLELWRKEPELLPTAIELIRYFSPLTMQGRVATQDTMVCQHAVKADSRISLCWASANR  
DETUVFENADEVVLDRKANPHVAFGFGTHNCLGATHARQVMKVLLRTLIAKVKSIDIHDAK  
DNIEDLGDFKRKVGFDSLTVKFNKI

>CYP1103C15 (M666\_07665) ***Cellulophaga baltica* 18**

MQKTPIVSQFEVKNSRKILKNPLPFHRENFEKYGDVFRVKIGVKEELAFTRSPQLIKHI  
LQKQHKKYHKSSLQTKDLAKYIGHGILTSNGEHWRTHRRMVQPAFHKKKLQNLMATIREA  
ILLEIKDIPVTHPIDVYPMNSLNLFQVVAKSLSRDDIQEEMSQLQYITETNQRMLIKEM  
RQPYLNWWFQLSGQIRKHLNLAKDGQAILHQLIEGRRNSAVEKDLLDMILLQARYEDGTA  
MAKEQLIDEVLILFTAGHETTANALSFLVFLLAKHPEIQEKayQEVKNITLEGDDVLIQL  
LELKVVQQCIEEAMRLYPPAYIIDRAVIEDDEFEGINIPKDSLVLMSIYELHRNENFWEA  
PNEFNPERFDASKKKEYQEYYYYPGAGPRMCVGNNFAMYEMI IAATELLQKYEMTTALPE  
VTINPLISLKPENVLISFTARN

>CYP236A32 (M666\_11750) ***Cellulophaga baltica* 18**

MKESIFTDPFKKARQETGIGEMDDQNDPVAMILGHKEVRRAAHNWKSYSSGAIPGRIVIP  
SEVNIRSIQIPFEVDPHQHGAYREVVEKWFKRPLEKKYEEELTLQIEALVTKVLEQDSF

EVIHDFALVLSQALTLFLNVPFEAQWTWISWGTHVFRSKDSALDVAKANVLYDYIDQKL  
AESNSNPGKDFYAVLLAEEVDGKKLTAAEAKGVLILTFAGGRDTVINAVTNSIAYFAEHP  
KALELRLKEPELLPTAIEELIRYFSPLTQMGRVATQDMVCQHAVKADSRISLCWASANR  
DETUVFENADEVVLRKANPHVAFFGTHNCLGATHARQVMKVLLRTLIAKVKSIDIHDAK  
DNIEDLGDFKRKVGFDSTVKFNKI

>CYP1103A9 (Krodi\_1564) **Dokdonia sp.** 4H-3-7-5

MPDKIPAVSVFKFLANAGSILKNPLPFHKENFESKGDTFKLKLGFGNVVFSRDPEFAKY  
ALQKNQRNYSKSPIQTKDLAKYVGEGLLTAEVDHWKKQRKLIQPAFHKKQLAQQLDAMHE  
VIKEELLRIETHKPFDVFEVFLAFMTVVKALFKTDVDRDKINRLQHITEQAQKMLVKE  
LRQPDKAWYFKYGGAIKHLALTKEARVILKELVKERKDSDGKPGDLDLDSQYEDGG  
FMDDNKQLIDEILILFSAGHETTSNALTFATAELLARNPIWQDKIYEEYAFAKANSTNLNEF  
LRHCTITKQVLEETMRMPPAYFIDRVNIEDDHNGMEVPAGSNLLFSVIEIHKHKDFWE  
RADQFDPTRFDDNAGMKHPAYFPFGAGPRMCIGNNFAMYEMILAITEMVSMSYKITPKNTP  
IEILPLITLKPKNALLEFIPR

