

# Lifestyles Shape the Cytochrome P450 Repertoire of the Bacterial Phylum *Proteobacteria*

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Table S1. Information on proteobacterial species and their respective genera was used in the study. Species abbreviations and the P450 count of different species were also presented in the table. Species information is presented as per their class.

*Betaproteobacteria*

Genus	Number of species	Number of species having P450s	Species name	Species codes	P450 count
<i>Neisseria</i>	40	0	<i>Neisseria meningitidis</i> MC58 (serogroup B)	nme	0
			<i>Neisseria meningitidis</i> alpha710 (serogroup B)	nmp	0
			<i>Neisseria meningitidis</i> H44/76 (serogroup B)	nmh	0
			<i>Neisseria meningitidis</i> G2136 (serogroup B)	nmd	0
			<i>Neisseria meningitidis</i> M01-240149 (serogroup B)	nmm	0
			<i>Neisseria meningitidis</i> M01-240355 (serogroup B)	nms	0
			<i>Neisseria meningitidis</i> M04-240196 (serogroup B)	nmq	0
			<i>Neisseria meningitidis</i> NZ-05/33 (serogroup B)	nmz	0
			<i>Neisseria meningitidis</i> Z2491 (serogroup A)	nma	0
			<i>Neisseria meningitidis</i> WUE 2594 (serogroup A)	nmw	0
			<i>Neisseria meningitidis</i> 510612 (serogroup A)	nmx	0
			<i>Neisseria meningitidis</i> FAM18 (serogroup C)	nmc	0
			<i>Neisseria meningitidis</i> 053442 (serogroup C)	nmn	0
			<i>Neisseria meningitidis</i> 8013 (serogroup C)	nmt	0
			<i>Neisseria meningitidis</i> alpha14 (cnl strain)	nmi	0
			<i>Neisseria gonorrhoeae</i> FA 1090	ngo	0
			<i>Neisseria gonorrhoeae</i> NCCP11945	ngk	0
			<i>Neisseria lactamica</i>	nla	0
			<i>Neisseria elongata</i>	nel	0
			<i>Neisseria weaveri</i>	nwe	0
			<i>Neisseria mucosa</i> FDAARGOS_260	nsi	0

			<i>Neisseria mucosa</i> ATCC 19696	nmj	0
			<i>Neisseria chenwenguii</i>	nei	0
			<i>Neisseria</i> sp. KEM232	nek	0
			<i>Neisseria flavescens</i>	nfv	0
			<i>Neisseria subflava</i>	nsf	0
			<i>Neisseria zalophi</i>	nzl	0
			<i>Neisseria animalis</i>	naq	0
			<i>Neisseria brasiliensis</i>	nbl	0
			<i>Neisseria zoodegmatidis</i>	nzo	0
			<i>Neisseria canis</i>	nci	0
			<i>Neisseria cinerea</i>	ncz	0
			<i>Neisseria animaloris</i>	nani	0
			<i>Neisseria bacilliformis</i>	nbc	0
			<i>Neisseria wadsworthii</i>	nwd	0
			<i>Neisseria shayegani</i>	nsg	0
			<i>Neisseria muscoli</i>	nmus	0
			<i>Neisseria sicca</i>	nsc	0
			<i>Neisseria perflava</i>	npf	0
			<i>Neisseria dentiae</i>	ndn	0
<i>Snodgrassella</i>	1	0	<i>Snodgrassella alvi</i>	salv	0
<i>Kingella</i>	2	0	<i>Kingella kingae</i>	kki	0
			<i>Kingella oralis</i>	koa	0
<i>Vitreoscilla</i>	2	2	<i>Vitreoscilla filiformis</i>	vff	2
			<i>Vitreoscilla</i> sp. C1	vit	1
<i>Eikenella</i>	2	0	<i>Eikenella corrodens</i>	ecor	0
			<i>Eikenella exigua</i>	eex	0
<i>Simonsiella</i>	1	0	<i>Simonsiella muelleri</i>	smur	0
<i>Alysiella</i>	1	0	<i>Alysiella filiformis</i>	aff	0
<i>Conchiformibius</i>	1	0	<i>Conchiformibius steedae</i>	cste	0

<i>Aquella</i>	1	0	<i>Aquella oligotrophica</i>	nba	0
<i>Paralysiella</i>	1	0	<i>Paralysiella testudinis</i>	ptes	0
<i>Chromobacterium</i>	8	7	<i>Chromobacterium violaceum</i>	cvi	1
			<i>Chromobacterium vaccinii</i>	cvc	1
			<i>Chromobacterium</i> sp. ATCC 53434	chro	0
			<i>Chromobacterium phragmitis</i> IIBBL 112-1	chri	2
			<i>Chromobacterium phragmitis</i> IIBBL 274-1	chrb	1
			<i>Chromobacterium rhizoryzae</i>	crz	1
			<i>Chromobacterium paludis</i>	chrm	2
			<i>Chromobacterium haemolyticum</i>	chae	1
<i>Iodobacter</i>	2	1	<i>Iodobacter ciconiae</i>	iod	0
			<i>Iodobacter fluviatilis</i>	ifl	1
<i>Laribacter</i>	1	0	<i>Laribacter hongkongensis</i>	lhk	0
<i>Pseudogulbenkiania</i>	1	1	<i>Pseudogulbenkiania</i> sp. NH8B	pse	1
<i>Jeongeupia</i>	1	0	<i>Jeongeupia</i> sp. USM3	jeu	0
<i>Aquaspirillum</i>	1	0	<i>Aquaspirillum</i> sp. LM1	aql	0
<i>Aquitalea</i>	2	1	<i>Aquitalea magnusonii</i>	amah	1
			<i>Aquitalea</i> sp. USM4	aqs	0
<i>Deefgea</i>	1	0	<i>Deefgea</i> sp. D17	dee	0
<i>Chitinibacter</i>	2	0	<i>Chitinibacter bivalviorum</i>	chiz	0
			<i>Chitinibacter fontanus</i>	cfon	0
<i>Vogesella</i>	1	0	<i>Vogesella</i> sp. XCS3	vog	0
<i>Ralstonia</i>	14	13	<i>Ralstonia solanacearum</i> GMI1000	rso	0
			<i>Ralstonia solanacearum</i> CFBP2957	rsc	1
			<i>Ralstonia solanacearum</i> PSI07	rsl	3
			<i>Ralstonia solanacearum</i> Po82	rsn	4
			<i>Ralstonia solanacearum</i> CMR15	rsm	3
			<i>Ralstonia solanacearum</i> FQY_4	rse	1
			<i>Ralstonia solanacearum</i> UY031	rsy	2

			<i>Ralstonia pickettii</i> 12J	rpi	2
			<i>Ralstonia pickettii</i> 12D	rpf	2
			<i>Ralstonia pickettii</i> DTP0602	rpj	2
			<i>Ralstonia mannitolilytica</i>	rmn	2
			<i>Ralstonia insidiosa</i>	rin	3
			<i>Ralstonia pseudosolanacearum</i>	rpu	1
			<i>Ralstonia syzygii</i> subsp. <i>celebesensis</i>	rsg	2
<i>Cupriavidus</i>	13	13	<i>Cupriavidus necator</i> H16	reh	4
			<i>Cupriavidus necator</i> N-1	cnc	7
			<i>Cupriavidus necator</i> NH9	cuH	3
			<i>Cupriavidus pinatubonensis</i> JMP134	reu	2
			<i>Cupriavidus metallidurans</i>	rme	5
			<i>Cupriavidus taiwanensis</i>	cti	3
			<i>Cupriavidus basilensis</i>	cbw	7
			<i>Cupriavidus gilardii</i>	cgd	2
			<i>Cupriavidus</i> sp. USMAHM13	ccup	1
			<i>Cupriavidus malaysiensis</i>	cup	1
			<i>Cupriavidus</i> sp. USMAA2-4	cuu	2
			<i>Cupriavidus pauculus</i>	cpau	6
			<i>Cupriavidus oxalaticus</i>	cox	4
<i>Burkholderia</i>	90	82	<i>Burkholderia mallei</i> ATCC 23344	bma	3
			<i>Burkholderia mallei</i> SAVP1	bmv	3
			<i>Burkholderia mallei</i> NCTC 10229	bml	3
			<i>Burkholderia mallei</i> NCTC 10247	bmN	3
			<i>Burkholderia mallei</i> 23344	bmal	2
			<i>Burkholderia mallei</i> 6	bmae	1
			<i>Burkholderia mallei</i> BMQ	bmaq	2
			<i>Burkholderia mallei</i> 2000031063	bmai	3
			<i>Burkholderia mallei</i> FMH 23344	bmaf	2

			<i>Burkholderia mallei</i> NCTC 10247	bmaz	2
			<i>Burkholderia mallei</i> 2002734299	bmab	2
			<i>Burkholderia pseudomallei</i> K96243	bps	2
			<i>Burkholderia pseudomallei</i> 1710b	bpm	2
			<i>Burkholderia pseudomallei</i> 1106a	bpl	3
			<i>Burkholderia pseudomallei</i> 668	bpd	2
			<i>Burkholderia pseudomallei</i> MSHR346	bpr	0
			<i>Burkholderia pseudomallei</i> MSHR305	bpse	2
			<i>Burkholderia pseudomallei</i> MSHR511	bpsm	3
			<i>Burkholderia pseudomallei</i> MSHR146	bpsu	3
			<i>Burkholderia pseudomallei</i> MSHR520	bpsd	3
			<i>Burkholderia pseudomallei</i> 1026b	bpz	3
			<i>Burkholderia pseudomallei</i> BPC006	bpq	3
			<i>Burkholderia pseudomallei</i> NCTC 13179	bpk	3
			<i>Burkholderia pseudomallei</i> HBPUB10134a	bpsh	2
			<i>Burkholderia pseudomallei</i> NAU35A-3	bpsa	2
			<i>Burkholderia pseudomallei</i> A79A	bpso	2
			<i>Burkholderia pseudomallei</i> TSV202	but	2
			<i>Burkholderia thailandensis</i> E264	bte	4
			<i>Burkholderia thailandensis</i> 2002721723	btq	4
			<i>Burkholderia thailandensis</i> E444	btj	4
			<i>Burkholderia thailandensis</i> H0587	btz	3
			<i>Burkholderia thailandensis</i> MSMB121	btd	3
			<i>Burkholderia thailandensis</i> MSMB59	btv	3
			<i>Burkholderia thailandensis</i> E254	bthe	3
			<i>Burkholderia thailandensis</i> USAMRU Malaysia #20	bthm	3
			<i>Burkholderia thailandensis</i> 2003015869	btha	4
			<i>Burkholderia thailandensis</i> 2002721643	bthl	3
			<i>Burkholderia oklahomensis</i> E0147	bok	0

		<i>Burkholderia oklahomensis</i> C6786	boc	2
		<i>Burkholderia mayonis</i>	buu	2
		<i>Burkholderia savannae</i>	bsav	0
		<i>Burkholderia vietnamiensis</i> G4	bvi	1
		<i>Burkholderia vietnamiensis</i> LMG 10929	bve	1
		<i>Burkholderia lata</i>	bur	4
		<i>Burkholderia cenocepacia</i> AU 1054	bcn	1
		<i>Burkholderia cenocepacia</i> HI2424	bch	1
		<i>Burkholderia cenocepacia</i> MC0-3	bcm	5
		<i>Burkholderia cenocepacia</i> J2315	bcj	2
		<i>Burkholderia cenocepacia</i> DDS 22E-1	bcen	2
		<i>Burkholderia cenocepacia</i> DWS 37E-2	bcew	1
		<i>Burkholderia cenocepacia</i> H111	bceo	2
		<i>Burkholderia ambifaria</i> AMMD	bam	1
		<i>Burkholderia ambifaria</i> MC40-6	bac	1
		<i>Burkholderia multivorans</i> ATCC 17616 (Tohoku)	bmj	3
		<i>Burkholderia multivorans</i> ATCC 17616 (JGI)	bmu	4
		<i>Burkholderia multivorans</i> DDS 15A-1	bmj	5
		<i>Burkholderia multivorans</i> ATCC BAA-247	bmj	2
		<i>Burkholderia cepacia</i> GG4	bct	2
		<i>Burkholderia cepacia</i> DDS 7H-2	bced	2
		<i>Burkholderia cepacia</i> ATCC 25416	bcep	0
		<i>Burkholderia dolosa</i>	bdl	1
		<i>Burkholderia pyrrocinia</i>	bpyr	2
		<i>Burkholderia contaminans</i>	bcon	4
		<i>Burkholderia ubonensis</i>	bub	3
		<i>Burkholderia diffusa</i>	bdf	1
		<i>Burkholderia latens</i>	blat	0
		<i>Burkholderia territorii</i>	btei	2



			<i>Burkholderia seminalis</i>	bsem	1
			<i>Burkholderia pseudomultivorans</i>	bpsl	1
			<i>Burkholderia metallica</i>	bmec	0
			<i>Burkholderia stagnalis</i>	bstg	1
			<i>Burkholderia stabilis</i>	bstl	1
			<i>Burkholderia anthina</i>	bann	2
			<i>Burkholderia glumae</i> BGR1	bgl	1
			<i>Burkholderia glumae</i> LMG 2196 = ATCC 33617	bgu	1
			<i>Burkholderia</i> sp. CCGE1001	bug	3
			<i>Burkholderia</i> sp. CCGE1003	bgf	4
			<i>Burkholderia gladioli</i> BSR3	bgd	4
			<i>Burkholderia gladioli</i> ATCC 10248	bgo	3
			<i>Burkholderia</i> sp. YI23	byi	7
			<i>Burkholderia</i> sp. KJ006	buk	1
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			<i>Burkholderia plantarii</i> PG1	bgp	2
			<i>Burkholderia plantarii</i> ATCC 43733	bpla	3
			<i>Burkholderia</i> sp. Bp5365	bud	3
			<i>Burkholderia</i> sp. PAMC 26561	bum	0
			<i>Burkholderia</i> sp. PAMC 28687	bui	0
			<i>Burkholderia</i> sp. JP2-270	burk	1
<i>Paraburkholderia</i>	24	23	<i>Paraburkholderia xenovorans</i> LB400	bxe	6
			<i>Paraburkholderia xenovorans</i> LB400	bxb	5
			<i>Paraburkholderia phymatum</i>	bph	4
			<i>Paraburkholderia atlantica</i> CCGE1002	bge	2
			<i>Paraburkholderia phenoliruptrix</i>	bpx	3
			<i>Paraburkholderia phytofirmans</i> PsJN	bpy	2

			<i>Paraburkholderia phytofirmans</i> OLGA172	buz	0
			<i>Paraburkholderia fungorum</i>	bfn	6
			<i>Paraburkholderia caribensis</i>	bcai	3
			<i>Paraburkholderia spreintiae</i>	pspw	5
			<i>Paraburkholderia</i> sp. SOS3	para	2
			<i>Paraburkholderia aromaticivorans</i>	parb	1
			<i>Paraburkholderia hospita</i>	phs	7
			<i>Paraburkholderia terrae</i>	pter	9
			<i>Paraburkholderia graminis</i>	pgp	2
			<i>Paraburkholderia caledonica</i>	pcj	4
			<i>Paraburkholderia terricola</i>	pts	3
			<i>Paraburkholderia caffeinilytica</i>	pcaf	2
			<i>Paraburkholderia megapolitana</i>	pmeg	5
			<i>Paraburkholderia tropica</i>	ptro	4
			<i>Paraburkholderia ginsengisoli</i>	pgis	2
			<i>Paraburkholderia acidiphila</i>	pacp	5
			<i>Paraburkholderia acidisoli</i>	pacs	2
			<i>Paraburkholderia edwinii</i>	pew	9
<i>Mycetohabitans</i>	1	1	<i>Mycetohabitans rhizoxinica</i>	brh	1
<i>Polynucleobacter</i>	4	0	<i>Polynucleobacter asymbioticus</i>	pnu	0
			<i>Polynucleobacter necessarius</i>	pne	0
			<i>Polynucleobacter duraquae</i>	pdq	0
			<i>Polynucleobacter paneuropaeus</i>	poh	0
<i>Pandoraea</i>	14	6	<i>Pandoraea pnomenusa</i> 3kgm	ppk	1
			<i>Pandoraea pnomenusa</i> RB38	ppno	0
			<i>Pandoraea pnomenusa</i> DSM 16536	ppnm	0
			<i>Pandoraea pnomenusa</i>	prb	0
			<i>Pandoraea pulmonicola</i>	ppul	1
			<i>Pandoraea sputorum</i>	pspu	0

			<i>Pandoraea apista</i>	papi	1
			<i>Pandoraea vervacti</i>	pve	0
			<i>Pandoraea oxalativorans</i>	pox	0
			<i>Pandoraea thiooxydans</i>	ptx	0
			<i>Pandoraea faecigallinarum</i>	pfg	0
			<i>Pandoraea norimbergensis</i>	pnr	1
			<i>Pandoraea</i> sp. XY-2	pand	1
			<i>Pandoraea fibrosis</i>	pfib	2
<i>Paucimonas</i>	1	0	<i>Paucimonas lemoignei</i>	plg	0
<i>Ephemeroptercola</i>	1	0	<i>Ephemeroptercola cinctiostellae</i>	hyf	0
<i>Lautropia</i>	1	0	<i>Lautropia mirabilis</i>	lmir	0
<i>Mycoavidus</i>	1	0	<i>Mycoavidus cysteinexigens</i>	mcys	0
<i>Caballeronia</i>	2	2	<i>Caballeronia</i> sp. SBC2	caba	2
			<i>Caballeronia insecticola</i>	buo	2
<i>Limnobacter</i>	1	1	<i>Limnobacter</i> sp. SAORIC-580	limn	1
<i>Chitinimonas</i>	1	1	<i>Chitinimonas arctica</i>	cari	1
<i>Vallotia</i>	3	0	<i>Candidatus Vallotia tarda</i>	vtr	0
			<i>Candidatus Vallotia lariciata</i>	vla	0
			<i>Candidatus Vallotia cooleyia</i>	vcv	0
<i>Bordetella</i>	23	15	<i>Bordetella pertussis</i> Tohama I	bpe	1
			<i>Bordetella pertussis</i> CS	bpc	1
			<i>Bordetella pertussis</i> 18323	bper	1
			<i>Bordetella pertussis</i> B1917	bpet	1
			<i>Bordetella pertussis</i> 137	bpeu	1
			<i>Bordetella parapertussis</i> Bpp5	bpar	1
			<i>Bordetella parapertussis</i> 12822	bpa	1
			<i>Bordetella bronchiseptica</i> 253	bbh	1
			<i>Bordetella bronchiseptica</i> RB50	bbr	1
			<i>Bordetella bronchiseptica</i> MO149	bbm	1

			<i>Bordetella bronchiseptica</i> S798	bbx	1
			<i>Bordetella petrii</i>	bpt	1
			<i>Bordetella avium</i>	bav	0
			<i>Bordetella holmesii</i> ATCC 51541	bho	0
			<i>Bordetella holmesii</i> 44057	bhm	0
			<i>Bordetella hinzii</i>	bhz	1
			<i>Bordetella trematum</i>	btrm	1
			<i>Bordetella bronchialis</i>	bbro	0
			<i>Bordetella flabilis</i>	bfz	0
			<i>Bordetella pseudohinzii</i>	bpdz	0
			<i>Bordetella</i> sp. H567	boh	0
			<i>Bordetella genomosp.</i> 13	bgm	0
			<i>Bordetella</i> sp. J329	boj	1
<i>Achromobacter</i>	10	6	<i>Achromobacter xylosoxidans</i> A8	axy	4
			<i>Achromobacter xylosoxidans</i> NH44784-1996	axo	1
			<i>Achromobacter xylosoxidans</i> NBRC 15126 = ATCC 27061	axn	1
			<i>Achromobacter xylosoxidans</i> NCTC10807	axx	0
			<i>Achromobacter denitrificans</i>	adt	0
			<i>Achromobacter insolitus</i>	ais	0
			<i>Achromobacter spanius</i>	asw	0
			<i>Achromobacter</i> sp. AONIH1	achr	3
			<i>Achromobacter</i> sp. B7	achb	1
			<i>Achromobacter deleyi</i>	ady	1
<i>Taylorella</i>	5	0	<i>Taylorella equigenitalis</i> MCE9	teq	0
			<i>Taylorella equigenitalis</i> ATCC 35865	tea	0
			<i>Taylorella equigenitalis</i> 14/56	teg	0
			<i>Taylorella asinigenitalis</i> MCE3	tas	0
			<i>Taylorella asinigenitalis</i> 14/45	tat	0
<i>Pusillimonas</i>	3	3	<i>Pusillimonas</i> sp. T7-7	put	2

			<i>Pusillimonas thiosulfatoxidans</i>	pus	1
			<i>Pusillimonas</i> sp. DMV24BSW_D	pud	2
<i>Advenella</i>	2	1	<i>Advenella kashmirensis</i>	aka	1
			<i>Advenella mimigardefordensis</i>	amim	0
<i>Castellaniella</i>	1	1	<i>Castellaniella defragrans</i>	cdn	1
<i>Basilea</i>	1	0	<i>Basilea psittacipulmonis</i>	bpsi	0
<i>Alcaligenes</i>	4	3	<i>Alcaligenes faecalis</i> ZD02	afa	0
			<i>Alcaligenes faecalis</i> JQ135	afq	1
			<i>Alcaligenes aquatilis</i>	aaqu	1
			<i>Alcaligenes ammonioxydans</i>	aamm	1
<i>Paenalcaligenes</i>	1	0	<i>Paenalcaligenes hominis</i>	phn	0
<i>Orrella</i>	2	2	<i>Orrella dioscoreae</i>	odi	1
			<i>Orrella marina</i>	boz	1
<i>Oligella</i>	2	1	<i>Oligella urethralis</i>	our	0
			<i>Oligella ureolytica</i>	oue	1
<i>Pigmentiphaga</i>	2	1	<i>Pigmentiphaga</i> sp. H8	pig	3
			<i>Pigmentiphaga aceris</i>	pacr	0
<i>Kerstersia</i>	1	0	<i>Kerstersia gyiorum</i>	kgy	0
<i>Paralcaligenes</i>	1	1	<i>Paralcaligenes</i> sp. KSB-10	park	2
<i>Rhodoferrax</i>	6	3	<i>Rhodoferrax ferrireducens</i>	rfr	2
			<i>Rhodoferrax saidenbachensis</i>	rsb	0
			<i>Rhodoferrax antarcticus</i>	rac	0
			<i>Rhodoferrax koreense</i>	rhy	0
			<i>Rhodoferrax sediminis</i> CHu59-6-5	rhf	3
			<i>Rhodoferrax sediminis</i> Gr-4	rhg	1
<i>Polaromonas</i>	5	4	<i>Polaromonas</i> sp. JS666	pol	4
			<i>Polaromonas naphthalenivorans</i>	pna	1
			<i>Polaromonas</i> sp. SP1	pos	2
			<i>Polaromonas</i> sp. Pch-P	poo	2

			<i>Polaromonas vacuolata</i>	pvac	0
<i>Acidovorax</i>	13	6	<i>Acidovorax citrulli</i>	aav	0
			<i>Acidovorax</i> sp. JS42	ajs	2
			<i>Acidovorax ebreus</i>	dia	1
			<i>Acidovorax avenae</i>	aaa	0
			<i>Acidovorax</i> sp. KKS102	ack	1
			<i>Acidovorax</i> sp. RAC01	acra	1
			<i>Acidovorax carolinensis</i> NA2	acid	0
			<i>Acidovorax carolinensis</i> P4	acip	0
			<i>Acidovorax carolinensis</i> NA3	acin	0
			<i>Acidovorax carolinensis</i> P3	acis	0
			<i>Acidovorax</i> sp. 1608163	acio	1
			<i>Acidovorax monticola</i>	amon	0
			<i>Acidovorax antarcticus</i>	aant	1
<i>Verminephrobacter</i>	1	0	<i>Verminephrobacter eiseniae</i>	vei	0
<i>Delftia</i>	5	3	<i>Delftia acidovorans</i>	dac	1
			<i>Delftia</i> sp. Cs1-4	del	0
			<i>Delftia tsuruhatensis</i>	dtb	0
			<i>Delftia</i> sp. HK171	dhk	1
			<i>Delftia lacustris</i>	dla	1
<i>Variovorax</i>	6	6	<i>Variovorax paradoxus</i> S110	vap	2
			<i>Variovorax paradoxus</i> EPS	vpe	2
			<i>Variovorax paradoxus</i> B4	vpd	3
			<i>Variovorax</i> sp. PAMC 28711	vaa	1
			<i>Variovorax boronicumulans</i>	vbo	1
			<i>Variovorax</i> sp. PMC12	vam	3
<i>Comamonas</i>	7	5	<i>Comamonas thiooxydans</i>	ctt	1
			<i>Comamonas testosteroni</i> TK102	ctes	3
			<i>Comamonas kerstersii</i>	cke	0

			<i>Comamonas serinivorans</i>	cser	3
			<i>Comamonas</i> sp. NLF-7-7	cof	1
			<i>Comamonas aquatica</i>	caqt	0
			<i>Comamonas odontotermitis</i>	codo	1
<i>Alicyciphilus</i>	2	2	<i>Alicyciphilus denitrificans</i> BC	adn	1
			<i>Alicyciphilus denitrificans</i> K601	adk	1
<i>Ramlibacter</i>	1	1	<i>Ramlibacter tataouinensis</i>	rta	2
<i>Symbiobacter</i>	1	0	<i>Candidatus Symbiobacter mobilis</i>	cbx	0
<i>Ottowia</i>	2	0	<i>Ottowia</i> sp. oral taxon 894	oto	0
			<i>Ottowia oryzae</i>	otk	0
<i>Limnohabitans</i>	2	2	<i>Limnohabitans</i> sp. 103DPR2	lim	1
			<i>Limnohabitans</i> sp. 63ED37-2	lih	2
<i>Hydrogenophaga</i>	6	5	<i>Hydrogenophaga</i> sp. RAC07	hyr	2
			<i>Hydrogenophaga</i> sp. PBC	hyb	0
			<i>Hydrogenophaga</i> sp. LPB0072	hyl	1
			<i>Hydrogenophaga</i> sp. PAMC20947	hyc	1
			<i>Hydrogenophaga pseudoflava</i>	hpse	2
			<i>Hydrogenophaga</i> sp. BPS33	hyn	3
<i>Diaphorobacter</i>	4	1	<i>Diaphorobacter polyhydroxybutyrativorans</i>	dpy	0
			<i>Diaphorobacter</i> sp. HDW4A	dih	0
			<i>Diaphorobacter aerolatus</i>	daer	0
			<i>Diaphorobacter ruginosibacter</i>	drg	2
<i>Simplicispira</i>	1	1	<i>Simplicispira suum</i>	simp	1
<i>Melaminivora</i>	3	0	<i>Pulveribacter suum</i>	melm	0
			<i>Melaminivora</i> sp. SC2-9	mela	0
			<i>Melaminivora jejuensis</i>	mje	0
<i>Serpentinomonas</i>	2	2	<i>Serpentinomonas raichei</i>	cbaa	1
			<i>Serpentinomonas mccroryi</i>	cbab	1
<i>Schlegelella</i>	2	2	<i>Schlegelella thermodepolymerans</i>	sthm	3

			<i>Schlegelella brevitalea</i>	pbh	2
<i>Kinneretia</i>	1	1	<i>Kinneretia</i> sp. DAIF2	kia	2
<i>Methylibium</i>	2	1	<i>Methylibium petroleiphilum</i>	mpt	0
			<i>Methylibium</i> sp. Pch-M	metp	1
<i>Herminiimonas</i>	1	0	<i>Herminiimonas arsenicoxydans</i>	har	0
<i>Janthinobacterium</i>	9	7	<i>Janthinobacterium</i> sp. Marseille	mms	0
			<i>Janthinobacterium agaricidamnosum</i>	jag	1
			<i>Janthinobacterium</i> sp. B9-8	jab	0
			<i>Janthinobacterium</i> sp. 1_2014MBL_MicDiv	jaz	2
			<i>Janthinobacterium</i> sp. LM6	jal	1
			<i>Janthinobacterium svalbardensis</i>	jsv	1
			<i>Janthinobacterium</i> sp. 17J80-10	jaj	3
			<i>Janthinobacterium tructae</i>	jas	1
			<i>Janthinobacterium lividum</i>	jlz	1
<i>Herbaspirillum</i>	7	5	<i>Herbaspirillum seropedicae</i> SmR1	hse	1
			<i>Herbaspirillum seropedicae</i> Z67	hsz	1
			<i>Herbaspirillum hiltneri</i>	hht	0
			<i>Herbaspirillum rubrisubalbicans</i>	hrb	1
			<i>Herbaspirillum</i> sp. meg3	hee	0
			<i>Herbaspirillum huttiense</i>	hhf	1
			<i>Herbaspirillum frisingense</i>	hfr	1
<i>Zinderia</i>	1	0	<i>Candidatus Zinderia insecticola</i>	zin	0
<i>Collimonas</i>	3	3	<i>Collimonas fungivorans</i>	cfu	1
			<i>Collimonas arenae</i>	care	1
			<i>Collimonas pratensis</i>	cpa	2
<i>Massilia</i>	10	6	<i>Massilia</i> sp. NR 4-1	mnr	0
			<i>Massilia</i> sp. WG5	masw	0
			<i>Massilia violaceinigra</i>	mass	0
			<i>Massilia armeniaca</i>	masz	2



			<i>Massilia oculi</i>	mtim	0
			<i>Massilia</i> sp. YMA4	masy	3
			<i>Massilia albidiflava</i>	mali	2
			<i>Massilia umbonata</i>	mum	6
			<i>Massilia flava</i>	mfla	2
			<i>Massilia plicata</i>	mpli	1
<i>Duganella</i>	1	1	<i>Duganella</i> sp. AF9R3	dug	2
<i>Oxalobacter</i>	1	0	<i>Oxalobacter formigenes</i>	ofa	0
<i>Undibacterium</i>	2	2	<i>Undibacterium parvum</i>	upv	2
			<i>Undibacterium piscinae</i>	upi	1
<i>Noviherbaspirillum</i>	1	1	<i>Noviherbaspirillum</i> sp. UKPF54	nok	1
<i>Glaciimonas</i>	1	1	<i>Glaciimonas</i> sp. PAMC28666	glc	1
<i>Sutterella</i>	3	0	<i>Sutterella megalosphaeroides</i>	sutt	0
			<i>Sutterella faecalis</i>	sutk	0
			<i>Sutterella wadsworthensis</i>	sws	0
<i>Leptothrix</i>	1	1	<i>Leptothrix cholodnii</i>	lch	1
<i>Thiomonas</i>	2	1	<i>Thiomonas intermedia</i>	tin	0
			<i>Thiomonas arsenitoxydans</i>	thi	1
<i>Rubrivivax</i>	2	1	<i>Rubrivivax gelatinosus</i>	rge	1
			<i>Rubrivivax benzoatilyticus</i>	rbn	0
<i>Roseateles</i>	1	0	<i>Roseateles depolymerans</i>	rdp	0
<i>Paucibacter</i>	1	0	<i>Paucibacter</i> sp. KCTC 42545	pkt	0
<i>Mitsuaria</i>	1	0	<i>Mitsuaria</i> sp. 7	miu	0
<i>Rhizobacter</i>	1	1	<i>Rhizobacter gummiphilus</i>	rgu	1
<i>Aquabacterium</i>	1	1	<i>Aquabacterium olei</i>	aon	1
<i>Sphaerotilus</i>	1	1	<i>Sphaerotilus natans</i> subsp. <i>sulfidivorans</i>	snn	2
<i>Xylophilus</i>	1	0	<i>Xylophilus rhododendri</i>	xyk	0
<i>Tepidimonas</i>	1	0	<i>Tepidimonas taiwanensis</i>	ttw	0
<i>Ideonella</i>	1	1	<i>Ideonella dechloratans</i>	idc	1

<i>unclassified Burkholderiales</i>	2	1	<i>Burkholderiales bacterium</i> GJ-E10	bbag	1
			<i>Burkholderiales bacterium</i> YL45	bbay	0
<i>Nitrosomonas</i>	7	3	<i>Nitrosomonas europaea</i>	neu	0
			<i>Nitrosomonas eutropha</i>	net	0
			<i>Nitrosomonas</i> sp. AL212	nit	1
			<i>Nitrosomonas</i> sp. Is79A3	nii	1
			<i>Nitrosomonas communis</i>	nco	1
			<i>Nitrosomonas ureae</i>	nur	0
			<i>Nitrosomonas stercoris</i>	nst	0
<i>Nitrospira</i>	2	2	<i>Nitrospira multiformis</i>	nmu	1
			<i>Nitrospira lacus</i>	nlc	1
<i>Sulfuritalea</i>	1	0	<i>Sulfuritalea hydrogenivorans</i>	shd	0
<i>Methyloversatilis</i>	1	1	<i>Methyloversatilis</i> sp. RAC08	metr	1
<i>Denitratisoma</i>	1	1	<i>Denitratisoma oestradiolicum</i>	doe	2
<i>Thiobacillus</i>	1	0	<i>Thiobacillus denitrificans</i>	tbd	0
<i>Methylobacillus</i>	1	1	<i>Methylobacillus flagellatus</i>	mfa	1
<i>Methylothena</i>	2	0	<i>Methylothena mobilis</i>	mmb	0
			<i>Methylothena versatilis</i>	meh	0
<i>Methylovorus</i>	2	0	<i>Methylovorus glucosetrophus</i>	mei	0
			<i>Methylovorus</i> sp. MP688	mep	0
<i>Methylopumilus</i>	2	1	<i>Candidatus Methylopumilus turicensis</i>	mbac	1
			<i>Candidatus Methylopumilus planktonicus</i>	mbat	0
<i>Methylophilus</i>	1	1	<i>Methylophilus</i> sp. TWE2	meu	1
<i>Methylophilus</i>	1	1	<i>Methylophilus palustris</i>	mpau	1
<i>Sideroxydans</i>	1	0	<i>Sideroxydans lithotrophicus</i>	slt	0
<i>Gallionella</i>	1	0	<i>Gallionella capsiferiformans</i>	gca	0
<i>Ferriphaselus</i>	1	0	<i>Ferriphaselus amnicola</i>	fam	0
<i>Nitrotoga</i>	1	0	<i>Candidatus Nitrotoga</i> sp. AM1P	nim	0

<i>Ferrigenium</i>	1	0	<i>Ferrigenium kumadai</i>	fku	0
<i>Sulfuricella</i>	1	0	<i>Sulfuricella denitrificans</i>	sdr	0
<i>Sulfuriferula</i>	3	0	<i>Sulfuriferula</i> sp. AH1	sulf	0
			<i>Sulfuriferula plumbiphila</i>	splb	0
			<i>Sulfuriferula nivalis</i>	sniv	0
<i>Sulfurimicrobium</i>	1	0	<i>Sulfurimicrobium lacus skT11</i>	slac	0
<i>Usitatibacter</i>	2	0	<i>Usitatibacter rugosus</i>	uru	0
			<i>Usitatibacter palustris</i>	upl	0
<i>Azospira</i>	3	0	<i>Azospira oryzae</i>	dsu	0
			<i>Azospira restricta</i>	ares	0
			<i>Azospira inquinata</i>	aiq	0
<i>Rugosibacter</i>	1	0	<i>Rugosibacter aromaticivorans</i>	rbu	0
<i>Oryzomicrobium</i>	1	0	<i>Oryzomicrobium terrae</i>	otr	0
<i>Niveibacterium</i>	1	0	<i>Niveibacterium microcysteis</i>	niv	0
<i>Aromatoleum</i>	4	3	<i>Aromatoleum aromaticum</i>	eba	2
			<i>Aromatoleum bremense</i>	abre	0
			<i>Aromatoleum petrolei</i>	apet	3
			<i>Aromatoleum pumilum</i>	atw	1
unclassified <i>Rhodocyclaceae</i>	1	0	<i>Rhodocyclaceae</i> bacterium <i>Thauera</i> -like	rbh	0
<i>Dechloromonas</i>	2	0	<i>Dechloromonas aromatica</i>	dar	0
			<i>Dechloromonas</i> sp. HYN0024	dey	0
<i>Quatrionicoccus</i>	1	0	<i>Quatrionicoccus australiensis</i>	qau	0
<i>Ferribacterium</i>	1	0	<i>Ferribacterium limneticum</i>	fle	0
<i>Azoarcus</i>	7	5	<i>Azoarcus olearius</i> BH72	azo	1
			<i>Azoarcus olearius</i> DQS4	aoa	1
			<i>Azoarcus</i> sp. KH32C	aza	0
			<i>Azoarcus</i> sp. CIB	azi	1
			<i>Azoarcus communis</i>	acom	2

			<i>Azoarcus</i> sp. DN11	azd	3
			<i>Azoarcus</i> sp. DD4	azr	0
<i>Thauera</i>	5	4	<i>Thauera</i> sp. MZ1T	tmz	1
			<i>Thauera humireducens</i>	thu	0
			<i>Thauera chlorobenzoica</i>	tcl	1
			<i>Thauera</i> sp. K11	thk	2
			<i>Thauera aromatica</i>	tak	1
<i>Nitrogeniibacter</i>	1	0	<i>Nitrogeniibacter mangrovi</i>	azq	0
<i>unclassified Zoogloeaceae</i>	1	0	<i>Zoogloeaceae</i> bacteirum Par-f-2	zpa	0
<i>Fluviibacter</i>	1	0	<i>Fluviibacter phosphoraccumulans</i>	fpho	0
<i>Ferrovum</i>	1	0	<i>Ferrovum myxofaciens</i>	fmy	0
<i>Accumulibacter</i>	1	0	<i>Accumulibacter phosphatis</i>	app	0
<i>Tremblaya</i>	3	0	<i>Candidatus Tremblaya princeps</i> PCIT	tpn	0
			<i>Candidatus Tremblaya princeps</i> PCVAL	tpq	0
			<i>Candidatus Tremblaya phenacola</i>	tpj	0
<i>Kinetoplastibacterium</i>	8	0	<i>Candidatus Kinetoplastibacterium crithidii</i> (ex <i>Angomonas deanei</i> ATCC 30255)	kci	0
			<i>Candidatus Kinetoplastibacterium crithidii</i> TCC036E	kct	0
			<i>Candidatus Kinetoplastibacterium blastocrithidii</i> (ex <i>Strigomonas culicis</i> )	kbl	0
			<i>Candidatus Kinetoplastibacterium blastocrithidii</i> TCC012E	kbt	0
			<i>Candidatus Kinetoplastibacterium desouzaai</i>	kde	0
			<i>Candidatus Kinetoplastibacterium galatii</i>	kga	0
			<i>Candidatus Kinetoplastibacterium oncopeltii</i>	kon	0
			<i>Candidatus Kinetoplastibacterium sorsogonicusi</i>	kso	0
<i>Profftella</i>	1	0	<i>Candidatus Profftella armatura</i>	ssdc	0
<i>Nasuia</i>	1	0	<i>Candidatus Nasuia deltocephalinicola</i>	ndl	0
<i>Vidania</i>	1	0	<i>Candidatus Vidania fulgoroideae</i>	vfg	0
<i>Desulfobacillus</i>	1	0	<i>Candidatus Desulfobacillus denitrificans</i>	ddz	0

unclassified Betaproteobacteria	3	0	<i>Beta proteobacterium</i> CB	bprc	0
			<i>Betaproteobacteria bacterium</i> UKL13-2	beb	0
137			<i>Betaproteobacteria bacterium</i> GR16-43	beba	0

#### *Deltaproteobacteria*

Genus	Number of species	Number of species having P450s	Species name	Species codes	Number of p450s
<i>Geobacter</i>	7		<i>Geobacter sulfurreducens</i> PCA	gsu	0
			<i>Geobacter sulfurreducens</i> KN400	gsk	0
			<i>Geobacter metallireducens</i>	gme	0
			<i>Geobacter</i> sp. M21	gem	0
			<i>Geobacter</i> sp. M18	geb	0
			<i>Geobacter pickeringii</i>	gpi	0
			<i>Geobacter anodireducens</i>	gao	0
<i>Geotalea</i>	2		<i>Geobacter uraniireducens</i>	gur	0
			<i>Geobacter daltonii</i> FRC-32	geo	0
<i>Trichlorobacter</i>	1		<i>Trichlorobacter lovleyi</i>	glo	0
<i>Citri fermentans</i>	2		<i>Citri fermentans bemidjiense</i>	gbm	0
			<i>Citri fermentans bremense</i>	gbn	0
<i>Geoalkalibacter</i>	1		<i>Geoalkalibacter subterraneus</i>	gsb	0

<i>Geomonas</i>	3		<i>Geomonas oryzae</i>	ger	0
			<i>Geomonas subterranea</i>	gsub	0
			<i>Geomonas nitrogenifigens</i>	gnt	0
<i>Syntrophotalea</i>	3		<i>Pelobacter carbinolicus</i>	pca	0
			<i>Syntrophotalea acetylenica</i>	pace	0
			<i>Syntrophotalea acetylenivorans</i>	pef	0
<i>Pelobacter</i>	1		<i>Pelobacter propionicus</i>	ppd	0
<i>Desulfuromonas</i>	3		<i>Desulfuromonas soudanensis</i>	des	0
			<i>Desulfuromonas</i> sp. DDH964	deu	0
			<i>Desulfuromonas versatilis</i>	dve	0
<i>Desulfovibrio</i>	11		<i>Desulfovibrio vulgaris</i> Hildenborough	dvu	0
			<i>Desulfovibrio vulgaris</i> DP4	dvl	0
			<i>Desulfovibrio vulgaris</i> Miyazaki F	dvm	0
			<i>Desulfovibrio vulgaris</i> RCH1	dvg	0
			<i>Desulfovibrio desulfuricans</i> ATCC 27774	dds	0
			<i>Desulfovibrio fairfieldensis</i>	dfi	0
			<i>Desulfovibrio piger</i>	dpg	0
			<i>Desulfovibrio</i> sp. G11	def	0
			<i>Candidatus Desulfovibrio trichonymphae</i>	dtr	0
			<i>Desulfovibrio ferrophilus</i>	dfl	0
			<i>Desulfovibrio sulfodismutans</i>	dsd	0
<i>Solidesulfovibrio</i>	2		<i>Solidesulfovibrio magneticus</i>	dma	0
			<i>Solidesulfovibrio carbinolicus</i>	dcb	0
<i>Megalodesulfovibrio</i>	1		<i>Megalodesulfovibrio gigas</i>	dgg	0
<i>Oleidesulfovibrio</i>	1		<i>Oleidesulfovibrio alaskensis</i>	dde	0
<i>Oceanidesulfovibrio</i>	1		<i>Oceanidesulfovibrio marinus</i>	dms	0
<i>Maridesulfovibrio</i>	2		<i>Maridesulfovibrio salexigens</i>	dsa	0
			<i>Desulfovibrio hydrothermalis</i>	dhy	0
<i>Desulfocurvibacter</i>	1	1	<i>Desulfocurvibacter africanus</i> subsp. <i>africanus</i>	daf	1

<i>Pseudodesulfovibrio</i>	6		<i>Pseudodesulfovibrio aespoeensis</i>	das	0
			<i>Pseudodesulfovibrio piezophilus</i>	dpi	0
			<i>Pseudodesulfovibrio indicus</i>	dej	0
			<i>Pseudodesulfovibrio profundus</i>	pprf	0
			<i>Pseudodesulfovibrio cashew</i>	psel	0
			<i>Pseudodesulfovibrio mercurii</i>	ddn	0
<i>Lawsonia</i>	2		<i>Lawsonia intracellularis</i> PHE/MN1-00	lip	0
			<i>Lawsonia intracellularis</i> N343	lir	0
<i>Desulfolutivibrio</i>	1		<i>Desulfolutivibrio sulfoxidireducens</i>	dsx	0
<i>Paradesulfovibrio</i>	1		<i>Paradesulfovibrio bizertensis</i>	pbiz	0
<i>Desulfomicrobium</i>	2		<i>Desulfomicrobium baculatum</i>	dba	0
			<i>Desulfomicrobium orale</i>	doa	0
<i>Desulfohalobium</i>	1		<i>Desulfohalobium retbaense</i>	drt	0
<i>Desulfotalea</i>	1		<i>Desulfotalea psychrophila</i>	dps	0
<i>Desulfocapsa</i>	1		<i>Desulfocapsa sulfexigens</i>	dsf	0
<i>Desulfurivibrio</i>	1		<i>Desulfurivibrio alkaliphilus</i>	dak	0
<i>Desulfobulbus</i>	3		<i>Desulfobulbus propionicus</i>	dpr	0
			<i>Desulfobulbus oralis</i>	deo	0
			<i>Desulfobulbus oligotrophicus</i>	dog	0
<i>Desulfomarina</i>	1		<i>Desulfomarina profundus</i>	dbk	0
<i>Desulfococcus</i>	2		<i>Desulfococcus oleovorans</i>	dol	0
			<i>Desulfococcus multivorans</i>	dml	0
<i>Desulfatibacillum</i>	1		<i>Desulfatibacillum aliphaticivorans</i>	dal	0
<i>Desulforapulum</i>	1		<i>Desulforapulum autotrophicum</i>	dat	0
<i>Desulfobacula</i>	1		<i>Desulfobacula toluolica</i>	dto	0
<i>Desulfosarcina</i>	3		<i>Desulfosarcina ovata</i> subsp. <i>sediminis</i>	dov	0
			<i>Desulfosarcina widdelii</i>	dwd	0
			<i>Desulfosarcina alkanivorans</i>	dalk	0
<i>Desulfonema</i>	2		<i>Desulfonema limicola</i>	dli	0

			<i>Desulfonema magnum</i>	dmm	0
<i>Desulfoluna</i>	1		<i>Desulfoluna</i> sp. ASN36	dek	0
<i>Anaeromyxobacter</i>	4		<i>Anaeromyxobacter dehalogenans</i> 2CP-C	ade	0
			<i>Anaeromyxobacter dehalogenans</i> 2CP-1	acp	0
			<i>Anaeromyxobacter</i> sp. Fw109-5	afw	0
			<i>Anaeromyxobacter</i> sp. K	ank	0
<i>Myxococcus</i>	4	4	<i>Myxococcus xanthus</i>	mxs	7
			<i>Myxococcus stipitatus</i>	msd	11
			<i>Myxococcus hansupus</i>	mym	4
			<i>Myxococcus fulvus</i>	mfb	2
<i>Corallococcus</i>	3	4	<i>Corallococcus coralloides</i>	ccx	10
			<i>Corallococcus macrosporus</i> HW-1	mfu	2
			<i>Corallococcus macrosporus</i> DSM 14697	mmas	1
<i>Stigmatella</i>	1	1	<i>Stigmatella aurantiaca</i>	sur	17
<i>Archangium</i>	2	2	<i>Archangium gephyra</i>	age	56
			<i>Archangium violaceum</i>	avm	43
<i>Melittangium</i>	1	1	<i>Melittangium boletus</i>	mbd	28
<i>Cystobacter</i>	1	1	<i>Cystobacter fuscus</i>	cfus	42
<i>Vulгатibacter</i>	1		<i>Vulгатibacter incomptus</i>	vin	0
<i>Sorangium</i>	2	2	<i>Sorangium cellulosum</i> So ce56	scl	19
			<i>Sorangium cellulosum</i> So0157-2	scu	8
<i>Chondromyces</i>	1	1	<i>Chondromyces crocatus</i>	ccro	26
<i>Sandaracinus</i>	1	1	<i>Sandaracinus amylolyticus</i>	samy	6
<i>Labilithrix</i>	1	1	<i>Labilithrix luteola</i>	llu	5
<i>Minicystis</i>	1	1	<i>Minicystis rosea</i>	mrn	24
<i>Haliangium</i>	1	1	<i>Haliangium ochraceum</i>	hoh	17
<i>Syntrophus</i>	1		<i>Syntrophus aciditrophicus</i>	sat	0
<i>Desulfobacca</i>	1		<i>Desulfobacca acetoxidans</i>	dao	0
<i>Desulfomonile</i>	1		<i>Desulfomonile tiedjei</i>	dti	0



<i>Syntrophobacter</i>	1		<i>Syntrophobacter fumaroxidans</i>	sfu	0
<i>Desulfoglaeba</i>	1		<i>Desulfoglaeba alkanexedens</i>	dax	0
<i>Desulfarculus</i>	1		<i>Desulfarculus baarsii</i>	dbr	0
<i>Hipaea</i>	1		<i>Hipaea maritima</i>	hmr	0
<i>Desulfurella</i>	1		<i>Desulfurella acetivorans</i>	dav	0
<i>Bradymonas</i>	1	1	<i>Bradymonas sediminis</i>	bsed	1
<i>Persicimonas</i>	1	1	<i>Persicimonas caeni</i>	pcay	3

*Epsilonproteobacteria*

Genus	Number of species	Number of species having P450s	Species name	Species code	Number of p450s
<i>Helicobacter</i>	78	1	<i>Helicobacter pylori</i> 26695	hpy	0
			<i>Helicobacter pylori</i> 26695	heo	0
			<i>Helicobacter pylori</i> J99	hpi	0
			<i>Helicobacter pylori</i> HPAG1	hpa	0
			<i>Helicobacter pylori</i> Shi470	hps	0
			<i>Helicobacter pylori</i> Shi112	hhp	0
			<i>Helicobacter pylori</i> Shi169	hhq	0
			<i>Helicobacter pylori</i> Shi417	hhr	0
			<i>Helicobacter pylori</i> G27	hpg	0

			<i>Helicobacter pylori</i> P12	hpp	0
			<i>Helicobacter pylori</i> B38	hpb	0
			<i>Helicobacter pylori</i> B8	hpl	0
			<i>Helicobacter pylori</i> PeCan4	hpc	0
			<i>Helicobacter pylori</i> PeCan18	hca	0
			<i>Helicobacter pylori</i> SJM180	hpm	0
			<i>Helicobacter pylori</i> ELS37	hpe	0
			<i>Helicobacter pylori</i> 35A	hpo	0
			<i>Helicobacter pylori</i> 908	hpi	0
			<i>Helicobacter pylori</i> 2017	hpq	0
			<i>Helicobacter pylori</i> 2018	hpw	0
			<i>Helicobacter pylori</i> Cuz20	hpu	0
			<i>Helicobacter pylori</i> F16	hef	0
			<i>Helicobacter pylori</i> F30	hpf	0
			<i>Helicobacter pylori</i> F32	heq	0
			<i>Helicobacter pylori</i> F57	hex	0
			<i>Helicobacter pylori</i> Sat464	hpt	0
			<i>Helicobacter pylori</i> 52	hpz	0
			<i>Helicobacter pylori</i> v225d	hpu	0
			<i>Helicobacter pylori</i> 83	hpx	0
			<i>Helicobacter pylori</i> SNT49	hen	0
			<i>Helicobacter pylori</i> Lithuania75	hph	0
			<i>Helicobacter pylori</i> Gambia94/24	heg	0
			<i>Helicobacter pylori</i> India7	hpn	0
			<i>Helicobacter pylori</i> Puno120	hep	0
			<i>Helicobacter pylori</i> Puno135	heu	0
			<i>Helicobacter pylori</i> SouthAfrica7	hes	0
			<i>Helicobacter pylori</i> SouthAfrica20	hpys	0
			<i>Helicobacter pylori</i> HUP-B14	hcn	0

			<i>Helicobacter pylori</i> 51	hpd	0
			<i>Helicobacter pylori</i> XZ274	hey	0
			<i>Helicobacter pylori</i> Rif1	her	0
			<i>Helicobacter pylori</i> Rif2	hei	0
			<i>Helicobacter pylori</i> Aklavik117	hpya	0
			<i>Helicobacter pylori</i> Aklavik86	hpyk	0
			<i>Helicobacter pylori</i> OK113	hpyo	0
			<i>Helicobacter pylori</i> OK310	hpyl	0
			<i>Helicobacter pylori</i> oki102	hpyb	0
			<i>Helicobacter pylori</i> oki112	hpyc	0
			<i>Helicobacter pylori</i> oki128	hpyd	0
			<i>Helicobacter pylori</i> oki154	hpye	0
			<i>Helicobacter pylori</i> oki422	hpyf	0
			<i>Helicobacter pylori</i> oki673	hpyg	0
			<i>Helicobacter pylori</i> oki828	hpyh	0
			<i>Helicobacter pylori</i> oki898	hpyj	0
			<i>Helicobacter pylori</i> UM032	hpyr	0
			<i>Helicobacter pylori</i> UM037	hpyi	0
			<i>Helicobacter pylori</i> UM066	hpyu	0
			<i>Helicobacter pylori</i> UM299	hpym	0
			<i>Helicobacter pylori</i> UM298	hem	0
			<i>Helicobacter pylori</i> BM012A	heb	0
			<i>Helicobacter pylori</i> BM012S	hez	0
			<i>Helicobacter hepaticus</i>	hhe	0
			<i>Helicobacter acinonychis</i>	hac	0
			<i>Helicobacter mustelae</i>	hms	0
			<i>Helicobacter felis</i>	hfe	0
			<i>Helicobacter bizzozeronii</i>	hbi	0
			<i>Helicobacter cetorum</i> MIT 00-7128	hce	0

			<i>Helicobacter cetorum</i> MIT 99-5656	hcm	0
			<i>Helicobacter cinaedi</i> PAGU611	hcp	0
			<i>Helicobacter cinaedi</i> CCUG 18818 = ATCC BAA-847	hcb	0
			<i>Helicobacter heilmannii</i>	hhm	0
			<i>Helicobacter typhlonius</i>	hty	0
			<i>Helicobacter bilis</i>	hbl	0
			<i>Helicobacter apodemus</i>	had	0
			<i>Helicobacter enhydrae</i>	het	0
			<i>Helicobacter cholecystus</i>	hcl	0
			<i>Helicobacter winghamensis</i>	hwi	1
			<i>Helicobacter suis</i>	hsh	0
<i>Wolinella</i>	1	1	<i>Wolinella succinogenes</i>	wsu	0
<i>Sulfurimonas</i>	9	9	<i>Sulfurimonas denitrificans</i>	tdn	0
			<i>Sulfurimonas autotrophica</i>	sua	0
			<i>Sulfurimonas xiamenensis</i>	suln	0
			<i>Sulfurimonas lithotrophica</i>	sulg	0
			<i>Sulfurimonas</i> sp. CVO	sulc	0
			<i>Sulfurimonas paralvinellae</i>	spal	0
			<i>Sulfurimonas sediminis</i>	ssei	0
			<i>Candidatus Sulfurimonas baltica</i>	sbal	0
			<i>Candidatus Sulfurimonas marisnigri</i>	smas	0
<i>Sulfuricurvum</i>	2	2	<i>Sulfuricurvum kujiense</i>	sku	0
			<i>Candidatus Sulfuricurvum</i> sp. RIFRC-1	sulr	0
<i>Campylobacter</i>	78	51	<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> NCTC 11168 = ATCC 700819	cje	1
			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> NCTC 11168-BN148	cjb	1
			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> 81-176	cjj	1
			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> 81116	cju	1

			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> ICDCCJ07001	cjn	1
			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> IA3902	cji	1
			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> M1	cjm	1
			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> S3	cjs	1
			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> PT14	cjp	1
			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> 00-2426	cjej	1
			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> 00-2538	cjeu	1
			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> 00-2544	cjen	1
			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> 00-2425	cjei	1
			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> R14	cjer	1
			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> MTVDSCj20	cjv	1
			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> YH001	cjy	0
			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> 35925B2	cjq	0
			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> 00-1597	cjl	1
			<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> 00-6200	cjw	1
			<i>Campylobacter jejuni</i> RM1221	cjr	1
			<i>Campylobacter jejuni</i> subsp. <i>doylei</i> 269.97	cjd	1
			<i>Campylobacter jejuni</i> 32488	cjz	1
			<i>Campylobacter jejuni</i> 4031	cjx	1
			<i>Campylobacter fetus</i> subsp. <i>fetus</i> 82-40	cff	0
			<i>Campylobacter fetus</i> subsp. <i>fetus</i> 04/554	cft	0
			<i>Campylobacter fetus</i> subsp. <i>venerealis</i> cfvi03/293	cfv	0
			<i>Campylobacter fetus</i> subsp. <i>venerealis</i> 97/608	cfx	0
			<i>Campylobacter fetus</i> subsp. <i>venerealis</i> 84-112	cfz	0
			<i>Campylobacter fetus</i> subsp. <i>testudinum</i> 03-427	camp	0
			<i>Campylobacter fetus</i> subsp. <i>testudinum</i> pet-3	cfp	0
			<i>Campylobacter curvus</i>	ccv	0
			<i>Campylobacter hominis</i>	cha	0
			<i>Campylobacter concisus</i> 13826	cco	0

			<i>Campylobacter concisus</i> ATCC 33237	ccoc	0
			<i>Campylobacter lari</i> RM2100	cla	1
			<i>Campylobacter lari</i> RM16701	clr	1
			<i>Campylobacter lari</i> RM16712	clm	1
			<i>Campylobacter lari</i> CCUG 22395	clq	0
			<i>Campylobacter lari</i> NCTC 11845	cln	1
			<i>Campylobacter lari</i> subsp. <i>concheus</i> LMG 11760	cll	1
			<i>Campylobacter coli</i> 76339	ccol	1
			<i>Campylobacter coli</i> CVM N29710	ccc	1
			<i>Campylobacter coli</i> 15-537360	ccq	1
			<i>Campylobacter coli</i> RM1875	ccf	1
			<i>Campylobacter coli</i> RM4661	ccy	1
			<i>Campylobacter coli</i> RM5611	ccoi	1
			<i>Campylobacter coli</i> FB1	ccof	1
			<i>Campylobacter coli</i> OR12	ccoo	1
			<i>Campylobacter iguaniorum</i>	caj	0
			<i>Campylobacter insulaenigrae</i>	cis	1
			<i>Campylobacter volucris</i>	cvo	1
			<i>Campylobacter peloridis</i>	cpel	1
			<i>Campylobacter</i> sp. RM16704	camr	1
			<i>Campylobacter subantarcticus</i> LMG 24374	csm	1
			<i>Campylobacter subantarcticus</i> LMG 24377	csf	1
			<i>Campylobacter gracilis</i>	cgra	0
			<i>Campylobacter ureolyticus</i>	cure	0
			<i>Campylobacter hyointestinalis</i>	chy	0
			<i>Campylobacter helveticus</i>	chv	1
			<i>Campylobacter sputorum</i>	cspf	0
			<i>Campylobacter pinnipediorum</i>	cpin	0
			<i>Campylobacter cuniculorum</i>	ccun	1

			<i>Campylobacter lanienae</i>	clx	1
			<i>Campylobacter avium</i>	cavi	1
			<i>Campylobacter hepaticus</i>	chw	1
			<i>Campylobacter</i> sp. RM12175	camz	1
			<i>Campylobacter</i> sp. RM6137	camy	1
			<i>Campylobacter ornithocola</i>	coj	1
			<i>Campylobacter upsaliensis</i>	cux	1
			<i>Campylobacter rectus</i>	crx	0
			<i>Campylobacter geochelonis</i>	cgeo	0
			<i>Campylobacter blaseri</i>	cbla	0
			<i>Campylobacter corcagiensis</i>	ccor	0
			<i>Campylobacter armoricus</i>	carm	1
			<i>Campylobacter mucosalis</i>	cmuc	0
			<i>Campylobacter showae</i>	csho	0
			<i>Candidatus Campylobacter infans</i>	cinf	0
			<i>Campylobacter novaezeelandiae</i>	cnv	1
<i>Sulfurospirillum</i>	7	7	<i>Sulfurospirillum deleyianum</i>	sdl	0
			<i>Sulfurospirillum barnesii</i>	sba	0
			<i>Sulfurospirillum multivorans</i>	smul	0
			<i>Sulfurospirillum halorespirans</i>	shal	0
			<i>Sulfurospirillum</i> sp. SL2-1	suls	0
			<i>Sulfurospirillum</i> sp. JPD-1	sulj	0
			<i>Sulfurospirillum</i> sp. ACSTCE	sult	0
<i>Aliarcobacter</i>	11	11	<i>Aliarcobacter butzleri</i> RM4018	abu	0
			<i>Aliarcobacter butzleri</i> ED-1	abt	0
			<i>Aliarcobacter butzleri</i> 7h1h	abl	0
			<i>Aliarcobacter skirrowii</i>	ask	0
			<i>Aliarcobacter trophiarum</i>	atp	0
			<i>Aliarcobacter cibarius</i>	acib	0

			<i>Aliarcobacter cryaerophilus</i>	acre	0
			<i>Aliarcobacter lanthieri</i>	alan	0
			<i>Arcobacter porcinus</i>	apoc	0
			<i>Aliarcobacter faecis</i>	afc	0
			<i>Aliarcobacter thereius</i>	athr	0
<i>Arcobacter</i>	7	7	<i>Arcobacter nitrofigilis</i>	ant	0
			<i>Arcobacter ellisii</i>	aell	0
			<i>Arcobacter aquimarinus</i>	aaqi	0
			<i>Arcobacter suis</i>	asui	0
			<i>Arcobacter cloacae</i>	aclo	0
			<i>Arcobacter venerupis</i>	avp	0
			<i>Arcobacter defluvii</i>	adz	0
<i>Poseidonibacter</i>	2	2	<i>Poseidonibacter lekithochrous</i>	alk	0
			<i>Poseidonibacter parvus</i>	alp	0
<i>Malaciobacter</i>	6	1	<i>Malaciobacter halophilus</i>	ahs	0
			<i>Malaciobacter mytili</i>	amyt	1
			<i>Malaciobacter marinus</i>	amar	0
			<i>Malaciobacter canalis</i>	acaa	0
			<i>Malaciobacter molluscorum</i>	amol	0
			<i>Malaciobacter pacificus</i>	apai	0
<i>Halarcobacter</i>	3	3	<i>Halarcobacter bivalviorum</i>	hbv	0
			<i>Halarcobacter ebronensis</i>	hebr	0
			<i>Halarcobacter anaerophilus</i>	aana	0
<i>Pseudoarcobacter</i>	1	1	<i>Pseudoarcobacter acticola</i>	paco	0
<i>unclassified Arcobacter</i>	1	1	<i>Arcobacter</i> sp. L	arc	0
<i>Hydrogenimonas</i>	1	1	<i>Hydrogenimonas</i> sp. MAG	hyo	0
<i>Nitratifractor</i>	1	1	<i>Nitratifractor salsuginis</i>	nsa	0
<i>Sulfurovum</i>	3	3	<i>Sulfurovum</i> sp. NBC37-1	sun	0



			<i>Sulfurovum lithotrophicum</i>	slh	0
			<i>Sulfurovum indicum</i>	sinu	0
<i>Nitratiruptor</i>	1	1	<i>Nitratiruptor</i> sp. SB155-2	nis	0
<i>Nautilia</i>	2	2	<i>Nautilia profundicola</i>	nam	0
			<i>Nautilia</i> sp. PV-1	nap	0
<i>Caminibacter</i>	2	2	<i>Caminibacter mediatlanticus</i>	cmed	0
			<i>Caminibacter pacificus</i>	cpaf	0

Table S2. Comparative analysis of P450 families and subfamilies in different classes of *Proteobacteria*. P450 family and subfamily data for *Alphaproteobacteria* and *Gammaproteobacteria* are retrieved from the published articles [1, 2] and used for comparative analysis.

Family	Subfamily	<i>Alphaproteobacteria</i>	<i>Betaproteobacteria</i>	<i>Gammaproteobacteria</i>	<i>Deltaproteobacteria</i>	<i>Epsilonproteobacteria</i>
CYP101	M			1		
	B	1				
	C	3				
	D	2				
	E	2				
	Q	1				
	R	1				
	F		2			
	N		2			
	P				1	
CYP1007	B				1	
	C				2	
	D				1	
	E				1	
	F				1	
	G				1	
CYP1010	A	1				
CYP1011	E				3	
	F				1	
CYP1013	A		42			
CYP1017	A	1				
CYP102	J		5	1	1	
	A	10	6			

	E		14			
	K	1				
	AC	1				
	M				6	
CYP103	A	4				
CYP1036	B	1				
	C	1				
CYP104	A	13				
CYP1043	C			1		
	A		1		1	
CYP1049	A		3	1		
CYP105	BQ			4		
	BF	3				
	CX	1				
	B		1			
	CV		4			
	CW		4			
	T		16			
	AC				1	
	EK				1	
CYP1061	B	2				
CYP1068	A	4				
CYP1069	A				6	
	B				1	
	C				2	
	D				1	
	E				1	
	F				1	
	G				1	

	H				1	
	J				2	
CYP107	DJ			3		
	E			4		
	HT			1		
	S			15		
	AN	8				
	JE	1				
	DG		12			
	DN		5			
	DQ		3			
	NN		1			
	NP		5			
	NQ		1			
	NX		1			
	AM				1	
	CJ				2	
	DL				7	
	DP				9	
	EN				2	
	HU				2	
	HV				4	
	HW				1	
	HX				3	
	HY				1	
	HZ				1	
	JA				1	
CYP1075	A	1				
CYP1076	A	1				

CYP1077	A	1	1			
CYP1078	A	7				
	C	1				
CYP108	R			1		
	A	2				
	D	6				
	G	18				
	L	1				
	P	2				
	U	1				
	V	1				
	W	1				
	X	5				
	AB		1			
	E		2			
	S		12			
	Z		1			
CYP1081	B	2				
CYP1082	A	1				
CYP1083	A	3				
	C	2				
CYP1086	B	1				
CYP1088	B	2				
CYP1089	A	1				
CYP109	AK				3	
	C				5	
	D				2	
	N				4	
	P				1	

	Q				4	
	R				7	
	S				1	
CYP1090	C	2				
CYP1091	A	3				
CYP1094	A	3				
	B	1				
CYP1097	B			1		
	A		16			
	C		1			
CYP1098	A	6				
	B		8			
	D		1			
CYP110	J		1		2	
	V				1	
	AD				1	
	AU				1	
	AV				1	
	H				3	
	R				5	
	S				1	
	T				1	
	U				2	
	W				1	
CYP1101	A	29				
CYP1104	B		1	3		
	A	4				
	C	3				
	E	3				

CYP1107	A	12				
	B	3				
	C	1				
CYP1108	A		1			
CYP111	A	1		1		
	B	1				
CYP1110	A		2			
CYP1111	A	5	2			
	B	1				
	C	1				
CYP1112	A		4			
CYP1116	B	3				
CYP1118	B	1				
CYP112	A	23		3		
CYP1135	A	1				
	B		1			
CYP1137	A	1				
CYP1138	A		3	1		
	B	2				
CYP114	A	22		4		
CYP1141	A	1				
CYP1142	A			1		
CYP1145	A	1				
CYP115	A	1		3		
CYP1155	B	1				
	A		1			
CYP1157	C			1		
	D		5			
CYP116	B	1	58	2		

	F		1			
CYP1164	A			1		
CYP1165	A			1		
	B			1		
CYP117	A	22		3		
	C		4			
	B				1	
	D				1	
	E				4	
CYP1170	A	7				
CYP1171	A	1				
CYP1172	A			1		
CYP1173	A	1				
CYP1174	A	2				
CYP1175	A	1				
CYP1176	B		1			
CYP1179	A			1		
	B		4			
CYP1180	A		1			
CYP1181	A	1				
CYP1182	A	1				
CYP1183	A		1			
CYP1186	A	2				
CYP1187	A	1				
CYP1199	A		1	2		
	C		1			
CYP120	F				1	
	G				5	
	H				1	



CYP1200	B			1		
	A		1			
CYP1201	A			1		
	B			1		
CYP1202	A			1		
	B		1			
CYP1204	A	2				
CYP1206	B	1				
CYP1220	A		13			
	C				1	
CYP1221	B	2				
CYP1224	J				3	
CYP1225	A		2	1		
CYP1229	A	1		1		
	B	2				
	C	1				
CYP1232	F		1			
CYP1234	A			5		
	B			1		
CYP1236	A	1				
CYP1246	A	2	1			
CYP1247	A			9		
CYP1248	B				2	
CYP125	U		1			
	E				2	
	N				1	
CYP125	P	1				
CYP1250	A	1				
CYP1258	A	1				

	B		1			
CYP126	C			4	1	
	B				2	
CYP1261	B			1		
CYP1263	B		1			
	C				1	
CYP127	A	18				
	C	1				
CYP1275	B	1				
CYP1278	A			1		
CYP1281	A	1				
CYP1284	B				7	
CYP1286	A				2	
	B				1	
CYP1291	B	3				
	C	2				
CYP1295	B		1			
CYP1298	A				1	
CYP1302	A	2				
CYP1311	A	2		1		
CYP1312	A	1				
CYP1315	B				1	
CYP1318	A		1			
CYP1319	A		3			
CYP1326	B	2				
CYP1329	A				2	
	C				1	
CYP133	B		10	22		
	C		14			

	D			1		
	E		4			
	F	1				
	J		1			
CYP1330	A	1				
CYP1335	A				2	
CYP1337	A	1				
CYP134	B			2		
CYP1347	B				6	
	C				1	
	E				1	
CYP1349	A	1				
CYP1350	A	1				
CYP1352	B				1	
CYP1355	B		4			
CYP136	F			2		
CYP1366	A				1	
CYP1371	B	1				
CYP1373	B				2	
	C				2	
	D				1	
CYP1376	B	1				
	C	1				
CYP1384	A	1				
CYP1387	A				1	
	B				1	
CYP1396	A	1				
CYP1405	B	1				
CYP1406	B	2				

	C	1				
CYP1413	A			3		
	B			1		
CYP1414	A			2		
	B			1		
CYP1415	A			3		
CYP1448	B				1	
CYP1460	C	1				
CYP1464	A		4	2		
CYP1465	A			4		
CYP1466	A			1		
CYP1467	A			1		
CYP1468	A			1		
CYP1469	A			2		
CYP147	D	16				
	A				1	
	L				1	
CYP1470	A			3		
CYP1471	A			1		
CYP1472	A			1		
CYP1473	A			1		
CYP1474	A			3		
	B			2		
	C			2		
CYP1475	A			1		
CYP1476	A			1		
CYP1477	A			1		
CYP1478	A			1		
CYP1479	A			1		

CYP1480	A			1		
CYP1481	A		1	2		
CYP1482	A			1		
CYP1483	A			1		
CYP1484	A		1			
CYP1485	A		6			
CYP1486	A		3			
	B				2	
CYP1487	A		2			
CYP1488	A		36			
CYP1489	A				2	
CYP1490	A				1	
CYP1491	A				1	
CYP1492	A				3	
CYP1493	A				1	
CYP1494	A				1	
CYP1495	A				1	
CYP1496	A				1	
	B				1	
CYP1497	A				1	
CYP1498	A				1	
CYP1499	A				1	
CYP1500	A				1	
CYP1501	A				1	
CYP1502	A				1	
CYP1503	A				1	
CYP1504	A				1	
CYP1506	A				5	
CYP151	A		1	2		

	C	2				
CYP1515	A	2				
CYP152	G			3		
	R			2		
	W			2		
	X			1		
	Y			1		
	B	4	3			
	C	3				
	E	2	1		2	
	P	1				
	AA	1				
	AB	2				
	AR		3			
	S		2			
	Z				1	
CYP153	A	44	5	16		
	C	2				
	D	14				
	E			3		
CYP155	J	3				
	K	1				
	H				1	
CYP159	B			4		
	A				1	
CYP1591	A	1				
CYP1597	A	1				
CYP163	K			1		
CYP167	B				11	

	A				1	
	C				1	
	D				1	
	E				2	
CYP168	A			18		
	B			1		
	C			1		
CYP1686	A		1			
CYP169	A		1	13		
CYP172	B			1		
	A					52
CYP173	A	45				
	B	8				
	C	3				
	G	1				
	H	1				
	J	2				
CYP1732	A	3				
CYP1733	A	1				
	B	1				
CYP1734	A	1				
CYP1735	A	1				
CYP1736	A	1				
CYP1737	A	2				
CYP1738	A	1				
CYP1739	A	2				
CYP1740	A	1				
CYP1741	A	1				
CYP1742	A	1				

CYP1743	A	1				
CYP1744	A	1				
CYP1745	A	1				
CYP1746	A	1				
CYP1747	A	1				
CYP1748	A	1				
CYP1749	A	1				
	B	1				
CYP1750	A	1				
CYP1751	A	1				
CYP1752	A	4				
CYP1753	A	1				
CYP1754	A	1				
CYP1755	A	1				
CYP177	E			2		
CYP1779	A			1		
CYP180	D	1				
CYP183	AG		1			
	AH				2	
	BE				1	
CYP1833	B				1	
CYP186	K	7				
CYP191	B	1				
CYP192	A	3				
CYP193	A	17				
CYP194	A	10				
	C		2			
CYP195	A	18	29			
	D	1				



	E	2				
	C		1			
CYP196	A	34				
	B	2				
	C	1				
CYP1962	A		1			
CYP197	R	2				
	AA				2	
	AB				2	
	F				4	
	G				1	
	H				1	
	J				1	
	K				1	
CYP198	A			3		
CYP1982	B		3			
CYP199	A	11	2			
	B	1				
	J	1				
	K	1				
	L	1				
	M	1				
	H		1			
	V		2			
CYP200	A	5				
	B	2				
	C	1				
CYP201	A	25				
	B	3				

	C	3				
	E		1			
CYP202	A	46				
	B	24				
CYP203	A	12	6			
	B	1				
CYP204	A	2				
CYP206	A	9				
	B	1				
	C	3				
	D	6				
CYP209	A				1	
CYP210	A				1	
	B				1	
CYP212	A		34			
	B		6			
	E		1			
CYP2140	A	1				
CYP2159	A		1			
CYP219	A	2				
CYP220	A		2			
CYP221	A			2		
CYP223	A	2				
	E	1				
CYP224	A	1				
CYP2242	A			1		
CYP225	A	7	1			
CYP226	A		18	5		
	C	1				

	D	1				
CYP229	A			7		
	D		1	7		
	E			4		
	B		4			
	F		39			
	G		1			
	L		4			
	M		4			
	N		1			
	P		1			
	H				1	
CYP2308	A		1			
CYP2334	A	2				
CYP234	A			1		
CYP2353	A		1			
	B		2			
CYP236	A			3		
CYP238	A			1		
CYP240	A		15			
CYP242	A				4	
	B				1	
	C				1	
CYP251	V				2	
CYP2528	A				1	
CYP253	D				5	
	G				6	
	H				2	
	J				1	

	K				1	
	L				1	
	M				1	
	S				1	
CYP259	A				1	
CYP260	A				1	
	B				1	
CYP261	D		1	1		
	A				1	
CYP262	B				2	
	A				1	
	C				1	
	D				1	
	F				1	
CYP2624	B				1	
CYP263	A				3	
CYP264	A				6	
	B				1	
	C				1	
	D				14	
	E				2	
	F				1	
	G				1	
	H				1	
	J				3	
	K				3	
	L				1	
CYP265	A				1	
CYP266	A		1		1	

	B				1	
CYP267	C		1			
	A				4	
CYP2724	A					1
CYP2730	A		1			
CYP2733	B		1			
CYP2742	A		1			
CYP2743	A		1			
CYP278	A	1				
	C	1				
CYP286	C	1				
CYP288	B	2				
CYP289	A	33	14	6		
	D			1		
	E		1			
	F		1			
CYP290	A	5				
	B	1				
CYP51	B			2	2	
<b>292</b>	<b>564</b>	<b>873</b>	<b>603</b>	<b>277</b>	<b>333</b>	<b>53</b>

Table S3. P450 identified and annotated in this study is presented as per their class. A header follows each P450 sequence consisting of protein ID, database, P450 name, species name, species code, and an abbreviation for the class, such as BP for *Betaproteobacteria*, DP for *Deltaproteobacteria*, and EP for *Epsilonproteobacteria*.

*Betaproteobacteria*

>VITFI\_CDS3214|KEGG|CYP1098B3|[Vitreoscilla filiformis]vff|BP

MSRFCPPYPRPVSDKTPAWRMFFSKRRSWLDGLYERSYHMKMGVHFPGVDLYMVNDPAL  
VREVMNADRFPKHLEMLGEALRPLLGDSIFTTNGEVWQRQRDLMDPSFEAARVKLVFGRM  
RDAAQAMVERLRQVPEGAVYDLEVEMTHVAADIILRTILSKSLDSEGARLIFDAFARYQD  
MAPRLMLPAFFGLRWLRPWWQIRRSRAAEDIRKLIVQLIRPRYDAYQTALASGNTEGVE  
TGGDILATLLRVRNAETGQGFTFDELVDQVAMLFLAGHETSASALSWSLHLLANAPDVQE  
RLHQESLDKLGAVGTDPSGLKDLELSRNVFRESLRLFPFVGFLVRASETGCPLGDKTVKP  
GGSMISPWLIQRHRQFWARPDEFDPDRYTHTEDTTPMTTRESLRKAYLPFGMGPRVCIG  
AAFALQEATLILSTLARHFRFEPVPGHRPEPVGRLLTLRAENGIPLKVFARDR

>VITFI\_CDS3233|KEGG|CYP203A11|[Vitreoscilla filiformis]vff|BP

MFSFDPYSPAVDADPFPPYQRLRDEFPCFWSPEAQMWVLSRYSDIVTALNDWQTYSSASGNLMTELPGRAGATLGSSDPPRHDRLRALVQHAFMKR  
NLLALETPIREVARDVFGTLKGVSEFDFKEVSSKFTVKVLMAALGLPMGDEALVPEQEVRDNAVLMVQSDARTRTKGPEHIAAYNWMQDYAAKVIA  
LRRAEPRDDLISHFAQAEIDGDKLDEREVLLTTTTLIMAGVESMGGFMMMFahnLATFADARRAVVANPALLPDAIEESLRFNTSAQRFRRLMKD  
VSLHGQTMKQGDFVCLAYGSGNRDERQFPNPEVYDITRKPRGHLGFGGGVHACLGTAIARMAVKIAFEFHRVVPDYRRVADQLAWMPSSSTFRSPL  
VLLLKAQ

>ADP71\_22770|KEGG|CYP151A16|[Vitreoscilla sp.]vit|BP

MDNSLIVEVPFLNFADPSFSIRSDAVKQAQDVSWYAKTPYGLAILRYDEVNALVRDQRLR  
QGSYAWPKHCNATGAFADWWTRMLLSKEGPNHSRLRRLANPAFSPKLVRLMQPVFFQLAN  
DLINQFIDQKCEFGVDFAAPYATQVICLLGIPLSEAKRLAELAVDMGVALGVTYERDQ  
NLVNGATDEMFEYCYEAVRRLKEEGLGDNFLSMLVKANENQADLSDEELFDMMLAIFGG  
IDTTRNQLSLAMDTFVQNPAQWQILGEQPDLAANAVEEIMRFRPTVTWVTREALEDFEFQ

GVFIKQGTTVHLISQAADNDPRAFGDVAFDITQKRKAHFGFGAGAHHCIGHFIARGDMKE  
ALALLAQRLHNVQYAAEPSYMPDSGNTGLNHLHIRFDAVKG

>CV\_2656|KEGG|CYP212A1|[Chromobacterium violaceum]cvi|BP  
MKTTPQSSCPFHAVGRPPTPPRSSAGRWPPGPESGLTGWGLLKLMSRDLMGTLAGWQREFGDLVHVRTWPEHQVIVSDPQLARELLVNQADALQRW  
ERALTVYRRVHGHSVLIAEGQVWREKRQALQPDFTRKSVQAFSPSIVEAARRAFEQWPARRAAWPIESELTSTMEVILRMMFSSGVGSEAQQAAEE  
AVHTLMVASTEELWRPASLPDWVPWQRKRRRARLLMNGLIERHLQARLAMPQDAWPEDLLSRLRLHLQQPQSWPLQAVRDECKTAFLAGHETVAT  
SLTWWAWCMASHPEIQERAREEALAALSGGGQADPAALQYVSQTLLETMRLYPAVPLLSRRALKPVTLDWTFPAKTVFMVPMQLMQHDERWFPE  
PRSYRPERFGPDARPQQGAYLPFGGGPRVCLGQHLAMAEMALVAAQQLLRYRLSAPEGAEPPRPVFHVSQRPSQPLTLGIARI

>BKX93\_03785|KEGG|CYP212A8|[Chromobacterium vaccinii]cvc|BP  
MKTTPQSSCPFHAGGHPPASPKPSSGSWPPGPEAGLTGWGLLTQLSRDLMGTLAGWQREFGDLVHVRTWPEHQVIVSDPHLARELLVNQADSLRRW  
ERALSIVYGRVHGHSVLIAEGEAWREKRQALQPDFTRKSVQAFSPSIEAAARRAFEQWPDRDAPWPIESELTSTMEVILRMMFSSGVGSEAREAAE  
AVHTLMVASTEELWRPASLPDWVPWQRKRRRARLLMNGLIERHLQARLRLPADAWPEDLLSRLRLHLQQPKSWPLQAVRDECKTAFLAGHETVAA  
SLSWWAWCMASHPDIEKARAEALAAWPGEESADADLSALQYVSQTLLETMRLHPAVPLLSRRRAVKPVTLDWTFPAKTVFMVPMQLMQHDERWF  
PEPLSYRPERFDPDARPQQGAYLPFGGGPRVCLGQHLAVAEMTLVAAQQLLRYRLSAPAGMAPRAVFHVSQRPSAPLALDIARI

>DK842\_20225|KEGG|CYP212A20|[Chromobacterium phragmitis]chri|BP

MKTTSSSSCPFRPGGPASQPNPQAGAWPPGPKPGLMGWRLLSRMSRDLMGTLADWQREFG  
DLVHVRTWPEHQIIVCHPQWARELLVSQADALQRWERALFVYGRVHGHSVLIAEGEAWHQ  
KRQALQPDFTRKSVQAFSPSIIDAGKQAFKWPERRDDAWPIERELTSLTMEVILRMMFSS  
GVGEEAQQAEDEVHTLMVASTDELWRPFSLPDWMPWQRKRRRARLVMGELIERHLQARLA  
VPPDAWPEDLLSRLRLHLHLEQPEEWPLQAVRDECKTAFLAGHETIAASLGWWSWSMASHP  
DIQQRAREEAIAAWPGDEHGEMDLSALQFVSQTLLESMLYPVAVPLLSRRRAIKPVAIGD  
WTFPARTVFMVPMQLMQHDERWFPEPRRYRPERFAPEAGRPQLGSYLPFGGGPRVCLGQH  
LAMAEMTLVAAQQLRRFRLSIPAGAQPVRPVFHVSRPDKPLTLAIARL

>DK842\_05860|KEGG|CYP261D1|[Chromobacterium phragmitis]chri|BP

MFATRGPGRGYMDGLICGRTDRTREFRFFIVWKEVLTEKDAWSETEAVAHRLSTRSETKAIVLLDQMQRNNMKRFNDLPAPPSLPFLGNAHQLDKK  
GLHLTLEKWAREYRQEPFRFQLGPLKFIVLSRPEDVRCVLKERPTQFRMRREMSKIFDEVGFSSVFTKEGEAWRRQRRMMQPAFTKHTLVFPVQI  
ARKALQLRDRLOKSNGEPLAIRHDFRRFTVDVGCLLVFGVDLNNLADDDNHVLHTFHNVVHTMNKRLRSLVPYWRLVKMPVDRRFDGSIQELRDMV  
TGIAHDVRRARMKRGEDLGEHCILHTMLAASEGDDATLTDDDEL FANMMILVLGSEGSTAAMLSWICFYLSQDEVLQQRLREELCDFDLETVDYDAIE  
SLPLTEAVIEETFIRSTVPALVLEALEDTEVGELHVDRGTRVFALTRVNGIMDTARDMVFDPRRWLNEDGSLASLKDARQTQFPFGYGPRVCPGA  
PLSNIELKLAIAMLVKHFKLEIVDGEAVEEVFMASAVPDNFRVKAIPLPKRPRESGSLVFGREEEREDARSPA

>DK843\_03200|KEGG|CYP212A20|[Chromobacterium phragmitis]chrB|BP  
MKTTSSSCPFRPGQPASQPNPQAGAWPPGPKPGLMGWRLLSRMSRDLMGTLADWQREFGDLVHVRTWPEHQIIVCHPQWARELLVSQADALQWE  
RALFVYGRVHGHSVLIAEGEAWHQKRQALQPDFTRKSVQAFSPSIIDAGKQAFKWPERRDDAWPIERELTSLTMEVILRMMFSSGVGEEAQQAEDA  
VHTLMVASTDELWRPFSLPDWMPWQRKRRLRLVMGELIERHLQACLAVPDPAWPEDLLSRLRLHLEQPEEWPLQAVRDECKTAFLAGHETIAAS  
LGWWSWSMASHPDIQQRAREEAIAAWPGDEHGEMDLSALQFVSQTLLESMLRYPVAVPLLSRRAIKPVAIGDWTFFPARTVFMVPMQLMQHDERWFP  
EPRRYRPERFAPEAGRPQQGSYLPFGGGPRVCLGQHLAMAEMTLVAAQLLRRFRLSIPAGAQPFRPVFHVSRQRPDKPLALAIARL

>D1345\_00555|KEGG|CYP2353B2|[Chromobacterium rhizoryzae]crz|BP  
MSAWPLDPLAAVVHAHPYPYRDLAQRQPLYFDAGLGLWVAAGHAQAAALASATCRVRPVEQPAPSQLGDGGLARTFCLWARMSEAPRHPALKAA  
LNRALATVAGAEAGGLAESLARDWLAREPLNGGLLDRMAQGLPVLTLAGLLGLPMEDAPGLVAEEAAGLARALAADADAEALESGERALEALQARVA  
KALPRSGGLLAVLRREWMEEEEALTANVIGLLFQSLDAGAGLFAAAVWHQAQGRPLAAGAAADWAWLALHDPVLHNTRRFVARDWHHGGQTPVAGA  
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>FYK34\_06710|KEGG|CYP212A21|[Chromobacterium paludis]chrM|BP  
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AAHALMVASNAEFYQPFSLPDWMPWQRGRQARQVLERLIEDHLQTRLRLAREAWPEDLLSRLRLHLLQPPQAWPLQAVRDECKTTFLAGHETVAA  
TLTWWAWCMASHPEAQAAARAARQFAPEQAMGQAGAPWRYLVQTLQETLRLHPAAPILISRRALQPVTLGDWRLPAGTMYLVPVLLMHHDARWFP  
QPRSFRRPERFAPEAARPLGAYLPFGSGPRVCLGQHLAMSEMTLIAAQLLRRYELSVPEGQAAPEPAFYITRRPREPLRLRIRRR

>FYK34\_16325|KEGG|CYP2353A8|[Chromobacterium paludis]chrM|BP  
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AASLAAQEDERAQRRARDLARGFLAGAAPD GARLDALVDFLPAATLASLLGWPERSLLGWPERSLGLSGQVAAWCRAVAADAGAAEREAGEAACL



ALHAELAALADAGWLARWRQEFGE LGEDALRANLLGVLFQSRDAGAGLLAAGISWRCEGPWDWRAAAEWRRRLRADPVLHHTRRFVAEDATLAGQP  
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>CH06BL\_01070|KEGG|CYP2353B5|[Chromobacterium haemolyticum] chae|BP

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LAREPLSGLLDRMAQGLPVLTLAGLLGLEVEDEPALVAEVAALAQALAADADAETLARG  
EQALAAALQVRVAEALPRSDGLLAE LRREWTV EEAALTANVIGLLFQSLDAGAGLFAAAVW  
HQAQGRPLAAGAAADWAWLALHDPVLHNTRRFVARDWHHGGQTPAGASLLVVLAAAALD  
PAGPGEGLMFGAGR HACPGQALALEIARGGLAALAAMRPDWKTLTAAARFRRLPNARVRI  
YDEEGSAE

>C1H71\_18930|KEGG|CYP107NX1|[Iodobacter fluviatilis] ifl|BP

MITTKPLSFYDPAFYQNPYASFQRLMEKGEIHYVKFPSGVCGLVTGYDAAMKTLTHPNI  
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IALIAQRLLEPLQRAGECDLIADFASQLPLLVLSEVIGLSDKHRIQFKPVWCKVVQPVGP  
NDVGRAAYIGLLTELQSYIDTVIVESRGGDS DRLIVQLIAAYDGKKISRDELTSVLFQLL  
VAGQEPMTNQIGNAMLALLQHPEQLKQIREDSTRIDRAMTELLRYDGAFALSTWRFFTET  
TQWLGATVFAGDSVIVGLNAANHDSAQFGCPHKLDFAREPNKPLSFGYDHHYCPASALAR  
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>NH8B\_0727|KEGG|CYP289A13|[Pseudogulbenkiania sp.]pse|BP

MNTKQTPPRDAGAQRPSPDWDARAPAVLQDQIRAYDDMRHRCPVAYSEYLNWSLFRHDDV  
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ALEFDGYIRAQLDARRAAGDQAPDDVTRRLGETLQGRTLSDAEIVCIVRNWTVGELSTI

SSCVGILTQYLAERAELQQRLRQQPELLPAAIDEILRIHAPLIANRRIATRDVEIGGCQL  
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ALLSQTERIGTVAGKTPVRASYPASGYASLPLWIERAAGPAPQA

>DLM\_1347|KEGG|CYP1200A5|[Aquitalea magnusonii]amah|BP  
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LRKVVAKDFSAAGVATLRD TVIQATHARLDALSSQTGVIDLLDLVLECI PAEVDCHLLGIPLADRSYYRPLTHTVQIADPRDVPPELLRQFWLVYDY  
LMDLVTGRRTTAPHGLIRRFVAARHESVPPLNDEELVGILLGILIGGDQNILTVLCKVVYTLLAAPALWQSLRAQPATLPAMVEELLRLIPLGTTS  
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>RCFBP\_20388|KEGG|CYP1179B1|[Ralstonia solanacearum]rsc|BP

MSEIENMETLNLSSSDIEPHRYRLYE AHRQNA PALWYPSANSWLIFRHGDAASLARSPLV  
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GRIASILAPRIEALKGRTEFDFVEALAH PVP AEILAAMLGLDEIDIVDFLRWSDAIADFM  
QDFVISPVPNRQIARATAEQ LLEMKAALREAI AVRRRQPKEDLLTDLACATGDDGSTITE  
EELMLQLIHLIFGGHKIPQFVLANTLHL LFKNPQYMLHGEEATFDKVS KLVD ESMRVESP  
IQFITRHAVDDFELNGQRIKKGDSIYLM LGSANRDPEVYSDPDTFQPYAPKRKGIHYGTG  
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>RPSI07\_mp0406|KEGG|CYP1464A2|[Ralstonia solanacearum]rsl|BP  
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VPLLGHVHRISQDALGELRKAEACGPMFWTYFGARLPVLQILDEEGLAILQNKYTDNSF  
LREQMPVITGAAMNAFDGPRHRNARHASSA AFSP TGLTRAQVGQFVVESIEQRLKRWTRE  
SKLAI F PETKDIALEVVFRI LGIKTHELAQWRRQYEEFFLGMIPLKINLPGFPAWRCRKA  
RGWLEARVAQIVATARADDDHDSL VGAMIFGRDDNGNGMSEVELVHNILGLGFAGSETTA  
SVMAWSALMLAQHPDVWRQLCRQVAGMDSVPSTQEELVRQAPLAE AIFRETMRLYPPAPF  
EMRKVHTEFEMMGHKIPAGVMVGVSLLHVS RNPERYPDPDSWKPERWLGVDRALTPVETC  
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DMTGR

>RPSI07\_mp0607|KEGG|CYP133B5|[Ralstonia solanacearum]rsl|BP

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TAHQLIDGFEQKQSADLVAEFAFPLPVRIICRMLDVDIDDPALGVAASKLAKVFDPA  
SADELVKTSAAEYELAQYFTKVIEARRAQPGTDLISMLLRVEEDGQKLTHDEIVSNVILL  
FIAGHETTSNMIGNALIALHRNPRQLDLLKRDPSRMPNAVLECLRYDGSVQVTIRAAMED  
VEVEGEVVPRGTTVFLMLGAANRDPAQFTDPDQLDIGRQQGRPQTFGAGIIHHCLGYRLAL  
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>RPSI07\_mp1116|KEGG|CYP229F11|[Ralstonia solanacearum]rsl|BP

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YMALPDATALGPALADAMHLRIPLATMTHALLGDDADAAACQORDIATYLAALSPGAPPAA  
IHHAQTAVARLSERVAAAPLAHADETIVANLAGLLAQTHDACAGLLGNAIVTLARQPGL  
AAHLRSHPHAIDPFLYEVLRLDAPVQNTRRFVSRDTTLCGESLRAGDRILVLLAAANVDT  
AANPDPLRFDLARVRRRVWTFGAGAHRCPAESLAVAVARETVQHLLSLPGIARWLAGAGE  
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>RSPO\_c02265|KEGG|CYP1179B1|[Ralstonia solanacearum]rsn|BP

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APIHGRLRTFMSRTFDRGYIERVRGRIASILAPRIEALKGRTEFDFVEALAHVPAPAEILAAMLGLDEIDIVDFLRWSDAIADFMQDFVISPVPNRQ  
IAQATAEQLLEMKAALREAIAVRRRLPKEDLLTDLACATGDDGSTITEEELMLQLIHLIFGGHKIPQFVLANTLHLLFKNPQYMLHGEEATFDKVS  
KLVDESMRVESPIQFITRHAVDDEFELNGQTIKKGDSIYMLGSANRDPEVYSDPDTFQPYAPKRKGIHYGTGPHVCIGAALAGVTIAEILCSFLQA  
TRSVEALYDLDPWTRNDTFHGVARMPVKAEYR

>RSPO\_m00920|KEGG|CYP229F10|[Ralstonia solanacearum]rsn|BP  
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PAGVFFGRLVRQIDGPDHGARRAAVLTALGRLDVSSVSAHAHRLAKMALPDATALGPALADAMHLRIPLATLAHALLGDDADAAACRQDIAAYLAA  
LSPEAPAAAIHRADTAVARLSERFATAPLAAHADEALVANLAGLLAQTHDACAGLLGNVVALARRPGLAGHLRTHPHAIDPFPLYEVLRLDAPVPM  
TRRFVSRDITLTCGESLRAGDRILVLLAAANVDASANPDPLRFDLARAPRRVWTFGAGAHRCPEGALAVAIARETVRHLLNLPGLIDRWLAGVAMVRY  
QASPNARIPVSAPSHQEAP

>RSPO\_m01039|KEGG|CYP133B5|[Ralstonia solanacearum]rsn|BP  
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MMQAFNARQIESMRELATVTAHQILIDAFEQKRSADLVAEFAFPLPVRIICQMLDIDVDDAMVLGAAASKLAKVFDPAAPMSAGELVETSAAYEELAQ  
YFTKVIEARRAQSGTDLISMLLRVEEDGHKLTHDEIVSNVILLFMAGHETTSNMIGNALIALHRNPQQDLRLRDPSPRMPNAVLECLRYDGSVQVT  
IRAAMEDVEVEGEVVPRTTVFLMLGAANRDPDQFTEPDRLDIGRQDGRQLQTFGAGIIHCLGYRLALIELETALSALFTRLPLRLTNLDQLGWNQ  
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>RSPO\_m01214|KEGG|CYP1464A2|[Ralstonia solanacearum]rsn|BP  
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FLREQMPVITGEAMNAFDGPRHRNARHASSAASFPTGLTRAQVGQFVVDTIEQRLKRWTR  
ESKLAIFFPETKEIALEVVFRILGIETHELAQWRHQYEEFFLGMIPLKIDLPGFPAWRCRK  
ARRWLEARVARIVATARANGDHDSLVGAMIFGRDDNGNGMSEVELVHNLGLGFAGSETT  
ASVMAWSALMLSQHPEIWRQLCQQVAGLHSMPLTHEELVSQVPLAEAIFRETMRLYPPAP  
FEMRKVHTEFDMMGHRVPAGAMVGVSLHVSERNPERYPDPDNWRPERWLIDRALTPVET  
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LDLTGR

>CMR15\_20043|KEGG|CYP212A14|[Ralstonia solanacearum]rsm|BP  
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QTRLAQPHVWPDDLRLQLHQEEASAWPLHAVRDECMTAFLAGHETTAALTTWWAWCMACNPAAQTARKEVQAVLQGRTPDADMLASLPYLT  
QTIKETLRLYPAAVPLISRATRISIALGPWQFPARTMFLVPVQLMHHDPRWFPQPLSFRPERFAQDAPEIPRGAYAPFGAGPRVCLGQHLAMSEMT  
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>CMR15\_mp10680|KEGG|CYP133B5|[Ralstonia solanacearum]rsm|BP

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IDAFQKPSADLVAEFAFPLPVRIICQMMDLDDIDDAMALGVGVSKLAKVFDPAAPMSADEL  
VETSAAYEELAQYFTKVIEARRAQPGTDLISMLMRAEENGETLTHDEIVSNVILLFIAGH  
ETTSNMIGNSLIALHRNPQQLDLLKRDPSRMPNAVMECLRYDGSVQVTIRAAMEDVEVEG  
EVLPRGTTVFLMLGAANRDPAQFTDPDQLDIGRQQGRLQTFGAGIHHCLGYRLALIELEA  
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>CMR15\_mp10892|KEGG|CYP1179B1|[Ralstonia solanacearum]rsm|BP

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LAPRIEALKGREEFDFVETLAHPVPAEILAAMLGLDEIEIVDFLRWSDAIADFMQDFVIS  
PVPNRVIAQATAKQLLEMKAALREAIAVRRRQPKEDLLTDLACAAGDGGDAITEEELMLQ  
LIHLIFGGHKIPQFVLANTLHLLFKNPQYL VHGEATFDKISKIVDESMRVESPIQFITR  
HAVDDFMLHGERIKKGQSIYMLGGSANRDAEVFGDPDTFQPDAPKRKGIHYGTGPHVCIG  
AALAGVTIANILCQFLQATRSVEPLYDLNNPEWTRNDTFHGVARMPKVTYR

>F504\_4509|KEGG|CYP133B5|[Ralstonia solanacearum]rse|BP

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IDDFEQKPSADLVAEFAFPLPVRIICQMMDLDDIDDAMALGVGVSKLAKVFDPAAPMSADAL  
VETSAAYEELAQYFTKVIEARRAQPGTDLISMLMRAEENGETLTHDEIVSNVILLFIAGH  
ETTSNMIGNALIALHRNPQQLDLLKREPSRMPNAVLECLRYDGSVQVTIRAALEDVEVEG  
EVLPRGTTVFLMLGAANRDPAQFTDPDQLDIGRQQGRLQTFGAGIHHCLGYRLALIELES  
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>RSUY\_15200|KEGG|CYP1179B1|[*Ralstonia solanacearum*]rsy|BP

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GRIASILAPRIEALKGRTEFDFVEALAHVPVPAEILAAMLGLDEIDIVDFLRWSDAIADFM  
QDFVISPVPNRQIARATAAQ LLEMKAALREAIARRRRQPKEDLLTDLACATGDDGSTITE  
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IQFITRHAVDDFELNGQTIKKGDSIYLM LGSANRDPEVYSDPDTFQPYAPKRKGIHYGTG  
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>RSUY\_42850|KEGG|CYP229F10|[*Ralstonia solanacearum*]rsy|BP

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KMALPDATAALDPALADAMHLRIPLETLAHALLGDDADAAACRQDIAAYLAALSPDAPAGA  
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AGHLHTRPHAIDPFLYEVLRLDAPVQNTRRFVSRDTALCGESLRAGDRILVLLAAANVDA  
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>Rpic\_4258|KEGG|CYP102E4|[*Ralstonia pickettii*]rpi|BP

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AFSQRAMKGYFDVMLDVANALADKWARQGPADADIPVADDMTRLTLDTISLAGFGYRFDSF  
NTPELHPFLAAMVGVLSEAMGKLTRLPLKDRFMREHHRRFEHDVAAMHQLVDEVIRARRQ  
AKDGGIGASDLLGLMLNARDPLSDQPLDDTNIRFQVITFLIAGHETTSGLLT FALYMLLR  
HPAVLAQAYAEVDRVLP GDTVPQYAHLAQLDVIERVLKETLRLWPTAPSGVAPYEDTRI  
GGRYAIRKDQRVVTVLLALHRDPAVWDRPEAFDIDRFLPENEAKLHPHAYKPFNGERAC  
IGRQFALTEAKLALAVILQRFALSDPYDYGFHIKETLTLKPDGFRLLRARLRHARERLSVA  
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IADALPQRGTLVVVAATYNGRAPDSARTLEARLDAADALTRQATGLRYAVLGCGNSQWPA  
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VDYVAPDALRAAMLPPAARAMTVLANEELVSDATGLWDFTREAPRGPTRHLTVQLPDDVT  
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VELQDTATVRDITALHAATRCPFTRGQLAVWLEGDDAAERFDQDIQAPHVSVLDLLIRLP  
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TSLLCFGCRHPEHDFLYRDTLRAWEDAGLVRVFPAYSCVAEHPHRFVQHALWDAREAVWA  
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>Rpic\_4262|KEGG|CYP229F16|[*Ralstonia pickettii*]rpi|BP  
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RVRPADEFPVKAVAATPTGAFFGRLVRQIDGPDHSTRKAKVMAALGRLDVSALAGQALRH  
ARTALPDAASLDAALDADAHFRVPLATMAQTLLGDHADAPACQADIAAYLAALGPGASAG  
VVAQADAAVGRLLQQRFADSPFAGGGDDSDADIANLAALLAQTYDACAGLLGNCIVALS  
AGLTARLRAQPLAIEPFVREVLRRDAPVQNTRRFVAHDIALLGQPLRAGDKVLVLAAN  
VDGTTNPDLRFDSRDTAPRLWTFGGGTHRCPADALATAIARETVRHLLSLPDVDRWLAG  
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>Rpic12D\_4368|KEGG|CYP102E4|[*Ralstonia pickettii*]rpf|BP  
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QPVSVRQLLRDFVELQDTATVRDITALHAATRCPFTRGQLAVWLEGDDAAERFDQDIQAPHVSVLDLLIRLP  
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TSLLCFGCRHPEHDFLYRDTLRAWEDAGLVRVFPAYSCVAEHPHRFVQHALWDAREAVWAAFDAGATLYVCGDGRAMAPAVRDTLIRMHQARYGSD  
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>Rpic12D\_4372|KEGG|CYP229F16|[*Ralstonia pickettii*]rpf|BP  
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RKAKVMAALGRLDVSALAGQALRHARTALPDAASLDAALDADAHFRVPLATMAQTLLGDHADAPACQADIAAYLAALGPGASAGVVAQADA AVGRL  
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>N234\_33520|KEGG|CYP229F9|[*Ralstonia pickettii*]rpj|BP  
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AAQWLGAWLADTTPGDGPLPALHQAHAAGIDAQAVAANTIGLLVQACEATAALAGNTLLRLGRGASDLALQAVVARVAQDDPPVQNTRRFLAADA  
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>N234\_37805|KEGG|CYP108S1|[*Ralstonia pickettii*]rpj|BP  
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NIVKALVHVDGDEHKGLRALTQSWFMPNSILKLDERIRGLARQIVDKLQQSDGNTIDFAKDIALHYPLHVIMDILGVPPPEDEPRMLLLTQELFGGE  
DPELKRAKQEASANDGALAKNLMVAVADFRDYFENVTAERRVNPNDVATLLANAVVNGEPISEVSRLGYVVIATAGHDTTSSSSAVAMWALSQY  
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>BTL\_5148|KEGG|CYP1488A2|[Burkholderia thailandensis]btz|BP

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>BTL\_5546|KEGG|CYP212A12|[Burkholderia thailandensis]btz|BP

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>BTI\_4127|KEGG|CYP116B103|[Burkholderia thailandensis]btd|BP

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>BTI\_4272|KEGG|CYP1486A1|[Burkholderia thailandensis]btd|BP

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>BTI\_4729|KEGG|CYP1488A2|[Burkholderia thailandensis]btd|BP

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>BTHA\_4656|KEGG|CYP212A12|[Burkholderia thailandensis]btv|BP

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>BTHA\_5068|KEGG|CYP1488A2|[Burkholderia thailandensis]btv|BP

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>BTHA\_5121|KEGG|CYP1013A3|[Burkholderia thailandensis]btv|BP

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>BTN\_4756|KEGG|CYP1013A3|[Burkholderia thailandensis]bthe|BP

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>BTN\_4810|KEGG|CYP1488A2|[Burkholderia thailandensis]bthe|BP

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>BTN\_5218|KEGG|CYP212A12|[Burkholderia thailandensis]bthe|BP

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>BTRA\_5023|KEGG|CYP1013A3|[Burkholderia thailandensis]bthm|BP

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>BTRA\_5078|KEGG|CYP1488A2|[Burkholderia thailandensis]bthm|BP

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>BTRA\_5488|KEGG|CYP212A12|[Burkholderia thailandensis]bthm|BP

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>DR62\_5346|KEGG|CYP212A12|[Burkholderia thailandensis]btha|BP

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>DR62\_5680|KEGG|CYP116B128|[Burkholderia thailandensis]btha|BP

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LEL

>DR62\_4913|KEGG|CYP1488A2|[Burkholderia thailandensis]btha|BP

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>DR62\_07990|KEGG|CYP1013A3|[Burkholderia thailandensis]btha|BP

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>OI25\_3864|KEGG|CYP226A17|[Paraburkholderia fungorum]bfn|BP

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>OI25\_5996|KEGG|CYP1155A1|[Paraburkholderia fungorum]bfn|BP

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>OI25\_7436|KEGG|CYP289A14|[Paraburkholderia fungorum]bfn|BP

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>K788\_0007982|KEGG|CYP195A6|[Paraburkholderia caribensis]bcai|BP

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>K788\_0003175|KEGG|CYP133C2|[Paraburkholderia caribensis]bcai|BP

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>BJG93\_05715|KEGG|CYP195A3|[Paraburkholderia sprentiae]pspw|BP

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>BJG93\_16600|KEGG|CYP108S7|[Paraburkholderia sprentiae]pspw|BP

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>BJG93\_29335|KEGG|CYP101F1|[Paraburkholderia sprentiae]pspw|BP

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>BTO02\_24655|KEGG|CYP1220A18|[Paraburkholderia sp.]para|BP

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>BTO02\_25280|KEGG|CYP1220A19|[Paraburkholderia sp.]para|BP

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>CJU94\_29980|KEGG|CYP1220A16|[Paraburkholderia aromaticivorans]parb|BP

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>C2L64\_08965|KEGG|CYP195A6|[Paraburkholderia hospita]phs|BP

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>C2L64\_25710|KEGG|CYP133C2|[Paraburkholderia hospita]phs|BP

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>C2L64\_30050|KEGG|CYP105T10|[Paraburkholderia hospita]phs|BP

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QMGALLYLAGHETTANQIGLGLLSLLQDSQQTAALIAEPSLVRGAVEEMLRFHSITHMNS  
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>C2L64\_30215|KEGG|CYP105T2|[Paraburkholderia hospita]phs|BP

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>C2L65\_08430|KEGG|CYP195A6|[Paraburkholderia terrae]pter|BP

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>C2L65\_22700|KEGG|CYP133C2|[Paraburkholderia terrae]pter|BP

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>C2L65\_33045|KEGG|CYP105T7|[Paraburkholderia terrae]pter|BP

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>C2L65\_33200|KEGG|CYP105T8|[Paraburkholderia terrae]pter|BP

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>C2L65\_38220|KEGG|CYP1049A4|[Paraburkholderia terrae]pter|BP

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>C2L65\_44875|KEGG|CYP1487A2|[Paraburkholderia terrae]pter|BP

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>CUJ91\_23590|KEGG|CYP1485A3|[Paraburkholderia graminis]pgp|BP

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>CUJ87\_03085|KEGG|CYP1220A2|[Paraburkholderia caledonica]pcj|BP

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ALQSRVSSRARTVLGAAGVCPTYETLKTLDLCEAVCTEASRFRPVVPVHAFEPLQDVEHR  
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>B1917\_2316|KEGG|CYP240A1|[Bordetella pertussis]bpet|BP

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>AXYL\_03286|KEGG|CYP116B81|[Achromobacter xylosoxidans]axy|BP

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>AXYL\_03542|KEGG|CYP1110A2|[Achromobacter xylosoxidans]axy|BP

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>EUB48\_06975|KEGG|CYP289A27|[Rhodoferax sediminis]rhf|BP

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>EUB48\_13810|KEGG|CYP1097A17|[Rhodoferax sediminis]rhf|BP

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>EXZ61\_03070|KEGG|CYP212B5|[Rhodoferax sediminis]rhg|BP



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>Bpro\_1581|KEGG|CYP107DG2|[Polaromonas sp.]pol|BP

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>Bpro\_2807|KEGG|CYP1180A1|[Polaromonas sp.]pol|BP

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>Bpro\_4920|KEGG|CYP1098B1|[Polaromonas sp.]pol|BP

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>Bpro\_5301|KEGG|CYP153A76|[Polaromonas sp.]pol|BP  
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>Pnap\_4029|KEGG|CYP107DG3|[Polaromonas naphthalenivorans]pna|BP

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>DT070\_17790|KEGG|CYP229M1|[Polaromonas sp.]pos|BP

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>DT070\_20855|KEGG|CYP195A26|[Polaromonas sp.]pos|BP

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>F7R28\_09720|KEGG|CYP195A26|[Polaromonas sp.]poo|BP

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>Ajs\_3072|KEGG|CYP1318A1|[Acidovorax sp.]ajs|BP

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>Dtpsy\_2579|KEGG|CYP289A19|[Acidovorax ebreus]dia|BP

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>C380\_19955|KEGG|CYP212B1|[Acidovorax sp.]ack|BP

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>BO996\_16530|KEGG|CYP212A16|[Delftia sp.]dhk|BP

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>I6G47\_21230|KEGG|CYP116B17|[Delftia lacustris]dla|BP

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TQEFALPFAVRVQSAFLGWPTLLQDELLGWLRRSHAATRSGDRVQTSAVAREFEDLVERV  
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HPDWQQRLREQPALLPTAIDEVLRIDGPLVSNRRITTRATALGGCPLPAGSRLSVNWIAA  
NRDPRVFGDPDAFRMDRDPGLNLLYGAGIHVCPGAPLARLELRVLEELLARTTRIVLAA  
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>Rta\_14540|KEGG|CYP195A32|[Ramlibacter tataouinensis]rta|BP

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HTRVRKLIMGALTRRAIAEMEPLVALVDGLLDRIAQRGGGDLIEDFASAI PVEIIGNLL  
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DVLTRLIQGEAAGEQLSEAELLQNCVFILNAGHETTTNLIGNALVALQEWPGKARLLHR  
LKHSAAHHPSGLEADLT LAVDEFLRFESSNQLGNRRALRACEVGGVALPEGALVTLCIGAA  
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APTRGGRARFRGFLKAPFSVA

>Rta\_37620|KEGG|CYP152AR2|[Ramlibacter tataouinensis]rta|BP

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VRQAEVTWLTMA SHWRSQPQLVLYTSAQEWLTRSVCAWAGVPLPEHEVQLRTGQLAALFD  
SAASGLGAHLRARRARRQAETWLAGLVQEIRDGRRRVAGRTLLQAAAELTDERGEPLPAR  
IAAVELLNVLRPTVAVSVFVFAAHALHHHPGWAPTLAAGGDLGADAFVQEVRRFYPPFP  
AIAARVRDFVWEGYHFPQGRRVLLDLYGTNHDGRLWPHPGEFRPERFMGRIPGLFELVP  
QGGGRADDQHRCPEGVTLALMKLALRLLVQRSRYRLPPQNLAIMRRLPALPRDRFVIA  
DFQPV

>L103DPR2\_02277|KEGG|CYP195A34|[Limnohabitans sp.]lim|BP

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>L63ED372\_01421|KEGG|CYP195A31|[Limnohabitans sp.]lih|BP

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EENG DALSEVELLQNCVFLNAGHETTTNLIGNALISLQEWPAQREQLQADLKQAATEAE

GEQIMGLAVDEFLRFESSNQLGNRRALQATQVNGMDLPAGALVTLCIGAANRDPVYENP  
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>L63ED372\_01617|KEGG|CYP225A10|[Limnohabitans sp.]lih|BP

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IRELCVGILDQALGQGEFDATHQIARQLPMRMLGRIAGLPEEDLDWLVDKGDALMANTDS  
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VISDTEFRNFFCLLVAAGNDTTRYISIAAALHALANQPGLMAQLKAVQGEAAWEGVADEFI  
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>BSY239\_1146|KEGG|CYP195A27|[Hydrogenophaga sp.]hyr|BP

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GALTRRAIADMEPGLIALVDSLLDDLAERGGGDLIEDFASAI PVEI I GNLLDVPHADRG  
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>BSY239\_2681|KEGG|CYP199V1|[Hydrogenophaga sp.]hyr|BP

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NERFQDRMNSSGEAVNWIAKVCQORDALTPDGLGAQLFAAADAGEIGHDEAGMLVRTLLSA  
GLDTTVFTLCNAFTSFARNPGQWALLRDDPSLARQALEEVLRYDSTFHSFYRTSTQDVEL  
GGITVKQGQKIVVFIASANRDPRRWPEADRFDITRRATGHMAFGTGIHGCAGQMMARLEG  
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>LPB072\_02045|KEGG|CYP212B6|[Hydrogenophaga sp.]hyl|BP

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AMRLYPPVAAIMARRTTAPIELGGWHTPKGAMLRIAPYVLRDERNFANAEAFLEPERFLE  
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>E5678\_02035|KEGG|CYP195A29|[Hydrogenophaga sp.]hyc|BP

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AHEAVLSAAVDEFLRYESSNQLGNRRVVHATQLSGVDLPVGSVLTLCIGAANRDPAAFAL  
PETLDLQORSPNKHAFGFGIHCAGLSLARLEGRIAIGRFLQRFPGYHLTAPPVRGGRAR  
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>HPF\_14080|KEGG|CYP2730A1|[Hydrogenophaga pseudoflava]hpse|BP

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NGDISASKPDHWLIGKPGQVLHVLTTLHTFASESIGDADWQLFTA AFDALKANAVAHGFA  
VEATHEAQAF LGQDRQPTGEIYFGYHDGIAQPRIAGQCPAHGGLKSDFQPAASPGEFLLS  
EAYS DIFRGPSLGNLPPELARNGTYAALRLLEQDVEGFDGMLASESASAGVPAAELQARL  
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VQANSPTQVPGSVPLKVKGRAPVAALSSLATLEEMARRPIETLRQTGPILSVTVEASFSG  
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MQFLMG TALRNLLSPDPRANRGGEQPWAALGALLKGKPPDFPAALALALEEARRFDP PVT  
IVQRFVGPNGAKLHG VQVAKDSPVFVVVGSANRDAAVAFDEPDQFHWDRPAGAGHLSLGH  
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>HPF\_17070|KEGG|CYP195A33|[Hydrogenophaga pseudoflava]hpse|BP

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WSLAILGALEPVPTPEQHAAGNRSVTEMLAYLRTLVAARRQAPGDPERDVLTRLIQGEAS  
GEKLSEVELLQNCIFLLNAGHETTTNLIGNGLIMQEFP AQRKQLLADLRTAGTDEAARE  
QVLT LAVDECLRFESSNQLGNRRALTAATVGGVALDAGALVTLCIGAANRDPAVYDQPET

LNLRREGNKHLLAFGFGIHQCAGLSLARLEGRIAIGRFLARFPRFELSAPPVRGGRARFRG  
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>F9K07\_04220|KEGG|CYP105T5|[Hydrogenophaga sp.]hyn|BP

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RMLAPEFMQPSLQRLRPQIEQCVQARMDAMERKGTADLVADFAVPIPSEVISILLGIPS  
EDIEQLNHLSTRNDHSAGVQVVEAAAQAMEDYLDQLIQKKKRDRHSDPGEGSDLLSRL  
VNQQVLPGLTHDGAVKMAALLYSAGHGTTSNQIALGALGFLWPDQIELLKADPSRLAG  
AVEEMLRFHTVAHMNSARLATQDVTVGGLIRAGETVYAMDASANRDPTVFEEPDKFDIC  
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KCLPVEWS

>F9K07\_04270|KEGG|CYP105T6|[Hydrogenophaga sp.]hyn|BP

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GLEQSPQPSDFMEKVANPLPVMVVSLLIGVPFEDFEMLGRWSNLRIDHRAAPQEIRQATL  
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IGMGTLTLLRHPEQKDAMAADPALVPRAIEEMLRYNAIAHLNSSRVAIADVEIGGQSIKA  
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>F9K07\_19630|KEGG|CYP195A30|[Hydrogenophaga sp.]hyn|BP

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EAVLGRAVDEFLRFESSNQLGNRRRAVKDTQVGGVDLPAGTLVTLCIGAANRDPAQFAEPD  
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>H9K76\_13975|KEGG|CYP1982B1|[Diaphorobacter ruginosibacter]drg|BP

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DEDAIHHSILSIFTEMFLDVELDRIPMAHDGPSRLIELASRYTCIHRGQGQDAHTKEHIR  
QILESRRQVFGGMQCLRDAGEYDSAMMRMLAAEAVPGYDFRFEKEMTTLFVAGADTASN  
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PFVTRVARADDRLSDIDVHAGDVVIVSLIGVNRKAMARPDFWIPDIDAAAREGVGMGTGI  
HSSFTWGARVCGGRNFALLELTTVLSFLIAELRLELSEDLPVENEWVGQMRKGGHRVRV  
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>H9K76\_15125|KEGG|CYP1982B1|[Diaphorobacter ruginosibacter]drg|BP

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DEDAIHHSILSIFTEMFLDVELDRIPMAHDGPSRLIELASRYTCIHRGQGQDAHTKEHIR  
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PFVTRVARADDRLSDIDVHAGDVVIVSLIGVNRKAMARPDFWIPDIDAAAREGVGMGTGI  
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TARS

>C6571\_02485|KEGG|CYP289E1|[Simplicispira suum]simp|BP

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IDALALPFAVWAQCDFLGWQDEDHAALAQWMQANYAATLAQDRAAHTELAAARFQAVVTAQ  
LERRRGIGAAAAPGDLTWALMQEKVHGVPPLTDAEIASILRNWTVGEIGTMAASAGILCDW  
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>SRAA\_1070|KEGG|CYP203A12|[Serpentinomonas raichei]cbaa|BP

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VDQFDFKDVSSQFTVKVLM TALGLPMGDEALVAEHEVRDHAVLMVQSDARTRAKGPEHIA  
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FMMMLAYN LASFDAARRAVVADPALLPDAIEESLRYNTSAQRFRRRLMCDVTLHGQTM RQ  
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>SMCB\_0828|KEGG|CYP203A12|[Serpentinomonas mccroryi]cbab|BP

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VSQFDFKDVSSQFTVKVLM SALGLPMGEEALVAEHEVRDHAVLMVQSDARTRAKGPEHIA  
AYQWMQNYAAQVIALRRAEPRNDLISHFAMAEIDGDRLDEREVLLTTTTLIMAGVESLGG  
FMMMLAYN LASFDAARRSVVADPSLLPDAIEESLRYNTSAQRFRRRLMKDVTLHGQTM RT  
GDFVCLAYGSGNRDERQFPDPDRYDIGRKPRGHLGFGGGVHACLGTAIARLALKIAFEEF  
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>IS481\_09000|KEGG|CYP152B10|[Schlegelella thermodepolymerans]sthm|BP

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WNGYAFPAGRRVLLDLYGTNLDPRTWHDPLSFQPERFRERTPGRFDFVPQGGGDPHLGHR  
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>IS481\_11920|KEGG|CYP116B144|[Schlegelella thermodopolymerans]sthm|BP

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VSFRGPQHLWVEWDPARNPERRDPSILQRRHPVRIGAPHARDKVRPLVVRAAEPVAEGIV  
RLRLAATDGRPLPQWAPGAHIDIECGETGLSRQYSLCGPLSDTSEWTVAVQLDPASRGGS  
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YSVRCRACLAFERELRELHGERLHLYVSEEGRRNDLAGLLATPDPQARIYACGPQRMLEA  
LERLAAGWPEDALRIEHFSGSAPRLDPSCERPFEVELRNSGLRLEVPAVRTLLLEVLASN  
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>IS481\_12540|KEGG|CYP229P1|[Schlegelella thermodopolymerans]sthm|BP

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>G8A07\_01530|KEGG|CYP1097A20|[Kinneretia sp.]kia|BP

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>G8A07\_02905|KEGG|CYP212E1|[Kinneretia sp.]kia|BP

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>C1M51\_06735|KEGG|CYP1097C1|[Methylibium sp.]metp|BP

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>GJA\_4741|KEGG|CYP1097A11|[Janthinobacterium agaricidamnosum]jag|BP

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>YQ44\_18725|KEGG|CYP1097A5|[Janthinobacterium sp.]jaz|BP

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>YQ44\_23945|KEGG|CYP1097A1|[Janthinobacterium sp.]jaz|BP

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>BZG29\_04195|KEGG|CYP1097A1|[Janthinobacterium sp.]jal|BP

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>CNX70\_04245|KEGG|CYP1097A1|[Janthinobacterium svalbardensis]jsv|BP

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>EKL02\_04155|KEGG|CYP1295B1|[Janthinobacterium sp.]jaj|BP

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>EKL02\_04905|KEGG|CYP1098B4|[Janthinobacterium sp.]jaj|BP  
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>EKL02\_15905|KEGG|CYP1098B2|[Janthinobacterium sp.]jaj|BP

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>FJQ89\_21240|KEGG|CYP1097A1|[Janthinobacterium tructae]jas|BP

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EALRDTVIADIAVPAGTLVWCVMRND SVADAHFPDAQVFQPERWLAEGGEANNKRASMPF  
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>G3257\_04380|KEGG|CYP1097A1|[Janthinobacterium lividum]jlv|BP

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>Hsero\_2448|KEGG|CYP107NP3|[Herbaspirillum seropedicae]hse|BP

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ALLRHPEQWRLLKSEPHWLRS AIREMLRHDS PVQYTGRRL LAPVQLDGQTLARGDLAILH  
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>ACP92\_12235|KEGG|CYP107NP3|[Herbaspirillum seropedicae]hsz|BP

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>Hrubri\_2195|KEGG|CYP107NP2|[Herbaspirillum rubrisubalbicans]hrb|BP

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>E2K99\_12915|KEGG|CYP107NP1|[Herbaspirillum huttiense]hhf|BP

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>CFU\_4256|KEGG|CYP107DG6|[Collimonas fungivorans]cfu|BP

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>LT85\_4854|KEGG|CYP107DG6|[Collimonas arenae]care|BP

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>CPter91\_0565|KEGG|CYP1199A10|[Collimonas pratensis]cpra|BP

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>C9I28\_12805|KEGG|CYP1097A16|[Massilia armeniaca]masz|BP

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>C9I28\_19965|KEGG|CYP1355B1|[Massilia armeniaca]masz|BP

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FIANARARIAANPALRAKPSNMLEALVVARDEPGSGFTDEAVIGNAITMVFAGEDTTSNT  
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>DPH57\_02135|KEGG|CYP1355B1|[Massilia sp.]masy|BP

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>DPH57\_08810|KEGG|CYP1097A16|[Massilia sp.]masy|BP

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>DPH57\_15060|KEGG|CYP229L4|[Massilia sp.]masy|BP

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>EYF70\_23845|KEGG|CYP229L2|[Massilia albidiflava]mali|BP

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>EYF70\_29330|KEGG|CYP1097A15|[Massilia albidiflava]mali|BP

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>FCL38\_05710|KEGG|CYP226A25|[Massilia umbonata]mum|BP

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>AAW31\_11620|KEGG|CYP1225A8|[Nitrosomonas communis]nco|BP

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>Nm1\_A2167|KEGG|CYP1225A8|[Nitrosospira multiformis]nmu|BP

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>azo2527|KEGG|CYP203A3|[Azoarcus olearius]azo|BP

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DEAVRYEPVATFKVRETAKEVELHGV TIPKGSFVQCMVVSANRDEEVFENPDQFDIDRKL  
KPSFGFGFGPHMCIGQFVAKVELNCAINAILDLFPNLRRLDPDKPAPVIEGAQLRGASHVH  
VIWD

>Tharo\_0243|KEGG|CYP116B253|[Thauera aromatica]tak|BP

MTIENSTQAQPTRGGCPVRHSEGACPASALAAAFDPFEGPYQVDPAEALRWSRDQLPVFY  
SPKLGWIVSRYDDIKSVFRDNVLYSPRNALEKITPATPEAMKVLASYGYAMNRTLVDNED  
EPAHMERRRVLLDHFLPENLEAKQEMVRRRLTREKIDGFDIDRGRVDLVEEMLYEVPLTIAL  
HFLGVPEDIEIERMRSFAVAHAVNTWGRPTPEQQVEVAHAVGRFWQYAGEVIEKMRADPDG  
EGWMHYTIRKNAEIP EIVTDSYVHSMMAIIVAAHETTSLASTNMFKTLLTHRDAWEDVC  
ADPSLIPNAVEECLRYAGSMVAWRRETTAAQALGGVELPAGAKLLIVQASGNQDERHFED  
GDRFDIYRDNAVEHLTFGYGSHQCLGKNIGRLEMRI FLEEMSRRLPHRLAEQEFTYLPN  
TSFRGPNNLWVEWDPEHNP ERANPALRRGSVHFVPVGA PLRKEIARKV RVSAVRQEAGGVL  
GLTLEDVRGRPLPRWSAGAHGELCLGEYERKYS LCGRPDAPGYDVAILLEEQGRGGSRI

HEVVRPGTELKLRGPNNLFRLLDESARSYVLIAGGIGITPILAMADRLKMLGRDYVIHYAG  
RSRASMAFLARLES DHGGRVRIYSKQEGERADLPAIVDSLAEGAQIYACGPARMIRALED  
LCAELPGNTLHFEHFS AQGSGLDPEKESAFEVELMDSGLTVAVAADTTLLEAIRAVGIDL  
ASDCCEGLCGSCEVSVLEGEIDHRDLVLTRAERAENRRMMACCSRAKSGGRIKLAL

>AI055061.1|NCBI|CYP1013A3|[Burkholderia mallei 23344]bmal|BP  
MSKHRQAPGPRGGLVMGNLAAYKRNPITMLRLHQYQGDVARNRLGPFVTHALAHDPDHIQ  
YVLQENHRNYVRGRFYDNFKMFFGDGLLTDDGEFWRRHRRVVQPLFHKKQVDAHTAAVGD  
AALALAYRWSALPPGKALDVVEEMHLSLRMLGLMVFN TDVSSHAEAAAGPAVRFGIEAMM  
PQGNLNDFIPRWAPTRFNRRIAHARRAIDTIVAKIIADHREARCEPSDVISL LLLNARDPD  
TGAPMTQQEVHDEVMTVFLAGHETT GAGLAWALYALAQH PAVLRQLRDELDARLGGRAPT  
VQDFEQLPYLSQVVDEVLRVYPPIWGFTRDLVEDDEIGGYRIPARSSVFMSPYVTHRHPA  
FWRNPDAFDPENFASDAPARHRFVYFPFGGGMKRCIGFQTALLQMRVLVAVVAQHFDLNA  
LPGHPIELGATISLRPVHGIRLIVKPRERQQSHLARVREHESARALRPLGDTATTAGAAC  
PMTAAREPGASAAALA AVEAGALDAAHRGGAAAAAAGEPCPPRDPAEAAPLPLAAAPAPA  
SPAVDADASARGVPAWRFTWRFPVPVDPVPDEPSPALSGRRIALVNGRGGTAERVA AALAR  
TCAKVS VFAPAASADHAEAAARVFVNEAGPLDGI VDLGLEAPFALDDAGAW EAPMRRTVEL  
LKACYGDWAAEDDTSRLFYVALTWMDGQMGYGETAG AQPLGGLWAGLAKTLPQELPNCNV  
RVLDIAPDETGRVDRLVVNELYRWGLFEVGYRGGVRYTLHAKRNELPPHAVDARTTLGAG  
DTVLFSGGARGIGLLCARSLAERHGCTVIVTGRET PPDGGEPWMALDEPGFKHYGLEQLR  
AATPEHPPKAIRAAALQRLKRRRELRTALDEMAALGLPVHYRVCDVTDRAAVRALCDELGD  
SLRMVIHNAGVDRPVRLIQKRAEDFADTVRTKVLGFANLCDAVRARPRLVQFCNVGSLTG  
RWGGMTGETDYAAANEALARLGLWAARHAFSPACGVKTLVWPTWEGVGMITNFAVTQRYV  
SPMNVDEGVRHWLRELAAPGSGEVMFMGAVGRAPT PMQIKGFVPIRELPNIGELVTRRH  
VGEPVRFRFPKRFESRYAIDPAVAPYAHAFR FNGRAVL PASLVLEHACAVGDWVMPPTGE  
PRELSEMTNVVLRLDALPDVPAGGAPVELASEAAGYMIGDVWCVDVRCSDARTQAELLSM  
TLVYRPQPEQIGAAFARAPDTTPEPAPLTSAPHAAWN GELLPAGDWSVPDDASAGIVRIG  
RVPSAAVLSLWALPFPLELRLPVNHVEHVLRVLLAEWGAARADAPAVWRIGGAKLARLPA  
ASADGVVEYAAGRFAVL DARGYVLLRIDDARVDGEPAQAALPETGALADPLTA

*Deltaproteobacteria*

>Desaf\_1336|KEGG|CYP152E2|[Desulfocurvibacter africanus subsp. Africanus]|daf|DP

MSTIPRDKLPESTLALFRDGYEFIGKRCKRLGSDVFQTRLMLQKTVCMRGPEAAQVFYDQ  
RYFQRKGGAPLRLRKTFLFGQGGVQGMGEAHRHRKAMFMSLMSSESIARLVRLMSDEWRA  
ALPGWAEKGRVLLDAARDILCRAVCWTGVPLKESEVRKRTQDFAAMIEDSGAIGPRHW  
KGRLSRKRAEGWIGGVIEAVRAGRLNPPEGSALRTVAFHRELDGELLKTRIAAVELINVL  
RPTVAVARFITFAALALYEYPDWRRRLARQKDRELELFVQEVRRFYPPFFPVAARVSKPF  
DWQGYHFP EGARALLDLYGTDHDPRAWDDPETFRPERFLTWDGSPFNFI SQGGGDHYENH  
RCPGEWITIELMKEAVRLLVMSMDYIVPQQDLTVSMTRMPTMPQSGFVIADVRPREVIV