>CYP1103A8 (MED134\_11416) **Dokdonia sp.** MED134

MSNDIPAVSVLKFLANAGSILKNPLPFHKENFESKGDTFKLQLGFGNVVFSRDPEFAKY  
ALQKNQRNYSKSPIQTKDLAKYVGEGLLTSEGLSLWKKQRKLIQPAFHKKQLAQQLIEAMHT  
VIKEELQSIKTGEADFVEIFNDLAFNTVAKSLFQTEVDRKKINRLQYITEQAQKMLVKE  
LRQPDKAWYFKYAGPIDKHLALTQEARDILMELVEERRASQQKVGDDLMLESTYEDGT  
GMDDEQLIDEILILFTAGHETTSNALTFAVSLALARHPEWQDKIYEEYAFAKAYSTSNEF  
LRHCTITKQVLEETMRMPPAYFIDRVNIEDDHNGMEVPAGSNLLFSVIEIHKHKDFWE  
DPLQFNPTRFDDNAGMYHDAYFPFGAGPRMCIGNNFAMYEMILAITEMVSMSYKITPKNTP  
IEILPLITLKPKNALLEFIPR

>CYP1103A9 (DCS32\_04110) **Dokdonia sp.** Dokd-P16

MPDKIPAVSVFKFLANAGSILKNPLPFHKENFELKGDTFKLKLGFGNVVFSRDPEFARY  
ALQKNQRNYSKSPIQTKDLAKYVGEGLLTAEVDHWKKQRKLIQPAFHKKQLAQQLDVMHE  
VIQKELLRIVMHKPFDVFEVFLAFMTVVKALFKTDVDRDKINRLQHITEQAQKMLVKE  
LRQPDKAWYFKYGGPIDKHLALTKEARVILKELVQERKDSDGKPGDLDLDSQYEDGG  
FMDDKQLIDEILILFSAGHETTSNALTFATAELLARNPIWQDKIYKEYAFAKANSISNEF  
LRHCTITKQVLEETMRMPPAYFIDRVNIEDDHNGMEVPAGSNLLFSVIEIHKHKDFWE  
RADQFDPTRFDDNAGMKHPAYFPFGAGPRMCIGNNFAMYEMILAITEMVSMSYKITPKNTP  
IEILPLITLKPKNALLEFIPR

>CYP236A2 (ZOBELLIA\_4677) **Zobellia galactanivorans**

MKKSELPDFEKARESKGYGEMNDQDPVTMLLRHKDVRKSahNYKTFQSGAVPGRIVIP  
SEVDIRDTRQIPFEVDPVHGTVRAIVEPWFKRPLQAEYQEKLTaqiseiveetllkgs  
EVVTDFAFLRQLQSRALTLLNTPFSESETWISWGTHVFRSEGEALDGDKANILYHYIDEQI  
DRASENPAGDDMYSVLLNSEFEGRKLTKEEVKGVMVLTAGGRDTVINAVTNSIAYLAEHP  
EALERLRKEPEITGRAVEEMIRYFSPLTQMGRVVTEDTHVCEHAVKADSRISLCWASANR  
DAAVFENPNEIVLDRKVNPHVGFQSHNCLGATHARQILKILLQTLAQVASFEILDYK  
ENIEDLHFQRKVGFHNIQIKFNPLTK

>CYP1103A10 (Aeqsu\_0891) **Aequorivita sublithincola**

MKAKKIPSVSAFRFLTHSIQILKNPLPFHHKNFETKGDTFRKLKGFGKSVIFSRDAGLAQ  
YALQKNHRNYTKSPIQTRDLAKYVGHGLLTSEGELWQKQRKLIQPAFHKKQLINLLDTIN  
SAIKLELTKIEGKPKDIFPVFNDLAFQTVVKSLFSSAVNQKEINKLQNITEAAQKMLVK  
ELRQPQYLIWWFKLSGTIKKHIAETEEARAILMKLVYERRNSGKREDDLDLDSQYEDGG  
SVMEDRQLIDEILILFTAGHETTSNALTFCELLARNPDIQEKLFEEVIFAEVNSETLMD  
FIKNLSFTKVNIEESLRLYPPAYFIDRVNIENDEFDGMFIPKNSNLLFSLLEIHTNPANW  
EEPQKFRPERFSDVNPNHFSGQYFPFGAGPRMCIGNNFAMYEMILAIAEIIKTYKIAEKK  
TSIEMKPLITLKPKNALLEFNF

>CYP1144A9 (P700755\_002170) **Psychroflexus torquis**

MTSSTHFPEVPVIEFLKHAGNILKNPLPFHQKNFEALGNTFRLNLGLGNSVVFSRDPF  
IYALRDNQKNFKKTDIQTAKDLAKYVGHLTSEGQKWKSRKLIQPAFKKNIYSLLDVM  
VEAIDKELERIEVDTPIDIFPIFNDLAFKVVKSLSDAINAEEISRLQYITEETQKMLV  
KELRQPYKKWWFVLSQLERKRNLNLSREARDLLIRIICKRRQNSNSESKDLDMLLA  
GSKMNQEQLIDEILILFIAGHETTSNALSFVQLIGQDEHVQEKLVSEIDLLEDHSFFDI  
LKDSKYTENVIQESMRLFPPVYFIDRQNIERDTFKGFEIPQGTTLLFSVHQIHRNATNWE  
NPNKFMPPERFQDSRSVSNFYFPFGAGPRKCIGNNFAMYEITLAINRLLKTYKIEQVNKEI  
EIQPLISLKPKNNAIVKFSKR

>CYP1103B3 (DDD\_1081) **Nonlabens dokdonensis**

MKQIEQVPTLTFLAKSRQIYKDPLPFHRENFKKYGNTFKISPCKPGLLIHFTCDEKL  
LQKNQKNFNKSTLQTEDLGKYIGHGLLTENGEWKRANRKLIQPAFYKKSISSL  
MVDEVIQEEIGKIKEDVATDVYEIFNDLAFKVVARSFLDFADIDNL  
DSKISRLQYITEKAQKTLI  
KELRIPWMKWYFDREWLSGKKSIPHSLSLIEEAREILRN  
IINNRRSGNKEPGDLDMLLH  
STYEDGSHMEDDQLIDEILVLFIAGHETTANALSFAAQLLAQH  
PETITKATQELQHLENE  
NLMEGLMSMPYIKQCVEETLRLYPAYVTDRA  
LEADSCEDEVIEKGSIWLVSFYEMHRR  
QDLWERPEEFIPERFEKEAKSYRDFYFPFGAGPRMCVGNNFA  
IFEMVLT SARLLERFEV  
KPVHDTIDYHPLITLKPRNAQLIFKRK

>CYP1103B5 (AAT17\_08830) **Nonlabens sp. MIC269**

MEIPQVPFIEFFSKSRQIYKDPLPFHRENFKKYGNTFKISPCKPG  
LVIHFTCDEDLAQYML  
QKNQKNFH  
KSTLQTKD  
LGKYIGHGL  
LTANGEQW  
KANRKLIQPA  
FYKKSIA  
TLMNK  
MEEVV  
DEELG  
KIKP  
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NNLAF  
KVVAK  
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IIDD  
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>CYP1103B2 (CW736\_02995) **Nonlabens sp. MB-3u-79**

MRKIEQIPALTFLAKSRQIYKDPLPFHRENFKKYGNTFKISPCK  
PGMLIHFTCDEKITQHI  
LQKNQKNFNKSTLQTEDLGKYIGHGLLTENGEWKRANRKLIQPA  
FYKKSISSL  
MRT  
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>CYP1103B4 (EJ995\_01145) **Nonlabens sp. MJ115**

MRKIDKVSAFRFLSKSAQIYKDPLPFHRENFKYQRYGHTFKISPCK  
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>CYP236A31 (BW723\_04380) **Polaribacter reichenbachii**

MKVSEFPDAFKKEREKGYDSIEDQNDPAMMILGHKDVRKCAHQWQTFQSGAKPGRIVIP  
SEVNIRETRQIIPFEVDPPEHKSYRNLLAEWFKRPLNEDYKNQLTQIESIVDEVLNKDAI

EVVGDFSLPLQSRALTLLNIPYSEADLWISWGTHVFRSEDTALDADKANILNYIDQEIDKAIENPSESLYSQLLNKVNNGKKLTKEEVKGVMILTFAGGRDTVINAVTNSIAYFSEHPSNLALKENPAMINKAVEELVRYFTPLTQMGRVATKDAEVCEHAVKADSRIALNWASANRDERVFENPNEVVLDRKVNPHLSFGFGIHNCLGATHARQILRILLATSKKVTSIDVLEAKENIEDLGNFKRKVGFDSLKVQFNK