>MXAN\_0683|KEGG|**CYP197F1**|[Myxococcus xanthus]|mx|DP

MVRSTCASGSSPLQDPFMSQVRLPPGPQGHFIAGNLVEFSEDPLGFLTRCAREYGDVVRL  
GKRNFLLNHPDLIERVLVNGDGNFVKLAGVGQGKRHKGGFPEAMNSEGEDWLRKRRLVQ  
PAFHRKHVAACGDTVVALTETMLQTWPRGDARDVHADVSALALDIVSRFLFHTPIDDEAR  
HVADAVDAVMRHTDSPLRPPIWVPTPTNLRLRRALGRLNTLLATLVRRYREQPESRTDLL  
ALLLSAPVPLSENQLRDELATMIMSGHETTADALVWAWYLLAQHPEAEARLVAELETVLG  
GRLPGAEDLPRLRYTEAVVKEAMRLYSPAWITSREALRDCELGGFHVPAGTMLAVSQWVT  
HRDARYFDAPESFRPDRWLSEDAQRMHRYVYFPFGGGPRFCIGSALAMMETVLITACVAR  
RFRLELAPGCVVRPRPALALQPLGVWLI PRHRSHTTQEGEVRHAAGA

>MXAN\_1743|KEGG|**CYP1506A3**|[Myxococcus xanthus]|mx|DP

MPNLLSRGLFSLFFGGRRKPLASLPGPAPGILGNIGDFLGAQPWDVCARYARTYGPVAVA  
WLGPSPALVLNDPTLIEHVLETRRLEFEKGNIGDQIRHSVTDDTPFIAQQGEDWARKHAM



DPLAQPWTPAWQAAQVEPLRAAILESVEALLQQPSIDLTPTLRKLTFDAFCVATVGEKLP  
TSVYDDFMLLAAAADARIQAKLPLKFVSPPKGFADAKERFYGLFLDKVRAARKAPAPHRV  
DLMSWTLREMPQLDDVVHANLLGGFFFGGVFSSSTTLVGAFHQLNKYPATEERLALESAA  
LGQGPLTLERLKDAPWGEAVAYEALRILPAVRIFLRRTPTPTRLAEVTLP PGTTLMISN  
QHLHRDPSHWTAPETFAPERWLDGGAARNPHGSDHFFPFGRGPRACVAGDFAIVYLRTAL  
ATVSARARIHVDSTEPFEEGFFFGVVRPQGVTGKLVPRQVQTLHPPTGAPPPAVESA

>MXAN\_2304|KEGG|**CYP253H2**|[Myxococcus xanthus]|mx|DP

MSIHPAGASTAAPLPPLSPGAPLIGHLRALRKDPLHFLQAQAREYGDVVRLPMGPADLVL  
VAHPDGVRHVLQDHARNYSKQSRGFRVLQELLGHGLLTSDDGHWLRQRRLAQPAFHRQRV  
AGFTRTMVDAAADLAATMEARADTGAAFNVAEDFTRLTLRIASSTLFGADVSSATHDIAT  
VMSRLQVFVYKRLTQPVPLSLRLPLPAHRQFERDVGSLNRVVHGI IAKRRRESGEHDDL  
QMMMEAHDDDTGERMSDSQLRDEVLTLLLAGHETTASALAWTIMLLSQHPGVRDMESEL  
ARELGGRNPETHDLPRLELTHRVVDESLRLYPWALSRIATKEDLVGGFRIPKGAHLII  
APWVTHRHP SIWNPGEFDPDRFLPEREQARPRFAWFPGGGPRQCIGNQFALMELVLVL  
ATLLQRVRLNLTPGQVIHPTPAITLRPRPGVWVTASRP

>MXAN\_3943|KEGG|**CYP209A1**|[Myxococcus xanthus]|mx|DP

MCGRPPQGGLFMTSEPVEPDHALSKPPPVAPVGAQALPRGPAMPGIAQLMMLFLRPTE  
FLDRCAARYGDTFTLKIPGTPPFIQTSDPALIEVIFKGDPLFLGGKANGLKPVVGENS  
LLVLDGKRHRDRKLIMPTFLGERMHAYG SVIRDIVNAALDRWPVGKPFVHEETQQIML  
EVILRVIFGLEDARTIAQFRHHVHQVLKLALFLFPNGEGKPAEGFARAVGKAFPSLDVF  
ASLKAIDDI IYQEIQDRRSQDISGRQDVLSLMMQSHYDDGSVMT PQELRDELMTLLMAGH  
ETSATIAAWCVYHLCRHPDAMGKLREEIAAHTVDGVLPLAKINELKFLDAVVKETMRITP  
VFSLVARVLKEPQTIGGTTYPANVVLSPNIYGTHHRADLWGD PKVFRPERFLEERVNPFH  
YFPFGGGIRKCI GTSFAYYEMKIFVSETVRRMRFDTRPGYHAKVVRRSNTLAPSQGVPII  
VESRLPS

>MXAN\_4127|KEGG|**CYP147A2**|[Myxococcus xanthus]|mx|DP

MAQASIFEQILD PANRANPYPLYAELRKT PVAREADGTIYIVSTYDEIVALLHDPRVSSDI  
RNLVRQAGATPSPQEGPGLPEPFIRRDPPDHRLRKLAMRPF GPPHTPGRIDALRPWL  
ETTTGLLDALAGKNQVDIVGDVAYFPVTVICKLLGVPREDEARFHELADAGVETLDP  
GTIEQRKAKRDRTKAELRQYLAALADAHLRQPGGDLLSGFLT DNGPDGRMSREEVLSTAA  
LLL VAGHETTVNLIANGMLTLLRHPGVFERLRREPELSIPLVEELLRYEPPVQFLPDRVT  
LADIDIAGTTIPQGSPLVLM LAAGSRDPERFDDPDRFMPDRPNNSHLGFGSGIHYCFGAP

LARLEAQIALTELACRLEHPRLVADPPPYRPNPALRGPLHLLVEVDGIRAAGVR

>MXAN\_4919|KEGG|**CYP1069C1**|[Myxococcus xanthus]|mx|DP

MSKTNAPSGLGSEYHPLDSPQLENPHPFLLARARSEEPVFFSPALGAWVVRHADISAVVA  
DTTRFSSAESITVGAATTPPEVV TALMDGYPLVPSLVDNDPPAHGRFRSLVSKAFTGRRL  
AEKEPFIRTLVDALIH SFRHERQADLFLRF AHPLSCSIIAEILGIPSSDIHRFRWSDEL  
STVLA AHGPIEHQVACAQGVVEFQRYLASTLKEREVSPREDLLSDIVTGAQGMTPPMSMA  
ELVSLLMQVHFAGHETTAGLIVGAVELLLHEHPEQLRALRDDPGLIAGAVEEAVRMISPVH  
AMFRTALEAVEIGGVPIPKGAHIRIVYASANRDEARFHEPERFDIRRP EVKKHLAFGQGL  
HFCIGAPLARLEARLAVEALLRSLPGLRLVPGQKPGFLRSVTVRRHESLEVAWDVQANQA  
L

>MXAN\_7298|KEGG|CYP1069A3|[Myxococcus xanthus]|mx|DP

MPVSVQKQEETGVP AHASAGRCPHLGAQYNPFTGPHAEDPHAFFEKL RKDEPVSFSPMLN  
MWLVSRYEDISQVLKSPAQYSNRDMLASGTHLTDEAKAILDQGFPTAHVLLGMDPPEHTR  
LRRLMNRGFTAQRIAGMPFIREMATTLVDRFAQDGEADLVKQLAWPLPVHVILGVMGV  
QEDVWKIKRWSSDWQQLVFEYVAPELQVEMAKGVIEFQQYCIRLIEDRKKNPQEDLTSYL  
VAVESDGEALTMHELVM AVGASMLSAGHESTTALMANAWKLALQHGLWQRLRDNRDLPK  
FLEESSRYDSVSHAMIRTAKEDVELGGVKIPQGSRLLLLFAAGSRDESLCPHSSKLDVDR  
EKVPQHLYTGRGTHFCLGAPLARLQFEITTNILLDRLPDPKLVPGQDFGTWQSLVLRQMK  
HLKVEWTPT

>MYSTI\_02578|KEGG|**CYP1506A2**|[Myxococcus stipitatus]|msd|DP

MPNLLSRGLFNLF FGSRRKPLASLP GPPPGILGNLGDFLGAPPWDVCAHYARTHGPVAVA  
WLGPSPALVLNDPAVIHEVMETRRLFEFEKGNIGTQIRHSVTDDTPFIADQGADWARKHAM  
DPLAQPWTPAWQAAQVEPMRAALESVEALLREPSLDLALALRKLTDFDVFCVATVGEKLP  
TSVYDDFILLAAAADARIQAKLPLRFVSPPKGFAAAKERFYGLFADKIRAARQAPS AHRV  
DLMSWTLREMPDFDDRVAHLLGGFFFGGVFSSSTTLTGAVHQLQKYPAVEERLAKESAA  
LMRVPLDFERLKGGSWGEAVAFEALRILPAVRVFLRRSPLAPTQLVGVTLP PGMTLMISN  
QHLHRDP SHWVQPEVFDPERWLNNGGAARNPLGSGHFFPFGRGPRACVAGDFAMVYLRTAL  
ATLFAVRVRIQVDSTEPFEEGFFFGVVLPKGVTKGFVARQRATDSTPMGAPPSSAVESA

>MYSTI\_03599|KEGG|**CYP253L1**|[Myxococcus stipitatus]|msd|DP

MDSTQVP SHPPSPWGLPLWGHLRHRDPLGF AVESFRKHGDVVRLKLGETTYLVSHPD  
HVR YFLTENANNYSKPPLVNDPFLGNGLFVSEGTYWRRQRRLVQPSFHRERLNGLLSGMA

ALIDGMLKSWEERTRAAQPLDIAEEMGILSLHMTTRALYSEVPDAPTTAAVRRMMHTFNA  
RESLLARVLRRLERLPLYRRKWADFFDTQRLMRRKAKEVVERRREGGPEDDIMAMLVAARD  
RDTGEAMTEKELRDEFMNLFSGNEGPGAALAWGWHLLSLHPEIADRLASESAAVLGGRAP  
TLEDLPRLRYATQVFEESSLRLYPTAWKLVRVAGAADTLGTYPVAPGTVFMAISYIIHRHP  
EFWSSPEVFDPPDRFAPGGPARHKFAYLPFGGGQHICIANNLSLMFGALVLAMVSQRFRLR  
GIPGRRVDIHPGISLLPRGGLPMTLEPRP

>MYSTI\_04048|KEGG|**CYP1501A1**|[Myxococcus stipitatus]|msd|DP

MDTSVSSSSGRRLAGPRGLPVLGSFFPMLSEPLALANKLHARYGDVSLIRVYKTPIAFLR  
NPVDVKRVLIDEPQTFPKPLIDNPFNGNGLTVSRGDHWKRQRHMQPLFHKEKVRLWSGI  
FSEELAKSVERWKEMGARGESFDMYTEGARLMFGVMWRTCFFEEQPEIAYFDRIMDAIDVF  
GRRVSPLSVLLYNLMPRMDPRHERVYTSVKLINGWIYERIGKRRGRGTEDGDITLLSMLV  
EAKARDSGESMNDKEVRDEIVNLFASFEMIATSLTWAIHACTQHPEVTQAIRDEVQGV  
GGAPPRYEDVAKMPYTNRVVQEIINRLCPPAWTILRETASEVEVGGVMLPKGTQLLLC  
PYAIHRHPDHWKDAETFDPPDRFLPERLTGMHKGAYVPFGAGSRICVQGHMSLVDTVQTLAAVL  
QQLDVEYLGKTPVEWQTRLTFVPHGMPVRMRARQG

>MYSTI\_04343|KEGG|**CYP1491A1**|[Myxococcus stipitatus]|msd|DP

MQGTHAETPLPPGSRLHWLLGNPRQVKDALGQLVRGHKRHGDIVYFRFFEGPTFLLCHP  
EHAQRVMVDNARNYRFPGPENGFDGPLMGRGLFASRGDYWLRQRRMVQPAFHRPRLGGMV  
SGLVEGTLAMVERWEPHLHSGQPLELLEEMRHLSISLLGRTIFSRDVYAESAQLREALDF  
FTRDSHGPRDSVVKVVRQLLRLNPGHHERFMGAITKMNTVLYALIAERRAAPSLGDDVLG  
MLMSARDAQGEAMTDRQVRDELVSFVGGQEATAVALTWTWYALARNPEVEQRIRKELAD  
VLGGELPTSATLPELHYTRATVEETLRLYPPSWQFARRAREADEVGGFKVPPGMLMLISP  
YILHRHPSAWEEPERFLPERFMGEQRERRSQRLAYMPFGAGQRLCIGNHFTPVLMTAVLA  
VTLRRFQHRLVPDFPVVTMSGSTFRPRNGLMATLHPASPLP

>MYSTI\_04792|KEGG|**CYP1497A1**|[Myxococcus stipitatus]|msd|DP

MTRHELPPGLSASAAAQGFRFFQNPLSFLDQCVEQFGDLFTIQFPGSRKQVCLSNPEDLK  
EMYTGSPDLLHAGEAAGSVFSPLTGWNCTLTLDGEAHARRRELTVQAPFRGGQVERHAGAM  
YAIATAAIERWPRTGRFPLQPQMQDIALRIIFRTVLGLDDTAPGHARFLELISQVARLGM  
GSKMLLIPALRWDLGPLSPWGRIVRIVRDTDALLFAEIIARRRTPDKLATSEDVLSLLIRG  
EGQDGLRLTDQEIRDDETVALLIAGLETTAVALTWVAERLMALPEVRERLRAELEPLHTNG  
ELDVTRLALPYLDAVLKESLRNRSLSPICGGRVLKAPMRLREYELPADTVLINSPLYLLH  
RRRELYSEPDAFRPERFLGSPPSAHKWTTFGGGRNRCLGQKFALLELKVVTSAMVLQTGL

ELATPRVVPKADGIHLVPAAGLPVRRGTCPFAKKAAAAS

>MYSTI\_04794|KEGG|**CYP120F1**|[Myxococcus stipitatus]|msd|DP

MHQPPPLPPHASGVPWVGDSVEFGRNPQRFVLKRQARFGPVFMGHILGASTAVMVGPPQALR  
FVLSSSHRHHFVSGPGWPRGLGMLMSGALMMKDGDIIQTRTRLLAPALAGSALASYTPVME  
ATARRHLERWVQQGRLSLYDGLKGLTFDTASQLLFGTPEGADTGRLGKLFATYTAGMQGL  
HPVVPLRVPFTPFGRFAARSEMLKEVTRIIQEREKSTGSDALARLLESRKEQGEGPSAD  
ALAEQAFFLLFAGHESTSSLTTWACLELSRHPDLLDSAREEAQSLGEGPLTMERVERLPF  
LEQVLLETERLHPPFSGSFRQVVKSFENGFHVPEGCRVFYSINGTHGDPATFPEPERFT  
PGRFTPEAACARHELGLVGFGAGPRSCLMGFGARLQAKVVLALLLRDYEWSLQPKQSLD  
PVYLP SLFPKDHLRVSFRRRSAQETRHRETA

>MYSTI\_04805|KEGG|**CYP1503A1**|[Myxococcus stipitatus]|msd|DP

MSQTPEISIFSPSFLANPFPIYQQLREQAPVFWWSRELGAWLISRYADV KMLLTDERATPD  
QKAWAGYPELKTS AQPTHEHVQWALDATLLLCHGAQHARMRRFANTPFQSAGCGRIARVTE  
QVVHEVLDDGFSGRKEIDLLADFSAPIRIKVMGR LFGAGFTPEEEEF LVTGTNLALGFLEP  
SLAPEAITRNEGALRGFRALVENVIRRGKEAGAEDSILGDLLQPNREGDRLSDEEVLSLV  
FSFLLAGTEANGSLITMGVLLLLLEHSGQLAHLQREPDRYPDAIREILRYSFTKFLPRYL  
KEDISLHGNVMKQGQIALLLFQSAFRDPETFENPDVFDVMRKRSHELLAFGAGPHRCVGE  
RMAEIEAVIALREFFKRFKATLRGSEADWVKHHMLVAVPRSVPVVPVLLS

>MYSTI\_04813|KEGG|**CYP1495A1**|[Myxococcus stipitatus]|msd|DP

MEPDFNPAHPAFRADPHRWLGWLRERDPVHFSRPLNAWVLTRYDDVRR AATDVTHFSNDT  
LSVLVGKHAGAMGPRRTEHRIGTNLGMADGAVHTRLRTAIAPYFTPGAIHRLETGLQHYV  
DGLLRRAASGGELDLVAGLGRPLAVEAVASGLFGIPEGDREPLSGWAAATTRISDPLLTR  
EERENFLELTRFADYLDGLVVQRRQQPGDDLLSRIADLDRSGLTHPEVLATCMSIVGGG  
IDTVSMGISRGILALLDHPEQMELLRENPDLLPGATEEILRFCAPAVFVARVVRVDLELR  
EKT LAAGDVVLYSPAAACRDP AVFSEPDRDLDRREVERGHNLAFGHGAHYCIGAALARLE  
LRVAFRGVLSRLPRLELKVPRSM LTYGRNLMSMGIESLPVVFPPQNIPLP

>MYSTI\_04828|KEGG|**CYP125N1**|[Myxococcus stipitatus]|msd|DP

MHKTELADLASPITYGRAIPHETFEHLRREAPVYFHQEPDGGTGFWAITRHEDIITISRD  
PATYSSYRGGTSIEDYSQEDLSLIRFMM LNMDDPPQHVKYRRLVSSGFTPVAITYLEPRIR

AVTKEILDKVVHEREFDVTSIAAELPLQVIAELVGIPREERHQLFAWSNRLIDYDDSGR  
ARSFDDAKMAAMEMWQYANQLAARNQGREGKDLVSVLMNAEVDGEKLNEAEFDAFFLLLI  
VAGNETTRNLISGGMLALMEHPEELARLRANPALLPTAVEEMLRWVSPVVCFRRTVTRDT  
VLRGQQLREGDKVVLFPYPSANRDESVFENPGRFDISRFPNEHIAFGIGQHYCLGTSLARL  
EIRVMFEELLKRLDGLELAGPVERRRSKLVNAIRAMPVRRPPSSRPREGARENQEGTACE  
PSMRG

>MYSTI\_06075|KEGG|**CYP1352B1**||*Myxococcus stipitatus*||msd|DP

MSKSAPPTFISRFEPHNVENPYPLYARMREEAPVHFSPEMHLWVVSRRHDDVKAVVLNPQD  
FLSANSFRNPVPPAPEVVAVLEQGYQPVPALVDDDPNHTMRVIVTKALAPHRLSAMEA  
RVRSITTELLDAFAADGHADLVKLGYPPLPARVIGAIMGLPDSDLERMKRWTEDLALLSA  
GNVPVARQVECAHGLVSIQKYLAGYIAERRKTPGDDLISALIEARYEDSPPLSDVELISL  
LSLLHFAGHETTTNLLGNLLVWVLQEPERLKELRDPTRIAPRAIEETLRRLDSPIQGMRT  
TARAVTLNGVEIPANARVLVLFASANRDETIFHAPDHGDPRRPDVGKHLGFGMGIHYCIG  
APLARLEVKLAMEMLLKRLPNLRLAPGNAFSYVPNFLHRGPHRLLVEWDPA

>MYSTI\_07239|KEGG|**CYP229H1**||*Myxococcus stipitatus*||msd|DP

MSPSNPVVAATHPDYPFYADLVARRPFYRDDTLGLWVASSARAVGAVLSSPACRVRPLP  
EPVPRVLQGLASAEVFGRLARMNEGPFHLVVRALMTVLGTLGAEHGAEEGRRQARRLIA  
EEVPLRELVLFRPLPVQAVGALLGLEPGGLPEVASWTGALVRGMAPGADAEQVREGALAAER  
LMAVFHARLAHSEDGPLTLLSRELGASSTAPGALSREQADAESSAVIVSNAIGLLVQTHD  
ATAGLLGNALRASLADPAVYAQVSSRPEWLPRLLEVLRFDPVQNTRRFLSEDAVIDGR  
ALRAGDTVLVVLAAANRDPVHHAPHRFDLHREPSELATFGEGRHACPGAALARAVSLGA  
LEVLFATDLVSHRAAFSATGFQPSVNGRVPLLPRLHLHSREHTT

>A176\_002600|KEGG|**CYP109S1**||*Myxococcus hansupus*||mym|DP

MSNALWGVRLPLVEFEPFSSVHWEDPYPVYRALREHSPVHWAPKAKLFCVSRHADVDFVLR  
RPEQFSSRAMTAVMFENKRPELGDVPSSLRLVVRGRVDVQKFFQGPPDAIINSDPPRHGA  
LRGMVSRCFTPRTIASWEPRIRELVNECLAPLRAGQPFDDVVSGLAVPLPVVIVTEMLGVE  
PEWRADFKRWAAGFITATGAGRDRTPMREFFDVLTEFRAYMRTLVEKRRQAPTEDLISV  
LVDPAQKEVLDEEELFSFIHTLLLGGNETTTNLIGNAVAALLDHPEQLALVQGAPEKIPG  
LVEETLRWESPVQFTLRSAVEDVDVGGVRLPAGSNMALLLGAANRDERAFKSPDTFDVTR  
TPSPHRAFGFGIHHCLGAGLARLEARVALEELVPLLPGVRRADARREYVDSLMMRGLARL  
PLVPR

>A176\_004746|CYP253H1|[Myxococcus hansupus]|mym|DP

MSTHSAGESTAAPLPPSPVGTPLLGHMRVLRSDPLTFLQAQVRQYGDVVRIHVGPASLVV  
VAHPDGVRHVLQDQAKRYGKRTRGLAALRELLGHLLTSEGSFWLRQRRLAQPAFHRQRL  
AGFARTMVDAASDLASELEARADAGTAFDVAEDCMRLTLRIASSTLFGKDVSGAWHDIAD  
AMGRVQVFTYKRLTQALPIPRRLPLPTHRRFERDTHMLDRVVRGIIETRRRDTGAHHDLL  
QMMLEQQDADTGERMSDTQLRDEVLTMLLAGHETTANALSWTLMLLSQHPSVRRDLEAEL  
AQVLGGRKPTDEDLPRALTRRVVDEVLRLYPPAWSLSRVAIEDDVIGGFRI PKGTYLLL  
SPWVTHRHPRVWDNPEGFDPRFLPEHEQERPRFAWFPGGGPRQCIGNQFALMELVVLV  
ATLLQVRVRLNLTPGQIIRPAPAITLRPRSGVWVTAARAP

>A176\_006320|KEGG|CYP197F1|[Myxococcus hansupus]|mym|DP

MPQVRLPPGPKGHFIAGNLVEFSEDPLGFLTRCAREYGDVVRLGKRNFLNPDPLIEKVL  
VNGDGNFVKLAGVGQQRHRGGFPEAMMNSEGEDWLRKRRLVQPAFHRKHVAACGDTVVS  
LTEQMLQTWRPGDARDVHAEVSALALGIVSRFLFHTPIDDEARHVADAVDAVMRHTDSPL  
RPPMWVPTPTNLRLRRALDRLDTLLTTLLRRYREHPESRTDLLALLLSSPVPLSEAQLRD  
ELATMILSGHETTADALVWAWYLLAQHPEAEARLREELDTVLGGRLPGAEDLPRLSFTEA  
VVKEAMRLYSPA WITSREALRDCELGGFHV PAGTTLAVSQWVTHRDP RYFDAPDAFRPER  
WLSEDATRRHKYVYFPFGGGPRFCIGAALAMMETVLITACVARRYRLELAPGCVVRPRPA  
LALQPLGVRLIPHPRAARGLESEARHAARA

>A176\_007236|KEGG|CYP1069A2|[Myxococcus hansupus]|mym|DP

MSVPKQEETGAPAPASSGRCPHLGAQYNPFAGPHVENPHPFDDQLRKEEPVAFSPMLNMW  
LISRYDDIAQVLRDPARFSNRDMLVSGTHAHLTEEARAILAQGYPTAHVLLGMDPPEHTR  
LRRLMNQCFTPQRVASLAPLVQRMATELVERFDKTGQADLVTQLAYPMPVHVILGAVGVP  
QEDFWRIKGWSTDWQRILFEYVPPEKQVDMAKGFLEFQQYCIRLIEDRRRNPRDDLASHM  
LAVEDNGEALSLHELIMAIGGSMLAAGHESTTALLANAWKLALQHGLWQRLRDHRELVP  
R FLEESSRYDSVSHAMIRTATEDVVVGGVKIPGGSRLLLLYAAASRDEALCPHANKLDLDR  
EKVPQHLYTYGRGTHFCLGAPLARLQFHVATNLLLDRLPDPRLVAGQDFGTTQNLVLRQMK  
HLKVEWTPH

>MFUL124B02\_14085|KEGG|**CYP1506A6**||*Myxococcus fulvus*||mfb|DP

MPNLLSRGLFNLFFGGRRAPLASLPGPTPGLLGNLGDFLGTQPWDVCARYAREYGPVTVA  
WLGPSPALILNDADVIHEVMQTRRLEFEKGNIGEQIRHSTDDTFFIAEQGDDWARKHAM  
DPLAQPWTPAWHAAQVEPLRRALLESVEACFAHPSVDLTPTLRKMTFDAFCVATVGEKLP  
ASSYDDFMLLAAGADARIQAKLPLRFVSAPKGFEEAAKERFYGAFARRIHEARQARSSTAV  
DLMSWTLREMPRLDDQVHAHLLGGFFFGGVFSSSTTLVGAFHQLNKYPATLERLALESDA  
LAQGPLSLRLVAEAPWGEAVAYEALRLLPAVRVFMRRSPLTPSRLAGVTLPSTTLMVS  
NQHLHRDPSHWASPETFDPERWLNNGGAARDPLGSGHFFFPFGRGPRACVAGDFAMVYLRTA  
LATLSARARILVDSTEPFEEGFFFGVVRPQGVTKITPRERSTLHPASPEAPLPPAVESA

>MFUL124B02\_42165|KEGG|**CYP1069A4**||*Myxococcus fulvus*||mfb|DP

MPVTVQKQEETGVPAAHAPTGRCPHLGAQYNPFAGPHVDNPHPPFFERLRQEEPVSFNPMLG  
MWLVSRHDDILQVLKETTRFSNRDMLVSGTQLTEEAKNILSQGFPTAHVLLGMDPPDHTR  
LRRLMNRGFTAQRIAGMEPFIEKMARELIGRFKDGHADLVEQLAYPLPAHVILGVMGVP  
QEDVWKIKKWSADWQSLTFEHVPAEKQAEMARGVLEFQRYCVNLIERRKAPREDLTSYL  
VEVEADGEALSVHELVAIGASFLSAGHESTTALMANTWKLALAHGLWGRLEDPELIPK  
FIEEGSRFDSVQHAMI RTALEDVEVGGIQLPKGARLLLLLYAAGSRDESLCPHANKLDVDR  
EKPPQHLTYGRGIHFCLGAPLARLQTQITRLLVEAVGNPRLVPNQDYGWTQWSIVLRQMR  
HLKVEWDVTP

>COCOR\_00795|KEGG|**CYP197J1**||*Corallococcus coralloides*||ccx|DP

MHAAPSDSAVLPPRLPAGLPWVGQGLEYSRKDPLGFFFLRYADRGAVVRTRFVGTDIYLLNT  
SEAIEHVLVKNFERNYPKDAFQKRALEAVVGHGLFTSHGDFWMRRRRMMQPAFHKNLLTAH  
GSVAVKAASTWMASRREGASFDAYPEMMALTLDVVAETLFGANLSAQARELGRAMEAVML  
HAQHLLFDTPISLPAWVPTLGQRRFRAGLRALHAVVDDVVERRRRQGGPGEDLLGLMLEAQ  
AEDGEHLTDAQLRDECLTLMIAGHETTATALALSLLARHPDAQAALRRELATVLGGRE  
PTVADLPSLPYCEQVVKESLRLYPPAWGMSRVAEQDDRMDGVLVPAGTVVAWSQWALHRD  
ASHFPEPEAFRPERWADGLERRIPRFAYCFFGGGPRLCIGAGSALMVIRLVLATVLQRIH  
FEAEPGPAPEVLPAITLRPKNGIPLVARRVSRQE

>COCOR\_02122|KEGG|**CYP264K**||*Corallococcus coralloides*||ccx|DP

MQTYDLFAPTTETERHALYARMRAESGLCRIAPFGAYAAARYEDVRTIQKDAQRFSSSEAL  
ATTAEPWLGPNPVAQSLVTRDPPRHTQLRALINRAFGPTGMARLEAQVRQEAQTLAEAA

VSQREVDLVDAFSFVLPRNII GRMLGLEPSTFTEFKRWSVNMGLITSAPPAQHAGIRDTV  
KEMEDYLGGVITARRRQPGEDMVSDLLRAEVEGQRLTDAEVL SFLFLLLPAGMETTAQLI  
GNAAILLARHPEQLEQARADRAHIPRFIEEVL RCEPPAQFAFRVATSDVELSGTPIPAGS  
LVMGLVASANRDERIFEQPDVFAPGREKASQHLSFGHGIHFCLGAQLARMEARLALEALV  
PRIRALRLRAPDIEWLPGLTIHGPR TLPVELLPA

>COCOR\_02428|KEGG|**CYP253D2**||[Corallococcus coralloides]|ccx|DP

MHAGHVGVLPLRPMTTATAAVTRRAPGHRGHL LMGILPDVRRDLLGCMSTLHRQYGDVVG  
YRLGPQRAHLIAHPDGVKHLVQDHVKNYTKDHLTYRMVRWLTGNLLVSTGDFWLRQRRL  
AQPAFHRQRIAGMAAGMVRRT EAMLQRWEPAAASGTPLSISEEMKRLTLTIVGEALFGTS  
VEDQTERVGVAFTEL GKQIAERFRTFRMLPPVLPTPYDRAFR AARASLQETVRGIIATR  
ERGDDSGDLLSMLMLARDEDTGEGMTDEQLGA EVMTMLLAGHETTATALSWTWGLLSKYP  
EAEARLHAELDAVLGGRAPTVEDMPRLTYTKQVLEETMRLYPSVPIFSRTVDEDDVIGGF  
HIPKGTSVNLCPYVTQRHPDFWEEPDAFRPERFAPEAAAKRHRFAYFPFSGGPRMCIGSG  
FTMMEAQLIVATVAQRYRLREAPGFTLEPNANLTLWPKGELPMYLERRS

>COCOR\_02429|KEGG|**CYP253D1**||[Corallococcus coralloides]|ccx|DP

MTTAAATATVTRQPPGPRGHLLMGILPDVRRDILGCLGTLHREYGDVVRYRLGPMRSHLV  
AHPDAVKHVLQDHVKNYTKDHLTYRMGRWITGNLLTSTGDFWLRQRRLAQPAFHRQRIA  
GMAAGMVRQTQGLLQRWETAAANGTPVGINEEMRLTLAIVGEALFGTSVEAQAGQVGAA  
FTELSQQIAERFRTFRMLPPVLPTRYDRAFRDARATLLRTVRGII TTRRERGDDTGDLLS  
MLMLARDEDTGEGMTDEQLGA EVMTMLLAGHETTATSLSWVWGLLSKHPEVEARLHAELD  
AVLGGHAPTVEDVPRLTYTKQVVEEAMRLYPAAVIFSRSVQEDDVIGGFRI PKGTSVDVS  
PYVTQRHPDFWEEPEAFRPERFAPEAAAKRHRFAYFPFSGGPRQCIGNSFAMMEAQLVLA  
TVAQRYRLREAPGFTLDPD SHLTLRPKGALPMYLERRS

>COCOR\_02734|KEGG|**CYP1506A1**||[Corallococcus coralloides]|ccx|DP

MPNALSRGLFNLFFGAKRKPFASLPGPQPGILGTAGDFLGASPDVCARYGREYGGVTLI  
WMGPNPGLVLNDPALIAEVYESPRMEFEKGNISEQIRPSTTDDTAFTAELRGDWVQKRA  
LEPSAQPWAEALADLVGPMQAAISEFVDALLKQERIDFAPALRRLTFDAFSVAQVGEKL  
PDQVFEDFMLLARAADARIQAKLPLKFVKPPKDFEAVKARFYGHFVDRIREARKRQDPGA  
VDLMSRYLRETPGIDDQVLAHMLGGTYFGGAFSSSVTLVGAFHQLNKYPGADARLAAEEA  
SLVADGPLTFQKVESAKWAEAVAYEALRILPAVRVMTRTPPKDAQLAGVTLPAGSMIMIS  
NQHLHRDPAHWPDPTFKPERWLDGGTTTRDPLGSGHFFFPFGRGPRACVGADFAMVFLKTA  
LTTIASRVKVQLDSTEPFEEGFFFGVVLPKGVTGKLVARTAQASLKAKVG



>COCOR\_03933|KEGG|**CYP264D1**||[Corallococcus coralloides]|ccx|DP

MSERFNLLSPEVKANPYPTYARMRREAPVCQVEPGGMWAVSRHEDVLRVLKDPQRFSSQG  
FRVATNPPWLGGNPFSESMLTMDPPQHGRRLRVLVQKAFGAGAMARLEPRVRDLCRQAVAE  
LPRGVPVDLMPPYALRIPAAVISELLGLDPARATRLKQWADLITGGVTTVRPEEEDRKQR  
ARDAVAELRQYFGEVLDARAHAPGTDLVSELQQARVDGEALSKDELIAFMALLLVGGIET  
VVHLLGASLVVLREHPEIWAQLRSDRSRIPAFIDEVLRYEPPAQAAPRLTTEAVELGGVS  
LPKGAPVLVLLGSAAHDEAHFPDGRFNLSRPGPQNLFFGHGVHFCLGAQLARMEGRALAL  
EAMLDAFRHLQAGPEPMTWHRTLTVVRGPATLPLVLHPH

>COCOR\_04510|KEGG|**CYP1069A1**||[Corallococcus coralloides]|ccx|DP

MSTAVEAVKVDGQSEAIHIDAHASKAAGAMKCPHLGAQYNPFAGPHVEDPHPFYAQLRQD  
APVSYNPMGLMWLVSRYEDICHVLKDPTRYSSADLGNMGSVLAPATLAVLAEGYPLADSL  
INSDPPAHTRLRKLLGRGFSAQRIAAQEAPIRAVSEELIQAFARKGHADLVTEFAYPLPV  
RVILGMAGVPQEDMADIKRWCDFFRMIFFTRVPAEEQPPLARSWVTFQHYVARLIRDRTD  
EPRDDLISYLVTTDADGEALTPELIIAIAGSMLAAGHETTTALLAQCWKQALLQPGLWQ  
KLREDRSLVPHLIEETLRFDSVAHGMIRTTMEDVELAGVALPKGSRLLLLYASGSRDAAL  
LADGDHFDISRHHPTHLGFGRGIHFCIGAPLARLEALIAATNLLLDQLPDLKLEENPDFGH  
TQSLTIRTITQHRLRVNWTPTGT

>COCOR\_04899|KEGG|**CYP1335A1**||[Corallococcus coralloides]|ccx|DP

MTPPTDPYQAVTHPDPYPYAE LRARGGLHRVPGFGPWIAADAATVRAVLASEHCRVRPR  
SEPVPPhLVGTAAGALFGRLVRMNDGGPYPAVKQTLSSALSLALREVEAESRRQAAWLFA  
TPSLSRLPDAALQLPVFVLGSLLGFPEDTLEASVRDVDAYVRSVAGPPAGSEGAARLNER  
VAACFQSAARTAFTARLMEGHGAEDLRLPNTVGLLTQAYEATAGLLGATLRAFARMPELR  
EQLSRGGCTMDDVVQEAA RHDSVPVQNTRRFTHAAALVAGQALEAGETVVVVLAANRDPL  
ENPQPD AFLPRRTGRQTFTFGLGLHACPGPSLATTMATAAAERVLASGLDLSPLSGPVTW  
RASTNTRVLGGLE

>COCOR\_05111|KEGG|**CYP264D6**||[Corallococcus coralloides]|ccx|DP

MSTSALEKPLAPGPAVASRPQTPGMFFNPRDPAFNKDPYPHYKRLREEDPVHRSPWGVWF  
LGRYEHVRGVLRDKRFSVQDVPQGQLRRRSELLKTRKLIPNQPANLDGLIANSENWFAFLE  
APDHTRLRLNLVSSAFQKRSVERMREQIRQCABELLEPVRKQGHMDLMKDFACILPQNVIA  
HLLGLPKEDFPQCVAWAEVIGRIFDPLVSLEEYARLNEDSISFMAYLKELVAKRRVEPKD  
DLISALIEARDGQDRLSEAE LISIIILIFGAGEETVVSLIGNGSLALIRHPEHLEYLRTH

PEVLPSAVEEMLRYDAPLQMTSRTALEDVELGGKIIRKGDQVYVALGSANRDPDQFTEPD  
SINLLRERNRHMSFADGHHYCVGAPLARIEAQEAYRVLFDTLGDFEVAIDELSYRDHTVL  
RSMVSLPVRFKERR

>COCOR\_06417|KEGG|**CYP264D6**|[Corallococcus coralloides]|ccx|DP

MTGRVNLMAPEVRANPYPVYEE LRRTAPVCQVEPGGLWAITRFEDVAAAFKNPQVFSSAG  
VRTTTAPPWLGHNPFSSEMI VMDPPHHMRLRTLVSRAWTPAAVNRLEPRIRSFARILAER  
LSPEREVD FVD AFAMPLPASVIGELFALDPTMTARYKRWSVDLSSVSGTTEKDTHRHESI  
KATVREMEDYLSNVVAERRRHQPDDMVSDLVKTRVDGEALSDAEVMSFLFLLVVAGLETT  
VQLVSHSVRMLMEQPHLMARLENPSQVGRFVEEV LRYEPSVHGLVRVTTKETQVAGVVI  
PEGARVALMVGSACRDGERFKDPDTFNMDREGVNNMPFGHGIHFCLGAPLARLEARVGLE  
VLLSRFTRFTSTGPKWNTSLTVRGPLSLPLIPHA

>LILAB\_05370|KEGG|**CYP197F1**|[Corallococcus macrosporus HW-1]|mfu|DP

MPQVRLPPGPKGHFIAGNLVAFSEDPLGFLTRCAREYGDVARLGKRNFLLNHPDLIEQVL  
VNGDGNFVKLAGVGQQRHKGGFPEAMNSEGEDWLRKRRFVQPAFHRKHVAACGDTVVA  
LTETMLQTWQAGEARDVHADVSTLALDIVSRFLFHTPIGDEARHVAAAVDAVMRHTDSPL  
RPPIWVPTPTNLRLRRALGRLNTLLATLVRRYREQPESRTDLLALLSSPEPLSEHQLRD  
ELATMIMSGHETTADALVWAWYLLARHPEAEGKLVAELETELGGRLPGAEDLPRLRYTEA  
VVKEAMRLYSPAWMTSREALRDCELGGFHV PAGTLLAVSQWVTHRDARYFDAPESEFRPER  
WLSEDAQRMHRYAYFPFGGGPRFCIGATLAMLETVLITACVARRFRLELAPGCVVRPRPA  
LALQPLGVRLIPRHRAHGARESEARHAASP

>LILAB\_09935|KEGG|**CYP1069A3**|[Corallococcus macrosporus HW-1]|mfu|DP

MPVSAQKQEETGVPAAHAQAGRCPHLGAQYNPFAGPHVEDPHGFFEQLRKDEPVTFS PMLN  
MWLVSRFEDISQVLKSPAQYSNRDMLVSGTHLTDEAKAVLDQGFPTAHVLLGMDPPEHTR  
LRRLMNRGFTAQRINGMAPFIREMASTLVDRFAKEGQADLVTQLAWPLPVHVILGVMGV P  
QEDVWRIKRWSSDWQQLVFEYVEPERQVEMAKGVIEFQQYCIRLIEDRKKNPREDLTSYL  
VAVENDGEALSMHELVMAVGASMLSAGHESTTALMANAWKVALQHGLWQRLRDHRELVPK  
FLEESSRYDSVSHAMIRTAKEDVELSGVKIPAGARLLLLFAAGSRDEALCPHANTLDLDR  
EKVPQHLYTYGRGTHFCLGAPLARLQFEITTNILLDRLPDPKLVPGQDFGTWQSLVLRQMK  
HLKVEWTPT

>MYMAC\_007011|KEGG|**CYP1069A3**|[Coralloccoccus macrosporus DSM 14697]|mmas|DP

MPVSAQKQEETGVPAAHAQAGRCPHLGAQYNPFAGPHVEDPHGFFFEKLRKDEPVTFSFMLN  
MWLVSRFEDISQVLKSPAQYSNRDMLVSGTHLTDEAKAVLDQGFPTAHVLLGMDPPEHTR  
LRRLMNRGFTAQRINGMAPFIREMASTLVDRFAKEGQADLVTQLAWPLPVHVILGVMGVP  
QEDVWRIKRWSSDWQQLVFEYVEPERQVEMAKGVIEFQQYCIRLIEDRKKNPREDLTSYL  
VAVENDGEALSMHELVMAVGASMLSAGHESTTALMANAWKVALQHGLWQRLRDHRELVPK  
FLEESSRYDSVSHAMIRTAKEDVELSGVKIPAGARLLLLFAAGSRDESLCPHANTLDLDR  
EKVPQHLYTYGRGTHFCLGAPLARLQFEITTNVLLDRLPDPKLVPGQDFGTWQSLVLRQMK  
HLKVEWTPT

>STAUR\_0027|KEGG|**CYP1494A1**|[Stigmatella aurantiaca]|sur|DP

MHLLPGPGLPPALQIARYRFQPYEFLDGCASRYGDLFTVRFPILGPLVCASRPESIRRI  
AASSEELRLGEANDIFRPLFGERSISVLDGPSHLKLRRLSVPLFQGEQSYAWTGMILEVA  
SRRTRRWRPGQHRLREEMEALTLEVILRALLGLEDPAQLRLASRHARTMVQWSASPLSA  
LLMVPALRRDLGPLTPWKGYHRDLSTLAALVMDQAARRRRARDASGRDDLRLMQEGAG  
LSDEELKDLVLMLLFAGYETTATSLCWAFAEALLSHPGERTWVERELAEVTGGGPLEAGHL  
EHLVRLDSAIKEVLRLYPVVPILGMARRAVRPFELQGVTFPAGTKLVPTSILAQRADVY  
PDPHTFRAARFLDSKPDPAWLPFGGGLRRCVGLPFALHELKAVLAHVLSQTRLRLTRTS  
PAHASLEGITVGPGRGTPVAVESVRA

>STAUR\_0257|KEGG|**CYP107CJ10**|[Stigmatella aurantiaca]|sur|DP

MALHEPLPDPVPLTGCPYKANPYFLYKRMREAGPVHRVLFPSGVRAWLVTGYEAARSALN  
DDRLLGKNHGRGNDRWRARASIMPEPQHSQQLQVHLLHQDPPRHTRMRRFVTDFTPRRIEQ  
LRPRFQALADALVDGLPEHGADLVTGFAARFPFQVLAEFIQLPPELAGRFDRDWGKVVQ  
PVGPTDPGRPLYEARLHGLQSYIAGVVAHKREHREDDLLSRLVVAHERSELSQEELGSMI  
FQLLVAGQEPVTNQITTALIALFRHPSQLARLRGNPDLLPRAVEELLRYDSAFELTTWRF  
FDRSDSLHGTRVPAGDSVIVSLCAANRDPFRFPDPTLDFDRSPNPHLAFGHGIHFPCGA  
ALARTELQIALGTLLSRLPGLHLSIRDEAIAWIPAVLGRGTNHLVPGYGRRL

>STAUR\_0258|KEGG|**CYP107EN2**|[Stigmatella aurantiaca]|sur|DP

MGREVKWVCEGSGGMAPTGLGTRYSCARPEHARHHKREGFLTTLARDKRYRCVTRVRSPL  
CRRMSTRNASRGDAQAI PGSPHYFPFVPVRALDLHPRYAELCREEPVSRVRMPFGGEAWL  
LTGYAEIKQFLADPRFSSLKATAPDTARVTPLPLRPGNLLTMDPPDHTRIRRVVAKAFTM  
RRVEQLRDRIRDVVDKQLDLLVAQGPPADLVASLAVPLPVVMISELFGIPYADREQFRYY

ADV FVATTAYDAVEIDRSRTALEQYFQELLEQRRSCPTDDL VSTLLEAMDTERLTPLETA  
RTGIGILMAGHETSLSMISNSCFLLLSHRALYAQLVAEPLLLPTAVEELLRYIPLRSTGS  
FPRRATEDVELGGVLIRKGETVIFQRASADRDERVFTCPEKIDLTRRPNPHLGFGHGAHH  
CLGASLARCELSLAIEGLIRRFPNLRLAVPDGEVPWKPGLIARCPAHLEVTW

>STAUR\_0406|KEGG|**CYP1069E1**|[*Stigmatella aurantiaca*]|sur|DP

MREPERDERGPLFIQCAVREGGAGGCVGKPPLFQNTLESPYHLGMPKTQPPVRVSPALST  
PVPSSRCPHLGDEYNPFKGPHLQAPYPFFAQLRKEEPVTFSPMLGMWLISRLEDIHEVLT  
HSASYSSASMLTSASQLTPEARAILGPGPILHDSPLNTDPPAHTRLRRLQLRGFLPARIA  
RQEASTRQLANALIDTFIHKGRVDLVEAFTYPFPMHVILNMVGVPHEDMNRVKRWCDLDF  
GLIFSQTPEEAQPSMARGVVEYRAYCADLIEKRRREPREDLTSYLVHTETGSDSLNTEEL  
VSLGGSLLIGAGHEATTAQLGLILLNLLRKPERWQALCENPALIPRAVEECIRLEAASHG  
MVRTAVEDVRIGGVMLPKGSRLLLYSSANHDEAQHPDPERYTLDRTNLHHLGFGHGVHY  
CLGSHLARLELCVAVELFTQRMFGMRLVPEQDVGYHQELLILRNISRLEVEWPG

>STAUR\_0533|KEGG|**CYP1489A1**|[*Stigmatella aurantiaca*]|sur|DP

MQTTATKIPAPKGWPLLGVAPEMPLRNPLPLISRLTRDYGDVVYMPGVDTYLISEPELVKT  
ILLDAEEYFTKSPKVMKKLSIPAIGAGLSTLSGDPWKRQRRMANPAFSRASIAATFEGIMQK  
AIAEAIVWEARAGETIDVTGEMKRLTLRIVLLCLFSTDVSSRADEIIENLDVLQRYSVH  
LLWSMMPLPEFIPTKRNEYQKARGTLDSEIYGIIAERRKSGNHDRKDLLAMYMSAVDEE  
TGEGMSDEQLRHELMNLFAGHDTTANGLAFTFYLLSKHPEALKRVDEERDAVLGNRMV  
TNEDLPQLNYARWSFEEALRIYPPTFAMSRTSVRELKHNDYVIPAGSNI FVCQWALHRNP  
RLWPNPDHFEPPERFSPERSEGRHRFAYLPFGAGPRICIGAHLARTEAQMI IAMLLQRFRL  
NSEPGYEPRLVARL FVTAEPGISMRLSRR

>STAUR\_0821|KEGG|**CYP1011E2**|[*Stigmatella aurantiaca*]|sur|DP

MNPVKLNLFDPAPFHADPYPVYTRLREEEPVHRTVMGAWVITRYADV KVLLRDNTFGVFDI  
PTRIERKSQFLERNKTGELRTLQAMRRWMLCDPPDHTRLRGLVNRSF TSPSAVEALRPR  
VQEMVDQLIARVRDTGKMEIVGELACPLAVTMIASMLGVPEEAHASVTRWADGLSRVLDP  
LRSLEQYAEMNRVAQEFLEYFRQLFAERRRNPQNDLISSLIAVTDQGDKLTEDEMLSVC  
MLFIAGEKTTVNLSINGVLALLRHRDEFERLQKDPALIRGAIDEILRYDSPVQLNTRVPK  
KDFTLHGKTIPAGDLIYFSLGSANRDP SQFPDPKFDITRKENRHLAFSGGIHYCLGAAL  
ALIEGQLAISTLAREFPKMELVPGTIDWQKEIIFRGPTLPVLLNP

>STAUR\_1562|KEGG|**CYP107DP2**|[*Stigmatella aurantiaca*]|sur|DP

MSTPDLFHELWSPEVIENPFPLYARMRQAAPVARSHHPSVAGPIWVVCRYHAAVEFLKDN  
RFAKSKQKLGRESQRRYFRVSALKHLDQHMLSADPPMHTRLRSLVAQAFTARRVEALRPR  
ITAIAEQLLDSVQQQDRVDLLDAFAFPLPITVIAELLGVPVEDQDRFREWTTFITLTPPKD  
GDVAPLRRMAQEFQAYLQEFLLARRAEPRDDLASAMIAAEEQGDRLSPVELMSMVFLLLV  
AGHETTVNLIGNGIWALLKHPEQLERLRAAPALLDSAVEEMLRYCGPVKHSTSRFTLEDT  
EFHGQHIPAGEMVAVGLVSAHDAEVFPEPERFDIARQPNRHIAFGSGIHFCLGAPLALL  
EAKLSFRLLLLERLPQLRFAVEPSTLRWRDSSLIHGLERLPVTF

>STAUR\_1628|KEGG|**CYP264A2**|[Stigmatella aurantiaca]|sur|DP

MTPQVRNLSPEFRADPHSGYAQLRRDTPVVQVEPAGFWAISRYDDVAFVIKNPQLFSSE  
GFKAAWQPAWVGYNPLANSMIATDGAGHARMRTLVSRAFNASAIQRLEARIRKLAHRLAD  
ELAQKGEADFVSQFAMPLPTFVIGELLGLDISLHHRFKGWSDDIASVTPEPLSPEYAQRT  
LTAISDATRYITEVIEARRHSPAEDLVSDLVRAEVDGQSLTTREIVDFLILLIAGLETT  
VHLLANSLFLAERPEESERLRADPTLIPRFIEEMLRYDSPVQSLVRIVTSDVTVAGVTI  
PKGVLALIIASANRDERQYPEPDRFDLHREQSSISFGYGAHYCIGAQLARMEARCGLEA  
LLSRFSRFQRTSAELTWSQAITVRGPHALPLRFTPA

>STAUR\_1874|KEGG|**CYP264A3**|[Stigmatella aurantiaca]|sur|DP

MTRRVNLSDDFRANPYPGYAE LRNSPVTQVEPSGLWAVSRYEDVAFVLDNPLLFS AEG  
IQAVWEPAWLGYNPLAHAMASLDGPRDAPLKTWVSQSFSPSALQRLEPRVRQLADILSDE  
LLSRKSTDFIASFALPLPALVLSDLLGLEASDYRLFKNWSDDFACILPKVPSEDALRLRN  
TVTRLTGHLTCLIEQRRLTPADDLISEMLRDDLPGPVPTDRERIELLTLVVAGLETTVP  
LLANGLILLAHQPELLAQLRADRTLIPSFVEELLRYDPPTQGVLRRTLEEVEISGVSLPK  
GAGVLALTGSAGRDERQYPEPDRFLLHREQSSIAFGKDSLTC LGAPLARMQARIGLEALL  
SRFEGFCLVPADLTWNKALTVRSLHALPLELTPVRAGALATSSAWVGSP

>STAUR\_2030|KEGG|**CYP120H1**|[Stigmatella aurantiaca]|sur|DP

MTTLARESELPLPPKSPSLPVLGDTLAFRLRDGPGLVETRGRQLGPVFQNLNFGQPTAVLL  
GEEANRFVLHSGTKHFNWRYGWPPHFRDLWVDTI FLEDGDPHRLRRKLLMPAFQTEAIEG  
YLPQMEKSHLAAIARWEKAGRMVCIEDFGRVTLRVANQLFLGDDTEDGAEDLPQWMKHWL  
EGFYSVPIRFPLGTFSRALAARHKLI SHVERAIHSRREKKT TDALGLLTGFKDS DGVALT  
TDQLASEMLVLVAAGFH TTTTSM LTYVMFALAEHPDVLKKARQEQRDLGIQGSVTLEQIHR

MSYLNNAVMAEIERLYAPVPFGFRRVVEPF EFHGYRIPAGWQVAWSVEGAQKDPRNYADPL  
RFDPERFTRAGSDADHRGDFKLVGFGGGPRMCIGTNFAKVQAKLLMSHLLRGYEWEVEPD  
QDLRPRFTPERTPKSGLRVRFKKRAGPPDSPA

>STAUR\_3582|KEGG|**CYP1498A1**||[Stigmatella aurantiaca]|sur|DP

MSYAVANTAFYPRYDLLDPDFPKSPYPLLHRMRTEEPVFWFEPLNTWVTRYEEVSSILK  
DPMRFSSRRADRLQAQLPSDTPSGIRQTIAHVMSLAAMFSDPPVHHLRSEANKGFSPR  
AMAPMAQRIQKVTDDELISRMEGRGEMDGFLDFFEPFALTVIGDLMGVPREDQHLFI PWTQ  
KTTKLLGGSKLTLEEAQASLRAFEEMNAYLAQALAERQRNPRDDMMSFLLAGYDPGRFPL  
EALAGMCSEIIIGGANAPTGDTLGNALLACLSPHEELEKARHTPALWKTAVPELLRYDGPI  
LFW SRLATEDVVLGGKRIRAGQMVYASLAGANRDPDVFPEPDQLDFSRPNAHKHVSFSFG  
PHHCIGAGLARMENTIVFETLFRRLPGLRLAGPVQWREGSLTTRGPTRIPLVF

>STAUR\_5213|KEGG|**CYP1486B1**||[Stigmatella aurantiaca]|sur|DP

MSTAAAIEHLPGEAGIVANVRNTLGWMRRGNEHLLEQHRRFGPVYRTVFAGYTVVCVADP  
EMVMSIARDDHSWSTALAWLTFFQGIDAKINASQIDSPLFLDFKPHRDARKILQPAFGHT  
ATAGYFDAATPIFEKAIDRWVEQGHVSFKDAIRSLLEVEVSTRIFLGVDSGAREFERALID  
YWEGPLSLRSALLSSKWRRSIRGHRVLCEMPLRSRIAERRATGGDDLFSRLCAKTQESEG  
ILDDDGLVRLVIGVMAAAFATTSSGLASMA YLLAIHPEWQEKMR EEALAVSKGRVSYEDS  
KQLEVTSRVWKETMRLYPIAPYCARRALHDVNLGQFRI PAGTFVMGLISVVMQDSALWSN  
PQRFPDRFTEERAEDKKSKASFLPFGTGAHTCTGMHLANAEAKSFWHAMLTRCRFTLER  
NYRGRHTYMPAGIVSGDVKLRVERL

>STAUR\_5214|KEGG|**CYP126B2**||[Stigmatella aurantiaca]|sur|DP

MSVEPPNRSAPLGGLHGPPSTPQPLPAVLEGFDLTDQSRFSNGFPHQVFARLRRDAPVLF  
HPPGQSIDGDGFVWLSKHADIREAAANPAFSSRGGGGRPHGGTHIDDARPELPGVLFNMM  
DDPRHQDFKDVMTPAMGRQALATLEGKLRPYAAELVSSLLARGNCDFATEVGATVGAHAI  
SQLLGIPSQDWPLFAEWTSLLMGFDDREAGRPTERSQKIHMDIFRYGCQLLA KRAGPSD  
DLTSLLAGGKLASTSGEGPISDLERQTCFCLMVLAGTESTRNMIAGGVLALAENPEQWRA  
LRADRS LVPSAVEEILRWTSPTPYNRRTATRDIRIRDTQIRAGDKVT LWWTSANRDEDVF  
SNPFSFDIRRKPNPHLAFGYGSHTCFGDHLGRLEMRVVLEALLDRVEQIELTGQVAWAGS  
NKHTVLLRMPVALTGA

>STAUR\_5220|KEGG|**CYP110U2**||[Stigmatella aurantiaca]|sur|DP

MKSAKSSREGFPEGPSAFTSVRYARDPVGLYRALTKYGDGHTVTMPLLLGPIVGAISP  
QSAKDILTADTASLDIFGPEALAMVFRPRSLVMLSGEQHARERKLLMPAFNRADAVRAYA  
VTMQETALQYASEIAVGKPFVMQKLAQRILLQVVIRDVFGVTEPDEQAEKQRVRELFEA  
SSPALIFFPGLRHRFGGIGPYANWQRADARLTRLIHDLIARRRASPPGSKVDVLSLLLTA  
RYEDGSVPSDEVVHDELMALFFAGHAATATTISWVFHWLHRYPETLAKLRAELATLPQDV  
EPTSYMKLPYLEAVCNETLRIYPPVADLYRKLRVPLRIGSTMVPAGTGVAVFTTIIHARE  
DLFPEPMRFRPERFAERSYTPFEFLPYGVGARRCIGAAFAHQALKIVVASILRRWELGLE  
TPDEPAVRQGVGVGPKHGVRMIRLNATEEQAPGATGRSAALS

>STAUR\_5324|KEGG|**CYP167B5**||[Stigmatella aurantiaca]|sur|DP

MTREAPPAVKFDPSTAEFDVNPYPMLERLRAQPALPYWEEGRGWLLCRYEDAIIVLRDNK  
RFTANRSVWEFDDELGLTHQIPELAELSQYGLFALADADHARVRKLVSPALTPRAIERLR  
PEIQAIIVDEILDGVEAKGTVNVVAEADLIIPARVIGSMLKIPKGREVQFQRTDAMIKNF  
VPGLVCAREVEAMRPDIAGGLELIRETVEDRRRHQPQEDILTTLIRTEERGDSLNAQELL  
SLVAALIVGGFETT VHLSIFTVYNLLQRPEVLAQVKAPELSNRNVEEVLRFDNFGKMGL  
ARYALEDVELGGVTIKKGQLVLVMLNSALRDEGTFSSADVFDVRRHTNASIAFGHGVHYC  
IGANLARLEVQLAVSTLVRRFPRMQLLGPPSFGPHPVLRKMESLEVQLRPQ

>STAUR\_6876|KEGG|**CYP1387B1**||[Stigmatella aurantiaca]|sur|DP

MPLSQTFHPFAPPLRDNPHPIFEEARKEEPVFFSEILKCWVTRYEDVYAVLQDSRRFSS  
AGNLAVHKESLCPAAKSLLIENQYTDPLVNEDAPVHTRRRPVYKKLFSQEAIIRSLEPRI  
RDITKELVDGFQAHQGHADIVSQLAYPLPMRVVLSWMDIPQEMMETIKRWGDWVLLLFAE  
LTPEHQMECAHMOVKLQRYIADLLAERLDQKRTDAMTQLATQLLTLEKLSIEELAGMVSG  
TVVAGNATLTSMVGLTTRVFLQQPNLWQRLREQPERISQAIDEALRLESPFWGLRRVTTE  
PVEVGGVKLPAGARVLVAFISANRDVERFPQSEVFDLDRPNASQHMSFGKGVHVCVGSGL  
AKQEVQAAMEVLLQRLPDARLVPGQELTFVPGLLRQHERLLVEWSPQRV

>STAUR\_7270|KEGG|**CYP264J1**||[Stigmatella aurantiaca]|sur|DP

MHSTADLMTPENCRNPYPLEYELRRDRPVCHVEPGGLVAVSRYKDVEHVLKHPEVFSSHG  
FRVAWEPEWVVDNPLAHGIVAQDGAEHLRLRSVAVSRAFTPVAINRLGAQVRETAQQLADA  
LLEQGEADFMDFATPLPARAMSGILGLDPSLERHYKRWTEAVVGITPVPLSEKHIHYTR  
ATIVEMKAHMQRRAIDERRQQPTDGLLGLIVRGKSDSEPLSNSQMMALCFNLLTGGETTS  
FFFSNAVRVLAERP DVYAQLRADRTLLPQFIEEVRLRYDGPVRGLPRIVTSDVELSGVRIE  
RGACVLLLVSANRDEAQFQAPNHFDLQREQKGISFGYGTHYCVGAFLARLEAQAGLEAL

LDRFSGFSLIPERLVWNRGIITSGPEKMPVRFLSA

>AA314\_00027|KEGG|**CYP109R1**|[Archangium gephyra]|age|DP

MSLLDHFDFFHPEVHNNPYPYFAELREKAPLFWTKSLQAHVLSRYEDVAYVLKNPALFSS  
VDIRVNGMRPQDRNELGELSSVTNLVNSDPPIHTRLRGLVSR AFLPKRISEMEPRVRELS  
RGLVAEMTAQGEFDFMDGLASPLPVTIIAEMLGIEISRRRDFKRWSDSLMSATAESLRTG  
KMSEEATRSAGEMFAYMKEIAEKRRLEPKGDLISLLVQSSEGVEALSPA EVNSFAVLLLI  
AGNETTTNLLGNSLLALIRHPEQYEWLRNNPSREACA AVEETLRYDSPVVGLMRRATQD  
VELGGGKVPAESTVMVLVASANHDP RKFPNPERFDPQRDTNGTLSFGHGIHFCLGAPLTR  
LEAPVALQELMERAPRLGFASRQPERIDYGSSFFLRGPRSLWLRKS

>AA314\_00028|KEGG|**CYP107HX1**|[Archangium gephyra]|age|DP

MTPEINLKTREL RANPYPTYARLRKESPVVLYKHP IFGKTYYLTRYNDIVSSFTDPRLAN  
DRRNVLGKKDPM DRWWVPKLFRI LQNNMLAKDVPDHRRLRDLVHKGFTPRRVEEMKQAV  
ERIVSELLDAAEKKPAVDLLAD FALPLPLTVISEMMGVPEEDRLTFHRQMGGLLDNLTTP  
AGFLLQTPN AFNM MRFFRKLIRLRQTEPRDDL LTALVQAEEQGDRLNEDELISMI FLLLL  
AGHETT VNLIGNGT LALLQHPEQLQKLREHPELIGSAVEELLRYGNPVDQPSPRYAREEI  
QLEGHVIPKGATVMCLLASANRDESVFENADTL DITRKNRHVAFGMGVHYCLGAPLARL  
EGTIALQHLVRRFPDMKLAVPAEQLRWRGSIGLRGLKALPLLLSPSGAPAAMREAA

>AA314\_00098|KEGG|**CYP197G1**|[Archangium gephyra]|age|DP

MLGNILAAAKGELDFFKELGSYGDVSSFHLGRRRFYFVNHPELIRKVLTSQNFVRTAISR  
DLMESFLGRGLFSQEGENHLQRRLMQPAFHHKRIEGYGAVMEGFATRMLEGWRDGETRD  
ISHDMMRLTFEIVSKTLFDADTGEQASQVGKAFTSIMQAINKEYPLYSVLP AWVPVKRWG  
ASRRAVEALNRITSTIIQERRGTGTD RGDLLSMLLLARDEDGTRMTDEQVGAQTLSLLFA  
GHETTANLLSWTWLLLSRNPDIRLKLQQEVDTVLEGRAPT VGDLPRLKYTESVVKETLRI  
YPPAWYAERAPLTDTELG GYTIPANAPIVISVYVTHRDGRFFEQPERFWPERFLGVEDRQ  
LPAYLPFGGGTHLCIGNRFALMEAQLLVAAIAQRYELELEPGLAVKPRALITLGVEGLRM  
KVKRRQPGSASPRASPASSASDSSA

>AA314\_00303|KEGG|**CYP107DL4**|[Archangium gephyra]|age|DP



MATNPPNEQQQETAPVTAPHEAPRADATHILDRTNPEFFERAHGLYSDLRALGPVVRAPM  
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KAMPEEFKPIAFSLIMDPDPDHTRLRKLQPNFTARAMEALEPRVQRLVDELLDKAEQAA  
AARGEPA SERCMEFVEAFAYPLPVRVISDMLGIPEEDRAQVHAWAERLLHAETPAARADP  
QVRAGLKAFASYLEGLFERKRREPGE DMISQMVHAQEDGDRLSHQELLSMVFILFFAGHL  
TTVNLLGNGVVALLNHPEQHARFLADPAGMSKGMVEETLRYWGPVDYLPSTPRIATESFAL  
GDTQVPQGA KVSVGLASANRDPERFANPDAYDISRPDAHRNIAFGKGIHVCIGAPLARLE  
ARIAFETLFRFPKLRRLAVPESELRWGAGAAMRGFNRIPLFF

>AA314\_00471|KEGG|**CYP253G2**||[Archangium gephyra]|age|DP

MPEAR TLGEAPGPRGHWFNGNIQERRHDPLQLFLRAHQEYGEFVRLRMGPTISLISVTSP  
ELIKHVLVDHADRYGKPSSSLVRDAWPVLGNGLFTSSGDFWKRRRLMQPSFHKERLATLA  
GSMVDATRQMLARWRARPSPEPLDVAAEMMHLTLGIVGRALFSTDVSGNASRVGQALT  
V ALAETNRRILSLGLYAPDFLPTARNRAFRQALGTLDSVIFDIIARRRAGETQGDDLLATL  
MAAQDADTGERMTDAQLRDEATTFLLAGHETTANALAWLWHLAQNPEVETRARA EVQRV  
LGGRTPTAQDIPQLRYLTQVFEEAMRLYPWIMARQPVKEDVLAGVQIPASPRVIVVTP  
PYAIHRNPRLWPEPERFDPERFSPEQTAQRPRMAYLPFGGGQRLCIGNNFALMEATLI IA  
EVLQHFRRLRAVPGHTVEPEPLVTLRPGGGLPMFVEPLHASA