>CYP2728A1 (EAG08\_11490) *Chryseobacterium* sp. 3008163

MISKTMAYAPEIDS PYRKNVLHGLAARNLKFKEKDEMKA SAEKFLKECLEKGKFDFINDFAHQYTFTISRIIGIPEEDIAELTEVVSKLNKGYLKLINNLETSDPAEQDFILFLRKFIQKKENSLGKD LASALIESCKVT DENSDFALCLLIFLFYAGHDNNMMNFLGNGFLSLYNNPHVN FNLKGKPHFIQNAIDELLRYDSPVQFFTMYTKNDIVIRDTKISAGCQLLVCAGSANRDPDKFQNPDEIKIDRSPQHLSYGFGAYRCIGARLAQLOQSATAFEVLIQNI NIEDLKISNPIWKNEQYIQRGPKKIIVNTK

>CYP1103C7 (SB49\_14710) *Sediminicola* sp. YIK13

MKLVSRFQVLKNARRILKNPLPFHENFEAHGDSFKVQLTTKETVLFTRNPG LIRHVLQKQHKKFEKSPLQTVDLAKYIGHGILTSNGEHWRVHRRMVQPAFHKKKLHNLGVIREAIRFELQRIKPNT EEDVPLMGDLAFQVVA KSQLFSSTDIRDKMSQLQHITEENQRMLIKEMRQPYLRWWYKLNGKIDRHLAMAKEQKLLIEERRTAGLEKDDLLDMLLKARYEDGSPMSD EQLIDEV LIFTAGHETTANALSFTLFLASHPEIQEQVYQEVSKVDFEDPEIDL MKGAMQLQLVKQCLEEALRLYPPAYVIDRIAIEDDSFEGISLPKGTLV LMSVYELHRYSDFWEK PSEFIPGRFNTTDKKDYS DYYYPFGAGPRMCVGNNFAMYEMILAVA EIIKKYKIKTSLEKV EINPLISLKP KCVPLLFEER

>CYP236A21 (TJEJU\_2941) *Tenacibaculum jejuense*

MKSEFSDPFEEAR KKTGLGHIDDQNDPVAMILRHKDVRKTAHNWKT YQSSAVPG RIVVPS EVNIRD IRQIPF EVDPPPLHKDFRDLLLEGWF KRPN REEYQKTLKNQVSNLID DVLS EDEIE VVHDFSLKLQSRALTILLNTEYES DTFISWGTHVFRSEGDSLDASKANVLYDYLD A KIN GAREN LGEDLYSVLLQAEVNGKKLTHDEIKGIMILTFAGGRDTVINAVNTVAYFADHPK SL LDIKNNPEKINKA VEE LIRYFSP LTHMGRV T E D T QVCE HAVKNDTRVSLCWA SAN RD ET VFENPNQVN FDRKINPHVAFGF SHNCLGATHARQIMRTLLQ LADKVSSIDI DSRE NIEEWGEFKRKVG FHELKVFKNF N K

>CYP1103A14 (CW732\_00785) *Olleya* sp. Bg11-27

MKNNIPEV SLLKFIKHSLEILKNPLPFHN RNFEEKGDVF KLN VG FNSKIYFSR DAGLAQY VLQKNQR NYV KSKI QTVDLV KYVGEGLLTSEGDKWKKQRKMMQPAFHKKQLQNLLGMQDT TI ISEFSKVETNKTI DLFPLN DLAFQTVVKSLFTQ AANSK DMERLQCITEANQRMLVKE LRQPYLGWWFKIGGALKKHLKLSEARTILKGIV AERKASGH RFDDLLDM LLETKYDDGK GMSETQLIDEI LIIIFTAGHETTSNALTFTFQLLA KHPEWQDKIYDEWSELGGDDV DLMTR VSTSKICQQVLEESM RLYPPAYFIDRVNVEADRFNDMV FEPGCNLLFSVYEIHRHPKLWT NPESFLPERFEDGGRQFSAQYFPFGAGPRKCIGNNFAMFEMI IAVTELVKNYKIRPEFDK IDITPLITLKPKNAFLRLEKR N

>CYP1103A17 (DZC78\_08210) *Olleya aquimaris*

MKKIPEV SLLKFIKHSLEILKNPLPFHN KNFTEKGDIFKLN VS FNSKIYFCRDA AFAQYV LQKNQKN YT KSNI QT KDLV KYVGEGLLTSEGDKWKKQRKMMQPAFHKKQLQNLLGMQDT IVEEFN KIY TNKTIDVFP I LD LAFQTVVKSLFTKPARAKD MERLQFITEANQRMLVKE RQPYLGWWFKTGGELKKHLKLSEEA RI I LKGIVADR KASNK RYDDLLDM LLETKYDDGQG MSEQQLIDEI LIIIFTAGHETTSNALTFTFQLLA KHPEWQDKIYNEWL TLGGDDADLMTRV SNSKICQQVLEESM RLYPPAYFIDRVNIKPDDFNEYHFESGSNLLFSVYEMHRHPKLWDQ PDTFLPERFKDGG RQYSAQYFPFGAGPRKCIGNNFAMFEMI IAVTELKKYKIKPKSETI EITPLITLKPKNAFLRQKRD

>CYP1099C2 (C1H87\_09385) *Flavivirga eckloniae*

MPKYKYPNPKVHFFKFLIQASSIAKNPMLFRNKWFNEIGDTFAIKSPFYGHIIILTRDAVIT  
KHMLQKKHKVYHKSQIQTLYLSKYVGGLTSSGDYWLKQRRLIQPAFHKEKIQLNVEII  
NKAQNEQVESINAEGFVELYPIMMELAFEVVAKSLFNFAEKETLKRLQFIIEKLQLFIV  
KELRMPYKKLWYTLTGEIKYHMKLVKESRSINTIIDQRRKSNEEHDDILDMLLSATYED  
GTTMTNEQLIDEILILFVAGHETTANALTFTLKLQAQNKDALTKVETEIKETNTKGTLPL  
QELSQNLNYTCCIEESLRLYPPAWITDRVNIEDDTIDDYLKKGTIIGASIYELHRNKNY  
WDDPESFKPSRFFEEENRKEVLVYMPFGAGPRLCIGNNFAMYEMILAVSAILKKFNITTD  
NDTIKVNPLITLKPVDRVLKFTLKNDC

>CYP236A27 (C1H87\_18040) *Flavivirga eckloniae*

MKKSKALPDPFEEARVNKGYGEADDQNDPVTMILGLKDVRKCAHNWKTQSGAEGRIVIP  
SEVNIRDTRQIPFEVDPPQHKSYRDLVEPWFKRPLEADYSATLTQQINDIVDEMLTKDSI  
EVVEGFSLRLQSRAILTLLNIPYESETWISWGTHVFRSEGEALDGDKANILYDYIDEKI  
TKAIENPGDDLYSMLLAATVNGKKLTREEVKGVMIILTFAGGRDTVINAITNSIAYLAEHP  
ESLNRLNNEPEITGRAVEELIRYFSPLTQMGRVVTEDTQVCEHAIKEDSRISLCWASANR  
DAKFENPNVVLDRKINPHVAFGFSHNCLGATHARQIMMILLTLAKKVKSIDIIDYK  
ENIEELGEFNRKVGYNSLTVKFNGR

>CYP236A33 (C1A40\_12590) *Tamlana* sp. UJ94

MKKSKIDDPFKEARETKGFGTMNDQNDPVTMILGHKDVRKCAHNWKTQSGGDEIGRIVV  
PSEVHIRDTRQIPFEVDPPQHKSYRDLVEPWFKRPLEEAYQEKLTDIINIIVDEALTKGS  
MEVVFSEALKLQSRALTLLNIPFEELWISWGTHVFRSEGEALDGDKANVLYDYIDAQ  
IDKAIANPGDDLYSKLLASEIDGKTLTKEEVKGVLILTFAGGRDTVINAITNTIAYFADN  
PQALQQLRQPEHLNSAIEELLRYSPLTQMGRVVAEDTQVCEHAVKAQSRISMWCASAN  
RDERVFENPNEVVLDRKVNPHVAFGFTHNCLGATHARQILRILLNTQKVGCMQITAA  
KENIEDLDEFNRKVGFDLQVAFHKL