>AA314\_00680|KEGG|**CYP1347C1**||[Archangium gephyra]|age|DP

MASAARKLQLNPVDPENLLNPVPFYKELRENDPVHWSDVVHGWLTRHEDVMNGLRDSRL  
SADRGKVLEHQFQMMGLSPESIREVTDTFKRQMACKDGAHLKPRRQTAAAFAPQVLDSW  
RPLIHRTLVTHLDKLRDRREADLVPELFYQMPPLVIAELLGITPEDRERLQQWGEAVTQL  
TSTGAAKNLMEVARQANEGQARINQFLTNLVEERRRAPGEDLISHMLRAQEQQGMTTEE  
V VANTSLLLLAAGHLTTTDQLSNGLYELLTRPEQLALLRREPSLLKPAIEEMMRFA PPVPFV  
HRIAVDNIELRGRTIRKGDIVFLGLAAANHDPAAFKDAEYFDISRDPHQQKSMSFGFGPH  
HCLGAGLARRELEIAFSELVHRMPEMRLDAAKLPRIKCGGLLFRGFESLPVRW

>AA314\_01068|KEGG|**CYP1069C1**||[Archangium gephyra]|age|DP

MSKTNAPSGLGSEYHPLDSPQLEEPHPFLARARREEPVFFSPALSSWVVRHADISAVVA  
DTARFSSAESITVGAATMPPEVVTVLMGGYPLVPSLVDNDPPAHTRFRSLVSKAFTGRR  
L TELEPFIRTRVDELLHSFRHEGRADLFLRFAPLSSSIIAEILGIPRSDIHRFRWSDDL

STVLAAHGPVEHQVACARGVVDQRYLASALEERKTAPREDLLSDIVTGAQGMPMPMSMA  
ELVSLLMQVHFAGHETTAGLIVGAVELLLHHPEQLRALRDDPGLIAGAVEEALRMTSPVH  
AMFRTALEAVELGGVSI PKGAHIRIVYASANRDEARFHEPERFDPRRPDVKKHLAFGQGL  
HFCIGAPLARLEARLALALEALLRSLPGLRLVPGQKPGFLKNVTVRRHESLEVAWDV

>AA314\_01308|KEGG|**CYP253G1**||[Archangium gephyra]|age|DP

MTPSAPLPPMPPGHWLWGHLPERASNPLGLYLDSSQRRLGDVVRYRMGYIHVEQLTHPDHV  
KHVLADASARYTKGTVFDKTRPLVGNGLLTAEGDFWKRQRRLAQPAFHRERLAALGTRMT  
DTVAELLPAWERAADGGTLPVPVQELMRLTLTVVVRALFGVDVAPHTTTMGKAFTTAEV  
TNERIISPLPYLPWLYRLPTRSNRAFRQAVDTLDGMVRGLIAQRRAGTQAEDLLGMLMA  
ASDADTGDTFNDAQLRDEVMTLLLAGHETTATSLAWTFHLLARHPEVEATLHAEVDAALG  
GRMPTVADLPRRLRYVGCVFEEAMRLYPPIWAI PRVPQEDDVVDGYRIPKGDIVILVPYVT  
HRHPDFWPEPERFEPTRF LPENSKDRPRWAYLPFGGGQRCIGNNFAMMEAQLILTLVAQ  
RFRLREVPGVPVVPPEPHVSLRPRGPMRVERREEVPRVRVA

>AA314\_01700|KEGG|**CYP197K1**||[Archangium gephyra]|age|DP

MIAIHNEPPGPEGAWGIANVADFHADPLRFVTRCAREFGDVVRLGQDNYLLCHPRDIEHV  
FVNSQRSFAKETGQKPTWAKTGSYHHALMHTDGKDWLYKRLLQPLFKRDRVDTGAEPV  
AAAEEMIASWRPGEVRALEGDVAPLSAQVVGRFLLGSDLSANEVQRVTSFLAWSFRPLPI  
RIPRWLPTPRNLRFRWSVLQFDRAIYGLIERLRERSRGSSNLELVQQARDGEEGCLAPP  
WYPRDELAIMLLAAHQPTAIALAWTLYLMALHPEVEARVAAEVKQTLGDRRATAEDAERL  
VYTSAVIKETLRLYPVWMTARDSLQEVELGGYRIAAGVSLALSPWVAHRDPRWFADPDT  
FRPERWLDGSLEGLPKYAYFPFGGGPRLCMGAWLAKLALVLVIATVVRRYRLTLAAGAKV  
TPFAAASFLIPQGVRLVPTART

>AA314\_01792|KEGG|**CYP264D2**||[Archangium gephyra]|age|DP

MTGRPNLMTPELKANPFPLYAELRRNAPVSQVDPGGMWAVTRYDDAMAVLKNPRTFSSAG  
FGLATNPPWLGGNPVSQSMGALDPPQHGRRLRTL VNRAFTPTAVARMEPRVRDFVARVATA  
LPLGRPVDMPAFALPVPAYVLGELLGLDPSLHSQLKRWADQLTSVTAIRAEETERQEPV  
RQAVAEVRRYFSEVVELRRQRPGEDLVSDLLRARVDGEALTQDELLAFMFLLLLGLETT  
VHLMGLCVLALMEHPEVMERLRADRSVPNFVEEVLRTGAPGHGLLRLTTEEVELGGVRL  
PKGARVVVLLGSVCRDESQFKDGERFDLDRPGSQLPFGHGPHYCIGAALARLEAKLATEA  
LLERCGGISPGEGPVVWHRSMVVRGPSSI PAVLHPA

>AA314\_02215|KEGG|**CYP109D3**||[Archangium gephyra]|age|DP

MSAPLSPDVLNTPEGISNPYPAYRAFQGPNPVRYLRLPAGPLTGRTEPLYAWALLRHADV  
LAAIRDPATFSSQTPAVFKTMPKFALLHDDPPHHTMRRLVSKAFSPQRIASLSEWIGRL  
ANELLDTTGRGPVELMAAYAVPLPMRVIAAMLGVPDQDYPSEFKLWSEAVVAYVGMSKEER  
MRKMQEMAAYLDQAIAARRAQPAEDLLSALVEAKVEGEALTDLEIRGFAAVLLVAGNETT  
TNLIGNMLALLADRPELWRRAREDRLVEPIIEEVRLRYESPVQRFPRLTTRPVKIGDVEI  
AEGEIVDMVYGAANRDPISIFEDPDSFNPERPTNSQHLGFGGLGTHFCLGAPLARLEARVTL  
NAFLDRFPALGRGEGA AVRQGFAPVSLGYKSLPLVLG

>AA314\_02385|KEGG|**CYP110R1**||[Archangium gephyra]|age|DP

MSTPQLPSGPRITPVQTFRFIRDATGFFVDCRARYGDPFTAPLPVGNVVITGDPEGIRDI  
FSADPATFEPLGQLPLAPAVGDNSLLLMGGQRHKRERKLLMPPFHGERMRAYGQLMRDIT  
LRAVETLRPGGPFRAQELTQSSISLEVIIRAVFGIEEPERVRRYREVLVGYMEAYTPLMM  
AVPLRRSFGRGPWARFQRHVAELDQLLTEELATRRGHEAGHTDILSLLLAARDENGQPM  
TDAELKDELRTLLIAGHETTAIGMAWALYHLHRVPETKQRLLEELAPLGPTPDPEALTKL  
PYLTAVCDESLRLHPVVAVVGRRTVAPFTLRGRELPPGTALMAAIALAHVDPVIYPEPER  
FRPERFLERKYS PF EYLPFGGGARRCIGAAFAQYEMRIVLGTLLAMHRFSLASDTPERP  
RRNVTIGPGGGVEMVYQGPRQGA

>AA314\_02449|KEGG|**CYP1284B1**||[Archangium gephyra]|age|DP

MSPFSGQKLDKLP AHVPPELVY EYDNARDPRMLEDPHARMRSLILEAPPIFFSPCNGGMW  
FVTRKKAIVDITMNPEVYSNSFFEAAAAHAGEHAGERQDAQPGFRMLPISEDPPRHTAYR  
APLNQPLAAKTVSGLETAIRMTNELIDKVLAAGRCDFSEIAEPLPVTLMKLAGMPTD  
RLAEFRDLATQATSATVDAATRAVTFKRIAGILAEVIKARQEKREDDLISKLLDANIHGR  
NPTFEEMLGYSVTLFGLGLETVVNALSFGVRHVARQELQAKLRADPSLIPGAIEELLRL  
YGIASPPRRVMRDEVCHGVQFKKDDMVLLLLPAANYDDAAFPNPEQFILGRKEQHQTFTNT  
GPHRCVGLHLARLEMKV FYEEWLKRVPPFR LDPQAPPRFMGGFNLA VTS LPLVWG

>AA314\_02454|KEGG|**CYP107DP4**||[Archangium gephyra]|age|DP

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RDPRFTQDPSRLPDEVRQRYFSHKNRALTQHLVTADPPDHTRRRSLVSKAFTPRRIEELR  
PRIKELCSELLEKLMAQSGADFLKVLAFPLPIMVIAEMLGIPPEDGDQFREWTQTFFTP  
PSKDAQEKTRNVHQLFINYLEGIFEQRRQQPRDDLISALLAVQEQGDRLSAEELTSMVFV

LLVGGYETTGNLLGNGLLALLQHPEQLQRLREDRSLIPSAVEEMLRYCGPFELSILRFAK  
EDMELHGGRIQAHEAVRVNYLAADR DAGQFSEPD RFDVGRTPNKHVAFGHGHIHFCLGAPL  
ARLEAAIAFEVLLERLPELRLATAPEKLVWRPSAQSRGLASLPLAF

>AA314\_02467|KEGG|**CYP1011E**|[Archangium gephyra]|age|DP

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YADVKTLLRDNTFGVF DIPTRIERKSQFLEKKNMGELRTLAQAMRRWMLCDPPDHTRLR  
SLVNRSFTPGAVESLRPRVQEMVDRLLARVRHTGRMDIVNDLACPLAVTMIASMLGVPEE  
AHASVTRWADGLSRVLDPLRSLEQYAEMNNVAQEFLAYFRELFAERRRHPREDLISSLIA  
VTDQGDKLTEDEMLSVCMLLFIAGEKTTVN LIGNGT LALLKNRGEMERLRQDPSLIRGAI  
DEMLRYDSPVQLNTRVPKKDVT LHGKTI PAGDLIYFSLGSANRDPTQFPDPDRFDITRE  
KGHLAFSGGIHYCLGAALALIEGQVAFSTLVREFPDLELVPGEIDWQKEIIFRGPTLPV  
TFSP

>AA314\_02616|KEGG|**CYP109C5**|[Archangium gephyra]|age|DP

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SAMTSQWL VFADPPRH SKLRALLLRAFTPRAVASLEPRILALSHELLDRTMARGEMDLAE  
DFSVPLPLRVIAEMLGVPTTDLPHFKRWS DVMALGYAVAGSEEAARVQREFSEVTEEMR  
VYVRDLAGQRRET PREDLLTRLVEAEVEGERLTEDELLGFVQ LLLSAGHETTTNLLNNAL  
LCFLEHPEQLARLRAEPALLPSAIEEVLRYS PVQAMFRVTRSEVSLHGQVI PPCKMVLA  
MIGSANRDPRKFQDPDRFDISREP NPHIAFGHGIHFCIGAPLSRLEARVGLSVLLERM RD  
VALASDAPWEPRRAIHVHGPTRLPIRFTPGT

>AA314\_02730|KEGG|**CYP267A3**|[Archangium gephyra]|age|DP

MTAIPMEVADPFGLLHPERRKDPYSGYARMLREAPVHFCEPWGAWLVSR YADVNAGFRDL  
RLLSARTGQFSAGMSEEV RKMEPLARNLSSWT LFLDAPSHTRLRGLISKAFTPRMMEAL  
RPRIQALVGELLDAARGKERMEI ISELANPLPVIVIGELLGLPREDRYRLKRWS DQLAGL  
IGTGRPTQEQVTAGLNAILEFEAYFRTLIAQRRTAPTNDLLSALVHAEKGNLLSEQELL  
STCTMLLFGGHETTTN LIGNGLLALLRHPEQWELL CASPELLPDAVEEFLRYDPPVQFTN  
REAAVDMEIGGQAIRKGERV MLMAAANRDPAHFKDPDRLDVRREELRHMTLGMGP HYCL  
GAALGRIEAQETFAALMRRFPRLKLEPGATLDWVDSAGFRGLLSLPVVLGAEAR

>AA314\_02743|KEGG|**CYP110V1**|[Archangium gephyra]|age|DP

MNRLPPGPRNNLLVSLKYLREPYATLLETGRRYGDTFAWPGFAGKMVVTGHPEGVRTLFT  
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HAARWTRGRPIPVHRTMQEISLQVILEAVLGLREPAERESFKTTVLEVIAALKPSFMFIK  
ALRRPLLGLSAWARFQRKREEITALFADVLRARRASPEPHEDILSLLLSARYDDGHALTD  
DELLTQMLNLIIVAGHETTASSLAWAFHFIHREPAVKARLVEELRGLPEPELEPEAVSRLPY  
LEAVCSEALRLNPVAPIIGRTLREGLTLQGYELPPGMDVGISILQVHRRPELYPEPERFR  
PERFLERGYSPEYLPFGGGARRCIGAAFALYEMKLVLAAILRTYDLLPASDAPVGVSVR  
NTTVGPRGEVGLLLA

>AA314\_03310|KEGG|**CYP1329A1**||[Archangium gephyra]|age|DP

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QRKLLAPSFQREQLAHFTQTMVQYTLDAIEGWRDGTDFDVHDEMATLTMRIIGKTLFDVD  
YRHETNELLGAMGQALEHIEYLTSSLVQIPLSWPTPRNRRVREALRTIDTTFRGMIRQRR  
VDHAQRKDMSSLVQVRDEEGQPIDEDQLHDDLMTIYSGHESTALSLGWTWYLLARHPEV  
LARVRQEVDTVLGGRPPAFEHLPQLRYTLQVIKESLRLYPVIFMLARAPTKDLEIEGYRL  
PKGQMVLMPPYIIHRDEKFFPDPERFDPDRFLPEREKQLPRYAWFPFGAGPHTCIGNHFA  
LMEKQLIVATMVQRLHIELVDGQEISPEVLTVTTLRPSHLKMRVEHRKDAPVSRVA

>AA314\_03966|KEGG|**CYP1248B1**||[Archangium gephyra]|age|DP

MDDISTRFNPMAPDQLDNPYPLYARMRRERPVFYSPMFDLWVVSRYADISEVERDTASFS  
SVGALDARAEPHPEVRAVLAQAYPRFLSLVQSDIPDHTRVRAVFGKALSTHRIAAMEPTI  
RATADALIDGFIRDGKADLIQQFAYALPGFIIICDLLGVPRSDMEQLKRWSDDKTLLMSAT  
APIEQQVQSAHGFIAMERYFQEQIHERRHPREDLLTMLVPQSLGGTAPLSEQEAVCNAM  
DLFAAGHETTTGLIGNGMWLLFNAREQLEAVREDLSLLPNALEEVLRVESPIRGFFRTVM  
ADTPLSGVTLPKGSRAFILYASGNRDETQFTEPDRFDIRRAEAKKHLAFGKGIHFCVGAP  
LAKLEGRIAFEQLLRRLPGLRPRTDEAPVFRPYFMLRGFEHLPIAWDVPA

>AA314\_04153|KEGG|**CYP167B4**||[Archangium gephyra]|age|DP

MSANPMNPEARPAVPFNPYAPGYDVNPHPTLAKLRAEAPLFYWEQGRGWIIISRYDDAIAV  
LRDNKRFSSSRADWEFAGMVGSAVSIPELLELNKNSLLSLSGQDHARVRKVFVSPALTPRA

VERLRPEIQAIVDELLDAAAAGKTIDVVADLAEHVPSRVIGTMLKMPKGQEALFMRFTYA  
VVKSIIPTLLRPEEVPELRTDLREGTRLLHEVIDERRRNPLENDILTTLIQTEEQGDRLN  
TQELLALVSSSLIVGGFETTMHLIAFTVFHILQRPEVLAQVKADPELLKNTIEEVLRFDFH  
GKVGVSRYPLEDELGGVKIRKGQMMILLGSLRDETAFDKAEVFDVRRNTNASIAFGH  
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>AA314\_04160|KEGG|**CYP1298A1**||[Archangium gephyra]|age|DP

MTHSFKSVPRIKESALLGSWSEFKSDRLGLVLRVMRECGELGEFHVGPVSMYFPTGPKLL  
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VGFADEVQRGMVDGSEVEIVGVMQHLALKILAKSVFHFLEFNEDKYFFDCIHVASEYVGVR  
VSNPVQLPLWVPTPRNRRDQAAIAHLRGRARSLLLEGRQRGDKGDVLSLLLTAKDEDGTG  
LSEAELLDQILTLYIAGHETTANALSFAFMLLGQHPESQAKLQAEVDSVLGGRAPTYEDA  
PKLTYTLQVIKESLRMFPPAVFFGRAPIEDLEIEGYRFRKGQFCLLSPYAIHRNPEFFPE  
PERFAPERFTPENKKLPRNTYLPFGTGPHVCIGQYFALLEAQLVLAHICQNVNVS LVPN  
QQIRLMPLATLGPSPFVRKVTRRKTATALAS

>AA314\_04162|KEGG|**CYP1347B3**||[Archangium gephyra]|age|DP

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TRYDDVTNGFRDPRLSSDRGALFEYQMKALGAKSPEAFVQRNRLMMINRDGVSHLNQRRQ  
TSPGFSPQSLDVYLPARRIMRSLVEQVQDRGEMDLVQEVSYQMPLLVLVEFLGLPTEDR  
QKFKDWSKPLADFNPMPTGDPVAAANAAITASGELSNYLDRLINERRQEPGTDMSRMI  
QGGKMSQEELVANTHVMITAGHTTTTDDQLGNGLHDLLSHPDQLQLLRENPSLVKSAVEEM  
LRFNPASPFFTRIAEDFQLHGQDIKKGQLVFLGMAAANRDPKYFPDADRFDITRDNLMH  
KPMTFGFGPHHCLGAGLARRQLEVAIETLLERFPRRLRDESRKANPRAEGLVFRGFHSLP  
VRW

>AA314\_04396|KEGG|**CYP1007C1**||[Archangium gephyra]|age|DP

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SLEPGKNAPPGSSLRRLWTGLGTTNGEVHKKGRRLMLPAFHKKRVEGYRDDMVSLFQRM  
DGWRPGETRDLSADMRRVTLLVVTKALFGLEDEQECIAHGELLSEWFRLFGSASVQLLQH  
DWPLLPYRRVMRISEKGEAAIRDIIARKRRDGGGGHDVLSLLLEARDEDGGSLSDEELVG  
HITILFLAGHETTANALTWTLFLLDQHPDVHAALVDELQGTLRGEAPALEQLEQLPLLDR  
VIKESMRILTVPVLSQRMAAAPFEMGGYSFDAGTEILYSPYVTHRMPELYPEPARFLPER  
WKTLDPPVYAYIPFANGPRRCLGATLAMMELKLALAMMLQRYRLALVPGSRIDREVLITL

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>AA314\_04497|KEGG|**CYP264K2**||[Archangium gephyra]|age|DP

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AVRQGEVDLVDRAFTFVLPRDIIGVMLGLDPSTFSEFRRWSTNMGLISSARTPEQYEEIRS  
VVREMKDYLTVDVIHARRRQPGEDMVSDLLQAEVEGQKLTDEQLLSFLFLLLPAGMETTSQ  
LLGNAVLTLAQHPEQLELMRADKTHIPRFVEEVLRYEPPTQLSFRMAMQDVELSGTKVPA  
GSLVLGLIGSANRDERVFDQPERFLPGREKATQHLSFGYGVHFCGLGAQLARMEARLGLEA  
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>AA314\_04571|KEGG|**CYP264E1**||[Archangium gephyra]|age|DP

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VRRQEVDFIAEFALPLPARVLNLFFGLEPAMALRLKHWADDLVSIPASQSPQRQEEIRH  
SLQEMERCFNALIEQRRARPGDELVSELLRGELTHEEVL SFLFGLVPAGVETTVYLLANT  
MVLSEHPRELERVRENPALIPRLIEEVLRFEPGQSSRLTTEDVELSGVRIPRGSIVV  
ALVGAAMRDESFRFPQADQFLLERESQSSLAFGHGPHYCLGAMLARLEARLGLEALFSRIG  
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>AA314\_04912|KEGG|**CYP262B2**||[Archangium gephyra]|age|DP

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GGALWESMRTFLGNGLPVSEGDFWKRQRRMIQPAFHQQRLIALTEKMVA/AIDSLAGWEP  
AARTGEPFDIAEAFSQMTNMVMVRAMFGSGLEADEAKQVAQALAYIIDYMMQGMVTKSLP  
EWLPVPGRARYREAIRYIDEVVLRVIERGRQRSEEDNLLSLLLHAVDGESGERMTNAQLR  
DEAVSLFVAGYETTAVGLAWAFHLMTRHPESFQRLRTEVREVLGQRVPGFADLRQLGYAR  
NVLQEALRLYSPSYWIPRTSSEEDLDGFQIPAGKMVVVFTHLIHHHPGVWEEPQRFDPD  
RFTPERSEGRHKQAWMPFGAGQRLCIGKEFSLMEGQHILARIAQRYDVSAVPGREAQVHI  
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>AA314\_05283|KEGG|**CYP1347B1**||[Archangium gephyra]|age|DP

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AVGANPVELATNANQAMVEMKQLLLPVIEERRRNPGETDLSLSLMIQAEAEGRMTPEELVAN  
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AGEDFEWHGKQLRKQQLVFLMMASANRDPSAFPEPDRFDITRDSTQQKHASFGFGAHHCM  
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>AA314\_05303|KEGG|**CYP109N1**||[Archangium gephyra]|age|DP

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LCGELLDTMLAREEFDLIPALAAPLPVIVITEMLGVEPERRPDFKRWSDDVMRAISLRSA  
SEDLGRLRESILEFHAYLETIVERRRREPRNDLISAIIEASEAEGGFLSTLDIMAFTRLL  
LINGNETSTHLISNGMVALLRHPSEWERLTADPSLLPNAIEEMLRYDSPGQAVMRLVTE  
TELAGHRLPKGSRLLLLLGAANRDPHRFPEPDRFDVTREVQGLVSFGHGIHFCLGAPLAR  
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>AA314\_05305|KEGG|**CYP109N2**||[Archangium gephyra]|age|DP

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TRGLLDTLLARDEFELMAGLAAPLPVTVIAELLGIEPEHRQDFKRWSAILQAASFTIRD  
KSQLGQSIRQLQDYLEAAIERRRREPRNDLMGALVEASEAEGGFLSTLELIDFVRLLLIA  
GNETTTNLIGNMVALLRHPSEWERLVADPSLLPNAIEEMLRYEPPAQSVLRVTTQDTEV  
AGVPIPKGSRIIMLLLSAANRDPRRFPEPDRFDITRDAHGHLAFGHGVHFCLGAPLARLEA  
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>AA314\_05406|KEGG|**CYP107CJ11**||[Archangium gephyra]|age|DP

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DQLRPRFQELADALVDGLPEHGPADLVTGFAARFPFQVLAEVIGLPPELAGRFDRDWGKV  
VQPVGPTDPGRPRYEALHGLQGYIADVIAHKREHGEDDLSRLVVARDRGELSQDELGS  
MIFQLLVAGQEPVTNQLTTALIALFHHPGQLARLRGDPDLLPRAVEELLRYDSAFELTTW  
RFFDRDSELHGTRVPAGDSVIVSLCAANRDPRRFPEPDTLDLDRGSNPHLAFGHGIHFCL  
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>AA314\_05534|KEGG|**CYP1347B2**||[Archangium gephyra]|age|DP

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TELSEPLPALVMTELFDI PAEDHERFQROWSNDTANFFGAAGDVRSAAALRANEGSAQLSR  
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LLTHPEQLEQLKRQPELCKAAVEELLRYTPAVPFMHRVVAEDLELRGRTLKQGQLVFLGI  
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>AA314\_05592|KEGG|**CYP120G1**||[Archangium gephyra]|age|DP

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EALVHRHCEQWLSAAQPFKAVDALVFEVAIVLLMGESRVDAAAYMSRLFKQWAAGLFA  
AVPLDIPFTTTFGRGAAAEKEMREYLTPLVAEREKLAEQPPDTLGSLLSARDEHGRPLPRE  
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YLHQVIQEVMRFI PPVAGAFRVTTQDVAYGGYRIPKGWQVSLGIRGTHQRAPWTS PERFD  
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>AA314\_06132|KEGG|**CYP1007D1**||[Archangium gephyra]|age|DP

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RVEGYRDDMVALTEHALSRWTPGRTL DVSGEMTELT LQIALRCLFGIEDERQAHD LGHLG  
MDFLEGLTSPAVMMLPRALPGTPYARFVRTSNALHARLLELIRHKRTLPEGRDVLSMLLR  
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AAPSVQLSRLPLLD AVVKESMRLLPATPLLFVR FATDGFQLG PLALPKGTGVMLSPFIT  
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>AA314\_06415|KEGG|**CYP167B3**||[Archangium gephyra]|age|DP

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RLRPELQAVVDDILNDLAGRDTLNVVKDISDRIPPRVIGSMLKIPKGRET LFQRFTEAAI  
KSFLPGLLRPEEVPSLREDVREGIALVRETIEDRRRNPLPDDILTTLIQTEEQGDR LN TS

ELLSLVAALIVGGFETTVHLIGFTVYNVLKRPELLTQVKAPELLKGVIEEVLRFDNFGK  
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>AA314\_06425|KEGG|**CYP1502A1**||[Archangium gephyra]|age|DP

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SQGPVEVERELKELLCCVFAQALFGVDVAAESESFVRAVGLLEEVQANHVFARGADTGPL  
RLRYQQAVEDQQLRVERIVQGSGTMREAVEEAPERHSLVHTAIIRTLLNGYNAMATALGW  
TLHLLGQHPETQRQVREEALGLEEELLTIRDLPRLRVTRCVVQESLRLYPPAWMLGRHVR  
EEERLGGITLPTGAIISVSPYTMQRHPRVWEEPDAFRPERFLGAESRQPGAYFPFGGGM  
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>AA314\_06601|KEGG|**CYP167E1**||[Archangium gephyra]|age|DP

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AERMGEIQKAVDDIIAENVKGDRANLTSVTEPLPMRVISDMLKIPDDKRAEFRAFGLAV  
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GGIPKFAKEELEFAGQKVRKGQMVIPFVTAALHDPEVFPEPERFDIRRDVSQTIAFGAGQ  
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>AA314\_06640|KEGG|**CYP107HX2**||[Archangium gephyra]|age|DP

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GRVEQITEDLLDAAARKPVVDLMEDFALPLPLTVIAEMLGVPQSDRIPFRALIAKVLDSS  
AVTPISFIRNYPNMLRLNSFLRKLVKLRREQPGDDLVTALVQAEEGGDR LSEDELISMVF  
LLL FAGHETT VNLIGNGVLELVRHPEQLQKLREQPD LIDSAIEEMLRFTNPVGIVAPRFA  
KEDVEIAGVPIPKGSALTLLIASANLDETAFFHADELITRSPNRHVSFGYGIHYCLGAP  
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>AA314\_06855|KEGG|**CYP242A3**||[Archangium gephyra]|age|DP

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QSITDALLDAAAAGGSIDLQELAIPLSSVIAEMLGVPLTDEYMLQRWSRDLTAIFSA  
FDVPQLLRSQKSVMEMMNMRDALAQHRRAPSENILEVFVRAQAEGLVSEEEILSNCVLL  
LFAGHETTARLISKGMWLLFQHPEQLAKLREDASLIPQAVEEVRLRYGDVVGFIITRLTVAP  
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>AA314\_06918|KEGG|**CYP117E1**||[Archangium gephyra]|age|DP

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REFVLGALPIKLDFFPYPARRARQKGQWLDLSRLSNLISKARGKPEMPGTLSALLKARDEE  
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ELKRHPFAEALFREVLRLYPPVSWTGREAIEDLELYGKRVPKGTITILVPVGTYGHDPKLF  
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>AA314\_07253|KEGG|**CYP1286A1**||[Archangium gephyra]|age|DP

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RSIDGWPGKAFTLHEVFQDITLDIILETVFGLAEGETFTTHFHELFAFMLDMGSHNAVLY  
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EEKLRAELRQVAGTGPLSPEQVNRLEYLDATLKETLRLVPVAPAVGRVLQRPMKVGWDL  
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>AA314\_07540|KEGG|**CYP264D5**||[Archangium gephyra]|age|DP

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AEAREHFQVLEERRRAPREDLVSDLLRARVDGEALTATDLMGFMFLLLIIGGLETTVHLL  
SASALKLQEDPALMARLRAEPELIPRFIDELLRHSGPVHGVVRLVTDEVELGGARIPRGE  
RLLLLMASANRDEAHFPEPDRFDLDRPGPQNLPGFGHGVHFCLGAQLARMEARLAEALLA  
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>AA314\_07541|KEGG|**CYP264D4**||[Archangium gephyra]|age|DP

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LPTGRSVDFAEESVRIPLIVMADLLGLSPEVHPRLKRWADTFGSFTGIGPNDTERQEHEM  
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VHLMNHSAIRFRDEPELMGRLRADHSLIPRFVEEILRYEPPVHGIFRVTTQETELGGVRL  
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>AA314\_07542|KEGG|**CYP264D3**||[Archangium gephyra]|age|DP

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TTLHLLSHAAHRLHLQPEVMTLLREQPILVPRFIEEVLREPPVHGMIRLATQEVELGGT  
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>AA314\_07761|KEGG|**CYP102M4**||[Archangium gephyra]|age|DP

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HDPDVF  
LYR  
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>AA314\_08132|KEGG|**CYP2624B1**||[Archangium gephyra]|age|DP

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TRVRALFSK  
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>AA314\_08208|KEGG|**CYP253G3**||[Archangium gephyra]|age|DP

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LMRMVGMM  
GEEVEH  
MVERWRARPDT  
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SLTVGQQ  
VVNERVLSLFPLPLSLPTPGNRAFLRARQTLDSVVFEIIARRRRGETEGQD  
LLAML  
MEAQ  
DAETGERMTDAQLRDELMTLFIAGYETTANALTWAWYLLSQHPEVEQ  
RARDEVAQVLGER  
APGPEDIPRLRYLAQVLEESMRLYPPAWVMVRQAREDDVLDGIRIPADPRL  
IVAVSPYVI  
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MVLVL  
AGVLR  
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>AA314\_08399|KEGG|**CYP107EN3**||[Archangium gephyra]|age|DP

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VMISELLGI  
PSADRERFRRHSDVLVSTTAYDAAEVN  
RTRTALEEYFQELLEQRRSRPTDDL  
VSTLLEAM  
DTERLT  
PLETARTGVGILMAGHETSLSMISNSC  
FLLLSQRELYARLVAEPSLLPTAIEEL  
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GETVIFQRAAADRDERVFTCPEKID  
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VTW

>AA314\_08581|KEGG|**CYP1492A1**|[Archangium gephyra]|age|DP

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FFPIFLSDTQKLIHWRHQHQSGRPVEMLDMMQVTAABILHSVFSTDSGETLLRVKNS  
IETLVSHISNSQMSPLQVPMWVPTPGNLRFNRAKKLVTAYIQELIARRRAIPTEQWPDDL  
LTKMMTTTRDEESGTFMAEQLLVDNGLTMFAAGHETTARTLSFLWYALSQNPEVERRLHAE  
LDSVLGEAPPTINDLKKLPYTLQVVKEVLRLYPAAPMYARDAVADDELDGVRI PAGTRTI  
VFSYATHRHPAFWDEPERFEPDRWLPEREAQHAHAYHPFAIGPRICLGNNFSLLETHVM  
TAMLARRFKLRLKPGHVPRIDMFGTLGSANGMPMLIEAR

>AA314\_08585|KEGG|**CYP107HV1**|[Archangium gephyra]|age|DP

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SKDRIGSMTPEQQAKMPWFFKFFTPLVQNMLSRDPPDHTRLRALVHKAFTPRLIERLRSR  
VQTLSDSLDDTAARKGSMDLVAEYAFLLPVTIIAEMLGVP PGDYKKFQHWSNRLVSNTDM  
SDVLLSIPSVVMFTRYLRKLIARQRTSLGDDLLSALIQAEEAGDKLTGDELVSMAFLLL  
AGHETTUNLISGGTLALLQHPEQLERLRKEPGLIEPAVEELLRYASPVEVATERIARDGV  
TVSGVTIPRGDLVFAVLASANDRERHFKDPNTLDLGRDPNKHVSFGMGIHYCLGAPLARL  
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>AA314\_08757|KEGG|**CYP264L1**|[Archangium gephyra]|age|DP

MTRPNIYSPEIWNDPHPFYAALRREAPVSQVEPGGMWAVTRYEDVLYVLKNPQLFSSEGF  
RPAVQPAWLQQRNPVADSILMDPPTHTRLRALITRTFSASGVARLEPYIRQSAGEIVDG  
MLARRKVDFMAEMALVLP SRAMSALLGLDPSLAPRFKTWADAVTGVGII PADDLKRRRAEL  
TGYLDELTHHLTGVLELRQREPGNDVVTDLLQARAQGGSMSDDELLGYCVLLL VAGLETT  
YDLLGMSALTLDNPDWLARLKKDRALVPKFVEEVLRFHAPSQSTIRTTTQETELGGVRL  
PKGATLLVQFVSANRDESVFPNAHRFELERTGSPHLTFGQGIHFCVGAPLARMEARLALE  
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>AA314\_09024|KEGG|CYP1007C2|[Archangium gephyra]|age|DP

MIATTPGLHAVELAGPRTTPLLGVGTGNYIRFVADQLTWLEKLSSYGPLVPLARGNTQHLE  
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KKVESYRDAMVACIGRMLSGWKPGEV RDIFLEMRQVTLLIVTQVLFGLEDDRETLMGMML

MAEWLERYASPAVHLLPWDPKGLPFRRLMNVSERGEAAIRALIARKRAQGADGDDVLSML  
LHARDEEGGSMSSDAELVGQTNILFVAGHETTTNSLTWTFLFLDQHPEVHAALVEELEGEL  
KGAPPTIEQLERLPLLDREVVKESMRLMPPVTTAFRTSTAPFEMGGHRFEAETQLYYSPI  
THRLPELYPEPKRFLPERWLKAEPVYGYIPFSNGPRRCIGSTLALLEMKLLLSMLLPRF  
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>AA314\_09111|KEGG|CYP107DP|[Archangium gephyra]|age|DP

MSTSTNRHDLWAPEARANPLPVYARMRQEAPLVRLFDPIYKVPIMATRYKDAVELIRD  
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ITAIHRLLDVQTSMSMDLLDAYAFPLPVTVIAEMLGVPQEDQDQFREWTNIVINPPLD  
GDLQNVKAGMQFAQYFQGMMAKRRAPRDDLSSALLAVEEQGDRLSPMELTSMLFLLLV  
AGHETTNNLIGNVWALLNHPEQLERLRANPALIESAVEEMLRFRGPVETSTQRWATQEL  
EFRGQVIPAGETVVASLLAADHDPEHFAEPERFDIAREPNRHIAFGFGIHFCLGAPLARL  
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>AA314\_09271|KEGG|CYP264F1|[Archangium gephyra]|age|DP

MSGRLNLVLPEVLSNPYPHFARLRDSDPVCQVEPGGLWAVTRYADVMHVLKNPQVFSSAG  
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LVAQRTVDFLPALALPLPAAVGLLLGLDPSLFPFRKRWSDDLGAVSATSESDHEGQKRI  
RHTIQEMEHYLREVVAERSRAPREDLVSALLQARVDGEALNDAELMAFLFLLLVAGFETT  
VNLLGNGAVLLADQPGLLERLRAEPALVPAFIEEVLRYESPAQSTFRLTLEEVELGGVRL  
PQHSVLILLGASRDEAYVPEPERFILERPQRGNLAFGHGAHFCLGAALTRMEARVALE  
ALLPRIQRLSRGPEPLQWTPSIQLRGLSRLPVEVTPA

>AA314\_09346|KEGG|**CYP264C1**|[Archangium gephyra]|age|DP

MSQRLNLLSPEFRENYPFYARLRGESPVQVDPHGFVAVSRNEDIVTVFKDPELFSSE  
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GLPRGEPVDFLSGFALGLPANIMALMMGVDPDSLQKEFKRWSDDISGVVVVAPDDVVRQAE  
VRKTLDDMEAYILALIDRRRANPGTEDLVTDLLRVQENGERLTDAEVVSFLVLLLVAGLE  
TTTYLLSHMALILARNPEWFERLRGNEALIKAFIEEVLRYEPPNHAQIRVTTRETTLGGV  
KLPAGAMVLLLLASGLRDEKSFDAERFNPERGVQANLAFGHGIHFCLGAPLARMARVA  
LGALLASFSRFEATDRVRWISLFFRAPESLPLRFIPL

>AA314\_09827|KEGG|**CYP242B1**|[Archangium gephyra]|age|DP

MSFAETYDFFSPEAVWNSRAFLHRMRTEDPVYWSAQFRGWVLTRYTDVLAAARDRLVSP  
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RLTSTLLAETRDSEVLEVVEELARPLSASVIGELLGLPVEDRALLLRWSTDINSFFQHAD  
LESLHRGQRSLLQM DYMRPLIEERRRAPREDLVSVLVSQQEGFFAREPEAVVANCVMLL  
FSGHETTSRLISSGLLLLLLEHSGQQALLRERPELMPSAIEEMLRWEGPTSGMTRVSREPL  
ELGGRRFGAGETFVLVYRAASHDPEAFPEPDTFDITRQPNRHLSFGMGAFACLGSALTRM  
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>AA314\_10088|KEGG|**CYP1315B1**|[Archangium gephyra]|age|DP

MVRWLTGAGMQRAVFGFMRRHHPNLMWKGKRALVTRAEDVNEVLKTDVAVFGVTEIYAERME  
RTTGPFFLGMENTPQYQREATLSRAVRPEDLEHIRSMVREHAEQLIALARPAGRLDVVN  
GLARPVAVGLVD RFFGVPGDPETMKRWMRIIFWDIFLNLGNDAV TARAKAASAEKTY  
MEGLIAQRRAGLATESRDDFLTRLLRMQQDEATRLDDDARRNVGGIIVGAVDTSSKALA  
QLVNELLEHPEALGEAQGAARAGDTARVAAHAFEALRFDPHNPLLMRVCHEDYVLARGTD  
REMRI PKGTLVIASTISAMFDPEVMQHPDEFVRDRPPPGYMHFGRGLHTCYGERINHIVL  
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>JQX13\_05850|KEGG|**CYP107DP**|[Archangium violaceum]|avm|DP

MRQEAPLVRLFDPNLNIPVWVATRYKDVVDLVRDPRFTKDMRKLPDGSPSKLRRIDSMEV  
INRHLSSDPPDHTRLRTIVSKAFTPRRVEELRPRVTAITHELLDAARAGEVDLLDAFA  
FPLPITVIAELLGVPVEDRDQFREWTTTTIITPPPNGDFEPLQKAGMQFIQYFQGLLARRR  
ADPRDDLTLALMSAEEQGDRLSQELISMLFLLL VAGHETTVNLIGNGVWALLRNPEQLE  
RLRANPALIESAVEEMLRYRSPVETTTQRWATQDIEFRGQVIPAGESVMGSLLAANHDPE  
QFPEPEKFDITREP NRHVAFGFGIHFCLGAPLARLEGAIAINLLLERMPRLRFAVEPSAL  
RWRDGILVHGLQRLPVAF

>JQX13\_06265|KEGG|CYP197AA2|[Archangium violaceum ]|avm|DP

MSTSRAQLPPGPRPLPVLGSLVDYAKEPLAFIERCARGYGDVVYVNFSLSGPTYVLQHPEH  
IEHVLVTRHRHYVKDKLQQRILGGRLLGKLLTNEGDSWLRQRRMQPAFHRQRLAAYGQ  
VMVGHARRQLASWRDGEVHDVYADMMRLTLGIVIKSLFDLEAEGEAGAVGPALARVMEHF  
ARLQSVVFPDWLPTPENLGYREAVERNV FVSHLIQRRREAGGDAGDLLSLLLHVQDEEG  
GRMSDQQIRDEVLTLAGHETTSITLAFCFHLLARNPEAEAAHRELD SVLGGREPTVE  
DLPALPFTECVVKESLRLYPPAWSLSREALEEDEVGGWRI PAGAVVMNPWTVHRDARFF  
EEPEAFRPQRWAGGLEQRLPRFAWFPPGGGPRLCIGSGFAMMEARLVLATLAQRFRFERV  
PGDAVELLPSITLRPKHGVKVRLRAR



>JQX13\_10145|KEGG|**CYP253D4**|[Archangium violaceum]|avm|DP

MTSPAPSPPTTPRIATGPRGLPLIGVVRDVRKDVLGWLTRTAAEHGPVAQYRFGPGGRAYLV  
THPDGLKHVLQDHSVNYTKDHYSYAMFRRIVGDGLLTSQGETWLKQRRLAQPAFHRARIS  
AMAGQMVRATVELSEQWATSERTGEPRHAVRDMMALTLRIVGEALLGTDVRAETEAVSAA  
FNVISEQTVERFRSLRLIPPVLPTAYDRAFRRANHALREVVARVIAKRERMEDQGDLLS  
MFMLARDEETGEQMDDEHLQSEVLTMMLAGHETTATLSWAWALLHQNPDAEKKLHEELD  
AVLGGRPPTAEDI PRLVYTRRVLDETLRLYPPVYILSRKVMEDDTVCGYQILAGSSLDIS  
PYVTQRLPELWPDPERFDPDRFTPEKIAARPRYAYLPFLGGPRQCIGNNFALMEGTLILA  
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>JQX13\_10185|KEGG|**CYP120G5**|[Archangium violaceum]|avm|DP

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QSQYGPVFRSHVLGSPTVFLLGPEAIQWIFAGEGKYLKNRWTPGVRQLLGAHCLSMIEGE  
EHLERRLLAPHFSYATMRGFVPTIEAIATRHFERWAALPGDFTLWPAMRELA FEIALAL  
IFGQDTVDPFPLMRHFKSWTAGLFVPVTVNLPWTTFGRALA AKKAMVGYLEQVVSERQSR  
TEQPPDLLGSLIQSRDEAGNPLTREIVIVDELQLLLFAGHDTTVTATSNLLMLAQYPDVL  
QRGREAVAGLQGGLTLDGLRAMPYLVQLLNEGMR LIPPIGGAFRVTTTRDVAYNGYRI PKG  
WMIPVSIKSAHGGSTWSAPERFDPDRFGSERNEQKKPGTFIPFGGGPRICLGQHFAMVEM  
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>JQX13\_10655|KEGG|**CYP264D11**|[Archangium violaceum]|avm|DP

MSGRINLLAPEVRAHPYAVYAE LRRNSPVCQVDPGGYWVVTRHDDVVTA FKNPQIFSNVG  
MRVATKPEWLGHNPFSDSMIGQDPPTHTRLRNLVNRTFGPAALARLEVVRVQYAESIVAR  
IP EEQLVDFVDAFTLPLPASVIGELIGLEPSLHARCKRWADDLTSISANPQDEKRREEIR  
ATVREVETEMAAVLDRRRREPREDLVTDLLQARVDGESPGDAELMSFMFLLLVAGLETTI  
HLLGHCMRVLMERPDVLARLRADRSLLPRFIEEVLRYEPPVQAMGRLT TAETELSGVRIP  
AGARVMLLIGSANHDDTRFPDADSFNMDREGVNNLPFGHGIHFCLGAPLARMEARIGLDV  
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>JQX13\_12475|KEGG|**CYP110R5**|[Archangium violaceum]|avm|DP

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IFSADPALFEPLGHLILAPAVGDNLLLLMGGQRHKRERKLLMPPFHGERMRAYGLLMRDI  
TLRAAEGLRPGSTLRAQDVTQAIISLDVIIIRAVFGIEEPERMRRFREALSVMESYTPLLM  
AAKPLRRSFGGLGPWARFQRHVAELDRMLSEELATRRGHEEGHEDILSLLLGARDEEGQP  
MTDAELKDELRTLLLAGHETTAIGLAWALHHLHHHPDTLERLLKELAPLGAVPEPEALAK  
LPYLGAVCDESLRLHPIIPVVGRRTVAPFTLRGRELPAGTGIMAAICVVHRDPVLYPEPE  
RFRPERFLERKFSPFEYLPFGGGARRCIGAAFALYEMRIALGTLLAAHRFALASGEQERP  
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>JQX13\_12730|KEGG|**CYP1347E2**|[Archangium violaceum]|avm|DP

MASAARTLQLNPVAPENLLDPVPLYRELRSNDPVHWSEAVQSWLITRHDDVVNCFRDPRL  
SANRVRFYEDQLRGLGPDLIKDFLKGLNDQMSQRDGREHIQMRRQAAAGFSPQALDRWRP  
AIRRTAEQLVEQVRGQGHMNAVESLASQLPPRVIAEVLGIPVQDREQFLEWARPIADFN  
PAAGTDVVDLARNTATRELFAYLRRIEERSHSPGEDLLSQMLQSQQAGQMTLDQLVS  
NASLILFAGHTTTTDQISNGLHDLLSHRDQFHKLQEDRTLVRSAVEEMLRYNPVAVPFMHR  
IAAETFQLRGKTIRKGDVVFMGLAAANRDPEAFDPDRFDITRDSNHQKHSFTFGPHHC  
LGAGLARRMLEITFEVLLERLPELHLDPKQLPQLKCHSLMFRGYDSLTVRW

>JQX13\_13845|KEGG|**CYP110AV1**|[Archangium violaceum]|avm|DP

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TEKAVASWPLREEFALHPMQSITLHVILHAVFGLGQAANDSTLEHLLTRTANEAVASML  
LILPPLQRDLGRWSPWGRLLHLIHQMDEALLAEIARRRREGAKPEQRDILSLLLQARYEN  
GEGLSDGELHDELVTLLMAGHETTGTSLTWAMECILSHPEVEQRLRAELDDVLGDEQLGH  
EHLTRLEYLDAVIKESIRYRPIMPTGGARLVKRPFSLGGYELPPGVVINALSVVHHRSD  
LYPEPDVFRPERFLGRRVDPYEWTPFGGGVRRCLGMAFALYEMKVVLATVLR SARLELAR  
SPVKARRRGFFIAPENGLPVRVLSRLRRAGDVPGTQEVATGGAPARSED TMGWGA

>JQX13\_14855|KEGG|CYP1069J1|[Archangium violaceum]|avm|DP

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FSSRDTLRPPVALPREVMAILEPAGYRADYPLLGDPPAHTRLRALVGKAFNQARVNALE  
PRLRQLVG AHLDTLRDGEPRAE LISQLISPLAMAVMTELLGLPTSSGKRIKWCDDEKLF  
FVPIPLDQHLRAARGVADFRRYLRELVEDRRKSPRDDLISLLQARTEGDRPLDTEELVA  
LTCVLVVFAGHETSTNLLATALHLLRHFGVWGELRKDTYLVRNAIEESLRYDSPVVGMMR

TTTEPLQLGGTSLPEGARLFLLFASANRDESVFEQGERFNIHRASAVRHLGFGHGLHYCV  
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>JQX13\_15660|KEGG|CYP197F4|[Archangium violaceum]|avm|DP

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FVNSQRSFAKETGQKPTWAKTGSYHYALMHTDGKDWLYKRLLQSLFKRDRVDTRAEP  
EAAEEMIASWRPGKVRALEGDVAPLAAQVVGRFLLGSDLSANEVRRVTSFLAWSFRPLPI  
RIPRWLPTPQNLRFWSVWQFDRAVYGLIERLRERSRGSSNLELVHQARDGEDGCLAPP  
WYPRDEVAIMLLAAHQPTAIALAWTLYLMALHPEVDARVAAEVEQTLGGRRATVEDSDRL  
VYTA AVIKESLRLYPPVWMTARDSLQEGELGGYRIAAGVSLALSPWVTHRDPRWFVDPEA  
FRPERWLDGSLERLPKFAYFPFGGPRLCMGASLAKLALVLVIATVTRRYRLTLAAGAKV  
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>JQX13\_15775|KEGG|CYP107DL9|[Archangium violaceum]|avm|DP

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TPEQARVESMPEEFRPVAYSILMLDPPDHTRLRKLVPNFTARAMEMLRPRIQKLVND  
LLDTAERKAAERGEAVSERRMDFVESFAYPLPVTVISDMLGIPMEDREQVHGWAEMLLKT  
DRQEAMADQKVRGSLRAFSQYLEGLFERKRREPAEDMISQMVHVQEDGDTLSHQEMVSMV  
FILFFAGHLTTVNLIQNGVVALLTHTPEQHALFMANPAGLAKGLVEETLRYWGPVDYISTP  
RIAQADLELGGTHIPKGENLSLGLASANRDPARFANPDVFDITRPDAHRNIAFGKGIHVC  
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>JQX13\_16055|KEGG|CYP2528A2|[Archangium violaceum]|avm|DP

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RFVLERETPHLSWGAAYGDEGSVMGPTAMPLLDGEEQRRRRAPMMSAFRHQNITAFGDA  
MVELARAQTAGWKEGRPVDLIGEMSELTFRVACGFLLGVEIGEDYPRFRELYKKMFTPVG  
LALQAAGLPYMQRYRDGLRRLSARWIADRRRAHPRDDIISRLLLEAGLDDDEDVISQVLVLMF  
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LYPPASLLRRGVLEGFELGGYTIPKGWKVMYLPRVSHHLPDVFKDPERFDPDRFAPPREE  
HKQPYAMVEFGGGYRTCIGKELAMFEAKVVL SYLLRTFRFELAPGQRLDVANS GAMS PR  
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>JQX13\_18665|KEGG|CYP1284B6|[Archangium violaceum]|avm|DP

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LNQPLSAKSVSGLETAIRDMTNELIDKVLAAAGRCDFLPDIAEPLPVTLFMKLAGMPTNRL  
AEFRHLATQATSSTVDPATRAGVFKSIAGILAETIKARQEKREDDLISHLLDANLN GRNP  
NFHEMLGYSIALFLGGLET VVNALSFGVRHLARDQELQAKLRADHSLIPGAIEELLRLYG  
IASTVRQVMRDEVCHGVQFKKGDTVSLLLPAANYDDEAFNP EQFIIGRKEQHQT FNTGP  
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>JQX13\_18675|KEGG|**CYP1284B7**|[Archangium violaceum]|avm|DP

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QPLSAKSVARLEPAIRDMTNELIDKVLTAGRCDFLPDIAEPLPVTLFMKLAGMPTNRLAE  
FRHLAAQAASPTVDPATRAATFKHIAGILAETIKARQEKREDDLISHLLDANLN GRNP  
HEMLGYSILLFLGGLDTVVNALCFGVRHLARDQELQAKLRADPSLIPGAIEELLRLYGIV  
CMPRHVARDEVYQGVQFKKGDTVLLLLPAANYDEAAFANPEQFILGRKEQHQT FNTGP  
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>JQX13\_18835|KEGG|CYP253G6|[Archangium violaceum]|avm|DP

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TDTITETLQTWEPAVASGRPLPVFQEMMKLTLTAVRSLFGVDVGEHTRAVGDAFTTALS  
V TNERIISPLPYLPWLYRLPSRDNRAFREAVDTLDSIVRGIISQRRVKGPAGADEDLLGM  
LMAASDADTGDTFDDAQLRDEVMTLLLAGHETTATALAWTFHLLQNPEVEATLHAEVDA  
ALGGRVPTLADLPKLRVYVGCVFEEAMRLYPVWAI PRVPLEDDVVDGYRIPKGDIVILVP  
YVTHRHPDFWPEPERFDPTRFLPENSKDRPRWAYLPFGGGQRQCIGNNFAMMEAQFVLAL  
VAQRFRRLRGVPGVPVEPEPHVSLRPRGPMPMHVERREDRSQVRARTA

>JQX13\_19770|KEGG|**CYP1263C1**|[Archangium violaceum]|avm|DP

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EELAPASLPGGLTDFAFRLSVHGVGELLGMPEAHLPRVADWMSDFVRCLAPASSPEQVER  
GRVAAGQLLGLFWELFARHALPAESLLSTLARELGRRSGGLDVGEAVAANGIGLMSQAY  
EAGAGLFGNTRLRVLAAPHEWRERVVANSGLLDVLRVLYDPPIQNTRRFVVRDDVVAG  
GRMRAGDVILVVLAAANRDP RVHPSPERFDPFRPERETR SFGAGVHACPG EALALALAKA

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>JQX13\_21720|KEGG|**CYP264D12**|[Archangium violaceum]|avm|DP

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LPLGSPVDMVPAFALPVPAPFVLGNLLGLDASLHSQLKHADQLTSVTAIRPDETERQEPV  
RRAVADVCRYFGEVVEHRRREPGEDELVSDDLRLARVEGEALTDDEIMAFLLMLLGGLETT  
VQLLGLCVLALMEHPDVMARVRADRSIIPRFVEEVLRTGAPGHGLLRVTTEEVELGGVRL  
PKGAPVVVLLGSLCRDEALFPNGDRFDIDRPASQLPFGHGPHFCIGALLARMEARLAVEA  
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>JQX13\_22375|KEGG|CYP1496B2|[Archangium violaceum]|avm|DP

MSASADIDLMSSEFFANPFPTFERLRTQAPVYFFEPFQCIFILTRGADIEAVTKNPSFSSR  
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ASLVERTLEKVRROGELDVVADFAEPIAINAIAELFALPEADRPRFMRWSKDLLKPTSSA  
VRTDEVNRNSVRRTSHDMVTYLRDLVEKRRAPGDDLISQFIAGEEGLNLQAGEAVIQSFQ  
MIGAGFVTSTNQLTNTVLALLKHPEQLRELRGDPGLIRGAIEESLRHEPAILSINRLCVQ  
DTEVGGTRIPQGRFVHAMTAAANRDPEVFPDPDRFDITRAPNRHVTFGVGAHYCPGASLV  
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>JQX13\_22385|KEGG|**CYP264A9**|[Archangium violaceum]|avm|DP

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ELAEEKGEADVFVSRLFAMPLPAFVIGELLGLDVSLHHRFKDWSDDIASVTPEPRDPEHARRT  
LIAISDATRYISEVIEARRRSPADDLVSELIRAEVEGQSLTDREIIDFLVLLLIAGLETT  
VHLLANSLLFLAERPDVRARLRAEPALVPGFIEEMLRYDTPVQALVRIVTSDVTLSGVKI  
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>JQX13\_24835|KEGG|**CYP107DP9**|[Archangium violaceum]|avm|DP

MTASPLFAEGETLWSPHVRANPFPLYKRMREDFPVARITDPQLGQHFWLLTRYEDVVS  
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PRIREICSELLEGLMAHGSGGDFLKLFAFPLPVIVIAELLGIPPEDRDRFREWTQTFFAP  
PSKDSQEKAREAYQRFFKYLGELEFQRRQQPRDDLISALLAVQEQGDRLSSEELTSMVFL  
LLVGGYETTGHLLGNGLLALLQHPDQLQRLREDRSLIPSAVEEMLRYCGPFELSILRFAK  
EDLELHGQRIQAHEAIRVNYLAADRDAEQFSEPDREFDVGRTPNKHVGFHGHGFIHFCLGAPL  
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>JQX13\_25725|KEGG|**CYP102M17**||Archangium violaceum||avm|DP

MRAVSASAPIQPRTPLVGNIPDVESETPIQSLMQLSREYGPIFRLTFPGRSILVLSSH  
ALVDEVCDERRFDKSVGGALKNIRDFAGDGLFTAYTNEPNWERAHRIIMPAGFPQAMRGY  
FDFMLDIAEQMLTKWERLGPADLDVTDNMTRLTLDTIALCGFGYRFNSFYQREMHPFVD  
AMVRS�AEAGERARRPLKTRLMLMTQQQYQORDIAYMHQVVDEVIRERRHNGDAATRKDL  
LSLMLQGVDPVSGQQLDDQNIRNQVVTFLIAGHETTSGLLSFTLYQLLQHPDVLARATAE  
VDRVLRDLSKRPTVEVLSKLTYLDQVLRESRLWPTAPAFGLYAREDTVGGAWPVRKG  
EPIMVLTPLMRDPEVWTEPERFDPERFSPEAVAARPPNAWKPFNGQQRACIGRPFAMQE  
ALLVLGMLLQRFQLIDHTRYQLHIKETLTLKPEGFRMRVRARGDADRPVVELRPAAA  
PQKPKWTSQPVQHGHTPLLVLVYGSNSGSSEAFQRIASDAVVQGYVPTLGTMDAYAGRLP  
HEGAVVIVTASYNNGNPPDNARAFCRWLEELQPGALSGVRYAVFGCGNRDWAATFQAVPRH  
VDERLAAAGAQRLLARGEADARADFFGDFDQGWYQGVWPRLGESFGVETAEANQAPRYEVE  
RLEQAADPLELAHGVPVEVVANRELVDMTSPFGRSKRHLEVRLPEGVSYRTGDHLAVLP  
ENAPEQVERVARRFKLSPDETTLIRRTREEPGTLPFDRPVTVRALLGRYVELSAPATRR  
LQLLAKYTACPEKKRLLALAGEGGAEPEVYRTQVLEKRLSVIDLLEEFQACELPFGVFL  
ELMPPMKPRRYSISSPLEAPDRCTLTAVVDAPAWSGRGRFQACSSYLTRVEPGTRIH  
AVLREPHAPFRPPEDPSVPVIMVGAGTGLAPFRGFIQERARLAERGTRLGRALLFFGCDH  
PDVDFLYREELEAWQRQGVVEVYPAFFRQERDGVTFVQHRLWEERERVGVLLDAGARLYV  
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>JQX13\_28490|KEGG|CYP264D14|[Archangium violaceum]|avm|DP

MTVRLNLFAPEFRANPYPFFAELRRQPTLSNVDPLGFWAVSRYADVLHVLKNPQLFSSTG  
NRAPAEPEWLGRSNPFADSMVMVDPPTRLRLALVNRSFGPTALSRMEPRIRAYAEQAAA  
ELTLGRPVDVFVESFALRVPAAVIGELLGLDASLHPRFKRWADDINNTSSTPPDAHEWHAQ  
IRGTYAEMEQLKEVIAERRRAPREDMISDLLAARIEGEALTDALLGFLFLLLIAGLET  
TVHLLGHAALVLAERPDPVFARVRADRSIPRFIEEVLRYEPVAQTLLRLTTAETELGGVR  
LPAGSHVMLLLGSACRDEAQFPNSESFDLDREGSQSMPFGHGHGFIHFCLGAPLARMELARL  
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>JQX13\_28950|KEGG|CYP267A4|[Archangium violaceum]|avm|DP

MPMEVADPYGLLSPERRQNPYPFYARLLREAPVHFSEPWEAWVVTRHADVNAGFRDMRLS  
SVRTGMFSQGMPEEVLRLKLEPMGRNMAWLLFHDAPSHTRLRSLINKAFTPRMVEALRPR  
IQALVEELLDAARGKERMEVISELANPLPVIVIGEMGLPREDRYRLKKWSDKLASLIGT  
GRPTLAEVEGALGAILEFEDYFRPLLARRRTQPGNDLLSALVQAEEQGNLMSEQEVLSTC  
TLVLFAGHETTTNLIGNGLLALLRHPDQWELLRGAPELLPDAVEELLRYDSPVQFTNRVA  
AVDLEFGGHTFRKGRVILMIAAANRDPAHFPEPDRLDVRREQLRHQGFQGMGPHYCVGAA  
LARVEAQETFAALLRRFPRMQVAPGVLPEFVDNVGFRGLQSLPVVLEPAA

>JQX13\_30100|KEGG|CYP264D13|[Archangium violaceum]|avm|DP

MSNRVNLLAPEVRANPYPVYAE LR RNAPVSQVDPDGLWVVARQADVLT VFKNPQHFS SDG  
IRQAYRPAWLDPYPLADSM LVM D PPHHTLRRAIINRAFGTSVVARLEPRIREVAHQVVAS  
LPVGRSVNFVD AFSI WVP IAVLGEMLSLPQSLHPRIKHWA E VYGEFTSIGENDTERQKTI  
LETVAETR FHFNQVLEDRRTPRDDLVS ELLRTHVNGEELS YTDLMGFL FLL LIGA LETA  
VHLLSSCALMLQE QPELMARLRAAPT LIPRFID EMLRHSGPAHGLFRLNTDEVELGGVRI  
PRGARM LLL IASANRDEAAIPDPDRFDMDRPGPQNLPFGHGIHFCLGAQLARMEVRVALE  
ALLARFARLT PGDGPIQWNASLVMRGLTQLPLVAHLP

>JQX13\_31565|KEGG|**CYP1248B6**|[Archangium violaceum]|avm|DP

MLDHNAPAPDDVSADFNPLAPDQIDNPYPLYARLR RRPV FHC PMFDLWVVTRYADISEV  
ELDTARFSSVGALDARAEPHPEVRKVLEQGY SQFLSVVQSDPPDHTRVRAVFGKALSAHR  
IAAMEPAIRATADSLIDGFIRDGQADLIQQFAYALPGFIICDLLGVPRSDMEQLKRWSDD  
KTALMSATAPIEQLVQCAHGFIAMERYFKEQLHERRRHPR EDLLTLLLPQSLGGTAPMSE  
QEAVCNAMDLFAAGHETTTGLIGNGMWLLFNAPDQLEALREDPSLLPNALEEMLRMEAPI  
RGFFRTVMADSTLGGVMLPKGARAFILYASGNRDETQFTEPDRFDIRRADAKKHLAFGKG  
IHHICIGAPLAKLEGRIAFEQLLRRLPGLRLRTDVAPVLRPYFMLRGFEHLPITWDVPA

>JQX13\_32710|KEGG|**CYP1043A11**|[Archangium violaceum]|avm|DP

MPDVNLNRPVANTLASRLPVALIGLRNRIFTRINGEEGIPIPGERVGVSHFKELYSNPAA  
DGRSEGAVLSDLFWYWLSPGA EIHQEHL EPGERYEEVAQATTRILSLPKKTAEELAARCT

VRVLEERAMHRATLVRLRDLMMPIWAEFYELVFNERCPREARDLIVDNADDVVTALKGL  
SLRHMDRRLRLTRYLKARLEAGAVAHLPSCLSLEQKAFYLQGVYFNTAVVQMSEAMAH  
VMFLAQHQEVQTRLADNLDDDRYLDRIITESLRLYPLFGIAHRITSSDIRVDDKTTLPG  
SVLCFNYQAYHHEGFEDPLRFPDRWLKHSTKESNYMPFGAAANRPCPAQAIALVTMR  
AVARETIRRFRAFSSASHTRPLPNRGPCVLEPRKENPDPRAREELLASMSAREPWEEVGRSV  
LQLVLGTYMVLDAKRLRLCQRYFEAERQASTTGAKASRCPFSSHS

>JQX13\_34720|KEGG|**CYP242A7**||[Archangium violaceum]|avm|DP

MKPAPeIAMLNANVVTSPRYEFFSPEAIANSQSLLSRIRSEDPVHFSDQLGGWLVTRYAD  
VMAALKDPRFLQATGTGRLDAMPEAARQQLRPLRDSIRLWMGNDSTEDHLRFQRILKKYF  
TPGTLEALRPRIQELTTELVDAAARARGRAEVVSELAYPLPANVIAEMLGVPTKDRELLQR  
WSRDLLPIFTASSMEQLLSQKSVLEMTDYM RPIVEEHRREPRQDLISVFLAEEAAGNIR  
DVEEIAANCVLLLFAGHETTANLICNGLSALFDFPDQLELLRAKPELMQSAVEEMLRFSG  
IGGTITRVAGTDLELGGKKIAPRQLV FVSLASANHDPEVFPEPSRFDITRKTNKHVTFGY  
GSYYCLGAALARLEAQVFFSTFLPRFPNRLVLDRAWEPSPLGRRLTALNVSF

>JQX13\_34870|KEGG|**CYP1329C1**||[Archangium violaceum]|avm|DP

MPKALPRLQEPPPLIGSLRSFRNERLELFNRVRRECGELGLFRVGPLSIMLVNSSRALQEV  
TSLHADAFEGGLAVNALLPIFGRYSLVLLPNKEHRTYRKIMAPTFQPRRVSMFAEPMVKA  
TLEAQARWTDGQEIDVGQEMLRRLTMRIVGKTLLGLEVLDEADDFGAALTTCLEYSNHLVA  
NIVPVPLWLP TKRNRELKKALAFIRGMLMEKLSSRRHAGCPATQDFASMLMGVRGEDGQG  
LSDEQLRDNLIFIFSAGYETSANTLAWTWYLLSKHPEVYERLRKEVDEV LQGRAPTYEDL  
ASLPYVHQVVKEVMRIYPVAYFFGREARRDVEIDGYQVPKGTFAAVCPYTLHRNPEYFPD  
PERFDPDRFAPEQESKLPKYAYLPFGAGVHACLG VHHFMIEAPLLLATLVQRVHIDVLP  
GQTVKPVVEVT LRPSRILARVHRS

>JQX13\_36270|KEGG|**CYP264K4**||[Archangium violaceum]|avm|DP

MRTYNLFDPAVLADPHAVFAQMRSEPGLCRVEPFGAFAAARYEDAAA ILKDPQRFSSEAL  
AITAEPPWLGPNPVAQALISKDPPNHARLRALVNRAFGPAGMARLEAQVWKVSEELAEAA  
VRRREVELVDAFTFVLPRDIIGYLLGLDPSTFSNFKRWSLAMGLITSATTPEQHEEIRFV  
VREMKGYLTEVIEARRRQPGEDMVSDLLRAEVDGRKLTDEEILSFLFLLLPAGMETTSQL