>CYP1099A5 (C5000\_03575) *Aureitalea* sp. RR4-38

MAAKTKYNYPERLPLLKFFLNAEAIRKNPIPFRQFFNLYGDTFAVKLGRRKHLMSRDK  
DVVQHILQKHNKNNYYKSTIQTCKYLSKYLGMGLTANGEFWLKQRRLIQPAFHKKKMDSSL  
GLMQKTIAGELDELTTESIDVFVVMNQLAFFNVVAKSLFNLNVSTDQLKRLQYIIQEIQ  
FLVKEVRLPHKGWWFKLSGQVKHHKLSEESREIIGKIIIEERKASTQSHDDLLDMLLATR  
YEDTREPMSTRQLVDEISILFVAGHETTANALAFTSFLLARHPKVQQRVFDEVLVAVSAT  
QDPLEQIKQLPYTRAVIDESMRLLYPPAWITDRENLEDDTIGDYHIRKNTLVGVSFYELHR  
NPKYWENPDDFVPERFLGEHKKETAGIYYPFGAGPRMCIGMGFAIYEMVLAVSHLVHYK  
LNTQLNEPKVNPLITLKPVDRVLINFERRDHS

>CYP1103C13 (HME9304\_02119) *Flagellimonas* sp. HME9304

MKNLPHVSASFVLLNSKRILRNPLPFHYENFEKLGDTFRISIPGEGEVLSRDPELIKQV  
LQKKHRYYSKSQKLTQDKLAKYIGYGLTSEGEHWRTHRRMVQPAFHVKKLKGIMRNA  
IVDELKRIEPNSQQNVFALMGDLAQVVAKSFLFSSNDIREPMMSRLQQITEENQKMLIREM  
RQPYFKWWFKASGEIKKHLKMSQIGRDILNDLIEERLTSGQEGQDLDMLLKATYEDGSR  
MPRRQLIDEVLILFTAGHETTANALAFTLFISKDEELQAKLFAEINTLENENYTLEDLG  
KLSLTMSCKEAMRLYPPVYFIDRVATHENEINGLMKKGTLVLLSIFELHRPEFWNKA  
TEYIPDRFMKMMKMEASNYYPFGAGPRMCVGNAFANYEMVMVIMEIIKKFKISTKMTSV  
EINPMISLKPKEVTLFVAR

>CYP236A30 (D1818\_05265) *Aquimarina* sp. BL5

MKKSEFLDPFEKARLEKGIGEMDDQDDHVVMALRHKDVRRCAHNWKMQSGAEGRIVIP  
SEVNIRDTRQIPFEVDPPMHGYRTLVEAWFKRPLEENYQIELKKIITTIVEESLKKDTV  
EVIREFALVLSRALTLLFNVPFSESETWISWGTHVFRSEETALDADKANVLYKYIDVQI  
ENSICKPGEDFYSKLLESEVNGRKLTKEEIKGVIILTFAGGRDTVINIVSNSIAYFSEHP  
KALEKLRSRSPASINFAIEELIRYFSPLTQMGRVVTEDAQVCEHAVKADTRISLNWASANR  
DESVFENANTVVVLDRKINPHVAFGFVHNCLGATHARQIMKVLIHTLIGKVQSIDLLDSK  
ENIENLGEFNRKVGFDLKVNFNSK

>CYP1103C10 (D1818\_11500) *Aquimarina* sp. BL5

MVIPKVSFFQVLKNAKNILSNPLPFHNKNFEKHGDVFEVNLGFGNSVIFTRDAGFAKHL  
QNQHRKYHKSPLOSKELARYIGNGLLTSNGDHWRQRRLIQPAFYKKIDVIANTIRETI  
CEELSRIEPNVSDIYPLMNDLAFKVVAKSLFSYTDGTNTMARLQHITETAQKSLIREIR  
QPYKRWWFHLSGQIKSTLKTQEARDILDNIEERRSKDTYDDLLDMLLNSKYEDGSSM  
DNERLIDEILILFVAGHETTSNALSFCLSLALHPEIQNKVFKEASEFDSEELSLMEQFQ  
KSKYTTQCVEEAMRLYPPAYFSDRVNIENDEYQDIKLKGTVLISFFEIHRSFWENP  
TKFDPDRFHSDNKEYSNWYFPFGAGPRMCVGNSNFAMYEMIYTVSELIRKYKISTSISEI  
EIKPLITLKPVNAILKFEKR

>CYP236A25 (D1815\_13705) *Aquimarina* sp. AD1

MKNSKFSDPDFDKARQEKGYGEMNDQDDPVTMVLRLKDVRKCAHNWKTYQSGAVPGRIVIP  
SEVNIRDTRQIPFEVDPPMHKTYRDLIEDWFKRPLLPEYQAEANIIEDIVDEAVTKDGS  
VEVVEEFALCLQSRAITLLNIPHEESKTWISWGTHVFRSEDSLADGSKANILYDYIDAQ  
IEKAIRNPNGNDLYSILLNSEIDNRKLTKEEVKGVMILTFAGGRDTVINSISNTIAYFAEH  
KESLQLLKDNPPIISKTVEELIRYFAPLTQMGRVATQDAAVCEHAIKKYTRISLCWASAN  
RDETFVNPNENVVLDRKINPHVSGFSSHKCLGATHARQIMKILLQALTKKVTSIEIVDA  
QENIEELGEFKRKVGFNSLSVKFNK

>CYP1103C9 (D1815\_19415) *Aquimarina* sp. AD1

MPVPKVSFYKVLKNAKNILSNPLPFHNKNFEKHGDIFEVNGLGFGNSVIFTRDAGFAKHL  
QNQHRKYYKSPLQTKDLGYIGNGLLTSNGDHWRQRRLIQPAFYKKIDVIAKTIRETI  
CEELSRIEPNVSMADIYPLMNDLAFKVVAKSLFSYTDGTNTMARLQHITEAAQKSLIREIR  
QPYKRWWFYLGSQIKSTLTLTQEARDILNTIEERRSEDTYDDLLDMLLSSKYEDGSSM  
DNERLIDEILILFVAGHETTSNALSFCLSLALHPEIQESAYTEIAKYDGQELSLMEQFE  
KSKYVAQCIEESMRLYPPAYFSDRVNIKDEFNDIELSKGTVLISFFEIHRRHKDFWENP  
TVFDPDRFHPDNKKYSDWYFPFGAGPRMCVGNSNFAMYEMIYAVSELIRKYKISTSISEI  
EIKPLITLKPVNAILKFTPRNK

>CYP236A28 (D1816\_09135) *Aquimarina* sp. AD10

MEKSKLDPFEEARLSKGYGKMNDQDDPVTMILRLKDVRKCAHNWKAQSGATPGRIVVP  
SEVNIRDTRQIPFEVDPPPLHKDYRSLVEPWFKRPLEKEYKQKLTQIEAIVDEVIAKTV  
EVVQDFSLRLQSQALTLLNIPFESESETWIGWGTHVFRSEGESLDADKANLLYDYIDQQI  
IKAERNPGNDLYSMLLSSEVNGKLTTHEEVKGVMILTFAGGRDTVINAVTNASIAYFAEH  
ESLKQLRENPDVTGKAVEELIRYFSPLTHMGRVATQDTQVCEHAIKADSRISLCWASANR  
DASFVNPNDIVLDRKVNPVHSFGFGTHNCLGATHARQIMNILLVSLAKKVKSIEILDHT  
ENIEDLEEFKRKVGYDSIKVNFNAL