LGNAI IY LARHPEHLARAREDKTHIPRFVEEVLRYESPVQLSFRMATQDVELSGTKIPAG  
S FVLGLVGSANRDERVFEQPD RFLPGRDKGTQH LTFGYGIHFCLGAQLARMEARLGLEAL  
VSRVGAIRLRSP EVQWLPGYTIHG PATLPVELIPA

>JQX13\_36820|KEGG|**CYP264E1**|[Archangium violaceum]|avm|DP

MDQPLHLMTPEARANPYPLYAEFRRAVCQVEPGGMWAVSRYDDVVTVLKDPRRFSSAGL  
GQSFLPPWLERNP TADSLVMKDPDPDHTRLRAMVSRAFSGMALSRWESRIRDIAEELAEAA  
VRHQEVDFIAD FALPLPTRVLNLFFGLEPAMALRLKGWADDLVSIPASQSPQRMEQIRH  
SLAEMERCFNALIELRRADPGEDLVSELIRTEALTHEELLSFLFGLVPAGVETTVYLLAN  
TMLVLSEHPRELERVRENPTLIPRLIEEVLRYEPPGQSSRLTTEDVVLSGVTIPRGSVV  
VALIGAAMRDEGRFPQADRFIIDRENQQLAFGHGPHFCLGAMLARMEARLGMEALFSRI  
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>JQX13\_38215|KEGG|**CYP152E5**|[Archangium violaceum]|avm|DP

MGGMPRDSRLDSTLALLSEGYRFIGNGCARHRSDVFETRLLLLRPTLCMSGAEAAARMFYDS  
ERFQRRGAAPLRLRKT LFGMGGVQGLDGEAHRSRKAMFMSLMSPDGIRRLSEQA EKHWR A  
SIREWERKGR LVLLDEVQQLCRVVCEWTGVPLPEAEVIQRTRELTALIDGSGGVGPRHW  
RARLMRMRSEAWLGRLVSRVRAGRHAAP EGSALRTVAEYRGPDGKRLGPRLAAVELLNVL  
RPTVAVARFVVFEALALHEHPESRAWLLEEEDDDAYEHFVQEVR RYYPFFPF AAARVRD  
FTWKGYHFPRGRRVLLDLYGTNHDVRLWERPHEFRPERFRTWDGSPFSFI PQGGGDHHTG  
HRCAGEWSTIALMKVAARMLTRGMRYDVPSQDLRV DLSRI PAEPASRFVIANVRDAREPP  
HERAAA ASTAGRKAVALPGPESPRGV

>JQX13\_38560|KEGG|CYP1224J3|[Archangium violaceum]|avm|DP

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APPDALHAGEGNAVILPLVGSSSLVMQDGAEHIRLRLLLLPPFQGERLHTYAGPMRETH  
ASLEQWPVGKPFPLPRMMSLTIEILLRSVFGIEGKEELALFARRFPRLVDSIASPLYLI  
PALSGVDV FQKVPWLRASKMKREVDEAIYALIAHRAQPADPRRQDMLSLLLESRDEAGQ  
PLTDREL RDALFTVIVAGYETTAIGMCFTVERLLSTPEALARVHEELERVVGDT ELQAEH  
LGQLEYLDAVIKETLRLRPVVPLVSRRTKVPFELSTYTLPPETMLVPGIALTHLREDIYP  
EPDSFQPERFLGKKPDYAWLPFGGGSRRCLGMALSLFEMKVVLATMLRRAKLRLASKRP  
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>JQX13\_39850|KEGG|CYP1224J2|[Archangium violaceum]|avm|DP

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VFNAPMEVVHAGESNSLLRPFLGPHSVVILDEWDHVRQRRLLLPFQGERMQAYAEVMRE  
VTHASLERWPMARPFPLLDVMTTELTLELMLRNVFGLETPEEIAAFSRDFSSLVDSTNSPL  
RMLPSLIGMDLFTLLPWARASRLKRRVDAAIYALVARRRAEPRRPERTDVLGLLLESTHE  
DGKPMSDQELRDALLTLIVAGYETTAIGLSFTVERLLAEPRTLTRMHEELERVVGDELG  
PEHIGQLEYLDATIKEALVRPLVPLISRQLKGPLELTHYTLPAAGVTVLPAIVLTHFRED  
LYPEPEHFKPERFLEQKPDOPYAWLPFGGGARRCLGMAFAMYEMKVVLATLLWRAKLRLAS  
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>JQX13\_41630|KEGG|CYP109N4|[Archangium violaceum]|avm|DP

MQPQALKLTPEMVANPYPVFAALRESAPVHYVEAFRGSYVLSRHEDMAPVLKNTTLFSSK  
MASVSALMPKELGEDVLRYPFRSENSLLSSDPPQHTRLRLTLVSRAFTPRRVADLEPRIREL  
TRELLDAMLTRQEFDLADLAVPLPIIVIAEMLGIEPERRLDfKRWSNAISQSVTLTVGG  
LDLEWIATGIREIHAYLEAAIERRRQEPGNLISALVESNEQQGGFLSSMDVIGFVRLLL  
FAGNETTTNLIGNGTALLNHPAEMERLAEDASLIPNAVEEMLRYDTPAQVIFRITTADT  
EIAGTPIPKDSRIMLLLGAANRDPKFPDPTDFDITRDTQGHVAFGHGVHFCIGGPLARL  
EAKVVFEELFRRVRRVSFAPGQEGHLDYGTTFSLRGPKSLRLRAERR

>JQX13\_41680|KEGG|CYP1347B6|[Archangium violaceum]|avm|DP

MSSAAPTLDRLNVSPQNMLNPFPLYQYLRENEPVHWSDAVHAWFLTRYDDVMAAYRDPRM  
SANRAKLFYQVQGLSPDITREFMQTVRNQMFMRDGPEHVRLRRQTGMGFTPQRLDELRLP  
TVHRIMRELLEQLASRHEMDLVKDLAYPLPALAIAELLGVPPEDRDRFWVWSEHLALYSS  
PPVGADSQLLASNANKTMVEMKEYLLPIIEHRRQSPGTDGLSQMLLAQEQQKMTPEELVA  
NACLILFAGHTTTTDDQLSNGVYDLLTHPDQFQMLREDMGLLRSVEEMLRYTTSVPAITR  
IASEDIQMHGKTIRKGDVFLVMAAANRDPSPVFPDPERFDITRDSYHQKHISFGFGAHC  
MGAGLARRELEIGISMLLERLPNLRLEDETKPPQVKCHGLSFRGFDLSLPVRW

>JQX13\_41805|KEGG|CYP109R10|[Archangium violaceum]|avm|DP

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GLVAEMTAHDEFDLMDGLGSPLPVTIIAEMLGVEPSRRRDFKRWSDSLVESGAEIIRDGK  
ASDKNIRLQGEMLAYMTEIAEKRRREPRGDLISMLVQGGEGAEPLTPKEVNSFAILLAA  
GNETTTNLIGNALVALIRNPEAYEWLRRDPTIAACAAVCEETLRYDSPVLGLTRRTTQEV

ELSGGKLPADSTLVVMVASANHDPKFPNPDRFDPQRDTTGLFSFGHGIHFCLGAPLSRL  
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>JQX13\_45100|KEGG|CYP167B1|[Archangium violaceum]|avm|DP

MSANPTNPSETRPSVQFNPYAPGFDANPYPALEKLRTEAPLFYWEQGRGWLVSRYEDAVA  
VLRDNKRFS PDRAEWEFASVLGSAAMVPELAELNKNGLFALNAQDHARVRKLVSPALTPR  
AIERLRPEIQAIVDEILDGVAAGRLDVVNEFAERIPARVIGSMLKIPKGREELFQDFTN  
AVIKNVLPGLVAPEEQELLRRHIREGIALVGETIEDRRRNPLESDILTTLIQTEEQGDKL  
NKQELLSLVAALIVGGFETT VH LIAFCVYNLLQRPEVLAQVKTEPELLKNFVEEVLRFDN  
FGKLGISRYALEDVELGGVRIKKGQMLLIMLNSALRDESTFDKADVFDIRRN TNASIAFG  
HGAHYCIGANLARLEVQIAVGTLVRRFP ELRLVKPPSFGPHPVIRRMESLEV DLRSPSA

>JQX13\_47220|KEGG|**CYP1833B1**|[Archangium violaceum]|avm|DP

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EGGGELMTRFAAPLALHAVCDFLGVPAPDPATFGEMSDAIIRGMDAGLAPERAAPGAAAR  
AGLSALIASWFEPPTGGMFGFLARSESAAGMPRAVL MN SMRVVFHAGYTSVYSAVGS AI  
ISLLRHGMELSR L RDPALLETAVEELFRYDGPVQATGRVCTEDVELGGVRIARGQALVLL  
LGSANRDPEAFSQPEALVLD RQPNPHLAFGWGIHACVGGLLAKAVVRLALCSLIEHAPGL  
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>JQX13\_47720|KEGG|**CYP109N5**|[Archangium violaceum]|avm|DP

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SKGMELSRRTTSKLSPEVLALVTPENSLIASDPPIHTSLRNMVGRAFTPKRVAELEPRIR  
EITVELIDDMLRKDEL DL MEDLAAPLPVTVIAEMLGVEPERRREFKRWSDDA ISSSNLSL  
ADTDPSRLEVGV RALHEYMRQAIEERRRS PRGDLISALVEAGGKEDFVTSNDLVAF CRLL  
LIAGNETTTNLIGNGMVALLRNPAWEKLVADPSLVPNAVEEILRYDSPVQGIFRETTQE  
LQVGQTLP EGS RVMTLFGSANRDPRKFQEPERFDVTREVQGHYSFGYGIHFCLGAPLAR  
LEAKVAFEELLRRVRRFEFASSPVESLEWNNNLFLRGPKSLRLKARLR

> JQX13\_49065|KEGG|CYP117E4|[Archangium violaceum]|avm|DP

MQALTNLLFQLPQKETHRDGIPILPGGLPLVGHAPFNIGSPLTFLRDAASKVGPLFWMKN  
MGGWSLVCMGEPGFELLKNRVTSSEFIREQAPDFIGDSL SRDGVPHRNLR SAMSGAFTP  
RGLTSSGAAAI SAEVIEASVAGLPQQGPFSLAETQKLALDIIFRIMGIDRSELEAWN RN  
YRDFVLGALPVRLDLPFSPARRASRGRRWLDARLADLISAARGKPD MKGT LAALLTARDE

EGNALGDSDLIQNLRLLAGHETSASVMAWLGIVLAQRPDLWEKLRDESMAAPGLPRSP  
DELKRHPFAEALFREVLRYPPVAFTAREATEDLVHGRVPRGTMITVPIGTYGYDPAL  
FSEPEYFDPSRWMGRRVPPSAIETAAFGGGPHFCLGYHLAWMEVVQFAAAFARELTRRGV  
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>JQX13\_51560|KEGG|CYP1286A2|[Archangium violaceum]|avm|DP

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RVIDRWPVGRPFSLHAQFQDITLDVILKTVLGLSEVESLERFRKLLVRMLKLSHPSLLF  
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>JQX13\_51845|KEGG|CYP242A6|[Archangium violaceum]|avm|DP

MQQATNPQPLTFDILLSLETARNPHPMYHALRTQQPILWSPQLHGWLTRHADISQVLKDP  
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RPRIQALTDITLLDAAAARGSSFDMMVKDLAIPLPSNVIAEMLGVPLADEYLLQRWSRDLGG  
IFTNFNPEQLFQSQKSVMEMMDYMREVLVSQYRRGASGENILEVFLRAQDEGLVTEEEILA  
NCVLLLLFAGHETTARLISRGLALLFDHPEQLAMLRQQPSLIPQAVEEMLRYGDVAGMTTR  
LTVPAPVELGGQTMQPYQMVYVMLAAANRDPSTLFPDPDRFDITRKPGKHVAFGYGSFYCLG  
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>JQX13\_52240|KEGG|CYP1329A2|[Archangium violaceum]|avm|DP

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SMTRYTQEAASGWQDGQMLDMVHEMTILTMRIIGKTMFDVDFQNEASDLREAMMVTLEHL  
DHMSSSAPIPLSWPTARNKRARAAIATIDNSIRAMIDERRRDATDRKDMSSLLQARND  
GQPIDESQIRAHIVTFFSAGHETTALALSWTWQLLARHPEVYARVRQEVDA LGGKTPGFE  
DLPRLSYLQQVIKESLRLHPTIFMIARAARDVEIEGYPIRKGQMVLIIPPYCIHRNPEYF  
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>MEBOL\_000247|KEGG|CYP253D|[Melittangium boletus]|mbd|DP

MNAPSASPRIPTGPRGLPLIGVIRDVRKDSLGLMRTATEHGVPVSGYRLGPGRSYLVSH  
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AQMVRAAAELSEQWTDQRSGEPRRAARDMLGLTLRIVGEALLGTDVRAQTDVSAAFNV  
ISEQTVERFRDLRVLPPIIPTAYDRAFRQANQSLREVVATLVAQRRRHLEDRGDLLSMFM  
LAQDEETGERMDDAHVQDEVLTMLLAGHETTATALTWTWALLEQNPDAERAFHAELDSVL  
GGRLPTAEDVPRLVYTRRVLDETMRLYPVYILSRKVVSDDTICGYRVLGGSMLDVSPYV  
THRLPEFWPDPERFDPDRFSPERSATRPRYAYFPFLGGPRQCIGNNFALMEGVILILATLG  
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>MEBOL\_000316|KEGG|**CYP107DL5**||[Melittangium boletus]||mbd|DP

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ANMP EEIRPLAHSILLDDPPDHTRLRKLVPNFTARAMELLRPRIQRLVNDLLDTAERKA  
VERGEAVSERRMDLIEALAYPMPVTVISDLLGIPVEDRERVHGAETLLRAEQDAMRDE  
RIRTSMRAFGQYLDGLFERKRREPTEDMISQMLHVQEDGDTLSHQEMVSMVFILFFAGHV  
TTVNLIGNGVVALLSHPEQHARFLADPAGLAKGLVEETLRYCGPVDYISTPRIAREEMEL  
GGTHIPKGENLSLGLASANRDPARFAHPDVFDTITRPDAHRNIAFGKGIHVCIGAPLARLE  
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>MEBOL\_000406|KEGG|**CYP117E2**||[Melittangium boletus]||mbd|DP

MQLNTPNALRERLSRPATYKDGIPILPGALPLVGHVPFNLGDTLTFLREAAHQVGPLFWM  
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FTPRGLTSSGASALSAEVIEASLAKLPSPGFSLLAETQRLALDIIIFRIMGIDRSELDAFN  
HHYREFVLGAFPVKITVPFGPYWRSVRGRRWLDERFSRLIVAARGRTDMKGTLAALLAAR  
DEQQQELKEVDLVQNLRLVALAGHETSASVMAWLGIVLAQRPDLWRQLREEAEAAPALPQ  
SPEDLKRHPFAEAMFREVLRLYPPLSATARQATEDLTLHGKHVPKGMTMTVPVGVYGFDP  
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>MEBOL\_000745|KEGG|**CYP264J2**||[Melittangium boletus]||mbd|DP

MQSIPDLMPLAHRMNPYPPLYAELRRDHPVCRVEPGGLVAISRYEDVEYVLKHPEIFSSHG  
FRVAWQPEWVDNPLAQSVASDGQEHTRLRSLIGRAFTPAAINRLGERIRATASRLADD  
LLARGEADFMESFAAPLPARAISALLGIDPSLERHYKRWTEVLVSITPIPENTEHVRRT  
DTIAEMKHHVQRLIDERRAQPSDDVLGLIVRGGPDGQRLSDPEIVGLVFTLLTAGLETT  
FLFTHAVRLLAERPDLVLEQLRAHRELLPKFIEEVLRYNGPVQALPRIVTTEVELAGVRIE  
RGACVLPLIASANRDEARFPHADRFDLEREESGIPFGYGAHYCLGAFLARLEARTGFDAL  
LDRFSGFSLIPEGLVWNRGLVTSGPVKMPVRFLKN

>MEBOL\_000961|KEGG|**CYP262F1**||[Melittangium boletus]|mbd|DP

MDSSSPSHGASAPRARLPPLASGLPLVGSTPQVLANPIRFLMRARERYGDIYTLDLGVQR  
MVLNLNHPRQHEHVFLTKSKNYLKQGALWDAMRTLLGNGLAVSQGEVWKRQRRMVHPQFHR  
QRLARITSLMVAAIEDQFERWDEQTRAGQSLDAVPMFAELTMKLLAKSVFGTAVSHESVE  
TLRPEMLYVIKYMVPSMLTQSLPSWVPRPGERRYQQALERIDRLLFSVIEQRRGEPGGSD  
DLLSMLLEALDEETGLPMQARQLRDETTLTLFLAGYETTSVALAWAVHYILEDAAVWRRLR  
EEVEQVLGDREPTFGDMGELKYTRMVIQESLRICPPIWWNPRLAMEDDEIDGYAIPKGSV  
IAPLTYVVHHHPDVWKDPERFDPLRFASEEGETRHRCAWGPFPGIGPRKCVGVEFAMMEAQ  
LVLAMFVRRYDVSRMAGPPVEKAMLGTLRPKAGIPIGLHRRRS

>MEBOL\_001720|KEGG|**CYP167B10**||[Melittangium boletus]|mbd|DP

MSAEQTNPSENRPASQFNPYAPGYEANPHPMLEKLRAEAPLFYWELGRSWIVSRYEGLA  
VLRDDKRFSPNREDWEFASVMGSDAIIPEMEELNKNGLFALGEQGHARVRLVSPAFTPR  
ATERLRPEIQAIVDELDDTMAAKGRLMNVHDFSERIPARVIGSMLKIPSGHEEQFHEFTN  
AVAKSLFPSALAPEELAPLRQIREGISLVTETIEDRRRNPRENDILTTLIQTEEQGDTL  
NKHELLALVSSLIVGGFETT VHLM SFCVYSL LQQPGVFAEVKARPELIKNLVEEVLRFDN  
FVKMGPARYALEDLEMGGVRIKKGQMLII LLTSVLRDERAFDKAHVFDVQRNGNSNIAFG  
HGAHYCLGANMARLLVQIAMGTLVRRFP EMRLVNPPAFGPHSLMRKMEVLEVELGTPSA

>MEBOL\_001721|KEGG|**CYP251V1**||[Melittangium boletus]|mbd|DP

MTAPPANLQRDVSPPTTPPERPPLTVAVMEAPGGLPLLGHLP RMVRAPHEYIQSLRAHGDI  
VRIRVGTS PVYVVTSP ELIHQVLVARSDGFERGRVFDKATAAIGKGVIVTNGDFHLRQRR  
LLQPGFQRARIHGYMETIHRQVDTQAARWTPGGRISLREEMHRFTLNAVTRTLFGANTEE  
GIATEIGDYIDAANAWVSHHTLLSSEFFERLPTPVNRAFVRKKARFDELIGAFIDARRAD  
ERDHGDLLSALLAAQDAETGKGMSDEQLRIE IAGLFVAGSETTAT ALSWLFHEVGKDPQV  
EARIQAEVDSVLGGRPVTADDLPRLQYIQC VVSETLR LYP IAWLLMRRTL RDLELGGYHL  
PAGVEVLVSPIMSHRNPRIYPEPMRFPDRWLPERARELPRYALLPFGDGKHKCIGDMFA  
RTEMVIAVAAIAARWRLVPVPGHRVWEVPRSVLRPNQVLMTTVPRTPHTPQETQS

>MEBOL\_001915|KEGG|**CYP1284B2**||[Melittangium boletus]|mbd|DP

MDAFNGQKLDKIPAHVPPELVYEYDNARDPRL LQDPHARMRSLILEAPPIFFTPYNGGSW  
VVTRKKAIVDITMNPEVFSNAFISGAKDSQQSL SLLPISVDPPKHTAYRAPLNQPLSAKS  
VAGLES AIRAMTNELIDK VLAAGRCDFLS DIAEPLPVTLFMKLAGMPTDR LAEFRHLATQ

ATSSSTDHATREGVFKRIAGILAEVIKARQEKREEDLISHLLDVNINGQNPTFQEMLGYS  
ITLFLGGLETVVNALSFGVLRRLARDQELQAKLRADPSLLPGAIEELLRLHGIASVTRQVT  
RDEVCHGVQFKKGDTVSLLLPAANYDDAAFPNPEQFILGRTEQHQTFTNTGPHRCVGLNLA  
RLEMKVFYQEWLKRVPFSFRLDSQSPPRFMGGFNLAVTSPLVW

>MEBOL\_002117|KEGG|**CYP1492A3**|[Melittangium boletus]||mbd|DP

MNTALTLDAPRPLHEYAPSSLELIKIRREGYLGWMMKVVRQHGLDVRIRMGSRSFLLVT  
HPDHVRHINVTQRESYDKAESYDSLRELLLGNGIVTATGVDWRRQRKLMAFFTPRGVEK  
FYPIFLSDTQQLIHWRSQHQSGRPPVEMLDEMMQVTAABILHSVFSTDTGETLQRIKHS  
IETMISHISNMQMRPVQVPLWVPTPGNLRFHRAQKLVTAIHELIAARRAIPTQWPDDL  
LTKLMTTRDEETGTVMAEQLLDVNGITLFAAGHETTARTLSFLWYALSQNPEVERRLHAE  
LDSVLGDAPPTINDLKKLPYTLQVVKEVLRLYPAAPMYARDAVADDDLDGVRIPAGTRTI  
VFAYATHRHAPAFWDEPERFDPDRWLPEREAERHAHAYHPFAIGPRICLGNNFSLLETHVM  
AAMLARHFKLRMKPGHVPQFDLLGTLGSRNGLPMLIEARTGTCTL

>MEBOL\_002190|KEGG|**CYP107DP7**|[Melittangium boletus]||mbd|DP

MSTTLSPQEIWAPHTRFNPLPLYARMRPEGPLFRQMDANRGVPIWLSTRYKASVELLRDP  
RFTKDERLVAPQARQARVAEMEAINRNMLMSDPPDHTRLRLTVSKAFLPRRVEELRSRVE  
AIAHRLLDALPAQGSVDLIDAFAFRIPVTVIAELLGVPPEDQDQFRVWTTAITQLPSADR  
LESIKQASLAFMAYVQNLMEKRRAEPREDLVSDLLQAEQGDRLSSEELIGMVVLLLNAG  
HETTVNLIGNGVWALLRHPEQLERLRQNPALIDSAVEEMLRYRGPLECATHRWAREDIEF  
HGQVIPAGETVLVSLLAANDPEQFPEPERFDITREPNRHIAFGFGIHFVCGAPLARLEA  
SIALPLLLERLPRRLAVDESQQLQWRQGLVLHGLKQLPVAF

>MEBOL\_002509|KEGG|**CYP102M15**|[Melittangium boletus]||mbd|DP

MGKMLAERLNLVTGQLGMERVSIPQPRVRPVVGNAPDLGSETPMQNMMKLARELGPLFRL  
SFPGGRSLLVSSHELVDLDCDESFRDKKVGAALIEIRDFA GDGLFTAYTHEPNWGKAHR  
LLMPAFGPAAMRGYHDEMLDVADQMLTRWERFGPEEAIDVPDNMTRLTLDTIALCGFGYR  
FNSFYQREMHPFVESMVRALAEAGNRARRVPLKTQLMLRTRRQFQVDASYMHEVTRELIA  
QRRKLAPEDAPRDLLGLMLSEKDPLTGEGLDDNIRNQLVTFLIAGHETTSGLLSFALYF  
LLRHPDVLQKAYAEVDRVLGSETPRFEQVNQLHYIDQILRETLRLWPTAPGFSVQALVDT  
RLVGTHPLSAGDTLFLVLT PMLHRDPTVWRDPERFDPDRFAPEVRDGI PQHAWKPFNGGQR  
SCIGRAFALQEATLVLGMLLQRFHISEPAPYSLHVRETLTLKPEGLRIRARVRQNVSRSL  
TTRPSPAPVAATSQGGGVAAGTPLLLLYGSNSGASEAFARRIASDGLARGYSAKVAPL  
DEYTGKLPKQGAVVLVTASYNGQPPDNARGFHAWI SHVPEGSLLGVRVAVFGCGNRDWAA  
TYQAI PKHFDERLHAAGA QALVARGEADARGDFFGDFEHWYAPFWSTVGEALGVSTGEVN

SGPLYKVEVVPASVDLVAQNKLGMSTLVENRELVDMTSPLGRSKRHLLTFRLEPGVTYAA  
GDYLAVLPENHPDLVERAARRFGVRTDAAVVLRSTRGAMAASLPTDRPVSQVQELLGRHVE  
LSAPATRKDLERLAAMNPCPPHAQHLLALAQDAERYKAEVLDKRVSVLDFLEKYSSCVLS  
FADFLELLPTMRVRQYSVSSSPRADPTQCSLTVAVVDADAWSGQGRFHGTCSSYLARLHP  
GDPVAVAVRTPNAPFHPASNATPLVMIGAGTGLAPFRGFIQERALRHVHGEAAGPALFF  
FGCDHPDVDFLYREELAAWEREGVVKVLPAFFRQPEGDMFVQHRLWKEREQVKALLAQG  
ATVFLCGDGRRMAPAVRETLARIHQETVGCSEEEASRWLAEMEKQGRVLADVFA

>MEBOL\_003675|KEGG|**CYP109R9**|[Melittangium boletus]|mbd|DP

MSLVDRFSFFDPEVMQDPYPYYAELRERAPLLWNAPLQAYIVTRHEDVAHVLKNPALFSS  
ASLRLAGQPIDVVGITILGRPSVPALVNTDPPLHTRMRSIVSRTFTPKRISALEPRVRELS  
QKLVAEMTAQEEFDFMEGLATPLPVIIIAEMLGIEPARRRDFKRWSDTLISLASAAGPGP  
EFRRDGQEMHAYMTRIAEERRLAPQEDLISLLVQGGEGQTLSAEEVNAFALLLMLAGNET  
TTNLLGNAMHALLSHPEQFDWLRKNPSGCGAAIEEALRYESPVVSVMRRTLREVELSGGK  
VPADSMMLVLSSANRDPKFPDPDRFDIQDAQGVMSFGHGIHFCLGAPLARLEAPTAL  
GELIARAPRLRFAPRQPLRPEYPPSFGVRALKTLWLRE

>MEBOL\_003803|KEGG|**CYP110R3**|[Melittangium boletus]|mbd|DP

MTHPLPPGPRFTPVQALRFLRDPTRFCLESKARYGDPFTAPLPVGDVVLTGQPDGIREIF  
SADPAVFEPLGNLPLAPIVGELSMLLSGPRHKRERKLLMPFFHGERMRAYGQTLRALTL  
HAAESLRPGEGLRAQHLLTQHISLEAIIQIVFGVQEPERVRRYREVMVPAMDSTPLLMMA  
VPLRRSFGGLGPWARFQHHLAQVDALLTEELANRRGHEAGHTDILSLLLAARDEDGQAMT  
NEELRDELRTLLLAGHETTAIGMAWALHYVHRLPEVQARLRDELAPLGPSPEPEALTRLL  
YLGAVCDEALRLHPVVPVVGRRTLAPFTLLGRELPVGTGVMAAICLAHASPELYPEPERF  
RPERFLERRYSPFEYLPFGGGARRCIGAAFAQYEMRVVLGTLLAAHRFSSPPHAAPERPA  
RRNITLGPRHGVALVYEGPARA

>MEBOL\_003931|KEGG|**CYP253G4**|[Melittangium boletus]|mbd|DP

MTTSTLPLAPMPPGHWLLGHLRERETNPLGLFLRGREQLGDVVRFRMGPPQYVEQLAHPDH  
VKHVLADASARYTKGSIFAKTRPLVGNGLLTAEGEFWKRQRRLSQPAFHKDRLATLAGVI  
TQTATEAIAGWEAPVAAGTPVPVFTEMMRLTLNVVVRALFGLDVAGQTQLIGDAFTQALE  
VTNRRIISPLPYVPWFYRLPTRDNRLFQRAMDTLHHTVEGLIAQRRAQARDGQSPPGEDL  
LGMLMTACDADTGDAFDDLQLRDEVMTLMLAGHETTATSLAWTFHLLQNPQEALMHEE  
VDQVLGGRTPTLEDLPKLRGTGCVFEEAMRLYPPIWALPRTPHEDDEVGGFRIPKGDIVL  
LVPYVTHRHPFEPDPERFDPTRFLPEASRQRPRWAYLPFGGGQRQCIGNNFAMMEAQFI  
LAMVAQRFRRLRGVPGVPVEPEPLVTLRPKGPLPMHVHRRQGKSRTHLASSA



>MEBOL\_003979|KEGG|**CYP253S1**|[Melittangium boletus]|mbd|DP

MTHDAARRIPPGPKGHWLLGNLPERRSDPLSLFLRGRERYGDVVRYPMGPFLLMHQLSHPD  
DVKRVLVDNAQNYRK TALMQRLRPVLGEGLLLSEGDFWKRQRRLAQPAFHKERLAGMATV  
ITGLIEDALPRWDALAERGEFPDLSAELMRLVLAMTGRVLF GADLSDSARDVARAVTTVL  
EELNHQVLSVLPLPASLPLPGHRRRLRAIQVLD SIVFGIIDARHRGAHASEDLLAMLMQA  
RDADTGEGMSDRQLRDEVMTLVLAGHETTANALTWTFHLL EQHPEAEARLAEVTRLLGE  
RTPTLQDL PRLGYTARV FDESMRLYPPAWLISRVALNDDILGGYPVARGTIVVILPYVIH  
RHPAFWEHPERFDPDRFLPARSGARPRFAWL PFGGGQRM CVGSGLALLQGHVLAMLARR  
YHFQRVPGHPVEPQALVTLRPRHGLRVTARRRSAPR

>MEBOL\_004399|KEGG|**CYP109AK1**|[Melittangium boletus]|mbd|DP

MQSSDYNPLSSTVQADPYPHYATLRENTPVYFNEQFGWYIVSRYEDVVAITKNPAVFSSA  
RAIVGPEKLDEAAKVAPHALRTFRRGVLISEDPPHTTKTRGLVTKAFTPKRISEMEPRIR  
QLARELISQLPRSGEFDLIKDLAEPLPVIVIAEMLGV EPPERHDFKRWSDDALATS FALA  
KGSELSGIERSNRELS DYMAQALEARRQQPREDLVQALLDNGVREGVLSVSDAVDFCRLL  
LVAGNETTTNLLGN GVRALLSHPDQRDLIREPALIPNAVEEMLRYDSAAQALFRKTTQE  
VEVAGTRIPAGASVLLLFGSANRDP RKFQEPDRFDVTRNVVGQVAFGHGIHFCLGAPLAR  
LEAKVVLEELLTPDRRLSLVPGQPWEVLEHFSIRGLKSLRVRVEPAAGARASA

>MEBOL\_004662|KEGG|**CYP107DL4**|[Melittangium boletus]|mbd|DP

MAMNPMDEKRTEESGTSPVGVC PMKASREVPHAGSVRLDREDPAFLAVAHEAYERMRKQG  
PVVRASFGRGFSDDL LPDGDKPRTAKGEPGSERYFVTRYDEAVEALLDDR LSSDFRSTMT  
PEQRAQLPFMP EELKPIAYSLLMLDPPDHTRLRKL VQPNFTARAMETLRPRIQRIIDRLL  
DQAESEAAARGESAPERRMDLLPAFAYPMPIA VISDMLGIPEEDRAQVHTWAENLLSAEG  
PSIGDEQRRGVLREFIRYLEGLFERKRRAPGEDMISQMAHFQEDGDKLSPQEMMSMVFIL  
FFAGHVTTVN LIGSGVVAL LTHPEQLERLLADPSLVKGAVEETLRYWGPVDYMGTPRIVL  
KDMELAGCPIAQGEKLT VGLASANRDPERFPNP DVF DITRPEAHRNIAFGKGIHVCIGAP  
LARMEAQLAFETLFR RYPKMRLAVPAGELRLAATSLRGFDRVPIFF

>MEBOL\_004948|KEGG|**CYP1506A5**|[Melittangium boletus]|mbd|DP

MPNVLSRGVFNLFFGSKRQAFASLPGPQPGILGTAGDFLGAQPWDVCARYGREYGGVTLI  
WMGPNPGLVLNDPVLIEQLLDSRTEFEKGSRLRQELTPTTTDQSLFIAPQSGDWA EKRI  
DPFVQWPSPDWLAAQVAPMQAAISDFVDGLIASGKTVDLAPVLRRLTCDAFAVA AIGKL  
PDSVYEDFMLLAKGADARIQAKLPLKFVSLPKGFEEARERFYRFFDERVSAARRNPKPEA

NDLMSRTMREVPDFGDKALAVNIALIFYGGAFSSSTALAGAFHQLQKHPDAEARLASEAA  
AFAGGPPTLERLNEARWAEAVVLESMRVLPPVRVFTRSPVTDVSFAGVTMPAGATIMVSN  
QYLHRDPQHWPNDPTFEPARWLDGGTARDPIGSGHYFFPGRGPRMCVATDFAMVFLRTAM  
VTIAARAKAEISSTEPFEEGFFFGVVLPTNVHTKFITRPR

>MEBOL\_005233|KEGG|**CYP264D7**||[Melittangium boletus]||mbd|DP

MDSPRFTRRAPMSERINLLAPEVRANPYPLYARLRQHAPVSQVDPGGIWAVSRYEDVMYV  
LKHPQLFSSEGFRQAYRPAWISNYPLADSALVMDPPRHTRLRGLINRAFGTSVLTRIEPR  
VREIAATIAANLPEGQEVDFVEAFSVPMMPMGVLGELLGLAPEVHPLLVRWAQHLAQFTSI  
GPADTARQEAMRATVNEARGHFERVLAERRRHPGDDLMSDLVQARMDGESLSDTELLGFM  
FLLLIGGLETTLHLSHVALRLHLQPELMTLLREQPALVPRFIEEALRHEPPAQGVMRLT  
SEETELGGVRLPRGVRMLLLMGSATRDEAYCADPDRFDPHRTAPQNLPGHGIHFCLGSQ  
LARLEARLSLEALLARFTRL SAGTQPIQWNSSLIVRGPTRLPLVAHVD

>MEBOL\_005971|KEGG|**CYP242C1**||[Melittangium boletus]||mbd|DP

MSAAPAVSTSNYDLFAPSVLEDPTELLTRLRAENPVYYSPQLQGYVLTRYDDIVMLKDP  
DMGSAMLTGWIDQMPQEAQEQLQPLRASLDLWMGHKNNDHQRIRQVLRRLRYLTSATIESL  
RPRVESLVKSLFDAVEGKTEVDIIQEIANPLPCNIIIGELLGVPQEDRDQLQQWSQQALNL  
FRIADLPTLLETQKAILAIQDYMKPIVEARRHAPLDDLPSVLATAQAEGQMKSDAEILGN  
CVALMFGGHETTIVYLIANALLALMQNPEQFQMIKDRPELIPAAVEETLRYDGPVDLITRV  
TPKPLELVGGHVPANSMMILMLRAGSRDPALYPNDRFDITRPTTVRSLAFGLGSFYCLG  
TALARMETQICLREIIHRMPNIRPLFDVNKPDYRPLPPIRRRLETLRVAL

>MEBOL\_006681|KEGG|**CYP107DP8**||[Melittangium boletus]||mbd|DP

MTTSPLFAEGETLWSPHVRANPFPLYKRMREEFPVARITDPQLGMHFWLLTRYDDVVSVMV  
RDPRFTQDPTRLPETVRQRFFGHKLRSLSRHLLTVDPDPDHTRMRSLSKVFTPRRIEELR  
PRITAICSELLENLKAQSGADFLKVLAFFLPVIVIAELLGIPSEDRDQFREWTQTFAP  
PSKDSQEKAREAYQLFFKYLEELFERRRQQPQDDLISALIAVQEQGDRLSAEELMSMVFL  
LLVGGYETTAHLLGNGLLELLRHPEQLQRLREDRALIPSAVEEMVRYCGTFELSILRFK  
EDLELHGQHIPAHEAVRVNYLAADRDPGAFSEPDRFDVGRTPNKHVGFGHASTSVWERPS  
PGWRPSSPSSCCWSDSRSCVWPRNPRSSCGARVPKRVGW

>MEBOL\_007050|KEGG|**CYP1347B4**||[Melittangium boletus]||mbd|DP

MSSVMPLMEEDRNLLSPENLANPLPLYEELRENEPVHWSPRVNAWFLTRHEDVLACFRDP

RMSADRLKFFEHQIQGLDPDTIREFMETSRNQMVMRVGAEHIRLRQTGAGFTPPRLDAM  
CPSIHRTMKQLLDRVYEQGRMNLAQDISYPLPTRVIADLLGVPAEDRERFQRWADMLADF  
AAPAAGACMLDAARRANQAMVEMKDYFLPLIEQRREHPTPDTLSLMVQAQEQGQMTPEGEL  
VANAILLLFAGHTTTTDDQLSNCVHDLLAHPEQLQLLRRRPELLRTAVDESLRFHPAVPFV  
FRVAVEDVALRGRLIRRGDVVFLGMAAANRDPRAFRDPDRFDITRDNSHPRHLSFGFGAH  
HCMGAGLARREMETGVSMLLERMPRLRLDESRPTRLKCHSLNFRGFEVLPVRW

>MEBOL\_007148|KEGG|**CYP120G3**|[Melittangium boletus]|mbd|DP

MTSPADASPPSPPETLPLPPGSSGLPLIGETLEYLRSSRAFAERRQRQYGAVFRSHVLGS  
PAAFLLGPEAVQWIFAGEGKYLKNRWSPGVRRLLAGHCLAMLEGNEHLERRRLLAPHFSY  
ASMRGFVPIIESLSRRHFERWTARPGDFTLWPAMRELAFEIALALIFGQDTVLDLPFLMH  
FKAWTAGLFSPPFIDLPWTTTFGRALASKKAMIGYLEQVVAERQARTEQPPDLLGSLLQRR  
EGEEPLSRAAIVDELQLLLFAGHDTTVTAMSNLMLMLAQHPDVLQRGREAVAGLEGPLTL  
EGMRATPYLVQLLHEGMRTIPPIGGAFRVTTTRDVAFNGYRIPKGWTVPVSIKMAHAGANW  
PTPDRFDPERFGGENPEQKKPGTFIPFGGGPRICLGQHFAMVEMSVMLILLKKHHAWELV  
PGQDLEYTQVPFPKPRSGIQLEFRRIDAGERPLAEP

>MEBOL\_007173|KEGG|**CYP107DP5**|[Melittangium boletus]|mbd|DP

MMRRMNSSPASFQELWAPTTRANPLPLYARMRQEAPVVRVVDPYFKLPVWVVSRYKDAVE  
LLRDSRFTKDQSKLPEDSLPRQMRNDTMAALNRHMLMADPPDHTRLRLTLVSKAFTPRRVE  
ALRPRVTAITERLLDGVKKQGSVDLLSAFAFPLPVTVIAEMLGVPAEDQARFHEWTTLIV  
NPPLDGDGPLRAAGMQFLLYFRDLMEKRRSDPRDDLTLALVSAEEQGDRLTTEELVGML  
FLLLVAGHETTNNLIGNGVWALLRHPEQLERLRKNPALIESAVEEMLRYRGPVETTTQRW  
APQDLEFHGQVIPQGETIIASLLAADHDPEQFPEPERFDITREPNRHIAFGFGIHFCLGA  
PLARLEASIAIPLLLERLPQLRLAVDEDALQWREGILVHGMKQLPVAF

>MEBOL\_007319|KEGG|**CYP197AA1**|[Melittangium boletus]|mbd|DP

MSTARAALPPGPRSLPVLGTLIDYAKDPLGFIEACVRDHGDVVYVELLGQRTYVLQRPEH  
IEHVLVTRHRHYIKDAFQRELMGGRLLGNLLTNEGEPWLRQRRMQPAFHRQRLAAYGR  
VMAEHARRQLATWRDGEVRDVNADMMRLTLGIVIKSLFDLELDGKAEAVGPSLARVMEHF  
AGVQALIFPDWLPTPENLGYRAALGQLDALVSSLIRRRREAGGGETEDLLSTLLHVQDDE  
GQHMSDPQIRDEVMTLMLAGHETTSINLAFCFHLLARHPEAEASLHRELD SVLGGREPTL  
EDLPALPFTDSVVKEALRLYPATWTLGREALEDEIGGWSIAKGSVMMMNPTVHRDARL  
YEDPLAFRPQRWVDGLEKRLPRFAWFPFGGGPRLCIGMGFALMEARLVLATLAQRFRFRER  
APEDDVELLPSITLRPKHGKVRVTR

>MEBOL\_007543|KEGG|**CYP167B6**||[Melittangium boletus]||mbd|DP

MSPDSTQSHPPTVSFSPDAPGFAANPFPVLEELRKAAPLSYWKEGRAWLVTRYEEALAML  
RDSKRFSTNRAHWEFASVSGIAAIIPELAELNNAGLFALSGADHARLRKLVSPALTPRAI  
ERLRPEVQAIVDEILDEVSGQDTVNVVSDIADRIPPRVIGSMLKIPKGRETFLNRFTEAA  
VKSFLPGLLRPEDVPALRADVQEGIALVRETIERRRNPLPDDILTTLIQTEEQGDRNST  
AELLSLVSSLIVGGFETTIHLIGFTTYNLLKRPELLAQVLVEPDLIKGVIEEVLRFDNFG  
KMGLARYALEDVEVGGVTIKKGQMILLMLNSALRDEAAFSQADVFDARRNTNSSIAFGYG  
VHFCLGANLARLELQVVMNRILERFPTMSLVKEPSFGPHPVIRKMESLEVQLRSR

>MEBOL\_007929|KEGG|**CYP1284B4**||[Melittangium boletus]||mbd|DP

MHAFSGQKLDKIPAHVPPELVYEDNARDPRMLEDPHGRMRSLILEAPPIFFTPYNGGHW  
FVTRKQAIVDITMNPEVYSNKISGEHSGEHKDSQPGLNLLPISEDPPRHTAYRTPLNQPL  
SAKSLAGLESAIRVMANELIDKVLAAAGRCDFLS DIAEPLPVTFLFKLAGMPTNRLAEFRH  
LAVQAASATVDPATRAETFKQIAGIMAESIQSRQEKREEDLLSRLLDAKIDGRNPTFQEM  
LGYSMLLFLGGLDVTVNNAMSFQVRHLARDQELQAKLRADPSLLPGAIEELLRLYGIASVP  
RRVTRDQTVCHGVQFKQGD TMLLLLPAANYDDAAFPNPEQFMLGRTEQHMSFN SGPHRCVG  
LNLARLELKVFIYQEWLKRVPFRLDPQAPPRFMGGFTLAVTSLPLVWE

>MEBOL\_007972|KEGG|**CYP109R3**||[Melittangium boletus]||mbd|DP

MDLLSRFDFFSPDVMRNPYPYFAELRDKAPLHYDAKLKAHVLSRYEDVAFVLKNHALFSS  
TKIRIAGKLQEERASVKELGVSNNLVSM DPPVHTRLRGLVSR SFTPKQINAMEPRVRELS  
RELVAEMTSRSEFDFMDALASPLPVTIIAEMLGIDPVRRRDFKRWSDNLIQSNNATLQSG  
ETPEEVIRSAKEMLAYMTEVAEARRREPRGDLISLLVQEIDGVAALTPPEVNSFTTLLLI  
AGNETTTNLLGNALTALIRNPGEYEA FRRDPSPAACSAICEETLRYDSPVIGLFRRTTQE  
VEMSGGKLPADTSVMVLLASANHDPRKFPEPERFDPTRDTHGLMSFGHGIHFCLGAPLSR  
LEAPVALRELMERAPRLGFSRQPQDIDYGGSFFLRGPKSLWLQKN

>CYFUS\_000165|KEGG|**CYP110R3**||[Cystobacter fuscus]||cfus|DP

MTTPQLPSGPRITPVQTFRFLRDTTRFFLDCRARYGDPFTAPLPVGNVVVTGDPEGIRDI  
FSADPALFEPLGQLPLAPAVGDN SLLLMAGQRHKRERKLLMPPFHGERMRAYGQLMREIT  
LRSVETLRPGGPFRAQELTQSISLEVIIRAVFGIEEPARMRRYREVLVGYMESYTPLMM  
AVPLRRSFGGVGPWARFQRYVTELDQLLTEELSTRRGHEVGHTDILSLLLAARDEEGQPM  
TDAELKDELRTLLIAGHETTAIGMAWALHHLHRAPGTMQRLLLEELAPLGPEPEPEALVKL  
PYLTAVCDEALRIHPIVPVVGRRTVAPFTLRGRELPPGTGVMAAICLAHVDPVLYPEPDS  
FRPERFLERKYS PF EYLPFGGGARRCIGAAFAQYEMRTVLGSLLAAHRFSLANDTPERPV

RRNITIGPARGVEMVYEGPRRGALA

>CYFUS\_000318|KEGG|**CYP264D9**||[Cystobacter fuscus]|cfus|DP

MSGRINLLAPEVRANPYAVYAE LRRHAPVCQVDPGGYWVITRHDDVVA AFKNPQLFSSTG  
VRMATKPEWLGHNP FADSMIGQDPPRHTRLRN LVNRAFGPPALARLEGRVRHYAE AIVAR  
IPEGREVD FVDAFTLPLPASVIGELIGLEPSLHSHCKRWADDLTSISANPQDEKRREEIR  
AAVRETEAEMARVLALRRSEPREDLVSELLQARVDGQSLSDAELMSFMFLLLVAGLETTI  
HLLGHCVRVLMERPDLARLRADRSLLPRFIEEV LRYEPPVQAFGRLT TAEAE LSGVRIP  
AGAKVMLLIGSANHDDARFPDGRFDM DREGVNNLPFGHGIHFCLGAPLARLEARIGLEV  
LLSRFERFTPAGPLEWNHSFTVRGPRVLPVIAHGSA

>CYFUS\_000663|KEGG|**CYP167E3**||[Cystobacter fuscus]|cfus|DP

MLQKTPTPDHGPDFVLDMEDPAFVHN PYPTYAWLREKAPAYRWKARGDAIVFSRHKDVRA  
LVLDRRFSNDYRMWEFARKEEWPAEHA EYKSIMDNGLFGLADADHLRV RKLVS PAFTPRA  
AERMRDEIQKAVDDIIAEQVKGERVDLT TITEPLPMRVVSDMLKIPEDLRGEFRAFGLAS  
IRSSVLFTKSEELFALIAMPRWIRMLREVI AERRANLLENDLLSTLITASDEGQKLTEE  
EMISLVHALIVAGSDTTVHAANWALYSLLRHPDQFALLRDEPSLIRNTIEETLRYDLFGK  
GGLPKFAREEMEFAGTKLRKGQMVMPFI PAALHDPEVFPEPERFDIRRDVSQTIAFSAGQ  
HFCLGAALARQELDLVVGTLVRRFPHMRLS QEPEFVPH PIMRALTRLEV TLS

>CYFUS\_000749|KEGG|**CYP253G4**||[Cystobacter fuscus]|cfus|DP

MNNSAPLPPMPPGHWLWGHLPERESDPLGLYL RGRALLGDVVRF RMGPIYVEQLTHPDHV  
KYVLADAPARYTKGPI FHKTRPLVG NGLVTAEGDFWKRQRRLAQPSFHRERLAGLAGVMT  
ETAAEVLAQWEPRVRAGEPV PVFPEMMRLTLLVVVRALFGVDVAEHTRELGESFTTAEV  
TNERIISPLPYKPWLYRIPTAKNLAFQ RAMVPLNRIVEGIIAQRRARGPADESQDLLGML  
MAARDADTGDTFDDVQLRDEVM TLLLAGHETTATSLAWAFH LLEKNPEQEALLHEEVDRV  
LDGRIPTLEDVPKLRYTSCVFEEALRLYPPIWAI PRVAEEEDV VSGYRIPKGDLVLLVPY  
VTHRHPDFWPDPERFEPT RFLPENSKQRPRWAYLPFGGGQRQCIGNNFAMMEAQFILAMV  
AQRFRLRGTGAPVTAEAHVTLRPHGTM PMHATRREKQPQLQSA

>CYFUS\_001301|KEGG|**CYP253D3**||[Cystobacter fuscus]|cfus|DP

MTDTS AAPRAPAPRIPTGPRGLPLIGVVREARKDILGWFLRTAAEHGPVAQYRFGLGRSY  
LVSHPDGIKHVLQDNVKNYTKD HFSYAMVRRVVG DGLLTSQGDTWMKQRRLAQPAFHRAR  
ISAMADQMVRATVELSEQWAE AQRTGEPRLGAVDMMSLT LRIVGEALLGADV RADTEAVG  
RAFTVISEQTVERFRSLRFIPVLP TAYDRAFRDANRSLRQVVTRVIAERRAHTEDRGDL

LSMFMLARDEETGERMDDTHLQDEVLTMLLAGHETTANALSWTWALLAQNPDAERTLHAE  
LDAVLGGRPPTVEDIPRLVYTRVLDETLLRLYPPAYALSRKVVEDDVICGYQVRSGSSVD  
MSAYMTHRLPEFWPDPERFDPDRFTPEKVAARPRYAYFPFLGGPRQCIGNNFALMEGTLI  
LATLAQHHRPRLVEGYTPRPEPVITLRPSGHLPVKITPR

>CYFUS\_001363|KEGG|**CYP264A6**||[Cystobacter fuscus]|cfus|DP

MTTQRVNIIAPEFRADPHPRYAELRRNAPVTQVEPAGFWAISRYEDVAFVIKNPQLFSSQ  
GFKAAWQPEWVGYNPLANSMLVLDGVGHARMRTLVSRAFNASAI SRLEVRI RQLANRLVD  
ELA EKGEADAVSSFAMPLPAFVIGELLGLDVSLHHRFKDWSDDITSVTPVPHNPEHAQRT  
LTAITDATRYISEII EARRRSPADDLVSDLIHAEVEGQSLTDREIVDFLVLLLIAGLETT  
VHLLAHSLLFLAERPEEQARLRAQPALVPGFVEEMLRYEAPVQALLRVATSDVTL SGVKI  
PQGDVVLALLASANRDERHYTEPDRFDVHRGQPGLSFGYGIHYCIGAQLARMEARCGLEA  
LLSRFSGFTRTSTELSWGQAITVRGPQHLP LRFIPA

>CYFUS\_001619|KEGG|**CYP107DL6**||[Cystobacter fuscus]|cfus|DP

MATNPVNEQTTKAAASGPTPQATCPMKALREAPRCPALLDKESPEFLAHAYATYADLRTQ  
APVVRTSFAHNFADAVLPGGTKRPESGSHPAKERL FVTRYDEVVEALLDERLSSDFRTSL  
TPEQRANLQYMPPEVRPIAYSLLMLDPPDHTRLRKL VQPNFTARTMEMLRPRIQRIADTL  
LDQVERAAAERGEREGERRMDLLHAFAYPMPITVISDMLGIPEEDRSRVHGWAE SLLGAD  
RRDAAMDELRRSSLREFARYLDGLFERKRREPAEDMISQMVHAQDEGDKLNHQEMVSMVF  
ILFFAGHVTTVNLI GSGVVAL LTHPEQLERFLADPTNLSKGAVEETLRYWGPVDY MSTPR  
IIKEEMELAGTHLPQGEKLSVGLASANRDPQHFPNPDVFDITRPNHRNLAFGKGIHICL  
GAPLARLEGQIAFETLFRRYPRMRLEV PFESLRWNTGSGLRGFD RVPVRF

>CYFUS\_001993|KEGG|**CYP1492A2**||[Cystobacter fuscus]|cfus|DP

MNPAL AIDTPRLKEYAPSTLELLKAIRREGFLGWM TNTWRQHGDLLRIRMG SQSLVLVT  
HPDHVRHVNVTRRESYDKGESYDVLRELLLGNGIVTATGEDWRWQRRLMAPFFT PRGVEK  
FYPIFLSDTQQ LIERWRSQLQGSGRPVEMLD EMMRV TASVILHSVFSTESDEALLRIKNS  
IETMVSHISETGMRPVQVPQWVPTPGNLRFRRAHKLVTAYIRELIARRRAIPT EQWPDDL  
LTKMMTIRDEETGRLMAEQLLIDNGLTMFAAGHETTARTLSFLWYALSQNPEVERR LHVE  
LDSVLGDAPPTLNDLKKLPYTLQVVKEVLR LYP AAPMYARDAVADDEL DGVRIPAGTRMI  
VFSYGTHRHPAFWDEPERFDPDRWLPEREAAARHAHAYHPFAAGPRICLGNNFS LLETHVM  
AAMLARRFKLRLKPGHVPRIDMFGTLGSSNGLPMLIEAR

>CYFUS\_001994|KEGG|**CYP1284B4**||[Cystobacter fuscus]|cfus|DP

MNAFNGQKLDKIPAHVPELVY EYDIAGDPRVLEDPHARMRSLILEAPPIFFSPFN GGGHW  
FVTRKKAIVDITMNPEVYSSKNPGEHGKEATGGLSLLPISVDPPQHTLYRTPLNQPLSAK  
SVAGLETAIRAMTNELIDKVLAAAGRCDFLPDIAEPLPVTFLKLAGMPTNRLAEFRELAL  
QAASATVEPATRAETFKRIAGILAE TIEARQE KREDDLISRLLDANLDGRNPTFQEMMGY  
SILLFLGGLD TVVNALCFGVRHLARDQELQAKLRADPSLLPGAIEELLRLYGIASIPRHV  
TRDTVCHGVQFKQGDALLLLPAANYDDTAFPNPEQFILGRTEQHMTFNTGPHRCVGLNL  
ARLEMKVFYQEWLKRVPFPRLDPQAPPRFSGGFALALTS LPLSWA

>CYFUS\_002491|KEGG|**CYP264D7**||[Cystobacter fuscus]|cfus|DP

MSGRINLLAPEIRANPYPAYAELRRNAPVSQVDPGGLWAVSRQEDVMHVFKNPQLFSSQG  
FRQAYRPPWISNYPLADSALVMDPPRHTQLRALINRAFGTQVVTRIEPRVREFAQ RIVQA  
LPDGQEVNFVEHFSVLMPMYVIGELLGLSPEVQPRLLSWVEWLGQFTGVGPADTARQEAV  
RATVNEARGHFEQVLTERRRNP GDDLISDLLRARVEGESLSDTDLLGFMFLLLVGGMETT  
IHLLSHSALRLQLQPELMRQLREQPSLLPRFIDEVLRHETPAHGVMRLTSEETELGGVRL  
PKGTRLLMLMGSANRDEAQHPDPDRFDMNRTQSNLPFGHGIHFCIGSQLARLEARLSLEA  
LLSRFTHLTAGTQSIQWNSSLVVRGPTRL SLIPHEN

>CYFUS\_002676|KEGG|**CYP105EK1**||[Cystobacter fuscus]|cfus|DP

MTDSYPLPKDWQHPLDPPPEYKRLRKEAPVCPVRTWDGNTPWLI TRYEDVLAALGDPRLS  
LDSSLPGFPHTSPASAA RQSRPLPFPFLPEAEYRAQRAMLVPEFAPRRMEALRPRIQQT V  
DEVLDAMLAGPRPADLISAFALPVSMRVICDLLGVSREDADRLHVISRTIGSRASSREVA  
EKALDELDTYFRRLVEENLREPTDTLVGRVVAEHVQPGRLSV DATAMFHALFYAGHGPS  
GYMVGMGVLALLLHPDQLDRFRALETPDALSAAVQELLRYVTVSHMGRQRAATEDVTIGG  
QLIRAGEGVLAQPD SANRDET VFPEPDRLDVHREPYRNFAFGHGIHLCTGRTLAIIELEV  
TFHTLFRRIPNLRLAAPLEQIRFKKDENLIGAHEL PVTW

>CYFUS\_003078|KEGG|**CYP120G3**||[Cystobacter fuscus]|cfus|DP

MTAQADPHAPSPENLPLPPGRTGLPLLGETLDFLRSSRAFTEQRRNQYGPVFRSHVLGSP  
AAFLTGPDAIQWIFAGEGKYLKNRWTPGVRLLGANSLSLLEGEEHLERRRLLAPHFSYA  
TMRGFVPAIESLATRHFERWAALPGDFTLWPAMRELA FEIALSLIFGQDTVDPFLMRHF  
QAWTAGLFVPLAVNLPWTKFGRALA AKKAMITYLDQLVAERQKRTEQPPDLLGSLLRHRD  
GEEPLPRETIVEELQ LLLFAGHDTTVTATS NLMLLLAQHPDVLQKGREAVADMEGPLTLD  
GLRAMPYL VQLIHEGMRLIPPIGGAFRVTT RDVAFKGFRI PKGWMVPVSIRTAHAGDHP  
LPERFDPERFGSENNEQRKPGTFIPFGGGPRICLGQH FAMVEMSVMLALLLKH YTWELVP

GQDLSYLLVPFPQPRSGIQRLRRRS

>CYFUS\_003193|KEGG|**CYP251V1**||[Cystobacter fuscus]|cfus|DP

MDTVTPLPTATAPEVPGGLPLLGHALRLLRLPIAYLQSLREFGDIVQLRIGSSPVYVVT  
PEFIHQVLVTHADSFERGRVFDKATAAIGKGLIVSNGTFHRQQRKLLQPGFHRPRIHGYM  
EIIHRQAEAQIAGWSPGARISLREEMHRLTLNAVTRTLFGANTEERIAAEIGDYIDAANS  
WVGLHTVLPGRFFERLPMFVNRAFERKKARFDEIINTFIESRRADGRDQGDLLSALLASQ  
DDETGKMSDEQLRMEIAGLFVAGSETTATALTWLFHEVGRHPEVEARIAEVDVAVLGGR  
PVTTEDLPRLQYIQSVISETLRRYPPIAWLLMRRATRDVELAGTLLPAGAEVIVSPMMVHR  
NPQLYPEPLRFPDRWLPERARELPRHAFLPFGDGKHKCIGDYFARTEMVIAVATIAARW  
RLVPVPGHRVWEVPRSVLRPNQVLMTAVPRSAAPVPEENH

> CYFUS\_003263|KEGG|**CYP117E2**||[Cystobacter fuscus]|cfus|DP

MQMQTLSNMLERLPMKETHRLGIPILPGGLPLVGHAPFNLGDTLTFLRAAEAKVGPIFWM  
RSFGSEMQLVCMGEPGFELLKNRVTSSEFIREQAPEFIGDALLSQDGAHRNLRTPMMSGP  
FTPRGLSSSGAATLSAEVIEASVASLPASRPFSLITETQKFALDIIFRVMGIDRSEIQEF  
NTNYREFTLGAFPLKLDLPYSPWRARRGRAWLDARFSSLIAAARGRPMPGTLSAMLLAA  
RDTEGQPLKEDDLISNLRLLALAGHETTASTMAWLGLVLAQRPDLWEKLREEATAAPGLP  
RSPEELKRHPFAEALFREYIRLYPPVSSSTAREATEDLTLHGKLVPKGTMITVPLGTYGYD  
PANFPEPEKFDP SRWMGRRIPPSSIETAPFGGGPHFCLGYHLAWVEVVQFATAFARELSR  
RGVRPQLAPGVAPPKLRYLPFGQPPKKALIEFVPVV

>CYFUS\_003343|KEGG|**CYP1284B2**||[Cystobacter fuscus]|cfus|DP

MSAFSGKKLDKIPAHVPPELVYEDNARDPRLLEDPHARMRSLILEAPPIFFTPYNGGNW  
VVTRKKAIVDITMNPEVYSNAFLVSGHQSEEHAGEHKEAQQGLMLLPVAADPPRHTAYRA  
PLNQPLSAKSVAGLETAIRDMTNELIDKVLAAAGRCDFLSDIAEPLPVTLMKLAGMPTDR  
LAEFRHLATQATSATVTPADREVTFKRIAGILAETIKARQEKREEDLISHLLDANINGRN  
PTFQEMLGYSIALFLGGLETVVNALSFGVRHLARDQELQAKLRADPSLLPGAIEELLRLY  
GIASTVRQVMRDEVCHGVQFKKGDTVSLLLPAANYDDAAFPDPEQFILGRKEQHQTFTNTG  
PHRCVGLNLARLEMKVIFYQEWLKRVPFRLDPEKKPRFVGGFNLAIASLPLVW

>CYFUS\_003436|KEGG|**CYP102J22**||[Cystobacter fuscus]|cfus|DP

MTPSLLPIQP RPWPLVGNLTDLDAEQSILSIMELARLHGPIFRLVFFGQSLIVVGSQEL  
VNELCDETRFGKLVHSSLRELRAIGGDGLFTAHTEEP NWGKAHRILMPAFGPLGVRDMFA



PMLDVAEQMLLRWERFGAGAVLDVDPQMTLRLTDLTLALCAFDYRFNSFYQDALHPPFVGAM  
VDGLHEAGVRADRPEVLNRLLLPSARRYAEDIRLMHAVADQIIITERRRDPDAGQKNDLLG  
RMLSARDPVTGETLSDENIRYQMVTFIAGHETTSGLLSFALYLLLKNPRVLHAARARVD  
EVLGGDTPRLEHLPSLRYVEQILMETLRLWPTAPAFAVRAYEDTVIGGRYAITPQDAVMI  
FPPILHRDPKVVWGPDVEAFRPERFDREAEARLPPNAWKPFNGQQRACIGRPFALQEALLV  
LSMILRRFDLIEDDPSYTLKIKETLTLKPEGFRIRARRRDLAALKSRSPVPGAPRGTPAP  
EPTPALARTEGPRTPLLVLVYGSNTGSAQAFAQRIGSDAPSHGYSVRVAPMDEHAGRLPTQ  
GAVIVLTASYEGQPPDNARQFVAALEAAPAGAFAGVKYTVFGCGNRQWARTYQAVPLQVD  
ALLEQAGATRLKPRGEADASEDDFFGAFDAWYATLWPALAATFGQEAAGTSEAPRLQVEVV  
RDNRESTLLRQEDLGAGQLVENRELVNLASPHARSKRHLEILLPEGMTYRAGDYLAVLPRN  
PGVSVERALRRFGFAQDSQIIIVHKEGARLTALPTGYPIAVSELLTSYVELGQPATRAQVE  
TLAKATRCPPPEKQPLEALAQEALYRREVLDKRVSVLDLLERFPACELSFAAFLEMLPPLK  
ARQYSIASSPLWNEHRCALTAVVVDAPAYSGQGRYLGVTSNYLAALAPPTRVSVAVRPSH  
PRFHPPTDPQEPLVMICAGTGLAPFRGFLQERALQAREGRRVGPALLFFGCDHPDADFLY  
REELEAWQRAGIVDVRPAFTYAPEGEVTFVQHRVWKDRADVAGFFQRGATVYVCGDGRRM  
APAVRETIVRIYEEATQVPREEAEQWALRMEREQGRFVADVFA

>CYFUS\_003477|KEGG|**CYP262B4**||[Cystobacter fuscus]|cfus|DP

MSETTSQTSSDRSLPVRVSSLPVGLPRLIANPLSFMEQAQREHGDIFSMDLGFTQVIG  
LCHPRYVHHVLVEHAHKYSKGGPMWDSMRTFMGNALPMSEGAFWKRRMIQPSFHHQRV  
SLMTDTMVEAIDECLLEWDLAALEGKPFVDVSVALSRVTMTVLVRTLFGSGLDKDDAEKVA  
QAFSFILEYFIAGMVTHSLPEWMPVPGRQRYRESIKMIDEIMRRLIERGREQASGEDNLL  
SLLLQAVDGESGERMTNEQLRDEALGFFIAGYDTTAAGMTWVLHALTQHPEVTDKVRVEL  
DAVVGTRRPGFADLMRMPYTRNVLQEALRIHSPSVWLPRLSVVEDEIDGYRIPPGVMMVI  
FTRLIHRHPGIWDDPLTFDPDRFTPERSEGRHKLAWLPFGSGQRQCIAKEFSLLEGMLIM  
ARIVSRYELSSVPGRLPQERVSTNLRTKDGMLNLRPRLPQAQVPRIQLSGTA

>CYFUS\_003785|KEGG|**CYP109AK1**||[Cystobacter fuscus]|cfus|DP

MQASDYNPLSSTVQADPYPYAALREHSPYIFNEQLGWYIVSRYEDVVAITKNPAVFSSA  
RAIVQPEKLDAAEKVAPISVRSFRRGILIGEDPPTHTKTRNLVTRAFTPKRIAEMEPRIR  
QIARELISQLPRSGEFDLIKDLAEPLPMIVIAEMLGVEPERRHDFKRWSDDAIAISFALV  
KGAELSGLEHSSREMADYMARALEARRQQPREDLIQALLDNGVREGLLSVDDASAFCRLL  
LVAGNETTTNLLGNGMRALLGHPDQLERLTREPSLIPNAVEEMLRFDSAAQALFRKTTQE  
VEVSGVRI PAGASVLLLFGSANRDPKRFQDPDHFVTRNVAGQVAFGHGIIHFCLGAPLAR  
LEAKVALEEELLTPDRQLSLVPGQRLNVAHFTLRGLKSLRLRTEPARSARASA

>CYFUS\_003950|KEGG|**CYP1335A2**||[Cystobacter fuscus]|cfus|DP

MTPPTDPYQAVTHPDPYPYYASLCARGGLQRIAGFEPWIAADAATVRAVLTSEACRVRPQ  
AEPVPSHLLGSPAGALFGRLVRMNDGAPSAAVKQALASALPTVMRAVDAESRRWSARLFS  
EPRLSLLPEKALQLPVFVLGCLLGFPFEEFLAESVREVDAYVRSVTQPGARTEGALGAVRL  
VERVTACLQAKPRAPELLGAFSSRMREEGGALEALVPNAVGLLTQAYEATAGLLGAALLA  
FARMPALREQLARGECSIDDVVREARHESPIQNTRRFIHACATVANQELEAGATVVVVVL  
AAANRDPRVNPQPDVFLPRRPERQTFTFGLGAHACPGRELAVTMVSAEVERVLASGLELT  
PLSKSITWRASTNARILGGLQ

>CYFUS\_004102|KEGG|**CYP167B9**||[Cystobacter fuscus]|cfus|DP

MSAQQTNPSENREPEVQFNPYAPGYDVNPHPALEKLRAVAPIFYWEQGRCWVVSRYEDGLT  
VLRDDKRFSPNRDDWEFASVLGSDALIPEMEELNKNGLFALGERNHARVRLVSPAFTPR  
ATERLRPEIQAIVDEILDSMAAKGRLMNVHEFSEIRIPARVIGSMLKIPKGNEELFLDFTN  
AVAKSVFAGALAPEELAPLRQIREGIVLVTTETIEDRRRNPNQENDILTTLIQTEEQGDKL  
NKQELLALVSSLIVGGFETT VHLSFCVYNLLQHPEVF AELRTRPELTKNLVEEVLRFDN  
FVKMGPARYALEDMELGGMPIKKGQMLVVLVGSALRDERAFDKADVFDVQRNASAGIAFG  
HGAHYCLGANLARLMGQIAMGTLVRRFP ERLRLVKQPSFGPHSLMRKMEVLEVDLGSPSA

>CYFUS\_004514|KEGG|**CYP102M6**||[Cystobacter fuscus]|cfus|DP

MSKPSLSTTIPQPRSRPLVGNVPDVGFTPLQNMMKLAREFGPIFRLSFPGENFLRVISS  
YELVADACDETRFEKMLGQVLLQLRDLGGDGLFTADAREPNWGKAHRLMPAFSPAAMRN  
YHDGMYDVADQMLTRWARFGPDTDIDVSDNMTRLTLDTIALCGFDFRFNSFYQREMHFV  
ESMVRALAEAGDRTRRVPLQTQLMLRTQRQYQSDLQYMYEVVRELIVRRRALPPEEAPKD  
LLGLMLEAKDPLTGEKLDDDNVRSQ LMTFLIAGHETTSGLLSFAVYFLLHYPEVLQKAYE  
EVDRLVGSEAPRFEQISQLQYIDQILRETLRLWPTAPAFTLHAKADNTLLAGRYPVGVKD  
TLMVLI PMLHRDPTVWKNPERFDPERFAPEVRDSIPTHAWKPFNGMRACIGRAFALQEA  
TLVLGTMLQRFHISTPEPYTLRIRETTLTKPDGLKLRVRARKPVS RAPAAARRAPT PAPVA  
SSSQPTEKTSSHGTPLLLLYGSNSGASEAFARRIASDGLARGYTAKVAPLDEYAGKLPKE  
GAVVIVTASYNGQPPDNARAFHTWLSNPAGALQGVRYAVFGCGNRDWGETYQAVPKFID  
ERLSAAGARSLLSRGEADARADFFGDFDYWYAPFWTRVGEGLGVASSEVDAGPRYTVEVV  
PPVSAELVKQNKLELATLVDNRELVDMTSPFGRSKRHLVFKLPQGVTYAAGDYLAVLPEN  
HPELVERAARRFGVSPDATVILGSARGDQGSSSLPTGRPVLVRELLGRHVELSAPATRKDL  
ERLAEKNPCPPHAMHLVALARDAERYKKEILDKRVSVLELLEQYTSCILSLGDFLELLPA  
MRVRQYSVSSSPLADPTECTLTVAVVDAEAWSGQGRFRGTCSSYLARLRPGEQVAVAVRT  
PNVPFHPPASNATPIVLVAAGTGLAPFRGFLQERALRHARGEAAAGPALFFF GCDHPEVDF  
LYREELAQWEREGVVKVLPAFFRQPDGDVTFVQHRLWKEREQVKALLDQGALLFICGDGR  
LMAPAARETLARIQKEKVGCSSEEALAWLAAMEKQGR LACDVFA

>CYFUS\_004527|KEGG|**CYP167B8**||[Cystobacter fuscus]|cfus|DP

MSHEQTKSETKSCFPNPNAPGFDVNPYPMFKELRQTPTISYWDQGHGWIVTRYEDVIAAL  
RDNKRFSTNSADWEFASTMGTAALIPERDELNRANLFSLPDADHTRVRRLVSPAFTPRAV  
EWLRPDIQAIVDELDDAAEAKGTINVVSDIADPIPARVMSSMLKIPKGREVLVQRFTEAS  
IKSLLPSLIPPEELVTVREAIREGIVLIRETIEERRRNPREDILTTLIQTEEQGDKLST  
PELLSLVASLIVGGFETT VH LIGFTLSNILRRPELFAQLKAEPELVKNVLEEVL RHDNFG  
KLGLTRYAREDLELGGVKIKKGQRLFLMTNSAMHDEAAFPHPETFDVRRNNTTTIAFGNG  
MHFCLGVHLARLEGRIAVDTLLKRFPDMKLVKPPTFGSHPVLRKMETLEVQLRARS

>CYFUS\_005195|KEGG|**CYP107HV5**||[Cystobacter fuscus]|cfus|DP

MPTITPPDFSSQQFKANPFPFYARLRQEAPVYHFTSLTKEPTWLVTTRYEDVSQVLKHASL  
SKDVFGAAGAERRAQMPWLLKIFEPVSQNMLSKDPPDHTRLRLSLVHKAFTPRLIEQLRSR  
VQALSDRLLDAAARKGSMDLVSEYALIVPVTIIAEMLGVPSPDYRK FQHWSNRLISNTSL  
WDVILSVPSVVMFTRYLRQLIARRRSSLGDDLLSALIQAEEAGDKLNADELVSMVFLLLV  
AGHETT VNLISGGTLALLQHPEQLERLRKEPGLIAPAVEELLRYASPVEVSTERFTKEDI  
TVGGVTIPRGHLVFAAIGSANRDERQFKDPTLDL GREPNRHLSFGMGIHYCLGAPLARL  
EGQIALQTLVNRFPKLRRLATSAQSLKWRTGVLMRGPQRLPVSL

>CYFUS\_005203|KEGG|**CYP1347B4**||[Cystobacter fuscus]|cfus|DP

MQSTVALVGMDRNPVSPQNLNNPIPLYHELREHEPVHWSEPLQAWVVTRHEDVMACFRDP  
RLSAERWKFFEYQIQGLEPETIREFMETTRDQMAMRVGPEHTRVRRQASAGFTPMKLEEM  
RACIHHTMAELLEGVRRERHGMNLAQEISYPLPTRVIAELLGVPAEDRDRFRRWSDTLAEF  
AAPAAGASMLGAARRANQAMMEMKAYFLPLIEQRRAHPTPDALGMMVQAEVGHMTAGEL  
VANAILLMFAGHTTTTDDQLSNCVHDLLTHPEQLQVLREEPERVRAAVEESVRFHPAVPFI  
FRVAVADV ELRGRLIHAGDVVFLGMAAANRDPRAFPEPDRFDITRDHTQHRHLSFGFGTH  
HCMGAGLARRELETGITLLEHLPLGLRLDETRPARLKCHSLNFRGFDVLPVRW

>CYFUS\_005279|KEGG|**CYP107HX5**||[Cystobacter fuscus]|cfus|DP

MVEAVRVNLQREFESPEARANPIPVYAKLRKLGPVLHSTALYGEGFVLP RYEEVVSVLKD  
PRFANDRRNVPGGTSM DRWWMPAILRLLVSSMVLKDPPDHRRLRNLVQKAFTPIMVENLN  
GRVEQITEELLDAAVRKPVVDLMEEFALPLPLTVISEMLGVPEPDRINFRKLIKVLDP  
SVSPIAFIRNYPHMLRLNRFLRRLVNLRRREQPGNDLV TALVQAEEGGDRLSEDELISMI

LLLFAGHETTVNLIGNVGLALVRHPDQLQKLREQPDLIDSAIEEMLRFTNPVGQVAPRFA  
KEDVEIAGVRIPKGSAVTLLIASANLDETAFPNADKLDITRSPNRHVSFGYGIHYCLGAP  
LARLEARVAIPALLQRFPRLELAVPAEKLRRWRPNIGLRGLEALPLSVSPASSAAERSAA

>CYFUS\_005395|KEGG|**CYP264A5**||[Cystobacter fuscus]|cfus|DP

MTQINLMSPEVLTNPYPYAELRRLSPVCQVEPHGMWAVSRYEDVLFVLKNPSLFSSSGF  
TVAWQPAWVGYNPMANSMITRDPPQHTRLRALLLRAFGPATIARLEPRVRATAERLASGL  
VDGADFIQTLALPVPAYVISEILGLDHQLLPYFKQWSDDIVAITPSPASPEAAERIRGTI  
AKLTEYVGKVIEERRRAPADDTVSDLLRAEVEGQRLTDVEIKDFLIILLIAGLESTTNLL  
GNSLLFLADHPEMMAHLRAEPSLIPSFIEEMLRYDGVAPGVPRLAASDVTLAGVTIPQGS  
MVFPLMSSANRDERKFPDPDRFDLHRGSQGGLAFGQGAHFCLGAMLARMEVRIVLETVLA  
RFQEVERLLGNIQYQCALTTTRGPVALPLRYIPVGG

>CYFUS\_005459|KEGG|**CYP1011E3**||[Cystobacter fuscus]|cfus|DP

MESVARPSVDVKELSTPRRSSIKFNMFDPAFHADPYPVYARLREEEPVHRTIMGAWIITR  
YADVKVLLRDNNFGVFDIPTRIERKSPFLERKKIGELRTLASAMRRWLMLCDPPDHTRLR  
SLVNRSFTPTAVESLRPRIQETVDQLIARVRSSGRMDIVNDLACPLAVTMIASMLGVPEE  
AHSSVTRWADGLSRVLDPLRSLEQYAEMNNVAQEFLAYFRELFAERRRNPKNDLISSLIA  
VTDQGDRLTEDEMLSVCMLMFIAGEKTTVNLLGNGMRALLLHRSEFERLRQDPTLIRGAI  
DEILRYDSPVQLNTRVPKKDVVLHGQTIIPAGDLVYFSLGAANRDPAQFEQPDFTDITRRE  
NRHLAFSGGIHYCLGAALALIEGQIAIGTLVREFPDMALVPGETEWMKEIIFRGPQTLPV  
TFTP

>CYFUS\_006003|KEGG|**CYP109R5**||[Cystobacter fuscus]|cfus|DP

MDLLSRFDLNPVEMRNPPYFAEMREKAPLHYDAKLQAHVLTRYEDVSYILKNPALFSS  
ADVRVAGKHQKERSQESGLEGVDSLLTTDPPVHTRLRGKVSRSFTPKQISAMEPRVRELS  
RELVAEMTASNEFEFMGLASPLPVTIIAEMLGVDTSRRRDFKRWSDAIANSNGNASFTGK  
TPEDVVRNAKEMLAYMTEVAEARREPRGDLISLLVQENEGQEALTPPEVNSFAILLLLA  
GNETTTNLLGNALTALIRHPEAYEWLRRDPTQAACAABAEETLRYDSPVITVVRRTTQEV  
ELSGGKVPANTTLFAVVSAANRDPKFPDPDRFDPRRDTTGLMSFGHGIHFCLGAPLARL  
EAPVALQELMARAPRLGFSRQPEHIDYGATFALRGPRVLWLQKN

>CYFUS\_006004|KEGG|**CYP109R3**||[Cystobacter fuscus]|cfus|DP

MDLLSRFDFFNPEVMRNPYPYFAEMREKAPIYYDAKLQAHVLSRYEDVSFVLKNHALFSS  
TKIRVAGKRQEERASVEELGSVSNLVTDDPPVHTRMRGLVSRAFTPKQISALEPRVRELS  
RTLIAEMTASPEFDFMEGLASPLPVTIIAEMLGVDTSRRHDFKRWSDILIHSSRAALQSG  
KVSEQVERSAREMLTYMKEVAEARRREPRGDLISLLVQETDGVAALTPPEVNSFTVLLLI  
AGNETTTNLLGNALNALIRHPEAYEWLRRDPSPAACAABAEETLRYDSPVIGLVRRTTQE  
VEVSGGKLPEDSTVMVLLASANHDPHKFPDPERFDPRRDTNGLMSFGHGIHFCLGAPLTR  
LEAPVALRELMERAPRLGFAPRQPEALDYGGSLFLRGPRSLWLQKN

>CYFUS\_006005|KEGG|**CYP109R5**||[Cystobacter fuscus]|cfus|DP

MDLLSRFDFFNPEVMRNPYPYFAEMREKAPLFYDAKLQSTLVSRYEDVSYILKNPALFSS  
AQIRIAGKLQTERNQDAGLEGVDSLTTDPPVHTRLRGRVNRAFTPKQISALEPRVRELS  
QECISEMTAHNEFEFMSGLASPLPVTIIAEMLGVDTSRRRDFKRWSDALVNSSNASITGK  
TPEEVIRSAKEMLAYMTEVAEARRREPRGDLISLLVQESEGEALTPAEVNSFAILLLLA  
GNETTTNLLGNALTTLIRHPEAYEWLRRDPSPAACAABIEETLRYDSPVLTLSRRTTQEV  
ELSGGKVPADTTLMVLVSSANHDPKFPDPRDFPRRDTAGLMSFGHGIHFCLGAPLARV  
EAPVALQELMARTPRLGFSRQPENIDYGASFLLHGPRSLWLQKN

>CYFUS\_006176|KEGG|**CYP242A4**||[Cystobacter fuscus]|cfus|DP

MTTTTAASLPSYDLFTPEMMANPMPTLHRIRAENPLVWSPQLNAYVLTRYADILAALKDR  
RLASSNMANWMDLLTPEQQQELLPVRQSIQLWMGHTNEQDHLRFQLLLKRYFTPGTVDAL  
RPRVRQLTEELLDAEPRGGMDVVEELAYPLPANVIAEMLGMPTRDREKLQAWSRDITAL  
FQRSDIHQLRRSQRSVLEMQDYLRPLLEERRRAPSEDLISVLLAASKEGTLSEEEIVSNC  
VLLLFAGHETTANLIANGLVLLFEHPDQFEALKARPELMATAVEEMMRCDGPASVISRVS  
IEPVEVCGRSFPAGQTFYLALGAGNRDPEVFPDPDRFDITRKPNRHLGFGMGAFYCLGAA  
LARMEADECFRILLRRFPNVRPAYQQPDWQVSPPLGHNLSLQVKF

>CYFUS\_006207|KEGG|**CYP1387A1**||[Cystobacter fuscus]|cfus|DP

MSSPSSPRPEAANASGCPFSARSFNPFAPPQHENMQALFAQARREQPVFFSEAMNAWVVT  
RHEDICAAVEDTQRFSSKLDSDQIFEALLPEPRAYLADAGYRKMPMIYDDPPEHSRSRQIV  
ARLFSKENLAALPLVRSITEELVDGFAQDRQVELVSRLAYPLPIRVIFAWMGLPLELMD  
DFKKWSRHLTLMLSLQARTLELQNECVRGVTDQMRCVAELISERVAHPREDGLTVLAQSL  
REGTTLDAADLAAMVLLISAGHETTSSLMGMAVRVLLLEQPERWRQLREEPHTLPRVVEE  
VLRyetPMAILARHTATQaelGGVTIPAGARVLLVVLsgNRDERRFpePEGfdPKRPQLG

QHIAFGRIHVCVGAGLARLEARMLEVLARRLPGLRIVEPPRLVPGPVRHQEQLLLAWD

>CYFUS\_006425|KEGG|**CYP107DL4**||[Cystobacter fuscus]|cfus|DP

MKPMDESQKQTVGVPSPAGTCPFKHLMEAPAPSGGSVVLDRNPEFLTAYATYARLRE  
QAPVVRTLFAFGVMDTRKVDSTRAGSTADLASSEERLLVTRYDEAVAALLDGSLSDFRTG  
MTPRQIEGLAHMPPEARPLADSLISRDPDHTLRKLVQPSFTARAMETLRPRVQRITDA  
LLDKAEREAAGRQAAADRQMDLLEAFAYPMPITVISDLLGIPEEDRERINHLAELLMNT  
DRFDASLAATRRDQTRRFNAYLEELFERKRREPAEDMISQMVHTQEEDGDRLGHEEMISM  
VHVLFFAGHLTTVNLIIGNGVVALFSDPDQARMVADPSLAKGMVEETLRYWGPVDYIGTA  
RTAIADTQVGGSVIPQETELSIGLGSANRDPSPFDPDVEDITRPEAHNRNIAFGKGIHVC  
LGAPLARLEGQIAFETLFRYPKRLRLAVPAEQKLGAGVGSVGLRGFARIPVLF

>CYFUS\_007441|KEGG|**CYP183BE1**||[Cystobacter fuscus]|cfus|DP

MRVPTAPARWPLLGHWSPLLSPRDRFLLSLEKVGSLVRVYIGQMPMVITDPELTRQVLH  
DSATFDKGGSLYEKLSELTGNGLLTSQSEPHKRQRLVQPAFKKSSIKDYSSVMAGVVEV  
ALRDWEDDAVDMKAAAYHIVSRIAARSMFSAEMADASIARIAEALSIYLNGLFVRTVGP  
GVLFERLPTPGNLRYKQALEVLHQEISRIISEYIASGVEREDVLSILLREKDEGDGAGLS  
PQEVHDQVTLLLAGIETSAATLCWCCLYLLSHHPDVTQRLQAELDGVLGGRAAQWDDIPE  
LKQTRRIVMEALRLYPGWLFTRVTMRDVTLGAYPLPRGTGIAYSPYLLHRSPSSFEQPD  
RFDPDRLWPERSNRLSMNSFVPFGGGVRRICIGEMLGVTVMMLTLATIASHWEARCVREGP  
IEPAPAHVSLIPKQLRMRVTRKR

>CYFUS\_007462|KEGG|**CYP109AK2**||[Cystobacter fuscus]|cfus|DP

MQASDYNPMLPAVQADPYPPYATLRENAPVYFNEQLGWYIVSRYEDVIAITKNPAVFSSA  
RAVVRPEQLDAAEKVAPTAVRAFRRGILLSEDPMPHTKTRSVVTRAFTPKRVAEMEPRIR  
QLARELISQLPRSGEFDLIKDLAEPLPIIVIAEMMGAEPKLRHEFKRWSNAVATFYALA  
RGAELSGIERTSQEMHDYMSQALEARRQQPREDLMQALLDNGVREGLLSVDEAIAFCRLL  
LVAGNETTTNLLGNGMHALLSHPDQLERLTREPALIPNAVEEMLRYDSAAQVFRKVTQD  
VEVSGTRIPSGANVLLFGSANRDPKRFQDPDRFDVTRNVAGHVALGHGIHFCLGAPLAR  
LEARVLEELLTPDRQLSLVPGQHLENVPNFNVRGLKSLRVRTEPAPGTRASA

>CYFUS\_008532|KEGG|**CYP167B6**||[Cystobacter fuscus]||cfus|DP

MSLEATKQSSPAVLFPQAPGYDANPYPMLDELRTKTPLVYWEQGRGWLLSRYEDAIEVL  
RDARRFSPNRDEWEFASVLGSAAMIPELVLSKTGLFALSGADHARVRKLVSPALTPRAI  
ERLRPEVQALIDEVLDEAAVKGTINVSDISDRIPARVIGSMLKIPKGRETFLQRFTEAS  
IKNFLPGLLRPEEVEALRADIREGIALVRETIEDRRKNPLPDDILTTLIQTEEQGDRLST  
SELLSLVAALIVGGFETT VH LIGFTTYNVLQRPELRAQLKTEPDLLKNVIEEVLRFDNFG  
KIGVARYALEDVELSGQTIKKGQMVLIIMNSALRDEAAFPKADTFDVRNTNASIAFGHG  
VHYCLGANLARLEVQLAVGTLLRRYPDMQLVRPPTFAPHPVIRRMETLEVQLRAQ

>CYFUS\_008546|KEGG|**CYP107DL5**||[Cystobacter fuscus]||cfus|DP

MAPNPLDEQQQQTPAQPPREAPFGGPVVLDKESLEFMTRAHAVYAELRDKGPIVRVPSGR  
GIVDRAQAERASPGASSPEQYFVTRYDEAVSILMEEKLSSDVLKAMPPEQRARMDAAMPE  
ELRPIVRSILVLDPPDHTRLRKLVPNFTARAMEALKPRIQRIVEDLLDKAEREAATRGE  
VSPDRRLDLVESFAYPLSITVISDMLGIPVEERETVYPWAERLLRAKGPEGMMDGETRAG  
LTAFANYLES LFARKRQAPAE DMISQMVQVQEDGDILSPQELLSMVFILFFAGHLTTVNL  
IGNGVVALLSHPEQHARFLEDPAACVKGMVEETLRYWGPVDFIGGPRIAE DL DVGGTRV  
PRGAKVAVGLASANRDP RRFTNPDAFDISRPAHRHIAFGKGIHVCIGAPLARLEAELAF  
EALFRRWPELRLAQPAQGLELSMGAALRGFKRIPVVF

>CYFUS\_008576|KEGG|**CYP264J2**||[Cystobacter fuscus]||cfus|DP

MQPTPDVMALAHRLNPYPLYAELRRDHPVCRVEPGGLVAVSRYKDVEYVLKHPELFSSHG  
FRFAWQPAWVDNPLAQSLAASDGKEHARLRSLSVRAFTPVAINRLEEKVRANAARLADG  
LLARGEVDFMEEFATPLPARTISDLLGIDPTLERHYKRWTEVLVSIAPVPENDEHVTRTR  
DTIAEMKRYVQQI IDARRSQPGDDVMGLIVQGPGDQRLGDQEIIGLAFTLLAAGLETTS  
FFFahalPLLAERP DVFERLRADRELLPKFIEEMLRYDGPVRGLPRIVTTDVELSGVRIE  
RGTCVLPLIASANRDEARFPHADRFDL DREQPGIPFGAGSHFCLGAFLARLEARAGLDAL  
LDRFSGFSLIPEGVVWNR SIVTSGPLKMPVRFLPA

>CYFUS\_008681|KEGG|**CYP1069J1**||[Cystobacter fuscus]||cfus|DP

MCAMISSQLGLEFTPLEPHFLENPFPPFYARLRREAPITFAPAFQFWLVSRYADVMTVFKD  
PRHYSSRDTLRPPVALPREVMAILEPAGYTS DYPLLGDPPAHTRLRALVGKAFNQARVN

ALEPRIRQLVGEHLDTLRDGEPRaelISQLISPLAMSVMTellGLPASDRERIKQWCDD  
KLFFVPIPLEQHLRAARGVADFRRYLRELVEDRRESPRDDLISLllARTEGDRPLDTDE  
LVALACVLVfAGHETSTNLLATALHHLRRHPGAWDELrkNTYLVRNAVEETLRYDSPVVG  
MMRTTTRPVQLGGTALPEGARLFLlFASANRDESvFEQGERFDIHRASAVRHLGFGHGIH  
YCVGASLGRLEAQLTLElllQRLPGLRLAPGEAVTYLPNLVHRVPRQLLVEWDT

>CYFUS\_008687|KEGG|**CYP107HU2**||Cystobacter fuscus||cfus|DP

MAERDVNAAQGPAPQPLPTEVVTLTLDPHISPETYARLRQQGRVARVSFTLGANAAPAG  
EKSAELIEFLGHEHLFVTRYEDVIAALLDDRISDPRTALTEEQKKKLPNVPDELRLPLAR  
SLLSVDPDPDHSRLRKLlQPSFTPRAMESLRSRIQRIAEDLVDGAERAAAERGESRPERRM  
DLIAEFAYPLPVKVISDMLGIPEEDREMVKGWTENLVKNNAGRGFRDAESLAKVREFTDY  
LRRLFVAKRKNPADDmISQLLRIEEDGDKLNEDETlSTVFILYLAGHVTTVNLIGNGIFA  
LLSHPEQLARLkanPSLVKGLVEETLRYWGPIDFISRRIAKEELDLAGTHFPKGEPmMLG  
LASANRDPARFAHPEVFDITRPDADKHIAFGKGIHICIGAPLARMEGQIAFETLIRRLPE  
LRLAVASEELHWSNSLLRGFAQLPVLF

>CYFUS\_008947|KEGG|**CYP107DP5**||Cystobacter fuscus||cfus|DP

MSTSTLTSELWAPQTRTNPLPFYARIRQeAPVVRMIDPYFQTPVWIVTRYKEAVELLRDN  
RFTKDQDKLPENSPSRMRIDSLAAINQHMLSADPPDHTRLRTIVSKAFTPRRVEELRPR  
VTAlAQRLlDEAWPQGSMDLLDSFAFPLPVTVIAEMLGVPAEDQDQFREWTNIIINPPVN  
GDVGPLQKAGMQFLQYFQQLMARRRAEPRDDLlTALMTAEeEQGDRLSPTELVSMLFllLV  
AGHETTVNLMGNGVWALLKHPEQLERLRANPALIDSAVEEMLRYRGPVETTTTYRWALQDT  
ELYGQVIPAGEAVLASLMAADHDPAQFPEPERFDITREPnrHIAFGFGIHFCLGAPLARL  
EATVALNlllLERMpRLRLAVDERELRWREGILVNGLQRLPVAf

>CYFUS\_009336|KEGG|**CYP102M7**||Cystobacter fuscus||cfus|DP

MNKPSHSSTIPQPHVRPLVGNPVDVGFETPMQNLMKLARELGPIFRLSFPGGRtSLILSS  
HELvADVCDERSFDKQVSGALKQIRDFAGDGLFTAMTEEPNWGKAHRLlMPAFGPAAMRN  
YHDDMLDVADQMfTRWERFGPDAVLDPDNMTRLTLDTIALCGFGYRFNSFYQKEMHPFV  
ESMVRALAEAGNRARRVPLQTQLMLRTQRQFQADIGYMHEVTRELIASRRALPPEEAPRD  
LLSLMLDARDPLTGEGLDEENIRNQMVTFliAGHETTSGLLSFATYFLLRHPEVLEKAQA  
EVDRLVGDEMPrFEQVSQlHYIDQILRESLRLWPTAPAFSVHPKAEETliAGTYPIRRDN  
TAVVLTTMLHRDPTVWKDPERFDpDRFAPEVRDSIPPHAWKPFNGGQRSCIGRAFALQEA  
TLVLAMMLQRfHLVEPAPYELHVRETlTLKPEGLKLRVRVRKPVSRPLASRPTPGAAAPA  
PKQEGVASHGTPLlllLYGSNSGASEAFARRIASDGLARGYSAKVAPLDDYTgKLPKEGAV  
VLVTASyNGQPPDNARAFHTWISNVPEGsLLGVRYAVFGCGNRDWAATYQAIPKHfDERL



SAAGAEALVARGEADARGDFFGDFEHWYAPFWEKVGAAALGVSSRAVSSEPLYTVEVVPSS  
STELVKQNKLELATLVDNRELVDMTSPLGRSKRHAFKLPEGVTYAAGDYLAVLPENHPD  
LVERAARRFGVRTDAAVVLHSTRGAMASSLPTDKPVSQVQELLGRHVELSAPATRKDLERL  
AEKNPCPPHAMHLAALAQDAERYKKEILDKRVSVDLLEQYTSCLLTFGDFLELLPAMRV  
RQYSVSSSPRADPTVCTLTAVVDAEAWSGQGRFHGTCSSYLARLRPGEQVAVAVRTPNA  
PFHPPASNATPLIMVGAGTGLAPFRGFIQERALRHARGEAAAGPALFFFGCDHPEVDFLYR  
EELAAWEREGVVKVLPAFFRQPEGDVFMFVQHRLWKEREQVKALLDQGALFFICGDGRMA  
PAVRETLAKIHQETVGCSEAEATAWLEGMEKQGRLVADVFA

>sce0122|KEGG|**CYP109C1**||[Sorangium cellulosum So ce56]||scl|DP

MNLFPDEMRRDPYPLYDQLRTGSPVFHVAPLDDLWMVFDYDGVKRALTDHEAFSSAVAPPT  
GKAPDWIVFSDPPRHTKLRSIVLRAFTPRSIAGLEPRIELSRDLLDPWIERGEMDLAAD  
YAGPLPTMVIAEMLGVPPEDRARLLRFSEVIVNLSHAISGEEAARAVSEHAVVKEEMKV  
YLAGLIEARRRAPAEDLLTRLVEAEVDGERLTEGDILNFFQFLLAAGTETATNLIDNAIL  
CFLESPAELFRLRAPELLPSAIEEVLRHRSPLQMVFRETRRAVEVHGQVIPAGKLVLPV  
IGSANRDPHQFHDPPGRFDIGRDPNPHVAFGHGHIHFCIGAALARLEARIALPDLLCRLKGL  
RRASDEPWEPRKAIIVHGPARLPIRFEPGRRAAVHAAGAHTPCPG

>sce0200|KEGG|**CYP261A1**||[Sorangium cellulosum So ce56]||scl|DP

METARAEVAPSAGMRDLSTLPGPRRLPLLGNLLEIRPSQFHLTLEGWNRKYGDLYTFWLG  
RTPVVVVGSAELVQRILRERPKEFRRWSPLQELIDEMGGGVFSAEGDQWTRQRRLVMSA  
FTAGQLRESHGTLSTITRRLRERWRASAARGAPVDARRDLARYTVDVTTAVAFGLDMNLI  
ERGTDPLSDQLETVFASLNRRVFAPFPYWRHVKL PADRALDQALSEVRTRMLDILRTTRA  
ELDRDPARAAAPRSLLEALLVARDADDPKARLSEQEVLGNVLTLLLAGEDTTADTMAWML  
HFMALRPDVQARMRAEVDDELGDADLPESPEHAQRLRYLGAVAQETLRLKSAAPILFMEA  
CADTVVGSRLRAAGTRMILLTRQIALKEEHFHDAASFMPERWLT PRPAGAGKHD PRAALA  
FGSGPRVCPGRALSMVESAMVGAMVARDFDVSLVDPARPVKELLGFTMKPEGLFVRFP  
HR

>sce0675|KEGG|**CYP267A1**||[Sorangium cellulosum So ce56]||scl|DP

MNSPDAPKPDAPPAANPAADADLDPFRLQSPETLANPYPVYARLRQEAPVYFSAAYNGWL  
ITRYDQVAAGFRDPRLSAKRSSAFVTKLPDEVRQRLEPLRRNLASWALLLDPPEHTRIRS  
LINKAFVPRLVEGLRSRVETLVNELLDVAPAGRMDVLRDLGDLLPLLVIGEV LGVPAED  
RHRLKGWSNALSGFLGAGRPTLEIAGGALSVAELEDYFRGVIAARRQSPGNDLLSQLIL  
AEEQGMILGEQELLSTCCMLLFGGHETTKNLIGNLLALLLHRSEREALRATPSLIGPAV  
EELLRYDSPVQWMSRVALDDIELDGVRI PKGDRAFLVLGAANRDP AQFPDPDKLDFRRTD

IRHISLGLGVHYCAGSALARVEAQAAISTFLRRFPDAELSPGPLTWRMNPGRGVTALPI  
ELGPQSSAS

>sce1588|KEGG|**CYP260A1**||[Sorangium cellulosum So ce56]||scl|DP

MDFPLANLFFVPSEDATAFGRRLRAAAQQAPIVFDTAFGMPILLRKSHITTAYRDTATFS  
TRMFQAGILNNGGLAAMQGDEHARMRRVYNMFFLPRAVSQYEERFVRPISEQVVDRLAGKP  
RVDLLEDFAMELPRRVIGELFGFPAEKLHETDERVRAMLRLGLVRMHDPAAVAESQRAYGE  
TLGLITEVVERESRDTSDTLLGEILRTLKAEHMDTIEASRQIVLSLILGGYETTSWLVAN  
TIHALLAHPDTLARVRQDPSLLPAAIEEGMRWCPSSFGVLRMVERDVRLDDQALSAGTVV  
CLAGIAGNYDETAYPSPEYDIDRKPLPAANVFGGGAHFCVGAPLARMEARVGLQALLAR  
FPGLRAVPEERPSFMYGAKDSVAHGPDKLPVLLH

>sce2191|KEGG|**CYP262A1**||[Sorangium cellulosum So ce56]||scl|DP

MVGLLPALARDAPSLRLRLARQYPGELIELDLGLTRAYLATHPEQVQYVLHDNWRNFGKE  
GGMWKPIGRLLGNGLVTTAGGDEWLRNRRRMQPLFSSRQLAGLVDRMFDVVEGDLPRLEER  
ARAGAVVDMDKEMMQLTQRVILATMFGVSITPREADSLGEVLLVAIQALNARMFLYFMPD  
RLLPGERALRDAIARIDEAILRLVRERRRSKEERDDLLSLLLRARDESGSGMDDRQLRDE  
LVTMFIAGNETTAITMTWLFYLLDRNPGIERKLRAEIEEVGDRRPTAADLSRMEYTKMV  
IQEAMRMYPSPSWLVPRTVKEDDQICGYPVPAGATVILSQYVMHHDPAFWEAPAEFDPERF  
TPERSASRPYSYMPFGGGPRQCIGNLFSIMEAQIVIAVLLRRLRMRLVPGHPVSPQAVA  
TLRPRHGLKMTLHAV

>sce3065|KEGG|**CYP110H1**||[Sorangium cellulosum So ce56]||scl|DP

MSQLPRGPRSRLLTTYKFLTRPFEFLTHCAATYGDVFNVPVVSVDVVIAGGPRTVQDVMT  
APPETFLPFATRAIAPLVGEHSLMLSDERHRRERKLLTPPFHGDRMRAYAAAMADTAAR  
RLTEAARAPRAVAQELTQAISLDVIRAVFGVEEPSRTSAFARAVVAMTDALTPALTFLP  
PLQRELGGGLGPYARFRRRVGELDALFRAQIERARAAPGDDILSLMVSARYDDGSRMSDQA  
IFDELRTLLFAGHETTALALAWALDHVHRHPGVLARLRDEIDALGPEPDPERLAALPYLD  
AVCKEALRVYPIVTESPRLLAQPFRLGEHELLPGTGVAPCILLVHHHPELYPEPSRFRPE  
RFLERKFSPFEYLPFGGGHRRRCIGAAFAMFEMKIVLGVALSAWEFRLLDERPPRPVRRNL  
TLSPSGGVPLVLRARGRSRLYAAA

>sce4633|KEGG|**CYP109D1** ||[Sorangium cellulosum So ce56]||scl|DP

METETAPSPSPEQIDLSAPSVIADPYPAYRALRGRSPVLYARVPAGGAAGLGEPIRAYAL  
LRHAEVLAALRDPQTFSSNVTDKIRVLPKITLLHDDPPRHThLRRLVSRSTPRRIAELE

PWIGRLAASLLEATGDGPSDLMGAYAMPLPMMVIATLLGIPAERYVQFRSWSESVMSYSG  
IPAEERASRGKAMVDFFAAELEARRRAPSGDLISALVEAEIDGARLDTPEAVGFCVGLLV  
AGNDTTTNLIGNMAHLLSERPELYRRAQQDRSLVGPIIETTLRHSSPVQRLLRVTTRPVD  
VSGVMI PAGHLVDVVFGAANRDP AVFEEDAFRLDRPPAEHLAFGQGTHFCIGAALARME  
ARIALNALLDCYESITPGEAPPLRQTRAIMPLGFESLPLVLRRSRATA

>sce4635|KEGG|**CYP259A1**||[Sorangium cellulosum So ce56]||scl|DP

MLSLGRTDHDSFPTAAGELPVLGHLPVLYRDAIGLLRRSRALGPLFWVNLGFAQRRIFY  
VGADALDLLRAPEVVMHDHPEHIKIVGRSMAAQDGPLHRHMRSAINPSFSPQGFAKEAAA  
AIASAIAAKIDAWLQQESFAVHPAMRDLTLDIILRICGVPTGDIRAWSRAYRELFGLGVYP  
IPGRLPGMPAYRSDRARAWIDDLRLKLLALARGGGAAGSLVEMLSNARDDEGEPLSDQGI  
VDNLRAIVLAGHETSASILAWIVIVLSRRSEVWSALCDEHAAAPDAPVPMASAREADRLPV  
ANAI FREVLRMYTPVWFIFRTVTETITLSGRRI PRNTPLALSPAQFGYDPSLFPDPDRFD  
LSRWRDRSIPPGPLELAAGGGPHFCLGYNVACVEALQLQFILVRALRRAGLVPHPLEGAS  
PKHVYFPTGHPTAATRVAFRR

>sce4806|KEGG|**CYP260B1**||[Sorangium cellulosum So ce56]||scl|DP

MLPRKNLFSFTSKDPSAFGIHLAAAAREHSVYFDEGLGVPVVLRGADVAVLRDSETFST  
RTYDTGIMKGALVTLGGEAHTMRRLFNAVLSPRVISRYEEATVTPVARRVVERLVRKER  
AELFDDFAISMPMGVTSALFGLPEERIAENDALIRKMIRSVMPQDPVVVAEGRSAHAAM  
EAQLREIAEREVAHPSDTLLGEIARAIVAEGLGGEACEGVVLTLLILGSYETTSWMLANL  
LVALLAHPDAMNQLRQQPSLLPQAIEESTRWCSAAGIVRFVEREATIGGETLAAGTILY  
LSLIARHYDEEIYPRPETFDIHRPVGMLNFGGGLHYCVGAPLARMEARVGVSLLLERFP  
ALRADPTVQPTFSTAPRGAAFGPDQIPALLV

>sce4885|KEGG|**CYP263A1**||[Sorangium cellulosum So ce56]||scl|DP

MSATLERQPPGPGPLASRLRYLANFRTGDMRHYEDLFARHGDVVRLRAPGAEDFVMAFHPN  
DIAHVLRTNARNYPKGKRYHELAPVLGWGLVNSEGELWRRQRRHVQPQFNHANTLKFVPI  
IVEHMEAVLRRWDAQPGEFERDINDMDMTVTFGIAGEAFFGAALHAHTDTVREAFKYALS  
IALKRMYSLVNPPLSWPLPSHLRFRRAMDRVHAVIDGIIIDGYQRGAGGEDNVLVRLMNSV  
DPETGAKMDRAQLRDEIKTILMVGHETSSVTASWALYQLARHPEVCARLTDEIDRVLGGR  
SPTARDIESMPYLTMVFNECLRLLPSPVFILRSPLEDDVIGGYKVAAGSTVAIVPWVTHR  
HPEFWSDPLEFKPERFANHRRSADDKLAFIPFGAGQRICLGEFMGQLEGKIMVAMALQRY  
RLRLVPGFDPRCRGFISLQPVNGMRMILKRREPSSAVRAAPAGREEPAGAEPPVTEPVAA  
AMSAHGCPYSARA

>sce5528|KEGG|**CYP117B1**||[Sorangium cellulosum So ce56]||scl|DP

MTTALPASFADLPLLQGRNPLARRIETRHGFPILPGRFPVVGHMPAIAVDELGLLREGQR  
RFGSLFFWAPGVDWQLIYASNEAFSLFKSKAVDSSYLTEGGVGHLFGQTLMAHDGASHR  
RLRTAMNGPFPSPKGLDAAEVGAIVATSVERKVRSWLGRRDVQLLRETRELALVFMKITG  
VEDDELPEWRHYIEDLMLVILSLPFDVPGSPRRRGLRARAWLDERIGRILAGVRARGDAK  
GLLPALLTARDEQGEPLSEQDLVGNLRLLLLLAGHETSASVMAWCVAHLAESPVWRALRE  
EASSAPDLPRSPADLRRFPFAEAVFREARLHPPVPHDARRAVADFELDGRAVPAGTHVA  
IPLVLLSRDPELYPDPDSYRPERWLGRKEALSPLAIAQFGGGAHFCLGYHLAWMEIVQFL  
VALGRELPASGPRLQGGFPASRYLPVLRPSGGTRVRFDG

>sce5624|KEGG|**CYP266A1**||[Sorangium cellulosum So ce56]||scl|DP

METQVAATQPEINIIAPENLRWPYPMFRLLLLLEEPVFYDKNTGSWVVSRYEDVNALLRDA  
RMSADRYVALADTVPEQKEMNSYIVKSLSMFMLNVENPTHFRLRNLTNRSFTPKSIAAM  
RPSAHAVVNELLDVAVQPRGHMDVVADLAYPMPFIKFCGILGMPVEDMGLIKQLSDDVSVY  
IGSAGKAAGCIPPAYHAIVEFSKLFRLPVEARRKEPKDDLISSMVTTRVDGDSLSDDEVI  
ANCILFLVAGFETVTNLIACGTLALLEHPDQLELLKRD SRLMEGAIDEMLRYYPPVNRTA  
RLCVEDIPLRGKVIKKQIVVLM LGAGNRDPSEYPDPDRFDIARENRSRPLSFGGGHHFC  
IGSHLARMEGEVALGALLQRMPLRLATQEVWVRGNSRFRGLRALPVSF

>sce6323|KEGG|**CYP264A1**||[Sorangium cellulosum So ce56]||scl|DP

MSERVDIMTPAFRADPYTPYAAMRREAPVCQVDPGGMWAVSRYADVATVLRSPERFSSQG  
FRAAWQPAWVGHNPLASSILAMDGPDHARLRGLVSRAFGAPAIARIEQRARDLCERLAGR  
LDGEVDFIAAAAAPLPAFVISELLGLDHALEPHFKRWMDLLSVTPEPASAEHAARVRAT  
IAELDRYMADVIAARRRSPSDDLVS ELARAGELLGDREIIDLLVSILGGGLETTTHFLGS  
SMLLLAERPAELERLRASPQLIPRFIEEMMYDGPTQSVPRLTTS DVALAGVTIPAGSLV  
LALVGSANRDEVRF TDPDRFDLHRGQPSLTFGHGAHFCLGAALARMEAKVALEVLVPRIG  
EVTRAPGEIPYNRTLTVRGPVSLPLRFRPA

>sce6424|KEGG|**CYP110J1**||[Sorangium cellulosum So ce56]||scl|DP

MGNLPPGPKSLSLVD TIRAGFISSEP VFRRYAAEYGPTFRLRSPNGILTITGDPEAIRAV  
YTADPDEFDVWGVQLTEPVFGTSSVVVTAGARHRRDRLLAPPFSAGAMRGYGD AIAEIS  
LDVASRWRPGRSFSMLAATQAIALDVIVRVVFGVRGEARVGR TREAVLGLIESLSPSFMI  
IPALRRDFAGFGPYARHKRAARALDALLFEEIRARRAEGDASQDILGLMMSARHDDGAGM  
SDVEIADQLRALLFAGHETTAMSLGWAMYWLHREPAVLARLLDELDTLGPAP EADALASL

PYLEAVCLEALRLHPPVVDVARVVKRPFRLKGYTIPAGEAIAASPLLLHGREDLYPSPER  
FRPSRFLDRKFTPFEFIAFGGGARRCLGAAFAMYEMKVALGTILGRYRLRLESQAPIHHV  
RRGLTMGPSGDVAMILEGERERARAEGRPAAVQGSPAEPALRPAAPQPAGRCPMGFS

>sce6630|KEGG|**CYP266B1P**||[Sorangium cellulosum So ce56]||scl|DP

MGQAPATCTAASPVAAPSSRGVAGRARSTGAYRSCPSPAATDWTGHGHDRRRGGSGVRRN  
CHLEPDRFDITRQQSRHLTFGSGAHYCPGASLIRMEVEESVRALLSLPRWELAEETLSYA  
GSNLQDRGPSSLRVRFPAACSGRARPIGRRAAGR

>sce7867|KEGG|**CYP125E1**||[Sorangium cellulosum So ce56]||scl|DP

MTPQTVDILDPDLYLAGAPHDRFELLRREAPVHWHPEPAGRGFWAITRHADVARI SRDPA  
AFCSGRGLFIEDLPPGDMRDNPDMIMMDPPRHARFRA LVSKGFTPRVIQRLESHVREL V  
TRLIDDACERGGCDFASDIAGKLPLSVILEVIGVPREDQE QMLDWTTRFFGASDPAYGVT  
PEELNAVLHNMNAYAHQLAEQRRKEPKDDMLSLLMAAEVDGEKLSYTEFGGFFNLLLTAG  
HDTTKNLISNGMLALLEHPDQRRRLDDPSLLPTAIEEMLRFTPPVYYFRSAVRDIELH  
GQRIAAGDKVVLWYVSANRDET VFSDFHRFDVGRTPNEHLSFGIGPHVCLGLVLARLEAR  
VAFEELLRRLPDLELAGPAVRLRSNWVSGVKSMPVRCARPAR

>sce8224|KEGG|**CYP265A1**||[Sorangium cellulosum So ce56]||scl|DP

MSTPHTLQPDDLMEEGGDVVRRAQEACWYAETSMGKAVLRYREVDLLRDARFRNMGTDV  
LTRQGVTEGLVRRMYEGFLLSTEGA AHARLRGLLKKGFTPD AVDALRPRMRERMHALLDE  
IGDRTEFDVFTAVAERFPGQVIIELLGLPVSFEDPDFRRWCSDLGYIVGLEVKKHLPRLE  
AAFEGLRGYIEPTIAARRAEPRGDLISTLAAAEQNGDRFSEEE LVCQIVALLFGGLDTTR  
RTIGKAFLVMLEHPDQRRLLQERPDLAEPA AEEILRYAPGTRVAVRVATCDLELHGVPIR  
AGEMVIAATGAANRDP RVFEAPETFDITRRGAAPLSLGAGPHHCLGAYLARAELQEAVPI  
LTRLTEAALASPVVVRTAREGSPGPRVIPLRCRVRPR

>sce8551|KEGG|**CYP264B1**||[Sorangium cellulosum So ce56]||scl|DP

MTRLNLFapevrenpyfyAALRRESPVCQVDPNGMWVTRYDDIVA AFKNTQVFSSAGL  
RMATEPPYLRRQNPLSGSMILADPPRHGQLRSISSRAFTANMVSTLEHHMRSMAVRLTDD  
LVHRRVVEFISEFASRAQVSVLAKLIGFDPGLEGHFKRWATDLVIVGVIPPEDHARIAEV  
RRTIDEME QYMLGLLASRRRHLENDLVSELLRSRRDDDGITDQDLVSLLSLLL VAGLETS  
TSLMTHMVLILAQRPMWMDRLRAEPALIPH FIEEVMRFEAPVHATMRLTVTETELGGTRL  
PAHAVVALLISSGLRDEARFQEPDRFNPERGDQANLAFGHGAHFCLGVFLARVQARIVLE  
ELLRRCHRIVLRTDRLEWQAALNTRSPVALPIEVIPVSTTAARESPVVQGIW

>sce8913|KEGG|**CYP109C2**||[Sorangium cellulosum So ce56]||scl|DP

MNLFSEEMRRNPYPAYDQLRSRTPVLHYPPSDSWLIFDHDGVKRALHDHDAFSSVVSPPG  
TRTAEWLIFSPPRHTKLRLITRAFTPRVAGLEPRIRRLSRELLDRTIESGQMDVAED  
YAVPLPLLVI AEMLGAPAADQPHFKRWSDAILDLSHTVSGSEEAARALDAFTAVTAEMQA  
YLRGLVEQRRAPEDDLLTRLVEAEVDGERLNEDEILGFFQLLL VAGHETTTNLIGNAML  
CFLENPDELARLRAAPELLPSAIEEVLRYRSPVQAMFRVTRRDVPMHGQVIPAGKAVLAM  
IGSANRDSQQFRDPDRFDIARDPNPHIAFGHGIHFCIGAPLSRLEARVALADLVARLGGL  
ERASDAPWEPRRAIHVHGPARLPPIRFAPGPRLGGAPG

>SCE1572\_00630|KEGG|**CYP109C3**||[Sorangium cellulosum So0157-2]||scu|DP

MNLFPEMRRDPYPLYEQMRSSSPALHIAPFDLWMIFDYDGVKRALTDHDAFSSAVTPPT  
GKAPEWIVFSDPPRHTKLRGIVQRAFTPRSIAGLEPRIRELSRELLDQRIEHGTMDLAVD  
YAGPLPTMVIAEMIGIPAEDRARFMRWSEAIVNLSHTLSGGEAAARVSEHAHVKEEMKA  
YVADLLEARRGAPEDDLLTRLVEAEVDGERLNEDELLNFFQFLLAAGTETTTNLIDNAIL  
CLLESPELARVRAAPDLVPSAIEEVLRYRSPLQMVFRETRRAVEVHGQAIPAGKLVLPV  
IGSANRDSRQFRDPGRFDVARDPNPHVGFHGHGIHFCIGASLARLEARIALPDLLTRLRGL  
ALASDEPWEPRKALIVHGPARLPVCFEPGRRAGAGAAGAHAASP

>SCE1572\_04555|KEGG|**CYP267A2**||[Sorangium cellulosum So0157-2]||scu|DP

MNSPDAPKPDATPVATPAADADLDPFRLQSPETFANPYPVYAKLREQAPVYFSAAYNGWL  
ITRYDQVAAGFRDPRLSAKRSGAFVTKLPEDVRQRLEPLRRNLASWALLLDPPEHTRIRS  
LINKAFVPRLVEGLRSRVEALVNELLDAVAPTGRIDVLRDLGDALPLL VIGEV LGVPTQD  
RHRLKGWSNALGGFLGSGRPTLEIAGGALSVAEMEDYFRGVIAARRQNPGSDLLS QLLV  
AEEQGMILGEQELLSTCCMLLFGGHETTKNLIGNLLALLLHPAEREALRESPALIGPAV  
EELLRYDSPVQWMSRVALDDIELDGVRIAKGDRAFLVLGAANRDPSQFPDPDRLD FRRTD  
IRHISFGLGVHYCAGAALARVEAQAAISTFLRRFPDAALSSAPLTYRQSPGIRSLTAMPV  
ELGAQSSAS

>SCE1572\_16700|KEGG|**CYP110AD1**||[Sorangium cellulosum So0157-2]||scu|DP

MTTLPKGPSNNILVNIQGMLDPIGYTLRMRERYGDPMSCPKMNGKPVLATGSVEGLRSVF  
AVPPENLDQMLGESFTAAVGESSFLSLSGARHAAMRKLLMPPFHGQRMRLYGKQICDLTL  
QCSQDFKPGQLQLVAQDLMHKISLQTIIHLVFGVTTPAEAAARLEELLEELRKSFSFGLTIT

LIIPWLRREFRGFGPWARRQRATRDRLRSFLDREVARRRAEPAERTDILSLLLEARQEDGT  
ALDDQQIFEQ LHTLLFAGHSTTAGALSWVLYFLGHAPAALRRLQDELTA LGADPEPEALA  
KAPYLEAVCNETLRLRPPSPGVGRKLNAPMQIAGYELPAGAGVFAQIIWAHNPVAVFPEP  
AVFRPERFLERTYSPFEFLPFGGGNRRCIGAAAFALYEMKLILGTLLRRYSFELVSKKPVR  
VGLQGLPGSPVRVIVR

>SCE1572\_18480|KEGG|**CYP110H2**||[Sorangium cellulosum So0157-2]||scu|DP

MAPDAAAAPRRRPHRWIDPGEAPRATGIELLPRCAMSQ LPRGPQGRLTTYQFLTRPIEL  
LSRCAATYGDVFNVP MYNGDVVMAGSPASVQDVMTAPPDALVTYATKSIAPLVGEHSLLM  
LSGERHRRERKLLTPPFHGD MRAYAAAMADVAARRFAEAAARAPRAVAQDITQAISLDVI  
LRAVFGVEEPSRMSAFARAVVAMTDALTPALTFLPVLQRELGG LGPYARFRRRV DHLEAL  
FREQUIERARAAPGDDILSLLVAARYDDGSSMSDQAI FDELRTLLFAGHETTALALAWALD  
HAHRHPAVLARLRDEIDALGPEPDPERLAALPYLDAVCKEALRLHP IVTEAPRMAAQ PFR  
LGEHTLPPGTGVAPCILLVHHRAELYPEPSRFRPERFLERKYS PF EYLPFGGGNRRCIGA  
AFAMFEMKIVLGVALSAWEFRLLDERPPRPVRRNLT LGPAGGVPLALRARGRAALRTAA

>SCE1572\_24990|KEGG|**CYP167A1**||[Sorangium cellulosum So0157-2]||scu|DP

MTQE QANQSETKPAFD FKPFPAGYAEDPFP AIERLREATPIFYWDEGRSWVLTRYHDVSA  
VFRDERFAVSREEWESSAEYSSTIPELSDMKKYGLFGLPPEDHARVRKLVNPSFTSRAID  
LLRAEIQRTVDQLLDARSGQE EFDVVRDYAEGIPMRAISALLKVPAECDEKFRRFGSATA  
RALGVGLVPQVDEETKTLVASVTEGLALLHGVLDERRRNPLENDVLTMLLQAEADGSRLS  
TKELVALVGAI IAAAGTDTTIYLIAFAVLNLLRSPEALELVKAEPGLMRNALDEVLRFDNI  
LRIGTVRFARQDLEYCGASIKKGEMVFL LIP SALRDGT VFSRPDVFDVRRDTSASLAYGR  
GPHVCPGVSLARLEAEI AVGTILRRFPDMKLKETPVFGYHPAFRNIESLNVILRPSKAG

>SCE1572\_32890|KEGG|**CYP105AC39**||[Sorangium cellulosum So0157-2]||scu|DP

MIMTESVHTVGLLP TAREPGCFDPPNELRQAREHGPI SRYPFPGGYEGWLITGYDLVRS  
VLADSRFSSRKELMRHPLIDL GDMKI PPAPPGEFLLMDEPEHGRYRKLLTGKFTVRRMQL  
LTERVEQVTTEHL DAMEKAGPPVDLVTAFAKPIPTIMICDLLGVPYETRDSFQEHVDAIF  
SGVSKQDQVAGYVATQQYIAQLVA AKRANPTDDVLSDLTDTDLTDEELMGVGLLLLAAGI  
DTTANMLALGTFALLSNPAQWATLRARPEIADLAVEELLRYLSVAKTFQRTALEDVELGG  
QTIKAGTTVILSYNTANRDPERFDNPHALDIRRQAIGHLAFGHGIHVCLGQQLARIEMRV  
ALPALVQRFP TLRDLVA AEDVDLRPETADIFGVNSLPVTWNA

>SCE1572\_38035|KEGG|**CYP110J2**||[Sorangium cellulosum So0157-2]||scu|DP

MGSLPPGPKSFSLVDYIRSGFISSEPVFKRYAAQHGPTRVKSPNGMLTITADPEAIRAI  
YTADPDFTFGVWAAELVEPVFGTTSVVVTTGARHRRDRKLLGPPFGAGAMRGYGEAIADIS  
LGEASRWRPGRSFSMLAATQAIALDVIVRVVFGVRGEERVGRTREAVLALIDSLSPSFFV  
LPALRREFGGFGPYARNRRAARALEALLVEEVQRRRAAGDASQDILGLMMSARHDDGGGM  
SDVEIADQLRALLFAGHETTAMSLGWAMYWLHREPAVLARLLAEIDALGSPSPAPDALASL  
PYLEAVCLEALRIHPPVVDVGRVAKRPFQLGRYTIIPAGESVAASPLLLHGREDLYPSPER  
FRPSRFLERRFSPFEYIAFGGGARRCLGAAFAMYEMKVVLGTILGRYRLRLESQAPIQHV  
RRGLTMGPSGGMAMILEGERERPRAAGGGAAAEGSQAEPALQGVASGPAARCPMGFS

>SCE1572\_50855|KEGG|**CYP109C4**||[Sorangium cellulosum So0157-2]||scu|DP

MNLFSDEMRRNPYPLYDQLRSGSPVLHYPPSDTWMIFDYDGVKRALHDPEAFSSVVSPPG  
NRTSEWLLFMDPPRHAKLRALLQRAFTPKAVAALEPRVRELSRGLLDRAIERGEMDLVED  
YTVPLPLLVISEMLGAPIEDQPRFKRWSVDVLDLSTTVAGTEEGARAIAAFTAVSAEMQA  
YLRGLIAERRAAPRDDLLTRLVDAEVDGERLGEDEILGFFQLLLIVAGHETTTNLIGNAVL  
CLLEDRAALARVRAEPALLPAAIEEVLRYRSPVQAMFRVTKRDVPMHGQVI PAGKPALVM  
IGSANRDPQQFRDPHRFDIARDPNPHVAFGHGLHFCLGAPLSRLEARIALSDLVTRLADL  
RLASDAPWEPRRAIHVLGPTRLPIRFAPGPRLDRSET

>CMC5\_001820|KEGG|**CYP102M3**||[Chondromyces crocatus]||ccro|DP

MSDLPAQSVIPQPPVRPLLGNAPDIDTDSFVMSMVQLSERLGPIYKLAFPGRSMLVLGNH  
ALAAEAGDEARFGKYVGGVLNELRALGGDGLFTADSNEENWGKAHRVLMFAFGPAAMRNY  
FDDMVEIADQMLVKWERFGPETDIDVADNMTRLTLDTIALCGFNRYRFNSFYQREMHPFVA  
SMVRALLEAGYRAKRLPLQNQLMFLSRRQFEADNAFMHGLTDELIEKRRKLDQREAPRDL  
LGLMLNAKDPLTGEGLDDKNIRYQLVTFLVAGHETTSGLLSFALHLLLDNPEVLEKAQAE  
VDRVLGDEAPRHEHLAQLVYVDQILRETLRLHPTAPIFAVHAREETTLGGRYPIHPEQAL  
MVLPSVHRDPAIWKHPERFMPERFAPGVRQEIPHRAWMPFGNGQRSCIGRAFSLQEATL  
VLAMLLQRFEITRPRRYRLVIKETLTMKPEGLVLRARARKPAVRGLAARPAPRAEPREDT  
KTKVRAPAHGTPLLLLLFGSNSGASEAFARRIASDGSARGYATHVAPLDDHAGKLPREGAV  
AIIITASYNQPPDNARQFCTWLDGLPEGALSGVRYAVFGCGNRDWAATYQNVPRRVDEQL  
ARAGATVLLPRGEGDARADFFGDFEQWYAPFWGTLGEALGVAPQEIDMSPLYEVEAVPSG  
SAELLAQNQLALATVIANRELVDLSSPFGRSKHHIEFTLPEGASYAAGDYLA VLPENHPD  
LVERAARRFGVRTDAAVVLRSTRGAMAASLPLGKPVSIQELLGRHVELSAPATRKDLERL  
AEKNPCPPHRAHLAALVGDLDRYKAEILDKRVSVDLLEITYPSCIVSFAEFLEMLPAMRV  
RQYSISSSPRLDPTRCTLTIVSVLSAPAYSGNGQFHGTCCSSYLARLRPGDRIPVAVRTPNV



PFHPPASNETPVVMICAGTGLAPFRGFLQERADRYAHGEAVGEAVLYFGCDHPDVDFIYR  
DELMQWERDGI DV RP A FF RK PD GE V TF V Q HR V W Q E R E R I R D L Y E Q G A I F F L C G D G Q R M A  
PAVRATLV R I R Q E A V G C T E E D A T A W L T S M E R E G R Y V P D V F A

>CMC5\_008210|KEGG|**CYP110R2**|[Chondromyces crocatus]|ccro|DP

MVALPPGPPLAPLHTLTFAGLDTPRFFKSCVSRYGDPFTVTLPAGKV VVTGHPDGIREIFT  
AEPSTFGALTQIPLLPVLGKSSMLLLEGQAHKRERRLLMPPFHGDRMRAYGTLMRDITLR  
LAATLPSHGAFTAMQLTQAISLEVIIQAVFGVKQPERVKAFQDTIASYFSSYTVPLMFVP  
PLRRSFHGVSPWDRFQQTAFHRFDILLDEEIIAARRRSSVEHEDILSLLLSARDEEGTPMTD  
EEIKDELRTMLIAGHETTAITMAWALYHVHRLPAVKARLLDELDALGPDPSPDALARASY  
LGAVCDEALRLDPVVILVPRRLKAPMTLRGVALPAGIGVMGAIVLAHHDPTIFSEPDQFK  
PERFLDRKYS PF E Y L P F G G G A R R C L G A A F A L Y E M K I A L G S L L L A H R F S L D E Q G P V K A V R R  
NVTFGPKTGVRRLRH D G V R P R P A S P A N P G L K G A G E G A A A

>CMC5\_010050|KEGG|**CYP107HV2**|[Chondromyces crocatus]|ccro|DP

MRIHVPDLCSAQHKSNPYPVYARLRAEAPVMRIVFGDKKPAWLLTRYDDVAAALKDPRLA  
KNAYRTLTPEEQAKAMPWTPGFLRPLTTSMLDQDPDHTLRLTLVHKAFTPRAVESLRER  
IEVLTAELIARARAGSIDLLEELAVPLPITVICEMLGVPEADRARFRAMSNRLIGIVTP  
TDMLLAMPSMWMMLMRYLRGLVESRRRSSGGNDMLAALIDAE E A G D R L G E E E L L S M V M L L L L  
AGHETTVNLIASGMLS L F D D H E A L E R L R S E P S L I K P A V E E L L R H T S P V D L A T E R Y T T E E V  
AFSGHVIPKGQRVFAVLGSANHDEQMFAQPERLQLDRDPNRHLAFGSGIHYCVGAPLARL  
EAQIAFTAILKELPGLRLAVPRASLRWKPATILRGLDQLPVHCTPAPTCSI P R A K P T A A A  
TAPLG

>CMC5\_013000|KEGG|**CYP264H1**|[Chondromyces crocatus]|ccro|DP

MNQQIDLFMDQNTRRNPYPVY A E L R R N R P V C Q V K G G I W V A A R H A D V M R I A K D V T S F S S S G  
FRVILSPPTIGPNPVAESILALDPNHTQLRALVSRAFTPRNIGRLEGRVTDIANEIGDR  
LRDMGEADLVAELAGPLPARIIAEILGLDPALHREFKRWGEHLAVITPATVDPLASAIRS  
SIGEMERYFKEVIAARRRNPREDIVTDLTRA E V D G V K L S D P Q I I S F L F L L S G G F E T T V N  
LIAHAMMILSARPQDHDRLRAEPHMIPAFVEEVRLRYEPPLQGLPRVCSADV V I G G Q F I P A

GSLVVGLIGSANRDESLYHDPDQFDMREQHGALAFGHGIHFCLGAALARLEGRLSLEAL  
LSRFRRLQQLPGEITYTCAISLRGPIAVPMRFIPG

>CMC5\_016940|KEGG|CYP183AH2|[Chondromyces crocatus]|ccro|DP

MDATSEIGIAPGGLPFLGHALQMLRRPLDFVASLRGQGDVVKIRVGAEWAYLVRHPDLVR  
QVLTDIFTFDKGGALFDKAKQIVGNGLSTCPASDHLRQRRLLQPAFSRERLENYAATMSE  
VTREMVDWQPGDIVDVHKAMGKLALSIAQTTLVSTSAVSASQETLKDSIQVLLDGIYWR  
MIAPFELLQKIPTRHNREFALAQQRMGAVVDQMAEEYRKSGVDRGDLLSALLAARDTDGT  
TGMTNAEIRDQVLTTLFLAGVESNGAAMAWAFYLLGRHPEVERQLHAEVDEVLGGRVPSFA  
DIPKLAVTHRIVQETLRLYPPIWMVSRRTTAAVKLGSCAIPAGAGILFSAYAMHHPDLF  
DEPERFDPDRWLPERARSLPREAMLPFSSGKRKCIGEAFSVIEATIAVATVARRFRLRSV  
RAGTIKGIPIRVTLIPGPLPMRVEGRKPKTMA

>CMC5\_016950|KEGG|CYP183AH1|[Chondromyces crocatus]|ccro|DP

MDTSSEIGVAPGGLPLLGHALQMLRHPLDFLTSLRGTGDVVKIRLGPEWAYLVRHPDLVK  
QVLADAYTFDKGGIVFDKARNILGNGLATCPAGDHLRQRRLLQPAFSRERLINYAVCMRD  
AARTRVESWHDGQVVEVDREMGSLALTVAATRTLFMSDSVAESPEEQASIQTILSGIYRR  
VITPFEVVLVRVPTRKNREFDQAMARMYSVIHQITEDYRTAGIDRGDLLSALLAARDEDGT  
TGLTNREIRDQILALFLAGIETTAAAMTWSFHLMGHHPEVEARLHAEVDTLGDKPPGFE  
DVPKLTHAHRVITEALRLYPPLWLLTRRTTAEVKLGHNLLQPGTAILFSSYAMHRDATYF  
EHPERFDPDRWLPERAKAVPRGAMIPFSAGKRKCLGDTFGMTEATIALATVARRWRLRPV  
PGKRISSIARITLAPGAVPMRVERRS