>CYP1103C11 (D1816\_12900) *Aquimarina* sp. AD10

MSKTIPEVSFLRVLRNAKRILKNPLPFHNENFEKHGDVFEVNLGFGKSAIFTRDAGFAKH  
MLQHQHRSYHKSSLQTKDLGRYIGNGLLTSNGEYWLKQRRLIQPAFYKKKLDLIAGTIKE  
TIKEELSKITPNQTVDIHPFMSDLAFKVVAKSLFSYTDGTNTIARLQYITETAQNALIKE  
IRQPYKRWWFYLGSQMKSSKMLTNEARDILNTIEQRRNDTATYDDLLDMLLASKYDDGT  
SMNNEQLIDEILILFVAGHETTSNALTSLLLGMHPEIQEKAYDEVMKSKDEDLSIMDQ  
FAKSQYTKQCIEEAMRLYPPVYFSDRVIAESDTYKDLQLPKGTVLISFFEIHRRHLDWK  
EPLVFNPDRFNPENKKEYADWYFPFGAGPRMCVGNSNFAMYEMIVVSELIQQTITTTSE  
EIQVNPLITLKPKQGSTLKFQR

>CYP1103C6 (D1013\_03865) *Euzebyella marina*

MKKSDDLVTISQVEVFKNRKRILKNPLPFHQENFEKFGDTFKVNIGIGGRVVFTRDAETI  
KYILQKNHKNYKSSLQTKDLAKYIGNGLLTSNGDFWRAHRRMVQPAFKRKLQGLLSIM

LSSIEQELERLNQADTIDIFPIMGDIAFQVVAQSLFSADNLRKMRKLQHITETNQEMLI  
KEMRQPYLKWWFQLSGKTNRHLAKAEEARNLLNEIIERVDLAEKKDLDMLLKARYED  
GSPMSRRQLIDEVLILFTAGHETTANALSFTLFLAKHPQWQEDIFDEIKELENFSEDIMS  
AIGQAQLVKNCIEEAMRLYPPVYVIDRVSLGDDTIKNRSFEKGTWVLMMSMYELHRSKKFW  
REPEAFDPTRFNELNSKDYSDFYYPFGAGPRMCVGNNFAMFEMIMVISTILKDYRVSAAS  
EKVEINPLISLKPQNVFLKLEKR

>CYP1103C8 (EQY75\_01290) *Muriicola* sp. MMS17-SY002

MRQLTTVSQWEVIRNRKRILANPLPFHSENFKYGYDTFRVKVGPHQTIVFTRDPEIVQQV  
LQKQQKKFRKSTLQTKDLAKYIGQGLLTAEGDHWTQRRMIQPAFKKKLVGLISTMHEA  
IKEELGRIRLNEEQDIFSLSMGDLAQVVAKSLSKSDIREKMRELQHITETNQKMLIREM  
RQPYLVWWFKLSGQLRKHNYSEDSRVLLNELIEDRVRRGEEDDLLDMLLNATYEDGTH  
MERKQLIDEVLILFTAGHETTANALSFALFLAKHPEIQEQVYEEVSSNEITHDDYLSWL  
SKFNLTQQCIEEAMRLYPPVYVIDRMAKEDIEISGYRFKKGSMLMSVYELHRYKAFWES  
PESFQPERFEKEKKKEMGPYYYPGAGPRMCIGNNFAMYEMVITISEIVKKYKISTPYPE  
VEVVPLISLKPKAWSIRFEKRQ

>CYP1252A6 (Oweho\_1887) *Owenweeksia hongkongensis*

MDTSQRNINDLPSPKGQPIVGHLLQFNSEAKHTVLENWVKEVGDVFRINMLGKPFLVSAN  
PDINLEILKSRPDKFQRFFKINEILTEMGVGVFNAEGERWKQHRELTAEALNVKNVRSF  
FSTLQMMTERLYGRWCAFAKAKKEIDVQKEMVRYTVTDITTSIAFGYDVNTLEKEGDVIQD  
HMEKIFPMINSRITAPIPIWRLIKSKKDKELDVALKAIEDLVHQFIEEAKRLHDNSELQ  
ENPTNFLEALLVEQKKNPDFTDQEVFGNVFTILLAGEDTTNSNISWTLFYLAQHPEVYQK  
VREEAQOVFGSTRCATSHEQVAELKYTEAVCMEMRLKPVTPNLYMQAKEDVVIQDLAIP  
KGTTIMMONKVGQTDEAHFTDADQFIPERWIANGCPHTAHSPQMMRAFGAGPRFCPGRN  
LAIQEMKMAISMICKNFDLELAVKPEEVKEIFTFTMFPEGLVVKLGGV