>CMC5\_019510|KEGG|CYP101P1|[Chondromyces crocatus]|ccro|DP

MNNELESERGVPAHVPVDLVVDLDVDFHPAGMEDDLHLAWRKVQVSGPDIFWTPRNGGHV  
ATRAEDIVVIQTDHERFSHRDVSIPTARPKGAPTALPVELDPPQHGayRGLISPAFSIRA  
VGAMEAKIREVTVALVEAIAPRGECEFVGDFAKELPVVVFLLDVLPRADRETLLPWAED  
LIRPKSAETAGLAYQNLARYVAGWVAQRTTERPGNDLISHIAGSRVHGRPITQDEAIRLCM  
LVLVGGLDTVASMLGFVARFMAQHPVHRRQLAEDPTLLPQAVEELIRRHGLVNTTRTITH  
DFVFKGVQLKEGERILVFNHLAGLDERTVEAPLTVDFLRPKPAPHAAFGNGPHRCPGSTL  
ARTELRIFFLEEWLKRIPEFGIKPGTKPVFASGAVNTVHELHLGWTARG

>CMC5\_023260|KEGG|CYP264G1|[Chondromyces crocatus]|ccro|DP

MSEVHLNLLSPEVAVDPFPFYAALRRDSPVCRVEPGGFVAVSRYEDAAAVVADPVRFSRR  
GVAPAMDPPWLQLEFNAGAHSMVVQDPPEHTRLRSMVNRAFGPALLAATEGPLRALAERL  
ADGLGGGDEVDFVSAFATPLVASVIGGVLGLDPTRHAQFKRWSVDLGSAGPVSQGPHEDE  
LVR SAYREMRHRCDEVIEARRREPGSDLMSALLQIRAGEQALTDRELHSFFHLLFIAGLE  
TTVHLIAKSVMR FADHPEEMARLRAEPAMIPRYLEEMLRYPDSVHFIFRQAPAEATLAGG  
TIPAGSFILVMLASANRDEARFPKADVDFMDRDTRGHLAFGHGPHTCLGLALARMEARIA  
LETLLTRFQRFERRPGPPEWMHTIIVRGLARLPVRAIPA

>CMC5\_023750|KEGG|**CYP263A3**|[Chondromyces crocatus]|ccro|DP

MTEMREEKRPPGPGPLTSLRYLANFRTGNMRHYEALFARYGDVVRLRAPGAEDFVLAFHP  
RDIGHILRTSSRNPYKKGKRYHELVPVLGWGLVNSEGLWRRQRRLVQPQFNHAGTLGFVP  
LIIAHT EALLRRWDARPDEFERDINDMDVTFGIAGEAFFGAALHAHTDTVRTAFKFAL  
SMALKRMYSLVNLPLSWPLPSHARFHHAMGQVHAVIDEIIDGYQAGDGSPDNVLVRLMKA  
VDPETGEAMDRAQLRDEIKTILMVGHETSSVTATWALYLLSQHREACERLTEEIDRVLSG  
RTPTVEDLDAMPYLGVMVFNECLRLMPSPVFILRSPLEDDVVGGRVEAGSTVAIVPWVTH  
RHPAFWNAPEKFMPERFAESRKSAAEKLAFIPFGAGQRICLGEFMGQLEGKIMVTMLLQR  
YRFQLIPGFDPRCRGFISLQPLNGMRMICRRREQTRSASVRRGGDGVRESVARPSRACPF  
SAGS

>CMC5\_027320|KEGG|**CYP109Q2**|[Chondromyces crocatus]|ccro|DP

METRVFAELDVTSPEFIRHPYPSYARARRASPLCRIQPNQFLGVSRYHDVVRVLHDSKRF  
SNSGYTASRPAQRQDLDIMPPMLVELDPPRHGKVRLIVRALSPTVAEFEPRLRKITDE  
LMASLHGESEFELLSALAIPLPMIVIAELLGVGSERRDDFRRWADDFAQAIGALETE  
KLQRSTQEFYHYFGERMEERRREPRGDLLSQLVHAEVDGERLSAEELLSVVTALLIGGNE  
TTTSLVANTIVTLTDHPEQLAEVQENLALIPALVEEALRFEPPAHCIFRQATTDVELEGA  
VIPRGTVVLPLLASANRDESQFPDPDRFDIHRDTKGHLAFGLDIHFCLGAALARMEGRVM  
LEALLSRTKNLKRAERDVAWTPSFIRAPQKLVLAQVD

>CMC5\_027330|KEGG|**CYP109Q3**|[Chondromyces crocatus]|ccro|DP

MSTGSADSAELDVTTTPDFIRHPYPGYARARRTASLCRILPNQFLGVSRYHDVVRVLHDSK  
RFSNSGYTASRATQQQNLDIMPPNLVELDPPRHGKLRGLIVRALSPRSVAEFEPWLRKIA  
DGLLES LHGASEFELLSTLAIPLPMIVIVEMLGVGTERRDEFRRWVDDFAAAHAIGSTLK  
REQLQRSTQAFCHYFSAQLEERRREPREDLLSQLVHAEVDGERVTAEELLSVVTALLIGG  
NETTTSLIANALVTLTDPDQLAEVQENPALIPAFIEEVLRFEPAHIVFRQTTTDDVELD  
GVTIPRGAMVLPMLASANDERQFPDPDRFDIHRDTKGHVAFGLDIHFCPGSALARLEAR  
VMLDALLSRAKNLRRPEREVAWAPSFFLRTPQKLVLCQAIA

>CMC5\_027340|KEGG|**CYP109Q4**|[Chondromyces crocatus]|ccro|DP

MFAELDVTSPEFIRHPYPGYARVRRSSPLCRIQPNQFLGVSRYHDVVRVLHDSKRFSNSA  
YTTSRPAQRQGLDTMPPMLLEMDPPRHGKVRALLVHAFSPRIVAEFEPRLRQLTDELMAT  
LHGAQEFELLSTLAVPLPILVIAELLGIGSERRDDFRWSDDFADALSIGATVETEQLQR  
STQEFYHYFGERMEERRREPRGDLLSLLVHAEVDGERLSARELLSAVTSLLVGGNETTTS  
LVANALVTLTDPHPEQLAEVQENLALIPALIEEVLRFEPPAHCLFRQTTTRDVEVAEMVIPG  
DTIVLPLLASANDASHFPDPERFDIHRDTRGHLAFGLNIHFCIGAALARMEARVMLEAL  
LSRTKNLKRAEREVAWSSSFLIRSPRRLVLRQAIG

>CMC5\_027350|KEGG|CYP109Q1|[Chondromyces crocatus]|ccro|DP

MIADFNITSPEVARNPYALFTEMRRASPVCLQPIQLLSVGRYHDVVRVLHDSKRFSNSG  
YNASVPKEMQENSTMPPSIVQVDPHRGQLRALVTKAFTPRTVAQLEPRIRELSRELIDG  
LRGQSTFELTSAITIPLPMIVIAELLGVGPERRGDFKRWSDDFVSTLALVEPGNRERVRR  
STEEFYGYFGQVLEERRKEPRDDLISRLLLADV DGSRLTPEEVLSFANTLLIGGNETTTS  
LIGNAMVALTDNPDQLAEVQENPALIPALIEEVLRFEPAQCIFRQTTTDDVDLDGVTIPR  
GAVVLPLLASANDHESRFPDPDRFDIHRDTKGQIAFGIDIHFCIGAALARLEARVLEEM  
LGRMKNIQRAEKDVAWTPSFFIRSPQSLPLRARID

>CMC5\_030120|KEGG|**CYP1011F1**|[Chondromyces crocatus]|ccro|DP

MSQRLHFDPLSSEFLADPYSLYARMRAEDPVHCNAMGSWLLTRHDDVAVLRDHRFGVHS  
MAANLRSGRFLGPGQKLDALADTVGQWLMFDNPPEHTRLRLVSRSTTGSVELLRAQV

EERVAACLDAAERERGELDVIHDLAVPLAVGTISSILGVPKDRARVLAWTEGLSHIVDPL  
RSLEEYLAAMEQVAEEFMEYFRALFRERRRNPEDDLVSALVAKEKDKGVTEVELLSMCTNL  
FTAGYKTTVNFIGNVLLLRNPAQCALLREAPEAVPRAMEELLRYDSPVQLITRLACEE  
VSLRGRTIPAGSMVFLALGGANRDPEQFANPDRLDLTRTEVRHVAFAPGMHHCGLGAMLAQ  
LEGQVAILGLVQRFEDLALRTEGVAMESDVIFRGPRSLPVSF DARTQALRRGRGG

>CMC5\_034440|KEGG|**CYP210B1**|[Chondromyces crocatus]|ccro|DP

MALPPGPRTPALVTTYHWIRRPQPFLTECRDTFGPAFTIRLPNLPPVAIFANPDDVKDIF  
TGDSDTMLAGRFNLSLRAFLGDHSLMLDGREHLRQRRLLLPPFHGERMTAYGRIMIDAA  
HDAIDRFPPFRSPFAVHGYMQEITLHVILRAVFGLEEGPRLDALAEAVTNLLEIAVWPPLL  
LPAMQRDLGPWSPWGRFLHYKRQTHGMLLDQIRRRRAEQATRPEGLEGDDVLTLLLQARD  
EEGQPLTDEELRDELMTLLVAGHETTATGLAWALHWILTTPGIEARLRRELADGHFTPER  
IARLELLDAVVRETLRLQPVLPFVGRILDKPVVGGWDLPAVGAVCSIYLAHKRPEVYT  
EPDRFNPDRFLGTFKFSPEFFFPFGGGIRRCIGMAFALHEMKMVLATVLARTILRPAHDRA  
IRAVRRNITLTPSDGCSVVLKRRAPRSTAAHAA

>CMC5\_036230|KEGG|CYP147L1|[Chondromyces crocatus]|ccro|DP

MPRNDLFQQATRPAHRADPYPLYAELRQKPVWLQDDGSYVVSTYREVSALLYDPRVSADP  
MKRSDLPPIIYTDPRMPRDQPSFIQLDEPKHGAMRRLTMKHFGPPRSAGRVSGMGARIGQI  
VDRLLDAHRDARQLDVVQDLSYPLPVMVICDLLGVPLDDEPLFREWSEVLTSSLDPDPAL  
QNDPAFLERIGSAAVGIRTYMTNLLQGHRRTPNDSMLSFAVNDPEAREHITDGEFLSIAI  
LMLIAGHETTIVNLISNATLTLLRHPDQLARLRDDPTLMPGAIEEFLRYEPPVQYRERTTL  
TDISIAGTTIPKGASVNLVLAANRDPLRFSEPDQFLLEREDNQHLSFGTGVHYCFGAPL  
ARVEAQIALNELLRRLDNPELTADPPPYRFNPALRGPSHLVVAFDGMRA

>CMC5\_041820|KEGG|CYP107HW1|[Chondromyces crocatus]|ccro|DP  
MSSPTIAEVMATPAFQLDPYPLYARLRDEQPLYRSPHGVAYLSRHADIEKALRDPRLSND  
RDRIIRAMQAQKNDTQLMTRLMRKLGRVMTNSDPYHARLRKLVGKAFNAGRIRDFRPQV  
QALTDDLLDAAQARGKGMDLIAALAYPLTSTVICALIGLPRDDQARFLAWFRQLEDPIGA  
GLSIGETEALVDTLYGALRALIHLREREPGDDFLSALVHAEEGGERLDEDELLSACFVLI  
GSGYETTMNLIANSVFTLLRHPDQLCALQEKPELLPQAIEEVLRYESPQLQVIRVVAEPV  
PIADGTLEEGEMVSLLLGAANRDPLRFPDAERFDITRTDSRHVSLGSGIHFCLGAPLARL  
EAAVAVGTVLRFRFSLRFEDSTPAWRPNPALRGLAHLNVAWS

>CMC5\_048430|KEGG|**CYP107HU1**|[Chondromyces crocatus]|ccro|DP

METRASQEQPRALRAVTEDEVSRRAQGGESIPVLNVGDPEFLGGAYEAYEALREKGPVVR

VAIPVSTGSDEEENPEGRTAFQEIIYGKEVFFLSRYAEVFEALRDERFSSCPHALKSAEEL  
AEEPVVAEELKPLRDSLLTTDAPDHTLRKLVQPSFTAQAMEALRPRIVQLAQGLLDQAE  
AAAAARGEKAGERRMDLVEAFAYPLPVTVISELLGIPEADRDRVRHWTEDLLINRGSRGL  
DKAALGKLQEFSTYLRLALFVERRDRPAEDLISRMVHAKEEGDALSEDELLSMVFLIYVAG  
HVTTVNLIGNGVFALLTHPEQLERFKASPSLSRGVVEETLRFWGPVDTVSGRIAKEDVEI  
AGTVIPKGSRVMCGLAAASHDPAFDHPEAFDITRPDAGRHVAFGRGIHLCLGAPLARLE  
GQIAFEVLFDRLFPSLRLSRPAEEMSWGCHKVLRGFDEIPVLF

>CMC5\_053220|KEGG|**CYP1007F1**|[Chondromyces crocatus]|ccro|DP

MANPSRDTALHALPGLRPLPLLGGPHLVRFRLDPLTTVRALHHEYGDVAVLCAEKPAMV  
CLFGGQNNRQVLTDAKLFVNYSKSLVETAPDSPLTRLTTSPLSLNGEMHKRRRRLMMPAF  
SKGRVEAYRDQMVEVTERYLARRPSGQIVDIASEMTELTMCIALQCLFGLDVSNEAEDLG  
RLGLQFLEGLTSLGVMALPFEIPGLPYRRFMQRCAQLEARISALIQRKRSSGEETQDLLS  
ILLRTHDEDGGALTDALLSESTGLFIAGHDTTANTLSWTLFLLSQHPEIYAALVDQLTS  
VLGGEAPTVEQLSQLPLLDVAVIKESMRLLPAAPLLFLRNSSEKAKLDGCTLPPDTTVILS  
PIISHHAPEIFPEPRRFRPDRWSTLRSPYDYL PFGAGPRTCIGASFAALELRIALAILL  
QRRRFTLSPDAVVSHHMRSILMGPRKGLRMVWTRQDGHFARPGGVRGTIHDLDVLS

>CMC5\_054910|KEGG|**CYP1224J1**|[Chondromyces crocatus]|ccro|DP

MKSSLPPGPRLPGFIQTSLYMSRPLHFLKRWSQQHGDFTTVHMTGSGDFVFITSPEDIRR  
VFTASIDVIYAGESNSLVRPFVGDSSVVVL DGEAHIRSRRQLLPFFQNERMQTYATIMRD  
VADASLDRWPVGRPFPLLSKMTEIAMELMLRNIFGLEDPREIATFLERFTSVLDEATSPM  
RVMA SFAGLDLYKLLPFLHVSKLKRQLDDSIYELIARRRAAPRDPTRQDVLT LILESKHE  
DGQAMTDREL RDALVTLIAAGYETSAIGMTFAVERLLAEPWALAKVHEELDRVLGQETIV  
AEHLPAL EYLDAAIKESLRLRPLVPLISRRTKAPFELS RHTLPAETMLIPALVLTHLRED  
LYPDPERFDPARFLGTPDPYAWLPFGGGARRCLGMAFAMYEMRMVLATVLRRASLELAS  
NRPVRMVNRHIMLAPSDGAPVVLKARRPKPQTKNSAAA

>CMC5\_054920|KEGG|CYP1286B1|[Chondromyces crocatus]|ccro|DP

MLPSGPTLPGRVQLFWWMFDPTSFMERCTREHGDFTTTRFTSYPPSVYVTDPEVIKQVFV  
ASAEDLSAGQANTGLMGFLFGERSVLSLDGAQHLSRRLVLPFFHNERLGRYGRMLMREIT  
DQHIDRWPIGKSFSVSKAMHELTFDVILRLLFGVHERAFYEPFSKLVAELVRQTTSPLFH

GLFAMLPPEWVMSMLTRGPTKVALGPLGERDLSLFMPGGAILQAKREIGALIHAEISLRR  
ASSQRGDDVLSMLLDARDENEGMSDDELHDQLITLFIAGHDTTANALSWAVHHLLQHRE  
VRGKLDDELSGVKGEAGWLQEVAEALAYLDAFIKETMRLTPVAPVILRILQRPLRFGQYD  
LPAGSYVCPCVYLTHRRADLWPEPERFLPERFIGRRVSPYEFFPFPGGGARRCLGAGFSMY  
EMKVILARLVARAALRPVGGGEVRPERRGIFLAPSSGVPVVLEGRREA

>CMC5\_063310|KEGG|**CYP107AM2**||[Chondromyces crocatus]|ccro|DP

MNTDRDEQVREYPFRAPGPLEPAEEWAPLRKGCPCVAHVRLPSGDQAVLLTRYDDVRQVLS  
DPRFTHNLSAEGAARTTANEAGGVFERQEASMLTDADRHQRWRRMIMKSFTVKHISAMQQ  
RIEAMADQLIDDMVKQGPPLDLASALGFPLPVWVICELLGIPGVDRDKLAYWSNTMLSVT  
QYGQQEIDAAQAEFKAYLTAHIVAKRANPGDDLSELLAAGDEGQGLSDMELLLTAQGGL  
VAGHETTSNMIGKMVAMLLSDRRRWEQLLADPSLVRTAVEEVLRFDANAGFGLPRFITED  
IEVAGQTLPRGTTVICAMASANRDERTFAEAEEMNLARSPNAHLTFGAGPHSCLGQTLAR  
TELQTVLRVLRLPTLALAVPTEALSRRAGLLVGGLEQVLVRW

>CMC5\_067690|KEGG|**CYP1496A1**||[Chondromyces crocatus]|ccro|DP

MDRRSSFVETSTSFSDPYPTLRLHDERPVYYHEPINAWFLVKYEHCEAVVRDPRFSSV  
RARELLHTLLPALRGTEGLDALVAQFSRLLWFVDPPRHTQLRSMVNRGFSASAIERMREK  
IRTVVQRALSRI GDGGEVDVVGDFADPIAIDVLCALFGLPEADSDVLRAWSDLGKVAGA  
SWADGTGGTDAKDASSAFAAYLKDLIADRIAHPGEDMVSRLFEGAGSAPEDIEGVIDQCY  
QVIGASYLPTCNQIGNAVLTLLQHPGELQRLRTTPELFRSAVEEILRFEPSTLTNNRIAS  
EDIELGGERILRGQLVFPVLAGANRDPVFPPEPERFDIGRRGARHLTFVGPHYCAGGAL  
VRMQLEEALQALLTFDTWELAGACDFRSGSLQDRGLATLPVRFSSRRPRSPRAAHGALESD  
LALLEV

>CMC5\_068540|KEGG|**CYP125E2**||[Chondromyces crocatus]|ccro|DP

MELADIRIADPDLYLTGVPHDRFERLRREAPVFWHEEEGGTGFWAITRHADAIQVISDAK  
RFSSARGGIWLEDYPPDDLRSNRDGLITLDPPRQTRYRGLVSKGFVPRLMQAIEPHAREI  
VTAMIDRVEERGSGDFVSELAGDLPLRIILQLLGIPLEDRAQVAAWAYQFLLAADKPKEE  
VEALVRDLVGYAARLAEERRASPRDDMLSVLMEGELDGEKLSSFEFGLFFSLLLSAGTVT  
THQLIAQGMLTLLERPETQRRLEEDPSLIPSAVEEMLRFVPSVGYMRRTATCDTEIQGQR  
IAEGDKVVAVLVSANRDEEVFPDAQTFDVTRSPNEHLSFGRGPHFCLGATLARLEARVAF  
EEILRRLPGMQLAGPVQRMRSNWLMLTHLPVRWSPSLRARP

>CMC5\_069130|KEGG|**CYP167B1**||[Chondromyces crocatus]|ccro|DP

MLDHTINHGQQPLKFCPFSTEYSANPYPTLERLREGSPLMFWEEGRCWVVS RHADVFGLL  
RDPFRFTTDRRTWEFAKPSEVEARCEPEYAEMSKHSLFSLDQAAHARVRKLVSPSFTPRAIE  
RLRPAIQHIVDEVLDAAAGKEILDVTRDFAEQIPIRAIGAMLNVPPERQAAFHRYADAMI  
RQLFPMLIRPEEVDGNFASIREGIAMIDDILEERRQEPREGDLMSSLLQAEEQGDRLSRR  
ELQALVSSLIVGGSETTVHLIGFMVLNLLRRPALMEQAKDEPELVKSILEEVLRFDNFTR  
LGLTRYARQDMDFNGSHIRKGQMMILLNLSALRDPSAFPLPDEFDPHREAVTSIAFGNGA  
HFCLGASLARLEGQVAVSTLLRRFPDMHLVGTPIFGPHPVIRKLDLSLKVALHASAR

>CMC5\_069160|KEGG|**CYP167B2**||[Chondromyces crocatus]|ccro|DP

MLEQNRENAPQKVDFDPFTNDYAKDPYPTLERLRANSPLLYWEEGRCWVASRYATVVVLL  
RDPFRFTTDRSVWEHAGHGQAAALCPEFVEMNRNGLFSLDQVAHARVRKLVSPSFTPRAIE  
RLRPAVQGIVDEVLDAAEGKDVLDVTRDFADQIPVRVIGALLNIPADRQAQFHHFADAVV  
RQLMPMLIKPSEIEENFAAIREGIAMIEGVIEERRQHPIEGDILTSLIQAEEQGDRLSKG  
ELVSLVSGLVVGGSETTVHLIGFMVLNLLQRPELLAEAKANPELIKGVLEEVLRFDNFGR  
LGITRYAKEDIELDGARIKKGQMVILMLNSAMRDAAAIIMPDTFDPHRDVTVTSLAFNGA  
HFCLGASLARLEGQIAVGTLLSRFPDLRQEKGA VFGPHPLIRKLDLSLQVRLRPAVS

>DB32\_001278|KEGG|**CYP110T1**||[Sandaracinus amylolyticus]|samy|DP

MKTTLP PGPRWTL PATLRLIRD PYATLRELRAEY GDLVTFPSPNGRVVLAMTPELVKPIF  
TASPDHFGAWAVGTTSVVLGPRSLIVSEGETHKRDRKLLTPAFHGARMRAYGDAMRTLAR  
RRFETAMQPGATVTMQDVTDDITMDVILRTVFGVGEGAAFD EGRALMGEIVRGMSPLLFF  
SKASHTPLFPPWRRFVRIRERFRAWLDARIAEARARGDEGDDVLAMMLAARYDDGSAMSD  
DDVAAQLVTLLFAGHETTAIALAWAMHWLGRHPDALALVRAEIASVGIDADPEVIAKLPY  
LSAVCDETLRLHPIVTENLRMLRKPLALGGYTIPPGIGVAAAIGAIHADPAIYPEPDAFR  
PERFLDRKYGA FEHLPFGGGHRRRCIGAAFAEYEMRLALAVLVDGWDVELVHRHERPVRRS  
VTLGPAHGVPVKVIGRRAGLRAAA

>DB32\_004988|KEGG|**CYP253M1**||[Sandaracinus amylolyticus]|samy|DP

MDARPYESMPTLPGGLPLLGHWP EIIHDVFGFLERAAERADVVRVRFVHERAVITHDPAM  
IQHVLQQSPRLYAKSRNYAGMKKVVGEGLLTSEGDFWKRQRKLAQPAFH HAKLRGITRTM  
ASATEDMLARWRTWEDGRPFDLHEEMMRVTLRIAGLSLFGADLDGESREIGAALGVILPW  
VNGIIQEPFRPPLWIPTRENALREALATLDRLVYRIVEERRRS DPEHQRDDLLSMLMAA  
TDDEGGGGMSDRQLRDEILTAVLAGHETTANALAWTGMLLARHPEIGARVEREASAVLGD  
RTPSVDDLSKLELCDRVVSESMRLYP PAWEFEREALVDDVAAGWRIPKGTVVM IAPWTLH



RSPRFWDEPARFDPDRFLPERSAGRPRYAYLPFGDGPRVCIGKAFAMMESKLLLAMMARE  
VRFELEPGAHVVRPEPSVTLRARGGVPMRFRRTAPAPFVDQTTSA

>DB32\_006288|KEGG|**CYP51B3**|[Sandaracinus amylolyticus]|samy|DP

MDETVRRAATRRRDEAPSGLLPAPRLSGGLPVVGHSVEFVRATIELLFRANRELGEVAAFS  
VFNREMAMFGPEAHEAVFRAPDAVLSPTEAYKIMTPVFGKDVVYDATPEKMAEQLKMLL  
PALKDRRMRTYGEAVVHETAASTREWGTSVGVDFVEFCRVLTNFTSSRCLLGKEFREGMS  
EEFARVYHDLEGGVTPLAYIDPHLPVPAFRKRDKARVMVEMITGIVDRRAHQRTGEDF  
LQTLMESNYADGRPLSEHEITGLLLAGIFAGHHTSSVTTAWTLLELLQNPTQLQRCVEEV  
DRVFGGGRPVSHAALRELT TIENAVKEALRLHPPLFMLVRVVKQDFTYKQFFIPKGTWIV  
VSPTVSHRIPTVFRDPDAFDPDRYLPGREEDKKDFAYIAFGGGRHKCLGNAFAILQIKAI  
LALLLGQFEFGLCGDAIAPSFQGLVIGPKEPCRVRYRRRAQPSVTMEMGTELAAAADAI  
AHELNGAKEVPQAVQQAAGCPAHAHVAATPSTSAGSSLRVKVDRLCQGHAVCATEA  
PEVFAVSPKDHKVMLKVARPPAELHDKVRKAAQYCPNHVIRIEETD

>DB32\_006357|KEGG|**CYP117D1**|[Sandaracinus amylolyticus]|samy|DP

MPVFRGAFPALGHLPALASDPLGLDRIAEREVGPLYWTDGTGFRWQLRCLSPESFDLFDKN  
VQTSSDYVGETLPDLFGRSVITLDGKPHRHARSVMGPAFTPGGLSAARVGSLFADVIERH  
VHEWIDRGVITTLASTRELVLALILRMLGVPERDLDVWRRDYEDHMLLALGVPLDLPGTP  
RRRGLTAKARLDERIGALVREARAGSDTTVLAQLSRAKDEHGEPLADAELLDNLRLLLILA  
GHETTATVIAWLIAYLAESPSSLERLQSEATDVPRAPGDLRAFRFAEALFREVLRLQPPV  
ARDARRAVVDLEIAGRRVPAGSIVAI SIELLSRSPRTYEDPDSFVPERWMGKTAPPTALE  
LVQFGAGPHFCLGYHVAWLEVVTQTSVILARALRARGARLALDGRFPRVRHLPLRHPDASS  
RVRFVRG

>DB32\_008533|KEGG|**CYP152Z1**|[Sandaracinus amylolyticus]|samy|DP

MGSIPRDPADIGSLALLREGYLFLPRRFERLDTDVLELRLMGLRFIALRGRDAAALFYDP  
TRFVRRGAVPMAVQRTLLGERGVQTLGDGMHAKRKKMFMSLMSRERIDALMGEMWKQWYA  
ALDRWQQREEIVLLEEAQDVMCRAACAWAGVPLEEREVRLRAEDFGAMVHSFATIGPRHF  
AGRIARARTERWMGGVIQIRIRRGELRPSPTQASYVVASHVDANDRPLDEHEASVELMNVL  
RPIVAIGTYVAFIGHALHAHPDHRAMLRAPVDETTRAERVEAFVQEVRRFYPTFPFLGAR  
VRESFEWRGYLFPKGRRVLLDVFGTDHRRLLFDDPDAFRPDRFLGWAGGPYDFIPQGGGR

YEGGHRCAGEWLTIEAMKVALTFLTRAVELRFAPQDAHIDLSRIPTLPRSGMILTDVRVAV  
ASDAPRPPVTRPDGAAARI

>DB32\_008796|KEGG|**CYP253J1**||[Sandaracinus amylolyticus]|samy|DP

MPLLGHLPVLRPDRLDYLMRVALETGDVVRFEFPHVTAHLVAHPDHVQQVLVDQHRFLTK  
QTRGYAKLRAFLGNGLVTSDEFWLRQRRIAQPAFHKKRIAGFADAMVRAAEDTVQRWAA  
PAREGTPIDVAAEMMRLTLRIAGETLLSTDPSDRANAVSTALTTVLHEANTRINTLWSPP  
AHWPTPRNRAYAAATRELDRIVLEIIEQRRRGREHRDILLQMLLEARDPETGAAMDDKQL  
RDEVMTMFLAGHETTANALAWTFVLLSRYPAVARALHEEACDVLGDRPATEADLPKLDLA  
RRVLNESMRLYPPVWIIIGRSPAEPVEIGGYDIPAKTIVFTSQWVTHRHPRFWDDPEGFDP  
DRWLPERAKTMHRHQFFPFAAGPRMCIGAGFAMMEGQLVLATLARRYRVDLLPGHPIVE  
PLITLRPKHGVTRATVHRID

>AKJ09\_00712|KEGG|**CYP1373B2**||[Labilithrix luteola]|llu|DP

MRAIAHKMDIMTNATSEAMPSSKSARKSVHAFPRLPGGHLLFGHLPDLKRDRAGLQFRVG  
REFPDVAVSLRFGVVRALMIGAPALANEVLSTKNASFIKAPGLTVFLRPVLGNGLLTS  
FHAQRKLIAPAFAHKRVASADTMAERARSFASGVRSEVLDVSDAMMRLTLEIVGKTL  
FDAEVSDDADEIGEAVTTAMECAIGQLESFLPLPPIVSPSPNVIRKAVARLDAIIYRLI  
RARRDQGGDRGDLLSMLLAAQDEGTAMNDRQVRDEAMTLFLAGHETTANALAWTLYLLA  
KNPEARAKVEAEVDTLGRAPSYEDLVRLPYTLAVLKEAMRLYPPAYILARRAVEDVSLGG  
HLVRRNTIVLVNVLGLHRRPDLFPEPERFVPERFLGDEEKKLPRCAYMPFGAGPRVCIGN  
HFALMEGHVLLATMLGRLRFELAGGADVELEPLVTTLRPRGLRMRVHVREAQN

>AKJ09\_02861|KEGG|**CYP210A2**||[Labilithrix luteola]|llu|DP

MLDNAGSRFGDIFTLRLPVGANGIVLVANPEAVKEIFALGPDEGHAGKANIVLKPFLGRH  
SLLVLDGAEHGRQRMMPAFHGERMQAYGQAMLDLAHDSVDGWPIGRSFVVHRPMQRIT  
TQVILRTVFGVAAGPQFEELADLLAKTLDAAAWPGLLFPFMQKDLGPLSPWGRWRRLRDR  
ASSILHEEIRQARSNHESRNDVLAMMVAARDESGRALSDDDEIHDELITLLVAGHETTATA  
LTWALRWIVPNRELTRLQDEIAGADDDPAKIDARLELLDATVKETLRLQPVIPIVGRVLQ  
EPMRVLGWDLPVTGTWLAPAIALIHQRASLYPNRRFDPDRFVGARPAWEPWGLPFGGGLRR  
CIGAAFAIYEMKMVLA AVLSRVSMRLVKNEVRTVRRSITLAPDEGLPIVALERRPRKARL  
RAA

>AKJ09\_06094|KEGG|**CYP1007B1**||[Labilithrix luteola]|llu|DP

MGTVFHLLIRYGRDPIGVTDRLFREYGPVIVSLVRGPVRIFSPAGCAMVFATGAGVNRQILT

EHDRYHMCALPGALYPSDEVLAEEAAAADKRWRATPERLQPIRRTLTGLFHVNGAEHRRHR  
RLLMPAFHKTRIDAYRDEMVALTTKVLDDEWRDDQVRDVLEDMTLTLRIATKTLFGEDAG  
EQGVRLARMFQEWLVTKFSPAMLLRFDAGPTVFRRWLDLTRDIDQCTLDIVRAKVARSKS  
QRDVAPDMLSSSLIAARDEDGSALDEDELVGHAGVIFAAGHETSTNALAWTLLLLSQHPDI  
ATDLVDELRGVLRGEAPTVEQLGSLPLLDVAVVKESLRILPPVPIHPRLVAKDSELEGHSL  
PAGTELFLSIYHMHDPDVFPRPQRFDP SRWSKIKPTVYEYNPFSAGPRMCIGASFATME  
IKIVLAMLLQRFRIELLPGARVDRRVTITMAPKNGLPMRIRRADDAWGGGPRDLRGNLRE  
LVDFS

>AKJ09\_06238|KEGG|**CYP1007G1**|[Labilithrix luteola]|llu|DP

MTMLRLHGFASVDIRGPRALPLVGTARRFISFLDDPVGVLALRRMGDVVAVVDRNPAIV  
CVFGPERNREVLSDPDFTFHNPEDDFTGPDGSAREKMRAMVVT SNGADHRRRRRLMMPAFH  
RSALDGYAEEIVTLTRSLVGAWPRGEVVS LDGLCRELSLCIAVQC FYGVDVKRGASVLGQ  
TMAEFVRLVTSPANILFPFDLPGT PYRRGVQIGEDLASRMLALVESKRQSGGQRRDAMGL  
LLDARDEHGNGLTAD EIVALAVELFIAGSETSSMALTWC LLLLDQHPRVLEALAAELSDV  
LGERDPSPADLPKLRLLD RVVKETLRVLP AAPILFLRSATRDTMLGGKAI PKGANLVVSP  
LATHHDASLYPD PDRFLPDRWKEIEPSTYAYFPFGAGPRMCAGALFASQSVRLMLAMILQ  
RFHPRTVDAGPIDRRVRANILNAQHGVHARLCPVRANAAPAAPVRGNIHELVKLESRGRS

>AKJ09\_10261|KEGG|**CYP1366A1**|[Labilithrix luteola]|llu|DP

MASNILVTDVSGIPSAGPLRRLPTKFALPLVGDSFAFLKDPAGFLATRAHELGP AFQINV  
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FTPDALDAYLGVLERVLT TRYARRWANLGTFAWVPEMTAFGMTVATSLFLGTNPDEDDPLL  
ARAFMTAFEGFLSVPINLPFTKYGRALQARDALRERIEHAIDEHEASTSTDALARLIDAR  
LPNGDKLSREEIRIETFHFV GAYLAVIGALSSSLAMFLGRRPDVKERLRQEIVDTLGTGPV  
TLRGLAGLEYLGRVTRESRRAEPVLPMTFFANVKEPCAYGGMRI PAGIKAIGCIGATLQD  
ERTFADPRSFD PDRWLPERATDRQHAAWVPHGGGGPFTHHRCAGERLADLMLSLSFSVVML  
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>A7982\_00879|KEGG|**CYP51B2**|[Minicystis rosea]|mrm|DP

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LLPALKDRRMRTYGEIVVSEVEQSIAGWGDSGEIDLVEYCRVLTNYTSSHCLLGREFRKG  
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DFLQTLMDAKYKSGAPLTEHEITGMLVAAMFAGHHTSSVTTAWAIIELCNHPQYLRRVVE  
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VLTSPTVAHQIPAVFRNPESFDPDRFAPGRDEDKRDFAYIPFGGGRHKCMGNAFALLQIK  
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EKRYRVSVLDLDCQGHAAACVGEAPEVFRVDGLGKVRVIDTTPDASLSAKVEKAAQFCPTK  
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>A7982\_00887|KEGG|**CYP263A2**|[Minicystis rosea]|mrm|DP

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IVAHMEALLQRWDAEAGEFERDINDMDVTFGIAGEAFFGAALQAHTDTRQAFKFALS  
IALTRMYSVVNPPLSWPLPSHVRFRAMDRVHAVIDSIIDGYQQDAGDTDNLVRLMKSV  
DPETGAKMDRVQLRDEIKTILMVGHETSSVTATWALYLLAQHPEVYAKLTDEIDRVLGGR  
SPTAEDIESMPYLTVMVFNECLRLPSVPFILRSPSEDDTIGGYDVAAGSTIAIVPWVTHR  
HPAFWREPHVFMPERFVDYRRNVEERFAFIPFGAGQRICLGEFMGQLEGKIMVAMALQRY  
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>A7982\_01273|KEGG|**CYP183AH3**|[Minicystis rosea]|mrm|DP

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AAVMHEEAERVAASWRPGQQLSVNKAMSALTAVTTTTLFSTEAPAGIVAEAQDALIVIF  
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RDPETGEGLSRELREQVMALFTAGTETTASALTSTFYLLDRHPDVERRLHAEADAVLHG  
RAARHEDLEALDYTTTRVFTETLRLYPPGWILTRRTNAAVDLGGHRVPAGATILFSPYALH  
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>A7982\_01853|KEGG|**CYP1373D1**|[Minicystis rosea]|mrm|DP

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MVACTRRTMEGWRDGEELPLSRETTRLTMGIAGKTLFDADTFSEADEIGHALTIALDWTG  
WIVGRPF AF AHVVLKRMAERLA AHATGNVREALTRAEQRFSRPVVHVGTGRGELSRAIAF  
LDEHVQRMIDRRRTAGTGRADLLSRLLEAHDEDDGAKMSDRQVRDEVLTFLVAGHETTA  
TGLAWTIYLLCKHPEVLAATVREVDVAGDDPSVSDLPRLDLCLRVFKEALRLYPVYVFG  
RDSKDPITLGGYDLPAPTNVLTSPWVLHHAARFWPDPERFDPDRFRPENEAARHRYAYLP  
FGAGPRICLGNHFAYMEAQLALATMLRRYTFELLAEDEPEPGATLRPKHGVRVRVRRRTH  
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>A7982\_01903|KEGG|**CYP1493A1**|[Minicystis rosea]|mrm|DP

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RLATRTLGLSLFSTDMSPDGLDDRVDRAATVADSITSRYVGSARQQMRAESLENASAWL  
RTYLAGLIRSRVDAPRRGRDDLLDVLLSARASTAGVDPWDDEQLIYDIGTILLAGTENPK  
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FSRTAVQPVTVGIDIPVGAEVLVSPYVLHRRADLYPNPTVFDPDFAPSTERRLHRMAY  
LPFGAGPRACIGGGFAMIQGPITLAVLAQSVLLDAVPGQHVEPEPMVTMRPSAFTMRVRR  
RPEAPEVR

>A7982\_01917|KEGG|CYP1500A1|[Minicystis rosea]|mrm|DP

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PGAVMKMVPRFAAVTVEMASAWSTGAPLDLLPCLKRLVTRQTGLVLAGRDAEAIYDDLRCR  
FFDLAVAVCFQAQVPRPVMKLLGYAEARERVLGFASSILDDRAAMPADARPGDLIDAILAA  
REPDGSPLDRGEQVGLVLAPFIGGLDVTSHTLSFLLYEVLTRPELQARCQREADAVFDGD  
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>A7982\_02131|KEGG|**CYP1069G1**|[Minicystis rosea]|mrm|DP

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VDALLDAQHEGEVPLTTEEIVGALCVLIFAGHQTTTNMIGTTLLHLLRRPGAWQTLRDDP  
GLIPGVVEEALRFDAFVQGMTRTVTEETDLGGVTLPKGAKVFVVFASANRDPACAAEPDT  
FDVRRAPPAQHLLAFGRGPHFCVGASLARLEGRVALEVLTERLPNARLVSDEALEYLPNLV  
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>A7982\_02356|KEGG|**CYP1499A1**|[Minicystis rosea]|mrm|DP

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VQAALSADHLRAYADVVTAGASRLDWTWRSGETRDVQADLMRLTLENTARVCAGSDDLAA

LPQIEAAVVAAMRWFENVELHAIGAETREEVGFKEAVARMNEQLAGVIQRRRSAPEPRKD  
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LARVLGGRAPALTDVPRLSYATRUVQETMRCYPLYPFILREARQGGTLAGRRIPASSKVI  
ISIWSMHRDGRFTDRPDFAFEPDRWAAPLDDAREIYAFLPFGGGPRRCPFKSYAMVEAVLL  
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>A7982\_03064|KEGG|CYP1069D1|[Minicystis rosea]|mrm|DP

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EMLAELVKGFLLPSLVTSDPPAHTHQRALVTKALSLRRLATFEPILRGIADGLVDGFAA  
KGRAEIVEAFAIALPGNFIVDLLGLPREHLAQVNHWTDSAEVFAGHKPLDQLVVHARGF  
VEYQHYLAAAIEERQKSPREDALSDIVTGAAALNPPLGMPEIINMLLQVIFAGYETTAGL  
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>A7982\_04313|KEGG|**CYP1069F1**|[Minicystis rosea]|mrm|DP

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GLLLAGHETTTNLIASITLLHVLRDPRVKQQIVDDPDLIPLAIEETLRFDAPIQGMIRTVR  
AEATVGGVSLPPGERLFLSYAAANRDEEQFTDPNRWNPHRASERHLGFHGHGHIHFCIGAP  
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>A7982\_04652|KEGG|**CYP1373C1**|[Minicystis rosea]|mrm|DP

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CAREAVAPLRTGEVVDVARLTTHIAMRIAGKTLFDSDTLDEADELGEALTVALRWANDQS  
SSLPYAAQLRLSGVFADVAEELPEPLRARAKTLAESLVEPIHWPGEQTRRIEHSTAVIER  
RVERMIAERRAAGLDRDRLTALLTAYDEDGGMSDKQVRDEIITLTVAGHETTATALAWS  
LYLLARHPEAYARARDEARQLGGRAATIEDLPKLGKLVFKESMRLYPPVYFFGRQASA  
DVRIGAYDLPRGAILISLYAMQRRPEVWPDPERFDPERFTPAAEEARPKLAWAPFSGGP  
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>A7982\_04960|KEGG|CYP120G2|[Minicystis rosea]|mrm|DP

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>A7982\_05203|KEGG|CYP197H1|[Minicystis rosea]|mrm|DP

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LFLAGHETTALALAHTFYLLSKHPDIERRLHAEIASVLGGRLPTADDVRALPYTERVLKE  
AMRLYPPAWTTGREVAEEVEIGGYVLPKGAQILTSQWVVHRDPRWFPNPEGFDPRFAPE  
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>A7982\_06089|KEGG|CYP1448B1|[Minicystis rosea]|mrm|DP

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PVRFSARVLVGDVQLDGHRLREGDVVTLCFGAANRDPRRFVDPDRFDPRRPRSRHLGFGH  
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RTT

>A7982\_06635|KEGG|**CYP1373C2**|[Minicystis rosea]|mrm|DP

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EQIGSIPWAVRRLYLASLLQALAERVASMRHAHTSTLTEAVVRPIHWPTVKRRRADAALAT  
IERRIEQMIADRRRAGLDRPDLLSLLLATHDEHGDRMSDKQVRDEIVTLFIAGHETTATA  
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QAANDVRIGDVDLPKGTIVLVSAAYALHRRPELWDPERFDPSRFEPQAEHRRHRLAYLPF  
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>A7982\_06764|KEGG|CYP1373B1|[Minicystis rosea]|mrm|DP

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>A7982\_07556|KEGG|CYP167D1|[Minicystis rosea]|mrm|DP

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RVEVERLVDAGLAPLSGQSEIDVAPFADFIPLRVIASMLAIPLAHEVTFRRFGEALIRRA  
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YALEDLEIGGVHLPRGTRVIGFSGAAQRDPRAYPNADHYDPRREP AEILTFGSGMHFCLG  
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>A7982\_10186|KEGG|CYP159A21|[Minicystis rosea]|mrm|DP

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DLVEAFATRFPINVIVEMLGLPREDHARFHAWYTSIMAFLSNLTGDP AVVERGLATREAL  
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FKNLVENPDQLEAVRRDRSLIDAAFAETLRYSPPVHMIMRTPLQDVTMTGGVIPANSTVT  
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>A7982\_10283|KEGG|**CYP110W1**|[Minicystis rosea]|mrm|DP

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EQVVDTFPTDRPFALHPYMQRITLDIILRTVFGVEQGADLDALRASLIRLLDRQASTIGA  
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RPM TDAELRDELMTLLAAGHETTAGMLCWA FELILGDGRVAARLRNEARDVGPEAAARLE  
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>A7982\_11355|KEGG|**CYP253K1**|[Minicystis rosea]|mrm|DP

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>A7982\_11494|KEGG|**CYP1069H1**|[Minicystis rosea]|mrm|DP

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>A7982\_11629|KEGG|**CYP110S1**|[Minicystis rosea]|mrm|DP

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TAIVDET LR LRPV VEMVARKLRPWT FAGYDLPTGATIAP AISLVHMRPDLYPDPLQFKP  
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>A7982\_12497|KEGG|CYP109P1|[Minicystis rosea]|mrm|DP

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>A7982\_13464|KEGG|**CYP1007E1**|[Minicystis rosea]|mrm|DP

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>Hoch\_0067|KEGG|CYP107HZ1|[Haliangium ochraceum]|hoh|DP

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AWS

>Hoch\_0804|KEGG|**CYP107JA1**|[Haliangium ochraceum]|hoh|DP

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>Hoch\_0812 | KEGG | **CYP262C1** | [**Haliangium ochraceum**] | hoh | DP

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HVFDPDRTFPERSEGRDRIYAWAPFGYGRSCIGQEMAMMEGVFILAGILQHLQIEPIGR  
EAKIALLGTLRPKNGVHLRLRPRHGGV

>Hoch\_0813 | KEGG | **CYP1490A1** | [**Haliangium ochraceum**] | hoh | DP

MASVAGLPAAPLARSLAQLARDPLAFLTEGRERYGDIYRLGLGGMHVLLHHPRAHHV  
FREHYKNYGKGGALWEALRDYLGNGLLVTEGDLWLRQRLLQPLFKRTNIDMRMSSMYEI  
VTRVLDSWGEECAQTGSLDLVSACARLSMGVSTGSMFGSALTHTHALMEEVRVVVDSM  
VWNMLTRRIPQRLRPGYARYRKAMDHIHSALDGLIDHYQRSEDGDDGLLAMFSYIEDSAT  
GARMSRELMRDETLDLLLGAETTAQALAWTFYCILQHAEVERRLRAEIGAVLGARRPEL  
EDLKQLPYVVRVIREALRVYPGAWITRTTREDDEIDGHHIAAGTTVAVVTYAIHHHPAI  
WEQPERFERFLPEADAARERCAWIPFGSGPRVCMGMDFAMLELALAVILALQRYDIQR  
VTSGPIAPRLRTTLTPAEPLVRLHLRPGDA

>Hoch\_0814 | KEGG | CYP1504A1 | [**Haliangium ochraceum**] | hoh | DP

MKHAHPRLSPFEHTRQLLASPFQWLVDSQTRTGDIARLGIGHQSVLLSSHPEHADHVFR  
RHARRYARAGRFDALPGIFGRGLLMTADETWLRHRRLLQRFFRRDHLLSIAEPLLATIE  
DAVARHLGTVRGPRVLDVHPVLEAIVLECMITLVFGTRLSDADRAQVRSQITWLTRRVPQ  
ALLYSTLPASLARVVRNRYAENLLAFRRRIAAMAADCRREPSVSDDMLSELVWAASPGGA  
VLPDAEIEDEIINVFIAGLDTSVLGVTWAVALTATHPAEGEGISSEGRALGAHRRLRPEH  
IDALTRSLWVFQEGLRLYPPIWFSPLALADDEFGGCELAAGSTVIRMTHVLHRHPQFWA  
ESERFLPERFEPGRCPARHRAAWVPYGLGPHVCIGRHLAAILSQAIITILFARYRLELSG  
RMPRPLLRLASLAPQGGVPVRISPI

>Hoch\_1303 | KEGG | **CYP1489A2** | [**Haliangium ochraceum**] | hoh | DP

MLNDPLKLMTRAFEQHGRISYLPGINSYMISDPEFMRLILLDGENKFIKSPEVMSKIQVA

VGNGLSTLNGGEWKRRMSNSAFKPRNIAAFEPiFHEHLGEVMHQWEQRLGQRFDIAQE  
MKRLTLRIVLKGLLSLDVTD RADMLIEHL DVLQDYAVYILWSLFPLPENVPTRNRQYAE  
SKRVMDEEIYRIIEQRRRDGEAAGKGDLLATYMHAVDDAGSGMGNTQLRHELMNLF LGGH  
DTTANSIAFTLYLLSRNPGCRERLERELDEV LGGRLPTVEDIPKLHYLECVYNESLRLYP  
PSSAMSRRITLEPIEYEGYEIPAGADLLLSQWAMHRDPTLWENPDVFD PDRFTPERSANRH  
KFAFVPFGAGPRICIGAKLARMEASMILAALLQKYRFESPPGYK LKLQSRLFVN AVPGVF  
LRLQKREVSEKM

>Hoch\_2132|KEGG|CYP167C1|[Haliangium ochraceum]|hoh|DP

MTTTPTSSEFPASPETFDDLMSSEAFVRAPAETYAYLRDRAPAYYWPRHQAWMMTRYDDV  
DALLRDRPFSTDRRKWRYAHTLPHASSPELAALFENDLFTMHADDHRRVRKLVAPAFSPR  
SIARLEDEVRALVNSLLDDAKIDQRETFDVSQELAEPLPIRVISTMLDIPAEKDEDFRVW  
GTSVIRLALPYLPREVLMEAAEKATAGVSMVRAIIAERRQNPGE DILSKLISAQEEGERL  
SEDELMSLVAGLLVAGSETTVHLITFATYQFLTHEDSRRRLQDDPSLLGNALEESLRHDN  
FGKSGVTRYALEDVELHGKTIEKGMVILNLSALLDERVWPD AERFDVTRDPVSNITFG  
RGAHFCLGAHLARLEGRVAMQTLLERFPEMQLAGPPSFDYAH PFIRRIDKLEVRLRA

>Hoch\_2513|KEGG|CYP107HY1|[Haliangium ochraceum]|hoh|DP

MSTEQPIAPAPDSHTAPPTHDPATPAALFADAAFHHPYPRLARLREAAPVCAITMPDGA  
RAWLITRYDEALQVLKDARVTNEPPGGMHPGAMHSGTLERLMSPNMIFMDKADHRRRLGL  
LAKAFTPRFAEGLRPAVQQLADELDDAVAARGRMEFISDFAFPLPITVIADMLGLPQEDH  
QRLRDWSAVLFDSIGAHGDADREQQANEFAGYVKELIAHKRREPADDLISKLVQAEQDGE  
RLDEQELRAMIVLLIFAGHETTVNLLGNLLALFRQPEQLEALKRDPSLVPNAVEEMLRF  
CGPATMLAPRYAREDMQIGGV TIAKDELILLSVAGADRDPAAFSDPESIDLRRPTPQH LA  
FGQGMHICIGAPLARMEAQVAFTTLLKRFPELRLTVPVDEVVWRGNFALRGVEALPLAF

>Hoch\_2966|KEGG|CYP1486B2|[Haliangium ochraceum]|hoh|DP

MAATSKSQPSPEVAPFITQRVGDVARPLVGMPTTMDLSHLPGEEGPVATVRNTLGWIRSG  
VDHLLAQHERFGPVYRTGFAGYRVCAADPDMVLSIARDNQSWSTSLAWL TFFQGIDSKI  
NRAQLDSPLFLDFEPHRNARKVLQPAFGHSATSDYFDAALSLYEA AERWVARGQVSFKD  
AIRSLMVEVSTRIFLGEDDAPEFERALIEYWEGPLALVRDPRFSRKWRRSIRGHRR LCE  
LLRARIASRRASGGDDLFSRLCMTGTSDGLVDDDDGLVRLVIGVMSAAFATTSSGLSSMV  
YLLAEHPAWQQRMEELLALDSPRM TYADSQSLDVCMRVWKETMRLYPIAPY CARRALHD  
VDLGSYRIPAGTFVFGLISAVLRDSALWTQPERFD PDRFTEERAEDKRHKA AFLPFGIGV  
HTCTGMHLANA EVMFAFCHAMLTRCRFSLERP YRARHTYAPAGIVSGPVKLRVERL

>Hoch\_2967 | KEGG | CYP126B3 | [Haliangium ochraceum] | hoh | DP

MSVDSTNRPPASETAHSSPTAGALPAVLEGFDLSDQPRFADGFPYEVFARLRREAPVLFH  
PPGQTKDGEFVWLSRHADICEAAASPAFSSQGGGGRPHGGTHIDDARPELPGVLINMMD  
DPRHADLKDVLSPAVGRQALVALEGALRPYVNELVDGLLARGEAEFAADVGAAVGARAI  
S LLLGIPREDWPLFATWTSALMGFDDRETAEPSERSQKIHMDFGYGARLLVARRAAPQED  
LGSLLANAQLRRDSERPLTELERQTAFCLMVLAGTESTRNMIAGGVLALAHQAQWQALR  
DERSLLPSAIDEILRWTTPTPYNRRTATRDVTLGDAHIRAGDKVTLWWT  
SANRDESVFKD PMAFDVRRDPNPHLAFGYGTHCCFGDQLGKLEMRLVLDAMLERVAPLELSGPVVWAASNK  
HTVVMDFMPVAVRAR

>Hoch\_2973 | KEGG | CYP110U1 | [Haliangium ochraceum] | hoh | DP

MPETVDPSSAQTAGDLGRGPSSAFLTTLRYSIDPVSLYRTLARDYGDGHTVHMPMLLGDV  
VGAISPQSAQDILTADAASFDFSPESLAMVFRPRSVMMLSGQEHARERKLLMPPFSRQ  
VLANYAGTMQETALAYAAEVADGRPFVQMELAQRVLLRVVVRDVFVGTEDAELDELELRI  
RELFEASSPALIFFPPLRHRFGGVPYATWERADRRLTRLIHDLIARRRAEPRGDRVDVL  
SLMLSARYPDGSAPSDEVHLDELMAFFAGHAATATSIWVFWAHRHPEVLHKLRLDELA  
ALPWDAEPARYTELPLYLDAVCNETLRIYPPVADLYRKLRLVPLRVGGRTVPAGTGVAVLVT  
CIHARPELFPPEPLRFRPERFAERRYSPFEFLPYGAGARRCLGASFALQALQVAVATILRR  
WELALVRREQKAVRQGVGVGPKHGVPMRVVRSVLPERSAAQAGGRP

>Hoch\_3012 | KEGG | CYP262D1 | [Haliangium ochraceum] | hoh | DP

MNATTTQQPSAEKRFPIEKGLPLVGTLPQLLSSGTQLVERVSRKHGQITVLKAGPTQVY  
LITHPDHVKHVLQHSERGFSKGPMDPLRRVFGDGIGTSEGSEWLRSRRMAQPLFSTKNI  
DSLVGSMSEIVARHVARLAPLVGSGESVDMNVEMMRMVQDVLVATLFGVDVPAQQMTTIA  
DAIQRILSSSQLELLLLGMVLPHRLLQPMDLLVRRRPRQVLDEVIFDLIAQARASDSANF  
LSWFLRARDIDTGKGLDDQQLRNELISIIYVAGLETTMCSLLWLWYHLDQNPEIDGKMRAE  
VDAVMGASSITAACLEQLSYTKMVIQESMRRLPTIWMMPRYSREDNVIDGYKIPADSLIF  
LSPYATHRDPKFWERPEAFYPEHFTPERVAARPRYAYYPFGGGPHQCIGKYLAMTDQLLI  
VAMMVQRFRPRLLLGSTVDPRPSLFLRPRHAMRMTLERR

>Hoch\_4349 | KEGG | CYP155H1 | [Haliangium ochraceum] | hoh | DP

MSDASAAERPLQGRCPIDHDSATQQKTARAVELPEVPLDCDAEGVWHVRAFELVRELLRS  
ADTKQAGFNAESFAEQQIIINAPILFLDGNEHHVQRKQTARFFTPTRTVSEKHRSMMESFA  
DQLMREFRARKRIELSSVSMKMAVQVAAVIGLTDSELLPGLSGRLEAFFDDHEPPETLSP  
PRRMLAHARSNARTFAFFYLDVKPAIRARRKRPQDDVISHLLERQYSDVEILSECLTYGA

AGMVTTREFISVATWHLLEQPALLEQYLGGDESARQRLLEILRLEPVVTHLRRRATADI  
EIAADGRRYTIPEGALIDLHIGAANLDSAATGPCPLSVQPERELQVPRVGAEVLSFGDGA  
HRCPGAYIAIQETDIFLQRLRLRPLGLRFAQKPSVSWHPLVTGYELRNFWLELEG

>Hoch\_4741|KEGG|CYP1069B2|[Haliangium ochraceum]|hoh|DP

MSHDPTPSLDFDPFSGAQLDDPVPFLNQARATTPVFFSPPLGTWVVTTRYDHVVEILRDPA  
RFSSAASTTNVPGPPPPVLEVL SRGVAYAPNSVDLDPPRHTLFRRLINKAFTPRRIESM  
GPEIERFAHQLIDDFTDGQCELVAFAHPLPTLVIA SVLGVPRQDLGAFRRWSDEWVLL  
AQRGDMARLVQAAGEVVAFQRYVADLVAQRRRAPQDDLISAIVEAAAELEEAPTEAELVS  
LLMTVMFAGHETTTSLIVNTVKQLGLHPVERDRALADRGLIPAAISESLRLDPPVPSMYR  
TATEAVEIGGVALPAGAHIQLNFAAANRDPARFDEPERFDLERAEPERHLSFGRGIHYCV  
GAALALLEGRIAIAALYDRLPGLELVPEQRIRIRPSATVRIPERVLARWRAEV

>Hoch\_5488|KEGG|CYP110H3|[Haliangium ochraceum]|hoh|DP

MSTLPPGPSGKLRPTYRLLTKPRTAIPAWSARYGDPFTLKS LTGHVVVTGNPEGNRAIFS  
ADPDTFDTFAANALEPFVQGYSMLLLSGEVHRRHRKLLMP PFHGERMRAYA AVMAEVARR  
KLREAGAGPVRAIEVAQEISIDVIVRAIFGIHDDDRAAELCDAVRRAMGALHPALAFMPF  
LQRRFGGIGPYARMRRYLDYSDSLVAEQMKRARTQPGDDILSLMLAARDDEGQPMSEVEI  
LDELRTL VFAGHETTALLLAWGIDFIHRHPAVLKRLLAEIDQVDDSADDAERYAQLPYL  
DAVCKETLRLQPPVLEVLRTL RVPFELCGYTVPPGMGVAASVQLTHSRPDLYPEPEAFRP  
ERFLERKFSPFEYFPFGGGNRRRCIGAAFSSFEAKVVLATLLANWQVRLLDPEPPVPVRAS  
VVITPKGGVPIELTSRQRPN

>Hoch\_5532|KEGG|CYP107HV4|[Haliangium ochraceum]|hoh|DP

MIDIPDITRPRH KANPYPLYARLRAEAPAVRVIFGDKRPAWLITRHADVSAALKDPRLSK  
NPFVTL SAEEQRKQLPWIPAFARPLSKNMLDQDPD HGRLRRLVHKVFTPRMVAELRTRI  
EAITGDLLGAARARGRFDLLEDFA MPLPITVICEMLGVP EHERRRFRILSNRMVSIVTPS  
EMLRGLPAVWLLVRYLRGLIARRRREGGEDMLAVLVRAEEDGDRLDEDELLAMTLLLLVA  
GHETTMNLIASGTLALLDAPEEFARLAGEPTLMASAVEELLRFTSPVDVATERYASTELQ  
VGGQVIPRGERVFAVLGSANRDG SVFDHPDALMLDRSPNRHVAFGHGPHYCLGGPLARLE  
GEIAFAAICNELRGLALDVPRDSLRLWKRS PVLRLSLPVRCDGAPAYSLPRAA

>Hoch\_6014|KEGG|CYP1220C1|[Haliangium ochraceum]|hoh|DP

MHRLPGPRRLPLVGNLHQIEL SRLHLILEDWARRYGSAYRIGLGRPNLVLSDP ELIRAV

LRDRPEGFRNRNRTLETVLSEMGISGVFSAEGAAWRPQRRRLATAALSRSHIQGFFPTLRLG  
GERLLRRWQRAADQGAIVNILTDFQRFQAVDVMTSLSFGRDVNTIEDGGGGVHELLETVPF  
VLARRLNARVPIWRWLPSPDADRALDDALVELRAWLGAIIEARSELANPDGVTKNFLEA  
MLHARDEDGAADFDEAALFGNALTMLLAGEDTTASSLAWAVHELSDDAEVVARLRAELDGE  
ISSAVPKTLREVARLPYALAVAEETLRLRPAAPVLLMESNRDAVLGEDIAVPAGTRVLLL  
TRLAAISEAYVPEPQRFLPARWLDREASELLRRGVHLPFGSGPRLCPGRNLAFIEMQMM  
LAVLYRNFEVERIGPRSAVAENYGFTMTPHRLRVRLRRRAHAPAPHAAAAPRMEQR

>DN745\_16145|KEGG|**CYP197AB1**||[Bradymonas sediminis]||bsed|DP

MKLRLSIREKVAQKLDPSAGVARPPGPGALETLKTHLSFAGDPIGSLRKLTDKHGPTAVF  
RLGPYTNLYFTNPEDIEEVLLRKNDAFHKDTMLHELDAVLGQGLLTAEGDYWRGQRKLIS  
PTLRRKHIESYAEVMVSHTKDMMDWKTGEVRDFHADIMGVTLRIVVKTLFNLELEADYH  
EVGEQLEAALDYFFERNNTMWRFMPEPLPTPMRAKNKRAIEGLDRLIYELIESRRRQARA  
DTRAGVDEGNLLYRLLIAVDDEGNKMDNRQVRDEALTFLLAGHETTALAVTYAWHLMAA  
HPDAAARLREEVDAVL DGRAPTAEDAKKLPTTRALLNETLRLYPPAWIIGREAIEDVQIG  
DWTVPARGAQVLTQPQALVHRDPRWFDAPDTFRPERWLGLEKTLPRFAFFPFGGGPRVCIG  
NYFAIMEATLIIATMAQQIELENVSTEPLRIRPSVTQRPLSEIKMKVTRR

>FRD00\_08280|KEGG|**CYP110AU1**||[Persicimonas caeni]||pcay|DP

MPMPSPSPMSPREQTFGWMTRPYELLARCRQEVDVFTIDFRGHGQYVLFSDPEHIHQIL  
TGDPVAFHAANGLLEPFLGAHSLLLLEERHKRERRLMMPHFSRRQIHGWDQIEEVADR  
MIDGWRVGEEMPMRETAQSVALGLIDRLVFGLDGEANHDRHDALHRCFDEILSHPHFNIA  
LIGQFGERLAGSPAQQQLQESLAEMDRLVREEIAERRATGRRGDDIMSLMDAEYEDGES  
LSDDELRLDELVTLLATGHETTATSLAWAVHWVSHPPVLERLRAELATLGPDASPSQIAE  
LDYLLQSVVLETLRINPVVPIIARELQEPVQIAGYELPAGVTVAPVIYLLHRREDLYDEPG  
QFRPSRFLERDYKHNEFMPFGGGVRRCLGMHLALYELQILLARIATRVELRLCDEEEVRP  
VRRMVTIAPSGGVRFEVERVGA

>FRD00\_16705|KEGG|CYP197AB2|[Persicimonas caeni]|pcay|DP

MFGLKDGLNLVDRFKSGESAPARPPGPRGWQNLKVLVDFATDQIGCFRRITRRYGSASFF  
KLGTFDAYLFTDPEAIEEVLLTKSSSF EKDALTHELDVLLGKGLLTSEGQMWRHQRRLLIS  
PNLRRKQIAHYADVMVERTRQMLDDWEDGQVRPLHRDAMEVTLRIVVDTLNFNLEMDSDIH  
RVGQALDTAMEGFHEQAHTLWRFVPEPLPTPMRAKFEKALEEFDALIYKLIDQRRQDATE  
GDDLLYRLIAAVDDEGNQMTDGQLRDEVITLFLAGHETTALAIMYAWYLMSDHPWVMDKV  
HAEVDEVLGERVATADDVSELPYTEAVIQETMRLYPPAWTIGREAIEDVEIAGWTVTKGA  
QVLLPQSLVHRDRRWFDNPD LFRPERWLDGLEDRIPRFAYFPFGGGPRICIGNYFAMMEA

ILVVATMAQQVRLNVSRLQALRTQPSVTQRPATAIEMKVRRR

*Epsilonproteobacteria*

>A0Z60\_06705|KEGG|CYP172A|[Helicobacter winghamensis]hwi|EP  
MGVCPFHPKPYKTKASTFATFLFKRRSWLDGLYERSYKMMGRVKMPGFDLYVVNDPKEV  
RHVMVDDVKNFPSQLLHELLEPLLGMISFTTNDKMWKKQRELLRPSFEMTRISKVFNL  
RDATDDMMRKLASCQNGAVIEVDAIMTFVTADVIFRTIMSSKLDEAKGKLVLEAFGTVQE  
ETTKTALRTMFCFPKWLSRLLGENKRLKAASVIRKVLSDIIAPRYHNAQSDLGKYEDILS  
SLLQVVDAETHQRFTFEEILDQVSMLFLAGHETTASSLTWTLYILSIAPNEQEKAYKEII  
RVAGDGVFEIEHIKEMHYVASIFKEALRLYPPVGFFARETREDRKMMDKLVKKGSGVVVA  
PWLIHRHERFWKNPHEFDPTRHESKSNIKKDTYMPFGMGERICIGQGFAMQESVLILANI  
IRKYKLELEENFVPDIVGRLTIRSANGMRIKFIKRNQ

>Cj1411c|KEGG|CYP172A1|[Campylobacter jejuni subsp. jejuni NCTC 11168 = ATCC 700819]cje|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNL  
SEAVADMMDRFSKYPNHAVIEVDEAMTFITADVIFRTIMSSKLDEEKGGKILNAFVTFQE  
QSVHTAMRRMFRFPKWLSYVLGDCKRAKAGDVIRQVLSDIIPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGGVIEISHLRQFKYLTNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKGSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFAMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKRKL



>BN148\_1411c|KEGG|CYP172A1|[Campylobacter jejuni subsp. jejuni NCTC 11168-BN148]cjb|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNL  
SEAVADMMDRFSKYPNHAVIEVDEAMTFITADVIFRTIMSSKLDEEKGKKILNAFVTFQE  
QSVHTAMRRMFRFPKWLSYVLGDCRAKAGDVIRQVLSDI IKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGGVIEISHLRQFKYLTNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKGSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFAMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKRKL

>CJJ81176\_1410|KEGG|CYP172A|[Campylobacter jejuni subsp. jejuni 81-176]cjj|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNL  
SEAVADMMDRFSKYPNHAVIEVDEAMTFITADVIFRTIMSSKLNEEKGKKILNAFVTFQE  
QSVHTAMRRMFRFPKWLSYVLGDRKRAKAGDVIRQVLSDI IKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGGAIEISHLRQFKYLINIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKGSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFAMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKREL

>C8J\_1325|KEGG|CYP172A|[Campylobacter jejuni subsp. jejuni 81116]cju|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNL  
SEAVADMMDRFSKYPNHAVIEVDEAMTFITADVIFRTIMSSKLDEEKGKKILNAFVTFQE  
QSVHTAMRRMFRFPKWLSYILGDRKRAKAGDVIRQVLSDI IKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGGAIEISHLRQFKYLTNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKGSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFAMQEAILILANILKTY  
KLELEEDFVPDVVGRLTVRSANGMRIKFSKREL

>ICDCCJ07001\_1342|KEGG|CYP172A|[Campylobacter jejuni subsp. jejuni ICDCCJ07001]cjn|EP

MQTGYVKMPNFDLYVINDTKEVKRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWK  
KQRELLRPSFEMTRINKVFNLMSSEAVADMMDRFSKYPNHAIIEVDEAMTFITADVIFRTI  
MSSKLDEEKGGKILNAFVTFQEQSVHTAMRRMFRFPKWLSYVLGDRKRAKAGDVIRQVLS  
DIIKPRYDMADNAEFEDILGSLLLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTW  
TLYLLSLYPKEQEKAYEEITQVLQGAIEISHLRQFKYLTNIFKESLRLYPPVGFFAREAK  
KDTQVRDKLIKKDSGVVIAPWLIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERI  
CIGQGFAMQEAILILANILKTYKLELEEGFVPDVVGRLTVRSANGMRIKFSKREL

>CJSA\_1342|KEGG|CYP172A|[Campylobacter jejuni subsp. jejuni IA3902]cji|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNLMS  
SEAVADMMDRFSKYPNHAVIEVDEAMTFITADVIFRTIMSSKLDEEKGGKILNAFVTFQE  
QSVHTAMRRMFRFPKWLSYVLGDRKRAKAGDVIRQVLS  
DIIKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGAIEISHLRQFKYLTNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKSGSVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFAMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKRKL

>CJM1\_1368|KEGG|CYP172A|[Campylobacter jejuni subsp. jejuni M1]cjm|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNLMS  
SEAVADMMDRFSKYPNHAVIEVDEAMTFITADVIFRTIMSSKLDEGKGGKILNAFVTFQE  
QSVHTAMRRMFRFPKWLSYVLGDRKRTKAGDVIRQVLS  
DIIKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGAIEISHLRQFKYLTNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKSGSVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFAMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKRKL

>CJS3\_1506|KEGG|CYP172A1|[Campylobacter jejuni subsp. jejuni S3]cjs|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNL  
SEAVADMMDRFSKYPNHAVIEVDEAMTFITADVIFRTIMSSKLDEEKGKKILNAFVTFQE  
QSVHTAMRRMFRFPKWLSYVLGDCKRAKAGDVIRQVLSDI IKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGGVIEISHLRQFKYL TNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKGSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFAMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKRKL

>A911\_06865|KEGG|CYP172A|[Campylobacter jejuni subsp. jejuni PT14]cjp|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNL  
SEAVADMMDRFSKYPNHAVIEVDEAMTFITADVIFRTIMSSKLDEEKGKKILNAFVTFQE  
QSVHTAMRRMFRFPKWLSYVLGDRKRAKAGDVIRQVLSDI IKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGAIEISHLRQFKYL TNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKGSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFAMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKRKL

>N564\_01408|KEGG|CYP172A1|[Campylobacter jejuni subsp. jejuni 00-2426]cjej|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNL  
SEAVADMMDRFSKYPNHAVIEVDEAMTFITADVIFRTIMSSKLDEEKGKKILNAFVTFQE  
QSVHTAMRRMFRFPKWLSYVLGDCKRAKAGDVIRQVLSDI IKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV

LQGGVIEISHLRQFKYLTNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKGSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFAMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKRKL

>N565\_01448|KEGG|CYP172A1|[Campylobacter jejuni subsp. jejuni 00-2538]cjeu|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
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SEAVADMMDRFSKYPNHAVIEVDEAMTFITADVIFRTIMSSKLDEEKGKKILNAFVTFQE  
QSVHTAMRRMFRFPKWLSYVLGDCKRAKAGDVIRQVLSDI IKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGGVIEISHLRQFKYLTNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKGSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFAMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKRKL

>N755\_01445|KEGG|CYP172A1|[Campylobacter jejuni subsp. jejuni 00-2544]cjen|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
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SEAVADMMDRFSKYPNHAVIEVDEAMTFITADVIFRTIMSSKLDEEKGKKILNAFVTFQE  
QSVHTAMRRMFRFPKWLSYVLGDCKRAKAGDVIRQVLSDI IKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGGVIEISHLRQFKYLTNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKGSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFAMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKRKL

>N135\_01500|KEGG|CYP172A1|[Campylobacter jejuni subsp. jejuni 00-2425]cjei|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNL  
SEAVADMMDRFSKYPNHAVIEVDEAMTFITADVIFRTIMSSKLDEEKGKKILNAFVTFQE

QSVHTAMRRMFRRFPKWLSYVLGDCKRAKAGDVIRQVLSDI IKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGGVIEISHLRQFKYLTNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKGSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFAMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKRKL

>H730\_08010|KEGG|CYP172A1|[Campylobacter jejuni subsp. jejuni R14]cjer|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNL  
SEAVADMMDRFSKYPNHAVIEVDEAMTFITADVIFRTIMSSKLDEEKGKKILNAFVTFQE  
QSVHTAMRRMFRRFPKWLSYVLGDCKRAKAGDVIRQVLSDI IKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGGVIEISHLRQFKYLTNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKGSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFAMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKRKL

>MTVDSCj20\_1387|KEGG|CYP172A|[Campylobacter jejuni subsp. jejuni MTVDSCj20]cjv|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNL  
SEAVADMMDRFSKYPNHAVIEVDEAMTFITADVIFRTIMSSKLDEGKGKKILNAFVTFQE  
QSVHTAMRRMFRRFPKWLSYVLGDRKRTKAGDVIRQVLSDI IKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGGAIEISHLRQFKYLTNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKGSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFAMQEAILILANILKTY  
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>PJ17\_07425|KEGG|CYP172A|[Campylobacter jejuni subsp. jejuni 00-1597]cj1|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV

KRMMVDKVVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNL  
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QSVHTAMRRMFRFPKWLSYVLGDRKRAKAGDVIRQVLSDI IKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGGVVEISHLRQFKYL TNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFAMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKRKL

>PJ18\_07210|KEGG|CYP172A|[Campylobacter jejuni subsp. jejuni 00-6200]cjw|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNL  
SEAVADMMDRFSKYPNHAIIEVDEAMTFITADVIFRTIMSSKLDEEKGGKILNAFVTFQE  
QSVHTAMRRMFRFPKWLSYVLGDRKRAKAGDVIRQVLSDI IKLRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGGAIEISHLRQFKYL TNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKDSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFAMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKREL

>cjr:CJE1598|KEGG|CYP172A1|[Campylobacter jejuni RM1221]cjr|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNL  
SEAVADMMDRFSKYPNHAVIEVDEAMTFITADVIFRTIMSSKLDEEKGGKILNAFVTFQE  
QSVHTAMRRMFRFPKWLSYVLGDCKRAKAGDVIRQVLSDI IKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGGVIEISHLRQFKYL TNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFAMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKRKL

>JJD26997\_1744|KEGG|CYP172A|[Campylobacter jejuni subsp. doylei 269.97]cjd|EP

MSECPFFPKPHKNKASTLLTFLLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNL  
SEAVADMMDRFSKYPNHAIIEVDEAMTFITADVIFRTIMSSKLDEEKGKKILNAFVTFQE  
QSVHTAMRRMFRFPKWLSYVLGDRKRAKAGDVIRQVLSNIIKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQI  
LQGGAIEISHLRQFKYL TNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKGSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKREL

>M635\_02730|KEGG|CYP172A1|[Campylobacter jejuni 32488]cjz|EP

MSECPFFPKPYKNKASTLLTFLLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNL  
SEAVADMMDRFSKYPNHAVIEVDEAMTFITADVIFRTIMSSKLDEEKGKKILNAFVTFQE  
QSVHTAMRRMFRFPKWLSYVLGDCKRAKAGDVIRQVLSDIKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGGVIEISHLRQFKYL TNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKGSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKRKL

>BN867\_13910|KEGG|CYP172A|[Campylobacter jejuni 4031]cjx|EP

MSECPFFPKPYKNKASTLLTFLLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRINKVFNL  
SEAVADMMDRFSKYPNHAVIEVDEAMTFITADVIFRTIMSSKLDEGKGKKILNAFVTFQE  
QSVHTAMRRMFRFPKWLSYVLGDRKRTKAGDVIRQVLSDIKPRYDMADNAEFEDILGSL  
LLVVDADTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEITQV  
LQGGAIEISHLRQFKYL TNIFKESLRLYPPVGFFAREAKKDTQVRDKLIKKGSGVVIAPW  
LIHRHEEFWTNPHGFNPSRFEGEYKKDAYLPFGVGERICIGQGFMQEAILILANILKTY  
KLELEEGFVPDVVGRLTVRSANGMRIKFSKRKL

>CLA\_0322|KEGG|CYP172A|[Campylobacter lari RM2100]cla|EP

MGQCPFHPPKPYKNKASTLTTFLKRRSWLDGLYERSYKMMGRVKMPGFDLYVVNDPKEV  
RRIMVDEVREYPKSQLLHELLEPLLGISIFTTNDRVWEKQRELLRPSFEMTRISKVFNL  
SEAASDMMARFAKYEDKAIVEVDEAMTFVTADVIFRTIMSSKLDEQKGKLVLDAFVTVQE  
ETVKTAMRRMFRFPTWLSNLLGERKRLKAGGVIRKVLSDI IKPRYDNATNDQGYEDILS  
SLLMVVDADTNERFSFNEILDQVAMLFLAGHETTASSLTWTLYILSISPNEQQKAYEEIM  
QVAGDEEFKIEHIRAMKYLTNVFKESLRLYPPVGFFAREARNDNKMRDKLIKKGSGVVVA  
PWLIHRHDSFWENPHEFDPSRHEDKSKIKKDTYMPFGMGERVIGQGFAMQETVLILANI  
LRTYKLELEENFIPDIVGRLTIRSANGMNIRFIKRQK

>UPTC16701\_0323|KEGG|CYP172A|[Campylobacter lari RM16701]clr|EP

MGQCPFHPPKPYKNKASTLTTFLKRRSWLDGLYERSYKMMGRVKMPGFDLYVVNDPKEV  
RRIMVDEVREYPKSQLLHELLEPLLGISIFTTNDRVWEKQRELLRPSFEMTRISKVFNL  
SEAASDMMARFAKYEDKAIVEVDEAMTFVTADVIFRTIMSSKLDEQKGKLVLDAFVTVQE  
ETVKTAMRRMFRFPTWLSNLLGERKRLKAGTTIRKVLSDI IKPRYDNAINDQGYEDILS  
SLLMVVDADTNERFSFNEILDQVAMLFLAGHETTASSLTWTLYILSISPNEQQKAYEEIM  
QVAGDEEFKIEHIRAMKYVTNVFKESLRLYPPVGFFAREARNDNKMRDKLIKKGSGVVVA  
PWLIHRHDSFWENPHEFDPSRHEDKSKIKKDTYMPFGMGERVIGQGFAMQEA VLILANI  
LRTYKLELEENFVPDIVGRLTIRSANGMNIRFIKRQK

>UPTC16712\_0326|KEGG|CYP172A|[Campylobacter lari RM16712]clm|EP

MGQCPFHPPKPYKNKASTLTTFLKRRSWLDGLYERSYKMMGRVKMPGFDLYVVNDPKEV  
RRIMVDEVREYPKSQLLHELLEPLLGISIFTTNDRVWEKQRELLRPSFEMTRISKVFNL  
SEAASDMMARFAKYEDKAIIEVDEAMTFVTADVIFRTIMSSKLDEQKGKLVLDAFVTVQE  
ETVKTAMRRMFRFPTWLSNLLGERKRLKAGGVIRKVLSDI IKPRYDNALNDQGYEDILS  
SLLMVVDVDTNERFSFNEILDQVAMLFLAGHETTASSLTWTLYILSISPNEQQKAYEEIM  
QVTGDGEFKIEHIRAMKYLTNVFKESLRLYPPVGFFAREARNESKMRDKLIKKGSGVVVA  
PWLIHRHDSFWKNPHEFDPSRHEDKSKIKKDTYMPFGMGERVIGQGFAMQEA VLILANI  
LRTYKLELEENFVPDIVGRLTIRSANGMNIRFIKRQK



>UPTC3659\_0339|KEGG|CYP172A|[Campylobacter lari NCTC 11845]cln|EP

MGQCPFHPPKPYKNKASTLTTFLKRRSWLDGLYERSYKMMGRVKMPGFDLYVVNDPKEV  
RRIMVDEVREYPKSQLLHELLEPLLGISIFTTNDRVWEKQRELLRPSFEMTRISKVFNL  
SEAASDMMARFAKYEDKAIIEVDEAMTFVTADVIFRTIMSSKLDEQKGKLVLDAFVTVQE  
ETVKTAMRRMFRFPTWLSNLLGERKRLKAGGVIRKVLSDI IKPRYDNTTNDQGYEDILS  
SLLMVVDADTNERFSFNEILDQVAMLFLAGHETTASSLTWTLYILSISPDEQQKAYEEIM  
QVAGDEEFKIEHIRAMKYLTNVFKESLRLYPPVGFFAREARNDNKMARDKLIKKGSGVVVA  
PWLIHRHDSFWENPHEFDPSRHEDKSKIKKDTYMPFGMGERVICIGQGFAMQEAVLILANI  
LRTYKLELEENFVPDIVGRLTIRSANGMNIRFIKRQK

>CONCH\_0330|KEGG|CYP172A|[Campylobacter lari subsp. concheus LMG 11760]c11|EP

MGQCPFHPPKPYKNKASTLTTFLKRRSWLDGLYERSYKMMGRVKMPGFDLYVVNDPKEV  
RRIMVDEVREYPKSQLLHELLEPLLGISIFTTNDRVWEKQRELLRPSFEMTRISKVFNL  
SEAASDMMARFAKYEDKAIVEVDEAMTFVTADVIFRTIMSSKLDEQKGKLVLDAFVTVQE  
ETVKTAMRRMFRFPTWLSNLLGERKRLKAGGVIRKVLSDI IKPRYDNATNDQGYEDILS  
SLLMVVDADTNERFSFNEILDQVAMLFLAGHETTASSLTWTLYILSISPNEQQKAYEEIM  
QVAGNEEFKIEHIRAMKYLTNVFKESLRLYPPVGFFAREARNESKMRDKLIKKGSGVVVA  
PWLIHRHDSFWENPHEFDPSRHEDKSKIKKDTYMPFGMGERVICIGQGFAMQEAVLILANI  
LRTYKLELEENFVPDIVGRLTIRSANGMNIRFIKRQK

>BN865\_07260|KEGG|CYP172A|[Campylobacter coli 76339]ccol|EP

MSQCPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
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SEAVEDMMKRFEKYPNGSIIIEVDEAMTFITADVIFRTIMSSKLDEEQGKKILDVFTFQE  
QSVHTAMRRMFRFPKWSYVLGDRKRAKAGDVIRQVLSDI IKPRYDAVSSGKAQSFEDIL  
GSLLLVVDQTNQRFSEIEILDQVAMLFLAGHETTASSLTWTLYLLSLYPDEQEKAYKEI  
IQVLQGENIQISHLRQFKYLTNIFKESLRLYPPVGFFAREAKKDTKIRDKMVKKGSGVVV  
APWLIHRHESFWNNPHEFKPSRFESEYKKDAYLPFGAGERICIGQGFAMQEAILILASIL

RKYKLELEEGFVPDVVGRLTVRSANGMNIKFTKRES

>G157\_01790|KEGG|CYP172A|[Campylobacter coli CVM N29710]ccc|EP

MSQCPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVKEFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRISKVFNL  
SEAVSDMMKRFEKYPNASIIIEVDEAMTFITADVIFRTIMSSKLDEEQGKKILDAFVTFQE  
QSVHTAMRRMFRRFPKWLSYVLGDRKRAKAGDVIRQALSDIIKPRYDAVSSGKAENFEDIL  
GSLLLVVDAQTNQRFSEIEILDQVAMFLAGHETTASSLTWTLYLLSLYPDEQEKAYKEI  
IQVLQGENIQISHLKQFRYLTHIFKESLRLYPPVGFFAREAKKDTKVRDKMIKKGSGVVI  
APWLIHRHEGFWANPHEFKPSRFEGEYKKDAYLPFGVGERICIGQGAMQEAILILANIL  
KKYKLELEEGFVPDVVGRLTIRSANGMRIKFSKREP

>N149\_1372|KEGG|CYP172A|[Campylobacter coli 15-537360]ccq|EP

MSQCPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVKEFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRISKVFNL  
SEAVSDMMKRFEKYPNASIIIEVDEAMTFITADVIFRTIMSSKLDEEQGKKILDAFVTFQE  
QSVHTAMRRMFRRFPKWLSYVLGDRKRAKAGDVIRQALSDIIKPRYDAVSSGKAENFEDIL  
GSLLLVVDAQTNQRFSEIEILDQVAMFLAGHETTASSLTWTLYLLSLYPDEQEKAYKEI  
IQVLQGENIQISHLKQFRYLTHIFKESLRLYPPVGFFAREAKKDTKVRDKMIKKGSGVVI  
APWLIHRHEGFWANPHEFKPSRFEGEYKKDAYLPFGVGERICIGQGAMQEAILILANIL  
KKYKLELEEGFVPDVVGRLTIRSANGMRIKFSKREP

>YSQ\_01815|KEGG|CYP172A|[Campylobacter coli RM1875]ccf|EP

MSQCPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVKEFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRISKVFNL  
SEAVSDMMKRFEKYPNASIIIEVDEAMTFITADVIFRTIMSSKLDEEQGKKILDAFVTFQE  
QSVHTAMRRMFRRFPKWLSYVLGDRKRAKAGDVIRQVLSDDIIKPRYDAVNSEKAQSFEDIL  
GSLLLVVDAQTNQRFSEIEILDQVAMFLAGHETTASSLTWTLYLLSLYPDEQEKAYKEI

IQVLQGENIQISHLRQFKYLTNIFKESLRLYPPVGFFAREAKKDTKIRDKMIKKGSGVVI  
APWLIHRHEGFWANPHEFKPSRFESEYKKDAYLPFGVGERICIGQGFAMQEAILILANIL  
KKYKLELEEGFVPDVVGRLTVRSANGMRIKFSKREP

>YSS\_07600|KEGG|CYP172A|[Campylobacter coli RM4661]ccy|EP

MSQCPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVKEFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRISKVFNL  
SEAVSDMMKRFEKYPNASIIIEVDETMTFITADVIFRTIMSSKLDEEQGKKILDAFVTFQE  
QSVHTAMRRMFRFPKWLSYVLGDRKRAKAGDVIRQALSDIIKPRYDAVSSGKAENFEDIL  
GSLLLVVDAQTNQRFSEIEILDQVAMLFAGHETTASSLTWTLYLLSLYPDEQEKAYKEI  
IQVLQGENIQISHLKQFRYLTHIFKESLRLYPPVGFFAREAKKDTKVRDKMIKKGSGVVI  
APWLIHRHEGFWANPHEFKPSRFESEYKKDAYLPFGVGERICIGQGFAMQEAILILANIL  
KKYKLELEEGFVPDVVGRLTIRSANGMRIKFSKRES

>YSU\_01845|KEGG|CYP172A|[Campylobacter coli RM5611]ccoi|EP

MSQCPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVKEFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRISKVFNL  
SEAVSDMMKRFEKYPNASIIIEVDEAMTFITADVIFRTIMSSKLDEEQGKKILDAFVTFQE  
QSVHTAMRRMFRFPKWLSYVLGDRKRAKAGDVIRQALSDIIKPRYDAVSSGKAENFEDIL  
GSLLLVVDAQTNQRFSEIEILDQVAMLFAGHETTASSLTWTLYLLSLYPDEQEKAYKEI  
IQVLQGENIQISHLKQFRYLTHIFKESLRLYPPVGFFAREAKKDTKVRDKMIKKGSGVVI  
APWLIHRHEGFWANPHEFKPSRFESEYKKDAYLPFGVGERICIGQGFAMQEAILILANIL  
KKYKLELEEGFVPDVVGRLTIRSANGMRIKFSKRES

>VC76\_07055|KEGG|CYP172A|[Campylobacter coli FB1]ccof|EP

MSQCPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
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SEAVSDMMKRFEKYPNASIIIEVDEAMTFITADVIFRTIMSSKLDEEQGKKILDAFVTFQE

QSVHTAMRRMFRRFPKWLSYVLGDRKRAKAGDVIRQALSDI IKPRYDAVSSGKAENFEDIL  
GSLLLVVDQAQTNQRFSEEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEI  
TQVLQGGVIEISHLRQFKYLTNIFKESLRLYPPVGFFAREAKKDTKVRDKMIKKGSGVVI  
APWLIHRHEGFWANPHEFKPSRFEGEYKKDAYLPFGVGERICIGQGAMQEAILILANIL  
KKYKLELEEGFVPDVVGRLTIRSANGMRIKFSKREP

>ATE51\_00744|KEGG|CYP172A|[Campylobacter coli OR12]ccoo|EP

MSQCPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVKEFPKSAFLHELLSPLLGESIFTTNGEVWKKQRELLRPSFEMTRISKVFNLM  
SEAVSDMMKRFEKYPNASIIIEVDEAMTFITADVIFRTIMSSKLDEEQGKKILDAFVTFQE  
QSVHTAMRRMFRRFPKWLSYVLGDRKRAKAGDVIRQALSDI IKPRYDAVSSGKAENFEDIL  
GSLLLVVDQAQTNQRFSEEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAYEEI  
TQVLQGGVIEISHLRQFKYLTNIFKESLRLYPPVGFFAREAKKDTKVRDKMIKKGSGVVI  
APWLIHRHEGFWANPHEFKPSRFEGEYKKDAYLPFGVGERICIGQGAMQEAILILANIL  
KKYKLELEEGFVPDVVGRLTIRSANGMRIKFSKREP

>CINS\_0316|KEGG|CYP172A|[Campylobacter insulaenigrae]cis|EP

MGQCPFYKPYKNKASTLATFLFKRRSWLDGLYERSYKMMGRVKMPGFDLYVVNDPKEV  
RRIMVDEVREYPKSQLLHELLEPLLGVSIFFTNDRVWEKQRELLRPSFEMTRISKVFDLM  
SQAANDMMIRFAKCDDGKIIIEVDEAMTFVTADVIFRTIMSSKLDEQKGKIVLDAFVTVQE  
ETIKTAMRKMFRRPNWLSNFLGEKKRLKAGSTIRKVLSDI IKPRYDNALADQGKYKDILS  
SLLMVVDEDTNERFSFNEILDQVAMLFLAGHETTASSLTWTLYILSISQNEQQKAYEEII  
QVANFNDFKIEHIKEMKYLTNVFKESLRLYPPVGFFAREARHESKMRDKLIQEGSGVVVA  
PWLIHRHDNFWENPHEFDPTRYEDKGKIKKDTYMPFGMGERVICIGQGAMQEAILILANI  
LRTYKLELEENFIPDIVGRLTIRSANGMRIKFIKRKK

>CVOL\_0316|KEGG|CYP172A|[Campylobacter volucris]cvo|EP

MGQCPFHKPYKNKASTLMTFLKRRSWLDGLYERSYKMMGRVQMPGFDLYVVNDPKEV

RRIMVDEVREYPKSQLLHELLEPLLGVSIFFTNGRVWEKQRELLRPSFEMTRISKVFGLM  
SEAASDMMARFDKYEDGAIIEVDEAMTFVTADVIFRTIMSSKLDEVKGKIVLDAFVTVQE  
QTVKTAMRRMFRFPTWLSNLLGEKKRLKAGMTIRKVLSDI IKPRYENALADKGKYEDILS  
SLLMVVDADTNERFSFNEILDQVAMLFLAGHETTASSLTWTLYILSISEKEQEKAYEEIM  
QVAGDEKFTIEHIKSMKYLTNIFKESLRLYPPVGFFAREAKHESKMRDKLIKEGSGVVVA  
PWLIIHRHDFWENPHEFDPSRHEDKSKIKKDTYMPFGMGERICIGQGAMQEAILILANI  
LRTYKLQLEENFTPDPVGRLTIRSANGMNIKFIKRRK

>CPel\_0328|KEGG|CYP172A|[Campylobacter peloridis]cpel|EP

MGQCPFHHPKPYKNKASTLTTFLLKRRSWLDGLYDRSYKMMMGRVKMPGFDLYVVNDPKEV  
RRIMIDEVREYPKSQLLHELLEPLLGVSIFFTNDRVWEKQRELLRPSFEMTRISKVFNLM  
SEAAADMMARFAKYEDKAIIEVDEAMTFVTADVIFRTIMSSKLDEQKGKIVLDAFVTVQE  
ETVKTAMRRMFRFPTWLSNLLGERKRLKAGGVIRKVLSDI IKPRYDNAINDQGKYEDILS  
SLLMVVDADTNERFSFNEILDQVAMLFLAGHETTASSLTWTLYILSISPKEQQKAYEEIM  
QIAGNDEFKIEHIKAMKYLTNVFKESLRLYPPVGFFAREARNESKMRDKLIKKGSGVVVA  
PWLIIHRHDFWENPHEFDPTRHEDKSKIKKDTYMPFGMGERVCIGQGAMQEAILILANI  
LRTYKLELQENFVPDIVGRLTIRSANGMNIRFIKQK

>CAQ16704\_0328|KEGG|CYP172A|[Campylobacter sp. RM16704]camr|EP

MGQCPFHHPKPYKNKASTLTTFLLKRRSWLDGLYERSYKMMMGRVKMPGFDLYVVNDPKEV  
RRIMVDEVREYPKSQLLHELLEPLLGISIFTTNDRVWEKQRELLRPSFEMTRISKVFDLM  
SDAASDMMARFNKYEDGATIEVDEAMTFVTADVIFRTIMSSKLDEQKGKIVLDAFVTVQE  
QTVKTAMRRMFRFPTWLSNLLGEKKRLKAGTTIRKVLSDI IKPRYDNALNDQGKYEDILS  
SLLMVVDADTNERFSFNEILDQVAMLFLAGHETTASSLTWTLYILSMPNEQQKAYEEIM  
QIAGKEEFKIEHIKAMKYLTNIFKESLRLYPPVGFFAREARNESKMRDKLIKKGSGVVVA  
PWLIIHRHDFWENPHEFDPSRHDDKSKIKKDTYMPFGMGERVCIGQGAMQEAILILANI  
LRTYKLELEENFVPDIVGRLTIRSANGMNIRFIKR

>CSUB8521\_0354|KEGG|CYP172A|[Campylobacter subantarcticus LMG 24374]csm|EP

MGQCPFHFKPYKNKASTLTTFLKRRSWLDGLYERSYKMMGRVKMPGFDLYVVNDPKEV  
RRIMVDEVREYPKSQLLHELLEPLLGISIFTTNDRVWEKQRELLRPSFEMTRISKVFNLM  
NEAASDMMARFAKHENGAVVEVDEAMTFVTADVIFRTIMSSKLDEQKGKLVLDAFVTVQE  
ETVKTAMRRMFRFPTWLSNLLGERKRLKAGATIRQVLSDI IKPRYDNALNDQGKYEDILS  
SLLAVVDADTNERFSFNEILDQVAMLFLAGHETTASSLTWTLYILSISPKEQQKAYEEIM  
QVAGNEEFKIEHIRAMKYVANVFKESLRLYPPVGFFAREAKNESKMRDKLIKKGSGVVVA  
PWLIIHRHDSFWENPHEFDPSRHEGKSKIKKDTYMPFGMGERVICIGQGFMQEAVLILANI  
LRTYRLELEENFVPDVVGRLTIRSANGMNIRFIKREK

>CSUB8523\_0336|KEGG|CYP172A|[Campylobacter subantarcticus LMG 24377]csf|EP

MGQCPFHFKPYKNKASTLTTFLKRRSWLDGLYERSYKMMGRVKMPGFDLYVVNDPKEV  
RRIMVDEVREYPKSQLLHELLEPLLGISIFTTNDRVWEKQRELLRPSFEMTRISKVFNLM  
NEAASDMMARFAKHENGAVVEVDEAMTFVTADVIFRTIMSSKLDEQKGKLVLDAFVTVQE  
ETVKTAMRRMFRFPTWLSNLLGERKRLKAGATIRQVLSDI IKPRYDNALNDQGKYEDILS  
SLLIVVDADTNERFSFNEILDQVAMLFLAGHETTASSLTWTLYILSISPKEQQKAYEEIM  
QVAGNEEFKIEHIRAMKYVANVFKESLRLYPPVGFFAREAKNESKMRDKLIKKGSGVVVA  
PWLIIHRHDSFWENPHEFDPSRHEGKSKIKKDTYMPFGMGERVICIGQGFMQEAVLILANI  
LRTYRLELEENFVPDVVGRLTIRSANGMNIRFIKREK

>CHELV3228\_0153|KEGG|CYP172A|[Campylobacter helveticus]chv|EP

MSGCPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSELLHRLLSPLLGESIFTTNGEVWHRQRELLKPSFEMTRISKVFNLM  
SEAVADLMARFEKYPNHSYIEVDEMMTFVTADVIFRTIMSSKLDKNEGRKILEAFVTFQE  
ESVRTAMRGMFYFPKWLSYLLGDRKRAKAGEVIRRALS DI IKPRYDEANLEKSSYEDILA  
SLLLIVDAKTNERFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPKEQEKAFFEIC  
EVLQDSEEIKITHLRQFKFLTNVFKEALRLYPPVGFFAREAKKDTQVRDKLVKKGSGVVI  
APWLIHRHELFWQNPHGFDPSRFEREYKKDAYLPFGMGERICIGQGFMQEAILILANIL  
RIYKLGLKENFVPDVVGRLTIRSANGMWIKFSKR

>CCUN\_1453|KEGG|CYP172A|[Campylobacter cuniculorum]ccun|EP

MSQCPFHFKPYKNKASTLLTFLLKRRSWLDGLYERSYEMQTGYVKMPNFDLYVINDPKEV  
KRIMVDEVREFPKSAFLHELLKPLLGESIFTTNGEIWSKQRELLRPSFEMTRISKVFNLN  
SEAVKDMMKRFEEKYPNDSIIIEVDEMMTFVTADVIFRTIMSSKLDEQKGKKILHAFVNFQE  
QSVHTAMRKMFREFPKWFSYILGDRKRLKSGEIIREILSDIIKPRYNAVSEGKNLGNEDIL  
ESLLLVDADAKTNQRFSEEEILDQVAMLFAGHETTASSLTWTLYLLSLYPQEQEKAYEEV  
RQILNGEEIQISHLRQFKFLTNVFKESLRLYPPVGFFAREAKKDTKIRDKNIKKSGSVVV  
APWLIHRHKHFWDNPNDFNPSRFDKEYRKDAYLPFGMGERICIGQGAMQEAILILASIL  
KIYKLELESGFVPDVVGRLTIRSANGMNIKFSKR

>CLAN\_0140|KEGG|CYP172A|[Campylobacter lanienae]clx|EP

MGVCPFHFKPHSSKAGLITTFLLKRRSWLDGLYEKSYKMRVGRVKMPGFDLFVNDPKEV  
RKIMVDNVKEFPKSDMLHELLKPLLGVSIFFTNGEVWKKQRELLRPSFEMTRISKVFDLM  
SSAAADMMERFRKYEDGAVVEVDEHMTFVTADVIFRTIMSAKLDEEKGKEILDAFVTFQE  
ETAKTAIRKFFCVPQWLSNLLGENKRIKAGAVIRKNLSNIIKPRYDNYANDTHCDILSSL  
LHTTDADSGERFSFEEILDQVSMLFLAGHETTASSLTWTLYCLSLDQDAQKAYNEIISI  
NKDSKFEISDIRDMKYLTNVFKEALRLYPPVGFFARQNKNEIKIRDKVLQKGAGVVVAPW  
LIHRHDDYWEAPHEFRPERHNENIPKERYMPFGLGERVCIGHGFAMQEAIILANILREF  
KLELKDGFIPDVVGRLTIRSANGMMIKMTQRH

>CAV\_1397|KEGG|CYP172A|[Campylobacter avium]cavi|EP

MACPFHFKPKKTKASTLMTFLLKRRSWLDGLYEKSYSMQSGRVKMPGFDLYVNDVREV  
RIMVDEVKEFPKSELLHRLLEPLLGVSIFFTNGDVWKKQRELLMPFEMTRINKVFELMK  
DAANDLLIRLEKKDKDFIDADEEMTFVTADVIFRTIMSAKLDEEKGKEILKAFSIMQEET  
IRTGIREMFCEFPKWLSKLLGENKRMKAGACIRDNLAQIIKPRYDEQREGKADYRQDILAS  
LLRVIDADTNEPFSFKEILDQVSMLFLAGHETTASSLTWTLYCLCPEPSWQEKAYDEIMQ

ITKGEELSLAHVKAFKVLNNIFKEALRLYPPVGFFPRTAKKDTKIRDKEIKAGSGVVVAP  
WLIHRHSLWQDPHEFKPQRFDEQINKDAYMPFGMGERICIGQGFAMQEAMIILASILKK  
YKLQLKENFTPDVVGRLTVRSANGMSIKFIRR

>A2J15\_004785|KEGG|CYP172A|[Campylobacter hepaticus]chw|EP

MNQCPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVVNNTKEV  
KRIMVNEVRQFPKSAFLHELLSPLLGESIFTTNGDVWKKQRELLRPSFEMTGINKVFNLN  
KDAADMMQRFDKYPNNAIIEVDEAMTFVTADVIFRTIMSSKLDEEQGKKILNAFVTFQE  
QTVHTAMRRMFHFPKWFSYILGDRKRAKAGELIRQVLKDIVKPRYDKANEANQEEFKDIL  
SSLLLVDQAQTNKRFSFEEILDQVAMLFAGHETTASSLTWTLYLLSLYPKDQEKAYEEL  
CEILQNKDIEIVHLKQFKYLINIFKESLRLYPPVGFFAREAKQDTQIRDKFIKKGSGVVI  
APWLIHRHEKFWSDPNGFNPSRFEHEYQKDAYLPFGVGERICIGQGFAMQEAILILANIL  
RVYKLELEEGFVPDVVGRLTVRSANGMRIKFTKRKA

>CVIC12175\_1523|KEGG|CYP172A|[Campylobacter sp. RM12175]camz|EP

MGVCPFHFKPHNSKAGLITTFLLKRRSWLDGLYAKSYKMRAGRVKMPGFDLFVVNDPKEV  
RKIMIDNVKEFPKSDMLHELLKPLLGVSIFFTNGEVWKKQRELLKPSFEMTRISKVFDLM  
SSAAADMMERFRKYPDGSIVEVDEHMTFVTADVIFRTIMSSKLDEIKGKEILHAFVTFQE  
ETARTAIRKFFCVPQWLSNILGENKRMKAGAVIRKSLSDIIQPRYDSYKSDNYSDILSSL  
LHTVDASSGERFSFEEILDQVSMLFLAGHETTASSLTWTLYCLSLDQDAQKAYNEIISI  
NKDGKFSISDIKEMKYLTNVFKEALRLYPPVGFFARQSKGEAKIRDKVLQKSGSVVAPW  
LIHRHDDFWEAPHEFRPDRHNENIPKEKYMPFGLGERICIGQGFAMQEAIILANILREF  
KLELKDGFVPDVVGRLTVRSANGMMIKMSKRQ

>CSUIS\_0153|KEGG|CYP172A|[Campylobacter sp. RM6137]camy|EP

MGVCPFHFKPHNNKAGLITTFLLKRRSWLDGLYVKSYSKMRSGRVKMPGFDLFVVNDPNEV  
RKIMIDNVKEFPKSDLLHELLKPLLGVSIFFTNGEVWKKQRELLRPSFEMTRISKVFDLM  
SSAAADMMDRFRKYEDGSIIEVDEHMTFVTADVIFRTIMSAKLDEEKGKEILHAFVTFQE



ETARTAIRKFFCVPQWLSNILGENKRMKAGEIIRQNLSNIIKPRYDNYANDTHCDILSSL  
LHTIDADSNQRFSFEEILDQVSMFLAGHETTASSLTWTLYCLSLDQDAQQKAYNEVISI  
NKDGKFSISDIKNMRYLTNVFKEALRLYPPVGFFARQSKNDTKIRDKVLKKGSGVVAPW  
LIHRHEDFWDAPHEFRPDRHNDIPKEKYMPFGLGERICIGQGFAMQEAIILANILREF  
KLELKDGFI PDVVGRLTVRSANGMMIKMTRRQ

>CORN\_0326|KEGG|CYP172A|[Campylobacter ornithocola]coj|EP

MGQCPFHPPKPYKNKASTLTTFLKRRSWLDGLYERSYKMMGRVKMPGFDLYVVNDPKEV  
RRIMVDEVREYPKSQLLHELLEPLLGVSIFFTNDKVWEKQRELLKPSFEMTRISKVFDLM  
SEAASDMMGRFAKYENKAVIEVDEAMTFVTADVIFRTIMSSKLDEQKGKLVLD AFVTVQE  
ETVKTAMRRMFRFPTWLSNLLGEKKRLKAGGVIRKVLSDI IKPRYDNALNDQGYEDILS  
SLLMVVDADTNKRFSFNEILDQVAMLFLAGHETTASSLTWTLYILSISPNEQQKAYEEII  
QVAGNGEFKIEHIRAMKYVTNVFKESLRLYPPVGFFAREARNESKMRDKLIKKGSGVVVA  
PWLIHRHDNFWENPHEFDPSRHEDKGKIKKDTYMPFGMGERICIGQGFAMQEAVLILANI  
LRTYKLELEENFVPDIVGRLTIRSANGMNIRFIKRQK

>CUP3940\_1510|KEGG|CYP172A|[Campylobacter upsaliensis]cux|EP

MSECPFFPKPYKNKASTLLTFLKRRSWLDGLYERSYQMQTGYVKMPNFDLYVINDTKEV  
KRMMVDEVREFPKSELLHRLLSPLLGESIFTTNGEVVHKQRELLKPSFELTRISKVFNLN  
SEAVADLMRRFEKYPDNSYIEVDEMFTFVTADVIFRTIMSSKLDEVQGRQILEAFATFQE  
ESVRTAMRGMFYFPKWLSYLLGDRKRAKAGELIRKALSDI IKPRYEANLEKSDYEDILSS  
LLLVDADAKTNQRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSLYPEEQERAYNEICE  
ILQDSKEIKIAHLRQFKFLT NVFKESLRLYPPVGFFAREAKKDTQVRDKLIKQSGGVIA  
PWLIHRHELFWQNPFGFDPSRFEREYKKEAYLPFGMGERICIGQGFAMQEAILILANILK  
TYRLELKEDFVPDVVGRLTIRSLNGMWIKFSKR

>CARM\_0293|KEGG|CYP172A|[Campylobacter armoricus]carm|EP

MGQCPFHPPKPYKNKASTLTTFLFKRRSWLDGLYERSYKMMGRVQMPGFDLYVVNDPKEV

RRIMVDEVREYPKSQLLHELLEPLLGVSIFFTNGRVWEKQRELLRPSFEMTRISKVFGLM  
SEAASDMMARFAKYEDKAIIEVDEAMTFVTADVIFRTIMSSKLDEQKGKIVLDAFVTVQE  
QTVKTAMRRMFRFPTWLSNLLGERKRLKAGGVIRKVLSDI IKPRYENALNDQGKYEDILS  
SLLMVVDADTNERFSFDEILDQVAMLFLAGHETTASSLTWTLYILSMSPNEQQKAYEEIM  
QVAGDEKFTIEHIKSMKYLTNIFKESLRLYPPVGFFAREARNESKMRDKLIKKGSGVVVA  
PWLIIHRHDSFWENPHEFDPSRHEDKSKIKKDTYMPFGMGERICIGQGAFAMQEAILILANI  
LRTYKLELEENFVPDIVGRLTIRSANGMNIRFIKR

>CNZW441b\_1292|KEGG|CYP172A|[Campylobacter novaezeelandiae]cnv|EP

MSQCPFFPKPYKTKASTLLTFLKRRSWLDGLYERSYKMQTGYVKMPNFDLYVINDTKEV  
KRIMIDEVKEFPKSEFLHQLLSPLLGESIFTTNGEVWRKQRELLRPSFEMTRINKVFNL  
SEAVADMMSRFEKYHDESIIEVDEAMTFVTADVIFRTIMSSKLDEKKGKKVLDAFVTFQE  
QSVHSAMRRMFRFPKWISYILGDKKRLQAGETIREVLSEIIRPRYESFDPQNTNEFDILE  
SLLCVIDANTNKRFSFEEILDQVAMLFLAGHETTASSLTWTLYLLSSFEDEQEKA  
YREVE  
EVLQGKDIEITHLKQFKILTNI  
FKESLRLYPPVGFFAREAKQDTKIR  
DKFVKKGSGVVVA  
PWLIIQRHENYWEKPNEFNPSRFEGDYKKDAYLPFGMGERICIGQAFAMQEAILILANILR  
KYKLQLQEGFIPDVVGRLTVRSANGMNIKFIKRKK

>AMYT\_2277|KEGG|CYP2724A1|[Helicobacter winthamensis]amyt|EP  
MKSLIPPQLKFQPLKNIKATSALRAMLYAEEFWPEEILNKPSVSLKTTTGELLFLSDPFL  
VKEVLTRNDGTIPRSRLQQRFAGHGTGRENVITDIGKRSAMHRKTLAPLFPDRFNTYFP  
FIKMTLEEAIKPIFDAIEKKEPIDIGRVCVNGTFGVIWQILFGEDKKLTPPLIVEQMANT  
LYEAGLSGELTQTSKAVKQAKEISLSLRPLVPLVSDTPFAKNPKINLQLTNKELEDNAQF  
LLTSGHESTALTITWALFLLAHYQDEQELIANEIKNILGNKELTLDILHKLPRLNNLFNE  
TMRLYPSAILVNRETIQDVTVGELSIKKGTTQIAVCFYSMHRHKNYWKEPDSFNPDRFNTL  
NKEQLRAFMFPSTGHHSCLGKLAWEAMTILTTILKDKVILCKNSIKPIARYTLRPDG  
PVMLEVQKRN

Table S4. Identification of P450s that are part of the secondary metabolite biosynthetic gene clusters (sm-BGCs) in alphaproteobacterial species. Reference cluster information was obtained by performing BLAST at the anti-SMASH database [3], as indicated in the materials and methods section. The cluster type and most similar known cluster names available in the anti-SMASH database[3], were listed in the table.

*Betaproteobacteria*

Species name	Species code	No of P450s part of cluster	Region	Type	Most similar known cluster	Similarity	P450
<i>Chromobacterium phragmitis</i> IIBBL 112-1	chri	1	Region 4	transAT-PKS,NRPS,NRPS-like	sorangicin A	8%	CYP261D1
<i>Aquitalea magnusonii</i>	amah	1	Region 3	butyrolactone			CYP1200A5
<i>Ralstonia syzygii</i> subsp. <i>celebesensis</i>	rsg	1	Region 5	transAT-PKS,NRPS-like,siderophore	rhizoxin A	100%	CYP1464A2
<i>Cupriavidus basilensis</i>	cbw	1	Region 2	NRPS-like	iturin	22%	CYP107DG5
<i>Burkholderia mallei</i> ATCC 23344	bma 2	2	Region 1	RiPP-like			CYP1488A1
			Region 1 1	hglE-KS,terpene	lipopolysaccharide	16%	CYP1013A3
<i>Burkholderia mallei</i> SAVP1	bmv 2	2	Region 6	hglE-KS,terpene	myxochromide D	20%	CYP1013A3
			Region 7	RiPP-like			CYP1488A1
<i>Burkholderia mallei</i> NCTC 10229	bml 2	2	Region 7	hglE-KS,terpene	myxochromide D	20%	CYP1013A3

			Region 8	RiPP-like			CYP1488A1
<i>Burkholderia mallei</i> NCTC 10247	bmn 2	2	Region 1	RiPP-like			CYP1488A1
			Region 1 1	hglE-KS,terpene	myxochromide D	20%	CYP1013A3
<i>Burkholderia mallei</i> 23344	bmal 2	2	Region 2	RiPP-like			CYP1488A1
			Region 3	terpene,hglE-KS	myxochromide D	20%	CYP1013A3
<i>Burkholderia mallei</i> 6	bmae 2	1	Region 7	RiPP-like			CYP1488A1
<i>Burkholderia mallei</i> BMQ	bmaq 2	2	Region 6	RiPP-like			CYP1488A1
			Region 7	terpene,hglE-KS	myxochromide D	20%	CYP1013A3
<i>Burkholderia mallei</i> 2000031063	bmai 2	2	Region 1	RiPP-like			CYP1488A1
			Region 1 1	hglE-KS,terpene	myxochromide D	20%	CYP1013A3
<i>Burkholderia mallei</i> FMH 23344	bmaf 2	2	Region 5	hglE-KS,terpene	N-myristoyl-D-asparagine / cis-7-tetradecenoyl-D- asparagine / (R)-N1-((S)-5- oxohexan-2-yl)-2- tetradecanamidossuccinamid e	8%	CYP1013A3
			Region 6	RiPP-like			CYP1488A1
<i>Burkholderia mallei</i> NCTC 10247	bmaz 2	2	Region 1	NRPS	glidopeptin	62%	CYP1488A1
			Region 1 1	hserlactone	L-2-amino-4-methoxy-trans- 3-butenic acid	20%	CYP1013A3
<i>Burkholderia mallei</i> 2002734299	bmab 2	2	Region 8	RiPP-like			CYP1488A1
			Region 9	terpene,hglE-KS	myxochromide D	20%	CYP1013A3
<i>Burkholderia pseudomallei</i> 1710b	bpm 2	2	Region 1 0	hglE-KS,terpene	myxochromide D	20%	CYP1013A3
			Region 1 1	RiPP-like			CYP1488A1

<i>Burkholderia pseudomallei</i> 1106a	bpl 2	2	Region 1	RiPP-like			CYP1488A1
			Region 1 7	hgIE-KS,terpene	myxochromide D	20%	CYP1013A3
<i>Burkholderia pseudomallei</i> 668	bpd 2	2	Region 1	RiPP-like			CYP1488A1
			Region 1 7	hgIE-KS,terpene	myxochromide D	20%	CYP1013A3
<i>Burkholderia pseudomallei</i> MSHR305	bpse 1	2	Region 1 3	hgIE-KS,terpene	myxochromide D	20%	CYP1013A3
			Region 1 4	RiPP-like			CYP1488A1
<i>Burkholderia pseudomallei</i> MSHR511	bpsm 2	2	Region 2	RiPP-like			CYP1488A1
			Region 3	terpene,hgIE-KS	myxochromide D	20%	CYP1013A3
<i>Burkholderia pseudomallei</i> MSHR146	bpsu 2	2	Region 1 4	hgIE-KS,terpene	myxochromide D	20%	CYP1013A3
			Region 1 5	RiPP-like			CYP1488A1
<i>Burkholderia pseudomallei</i> MSHR520	bpsd 2	2	Region 7	hgIE-KS,terpene	myxochromide D	20%	CYP1013A3
			Region 8	RiPP-like			CYP1488A1
<i>Burkholderia pseudomallei</i> 1026b	bpz 2	2	Region 1	RiPP-like			CYP1488A1
			Region 1 5	hgIE-KS,terpene	myxochromide D	20%	CYP1013A3
<i>Burkholderia pseudomallei</i> BPC006	bpq 2	2	Region 1	RiPP-like			CYP1488A1
			Region 1 7	hgIE-KS,terpene	myxochromide D	20%	CYP1013A3
<i>Burkholderia pseudomallei</i> NCTC 13179	bpk 2	2	Region 8	hgIE-KS,terpene	myxochromide D	20%	CYP1013A3
			Region 9	RiPP-like			CYP1488A1

<i>Burkholderia pseudomallei</i> HBPUB10134a	bpsH 2	2	Region 1 4	RiPP-like			CYP1488A1
			Region 1 5	terpene,hgIE-KS	myxochromide D	20%	CYP1013A3
<i>Burkholderia pseudomallei</i> NAU35A-3	bpsA 2	2	Region 2	RiPP-like			CYP1488A1
			Region 3	terpene,hgIE-KS	myxochromide D	20%	CYP1013A3
<i>Burkholderia pseudomallei</i> A79A	bpsO 2	2	Region 1 2	RiPP-like			CYP1488A1
			Region 1 3	terpene,hgIE-KS	myxochromide D	20%	CYP1013A3
<i>Burkholderia pseudomallei</i> TSV202	but 2	2	Region 7	RiPP-like			CYP1488A1
			Region 8	terpene,hgIE-KS	myxochromide D	20%	CYP1013A3
<i>Burkholderia thailandensis</i> E264	bte 2	2	Region 1	Ripp-Like			CYP1488A2
			Region 1 4	hgIE-KS,terpene	myxochromide D	20%	CYP1013A3
<i>Burkholderia thailandensis</i> 2002721723	btq 2	2	Region 2	RiPP-like			CYP1488A2
			Region 1 5	hgIE-KS	myxochromide D	20%	CYP1013A3
<i>Burkholderia thailandensis</i> E444	btj 2	2	Region 7	hgIE-KS,terpene	myxochromide D	20%	CYP1013A3
			Region 8	RiPP-like			CYP1488A2
<i>Burkholderia thailandensis</i> H0587	btz 2	1	Region 1 3	RiPP-like			CYP1488A2
<i>Burkholderia thailandensis</i> MSMB121	btd 2	2	Region 2	transAT-PKS,PKS-like,NRPS,NRPS-like	thailanstatin A	100%	CYP1486A1
			Region 7	RiPP-like			CYP1488A2
<i>Burkholderia thailandensis</i> MSMB59	btv 2	2	Region 7	RiPP-like			CYP1488A2
			Region 8	terpene,hgIE-KS	myxochromide D	20%	CYP1013A3

<i>Burkholderia thailandensis</i> E254	bthe 2	2	Region 1 0	hgIE-KS,terpene	myxochromide D	20%	CYP1013A3
			Region 1 1	RiPP-like			CYP1488A2
<i>Burkholderia thailandensis</i> USAMRU Malaysia #20	bthm 2	2	Region 1 0	hgIE-KS,terpene	myxochromide D	20%	CYP1013A3
			Region 1 1	RiPP-like			CYP1488A2
<i>Burkholderia thailandensis</i> 2003015869	btha 2	2	Region 1 3	hgIE-KS,terpene	myxochromide D	20%	CYP1013A3
			Region 1 4	RiPP-like			CYP1488A2
<i>Burkholderia thailandensis</i> 2002721643	bthl 2	2	Region 1 1	hgIE-KS,terpene	myxochromide D	20%	CYP1013A3
			Region 1 2	RiPP-like			CYP1488A2
<i>Burkholderia oklahomensis</i> C6786	boc 2	1	Region 5	hgIE-KS,terpene	myxochromide D	20%	CYP1013A3
<i>Burkholderia mayonis</i>	buu 2	2	Region 9	terpene	sodorifen	50%	CYP117C2
			Region 1 7	hgIE-KS,terpene	myxochromide D	20%	CYP1013A3
<i>Burkholderia multivorans</i> ATCC 17616 (Tohoku)	bmj 1	1	Region 2	hgIE-KS	myxochromide D	20%	CYP1013A4
<i>Burkholderia multivorans</i> ATCC 17616 (Tohoku)	bmj 3	2	Region 2	redox-cofactor			CYP116B113
			Region 3	terpene	sodorifen	75%	CYP117C1
<i>Burkholderia multivorans</i> ATCC 17616 (JGI)	bmu 1	1	Region 3	hgIE-KS	myxochromide D	20%	CYP1013A4
<i>Burkholderia multivorans</i> ATCC 17616 (JGI)	bmu 3	2	Region 2	terpene	sodorifen	75%	CYP117C1
			Region 3	redox-cofactor			CYP116B113

<i>Burkholderia multivorans</i> DDS 15A-1	bmk 1	1	Region 2	hgIE-KS	myxochromide D	20%	CYP1013A4
<i>Burkholderia multivorans</i> DDS 15A-1	bmk 3	2	Region 2	terpene	sodorifen	75%	CYP117C1
			Region 3	redox-cofactor			CYP116B113
<i>Burkholderia multivorans</i> ATCC BAA-247	bmul 3	1	Region 2	redox-cofactor	lankacidin C	13%	CYP116B113
<i>Burkholderia gladioli</i> BSR3	bgd 1	1	Region 3	transAT-PKS,T3PKS,PKS-like	isobongkreki acid / bongkreki acid	85%	CYP267C1
<i>Burkholderia gladioli</i> ATCC 10248	bgo 2	1	Region 1 2	terpene	desotamide	9%	CYP183AG1
<i>Burkholderia</i> sp. 2002721687	bul 2	3	Region 1	transAT-PKS,PKS-like,NRPS,NRPS-like	thailanstatin A	100%	CYP1486A1
			Region 5	RiPP-like			CYP1488A2
			Region 6	terpene,hgIE-KS	myxochromide D	20%	CYP1013A3
<i>Burkholderia plantarii</i> PG1	bgp 2	1	Region 1 1	blactam			CYP107DN1
<i>Burkholderia plantarii</i> ATCC 43733	bpla 1	1	Region 9	CDPS	bicyclomycin	75%	CYP1481A2
<i>Burkholderia plantarii</i> ATCC 43733	bpla 2	1	Region 1 2	blactam			CYP107DN1
<i>Burkholderia</i> sp. Bp5365	bud 2	3	Region 1	RiPP-like			CYP1488A2
			Region 5	NRPS-like,transAT-PKS,NRPS,PKS-like	thailanstatin A	100%	CYP1486A1
			Region 1 3	hgIE-KS,terpene	myxochromide D	20%	CYP1013A3
<i>Paraburkholderia phymatum</i>	bph 2	1	Region 5	terpene			CYP133C2
<i>Paraburkholderia caribensis</i>	bcai 2	1	Region 1	terpene			CYP133C2
<i>Paraburkholderia hospita</i>	phs 2	1	Region 5	terpene			CYP133C2
<i>Paraburkholderia terrae</i>	pter 2	1	Region 5	terpene			CYP133C2
<i>Paraburkholderia megapolitana</i>	pmeg 2	1	Region 4	NRPS-like			CYP1686A1



<i>Mycetohabitans rhizoxinica</i>	brh	1	Region 6	transAT-PKS,NRPS-like	rhizoxin A	88%	CYP1464A3
<i>Achromobacter</i> sp. AONIH1	achr	1	Region 6	NRPS-like			CYP2308A1
<i>Paralcaligenes</i> sp. KSB-10	park	1	Region 5	NRPS			CYP107DG1 1
<i>Acidovorax</i> sp. JS42	ajs	1	Region 2	NRPS-like			CYP1318A1
<i>Massilia umbonata</i>	mum	1	Region 6	linaridin			CYP1104B1
<i>Methyloversatilis</i> sp. RAC08	metr	1	Region 7	terpene			CYP1246A

#### *Deltaproteobacteria*

Species name	Species code	Number of P450s part of clusters	Region	Type	Most similar known cluster	Similarity	P450s
<i>Archangium violaceum</i>	avm	4	Region 26	T1PKS,NRPS,lanthipeptide-class-ii,lanthipeptide-class-i	ajudazol A	84%	CYP1224J3
			Region 31	NRPS-like	glidobactin	10%	CYP109R10
			Region 39	NRPS,T1PKS,NRPS-like	puwainaphycin A / puwainaphycin B / puwainaphycin C / puwainaphycin D	50%	CYP242A6
			Region 40	terpene			CYP1329A2

<i>Melittangium boletus</i> DSM 14713	mbd	4	Reg ion 1	T1PKS	microsclerodermin M	18%	CYP253D
			Reg ion 3	proteusin	haliamide	29%	CYP262F1
			Reg ion 5	terpene			CYP167B10 , CYP251V1
<i>Cystobacter fuscus</i>	cfus	6	Reg ion 16	NRPS			CYP105EK1
			Reg ion 17	proteusin,RiPP-like			CYP120G3
			Reg ion 18	terpene			CYP251V1
			Reg ion 19	terpene			CYP262B4
			Reg ion 28	NRPS,T1PKS,NRPS- like	minutissamide A / minutissamide C / minutissamide D	30%	CYP1011E3
			Reg ion 40	terpene			CYP183BE1
<i>Sorangium cellulosum</i> So ce56	scl	3	Reg ion 13	T3PKS			CYP262A1
			Reg ion 20	hglE-KS,T1PKS			CYP263A1

			Reg ion 34	terpene	eremophilene	100 %	CYP264B1
<i>Chondromyces crocatus</i>	ccro	6	Reg ion 4	T1PKS,NRPS,RiPP-like			CYP110R2
			Reg ion 9	T1PKS			CYP263A3
			Reg ion 13	T1PKS,NRPS- like,NRPS	crocacin	100 %	CYP1011F1
			Reg ion 15	NRPS,T1PKS			CYP147L1
			Reg ion 17	NRPS,RiPP-like			CYP107HW1
			Reg ion 20	T1PKS,NRPS-like	ajudazol A	38%	CYP107HU1
<i>Sandaracinus amylolyticus</i>	samy	2	Reg ion 2	terpene			CYP110T1
			Reg ion 15	terpene			CYP51B3
<i>Minicystis rosea</i>	mrm	6	Reg ion 5	hglE-KS,T1PKS,terpene			CYP51B2, CYP263A2
			Reg ion 8	terpene			CYP183AH3

			Region 14	NRPS-like	ralsolamycin	40%	CYP1499A1
			Region 26	lanthipeptide-class-ii,LAP			CYP1448B1
			Region 42	hglE-KS,T1PKS			CYP1069H1
<i>Haliangium ochraceum</i> DSM 14365	hoh	10	Region 1	RRE-containing			CYP107HZ1
			Region 2	RRE-containing			CYP107JA1, CYP262C1, CYP1490A1, CYP1504A1, CYP1489A2
			Region 18	NRPS,T1PKS,phenazine	aurafuron A	71%	CYP1486B2, CYP126B3, CYP110U1
			Region 23	RiPP-like			CYP1069B2
<i>Archangium gephyra</i>	age	6	Region 9	NRPS-like,T1PKS,NRPS	crocacin	38%	CYP107DP4, CYP1011E
			Region 14	terpene,lanthipeptide-class-ii			CYP1329A1
			Region 19	terpene			CYP1298A1, CYP1347B3
			Region 35	T1PKS,NRPS	microsclerodermin	21%	CYP253G3

<i>Stigmatella aurantiaca</i> DW4/3-1	sur	10	Region 1	T1PKS,NRPS	nostopeptolide A2	25%	CYP1494A1
			Region 6	NRPS,T1PKS,NRPS-like	minutissamide A / minutissamide C / minutissamide D	30%	CYP1011E2
			Region 11	T1PKS	dawenol	100 %	CYP107DP2
			Region 13	indole			CYP120H1
			Region 18	NRPS,furan,terpene	myxochelin A / myxochelin B	100 %	CYP1498A1
			Region 29	T1PKS	aurafuron A	100 %	CYP1486B1, CYP126B2, CYP264J1, CYP1495A1
			Region 38	microviridin	microviridin K	25%	CYP264J1
<i>Desulfocurvibacter africanus</i> subsp. <i>africanus</i> str. Walvis Bay	daf	1	Region 3	NRPS-like,RiPP-like			CYP152E2
<i>Myxococcus xanthus</i> DK 1622	mxs	1	Region 13	transAT-PKS,NRPS,PKS-like	myxovirescin A1	78%	CYP209A1
<i>Myxococcus stipitatus</i> DSM 14675	msd	7	Region 11	NRPS,T1PKS	pyridomycin	7%	CYP253L1
			Region 16	NRPS,T1PKS	phenalamide A2	100 %	CYP1491A1

			Reg ion 19	T1PKS,other	dawenol	77%	CYP1497A1, CYP120F1, CYP1503A1, CYP1495A1
			Reg ion 28	T3PKS	alkylpyrone-407 / alkylpyrone- 393	25%	CYP229H1
<i>Myxococcus hansupus</i>	mym	1	Reg ion 3	terpene	geosmin	100 %	CYP109S1
<i>Coralloccoccus coralloides</i> DSM 2259	ccx	2	Reg ion 16	NRPS			CYP264D1
			Reg ion 21	NRPS			CYP264D6

#### *Epsilonproteobacteria*

Species names	Species code	No of p450s	Cluster Count	Region	Type	From	To	Most similar known cluster	Similarit y	P450 in Clusters
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<i>Helicobacter winghamensi</i> s	hwi	1								
<i>Campylobact er jejuni</i> subsp. <i>jejuni</i> NCTC 11168 = ATCC 700819	cje	1								
<i>Campylobact er jejuni</i> subsp. <i>jejuni</i> NCTC 11168- BN148	cjb	1								
<i>Campylobact er jejuni</i> subsp. <i>jejuni</i> 81-176	cjj	1								
<i>Campylobact er jejuni</i> subsp. <i>jejuni</i> 81116	cju	1								

<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> ICDCCJ0700 1	cjn	1								
<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> IA3902	cji	1								
<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> M1	cjm	1								
<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> S3	cjs	1								
<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> PT14	cjp	1	1	Region 1	betalactone	858,63	888,467			



<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> 00-2426	cjej	1	1	Region 1	betalactone	859,152	888,989			
<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> 00-2538	cjeu	1	1	Region 1	betalactone	897,707	927,544			
<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> 00-2544	cjen	1	1	Region 1	betalactone	897,708	927,545			
<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> 00-2425	cjei	1	1	Region 1	betalactone	897,706	927,543			
<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> R14	cjer	1	1	Region 1	betalactone	963,554	993,393			

<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> MTVDSCj20	cjv									
<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> 00-1597	cjl	1	1	Region 1	betalactone	856,759	886,598			
<i>Campylobacter jejuni</i> subsp. <i>jejuni</i> 00-6200	cjw	1	1	Region 1	betalactone	857,862	887,699			
<i>Campylobacter jejuni</i> RM1221	cjr	1								
<i>Campylobacter jejuni</i> subsp. <i>doylei</i> 269.97	cjd	1	1	Region 1	betalactone	935,951	965,789			
<i>Campylobacter jejuni</i> 32488	cjz	1	1	Region 1	betalactone	10,63	40,467			

<i>Campylobacter jejuni</i> 4031	cjx	1	2	Region 1	thioamide-NRP	181,841	244,976			
				Region 2	arylpolyene	1,433,255	1,476,717	APE Vf	20%	
<i>Campylobacter lari</i> RM2100	cla	1								
<i>Campylobacter lari</i> RM16701	clr	1								
<i>Campylobacter lari</i> RM16712	clm	1								
<i>Campylobacter lari</i> NCTC 11845	cln	1								
<i>Campylobacter lari</i> subsp. <i>concheus</i> LMG 11760	cll	1								
<i>Campylobacter coli</i> 76339	ccol	1								
<i>Campylobacter coli</i> CVM N29710	ccc	1								

<i>Campylobacter coli</i> 15-537360	ccq	1								
<i>Campylobacter coli</i> RM1875	ccf	1								
<i>Campylobacter coli</i> RM4661	ccy	1								
<i>Campylobacter coli</i> RM5611	ccoi	1								
<i>Campylobacter coli</i> FB1	ccof	1								
<i>Campylobacter coli</i> OR12	ccoo	1								
<i>Campylobacter insulaenigrae</i>	cis	1								
<i>Campylobacter volucris</i>	cvo	1								
<i>Campylobacter peloridis</i>	cpel	1								
<i>Campylobacter</i> sp. RM16704	camr	1								

<i>Campylobacter subantarcticus</i> LMG 24374	csm	1								
<i>Campylobacter subantarcticus</i> LMG 24377	csf	1								
<i>Campylobacter helveticus</i>	chv	1								
<i>Campylobacter cuniculorum</i>	ccun	1								
<i>Campylobacter lanienae</i>	clx	1								
<i>Campylobacter avium</i>	cavi	1								
<i>Campylobacter hepaticus</i>	chw	1								
<i>Campylobacter</i> sp. RM12175	camz	1								
<i>Campylobacter</i> sp. RM6137	camy	1								

<i>Campylobacter ornithocola</i>	coj	1								
<i>Campylobacter upsaliensis</i>	cux	1								
<i>Campylobacter armoricus</i>	carm	1								
<i>Campylobacter novaezeelandicae</i>	cnv	1								
<i>Malaciobacter mytili</i>	amyt	1								

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