

Supporting Information

The Chemical Biology of Dimethylsulfonylpropionate

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Table 1 Distribution of genes of the DMSP demethylation pathway in culturable microorganisms. Entries are gene bank accession numbers. Bold entries represent characterised genes or enzymes (see text). Asterisks indicate probe sequences used for BLAST searches. Marine microorganisms are shown in blue, terrestrial microorganisms are in brown.

Strain	DmdA	DmdB	DmdC	DmdD
α-Proteobacteria				
<i>Defluviimonas</i> sp. 20V17			KDB05057	KDB05056
<i>Dinoroseobacter shibae</i> DSM 16493	WP_012178987			
<i>Donghicola xiamenensis</i> DSM 18339		WP_028094269	WP_028093415	WP_028093416
<i>Hellea balneolensis</i> DSM 19091	WP_026941315			
<i>Jannaschia</i> sp. CCS1	WP_011455500			WP_011453790
<i>Labrenzia alexandrii</i> DFL 11	WP_008197071			
<i>Labrenzia</i> sp. DG1229	WP_029062767			
<i>Leisingera aquimarina</i> DSM 24565	WP_027258747		WP_027258036	WP_027258037
<i>Leisingera methylohalidivorans</i> DSM 14336	WP_024090329		WP_024089192	WP_024089193
<i>Leisingera nanhaiensis</i> DSM 24252	WP_027261272	WP_027260686	WP_027263950	WP_027263949
<i>Mesorhizobium loti</i> MAFF303099			WP_010914467	WP_010914468
<i>Nisaea denitrificans</i> DSM 18348	WP_028465009			WP_028466920
<i>Oceanibulbus indolifex</i> HEL-45	WP_007119686	WP_007119563		
<i>Octadecabacter antarcticus</i> 307	WP_015500755			
<i>Octadecabacter arcticus</i> 238	WP_015495252			
<i>Pelagibacter ubique</i> HTCC1062	YP_265671^{1,2}	YP_265673³		
<i>Phaeobacter arcticus</i> DSM 23566	WP_027240557	WP_027238804	WP_027239243	WP_027239244
<i>Phaeobacter caeruleus</i> DSM 24564	WP_027237414			
<i>Phaeobacter daeponensis</i> DSM 23529	WP_027243785			
<i>Phaeobacter gallaeciensis</i> 2.10			WP_014889350	
<i>Phaeobacter gallaeciensis</i> ANG1	WP_019297481		WP_019298515	WP_019298514
<i>Phaeobacter gallaeciensis</i> DSM 26640			WP_024099207	WP_024099206
<i>Phaeobacter inhibens</i> DSM 16374			WP_027246490	
<i>Phaeobacter inhibens</i> DSM 17395	WP_014881813	WP_014881571	WP_014881816	WP_014881815
<i>Pseudorhodobacter ferrugineus</i> DSM 5888	WP_022705551			
<i>Roseibacterium elongatum</i> DSM 19469	AHM05061			
<i>Roseibium</i> sp. TrichSKD4	WP_009759003			
<i>Roseobacter denitrificans</i> OCh 114	WP_011568488			
<i>Roseobacter litoralis</i> OCh 149	WP_013962134			
<i>Roseobacter</i> sp. AzwK-3b	WP_007814764			
<i>Roseobacter</i> sp. CCS2	WP_008234947			
<i>Roseobacter</i> sp. GAI101		WP_008227110		WP_008228206
<i>Roseobacter</i> sp. MED193	*WP_009808095⁴	*WP_009810225⁵	*WP_009810957⁵	*WP_009810956⁵
<i>Roseobacter</i> sp. SK209-2-6	WP_008204180	WP_008205770		
<i>Roseovarius nubinhibens</i> ISM	WP_009812064			
<i>Roseovarius mucosus</i> DSM 17069	KGM88025		KGM88028	KGM88027
<i>Roseovarius</i> sp. 217	WP_009817723			
<i>Roseovarius</i> sp. TM1035	WP_008279853			
<i>Ruegeria conchae</i> TW15	WP_010439960	WP_010440301		
<i>Ruegeria lacuscaerulensis</i> ITI-1157	WP_005983312	WP_005982887³		
<i>Ruegeria mobilis</i> F1926	WP_005606118			
<i>Ruegeria pomeroyi</i> DSS-3	AAV95190¹	AAV95316³ WP_011046428³	AAV97018²	AAV97019⁶
<i>Ruegeria</i> sp. R11	WP_008563007	WP_008560557		
<i>Ruegeria</i> sp. TM1040	WP_011538780			
<i>Sediminimonas qiaohouensis</i> DSM 21189	WP_026757707			WP_026757455
<i>Silicibacter</i> sp. TrichCH4B	WP_009177301			
<i>Stappia stellulata</i> DSM 5886			WP_029057096	WP_029057095
<i>Sulfitobacter donghicola</i> DSW-25				WP_025058442
<i>Sulfitobacter guttiformis</i> KCTC 32187	WP_025062221	WP_025061757		WP_025064410
<i>Sulfitobacter mediterraneus</i> 1FIGIMAR09	KAJ04687	KAJ03345	KAJ01811	KAJ01810
<i>Sulfitobacter mediterraneus</i> KCTC 32188	WP_025049182	WP_025046243	WP_025046847	WP_025046848
<i>Sulfitobacter pontiacus</i> 3SOLIMAR09		KAJ31439		KAJ31608
<i>Sulfitobacter</i> sp. 20_GPM-1509m		WP_028957422		WP_028956844
<i>Sulfitobacter</i> sp. EE-36		WP_005853738		WP_005853055
<i>Sulfitobacter</i> sp. H3		KEJ94708		KEJ95369
<i>Sulfitobacter</i> sp. MM-124	WP_025044868	WP_025044711		
<i>Sulfitobacter</i> sp. NAS-14.1		WP_009824717		WP_009826810
<i>Sulfitobacter</i> sp. NB-68		WP_025052937		WP_025053001
<i>Sulfitobacter</i> sp. NB-77	WP_025057289	WP_025057411		WP_025054544
<i>Thalassobacter arenae</i> DSM 19593	WP_021100146			
<i>Thalassobacter stenotrophicus</i> 1CONIMAR09	KGK78881			
<i>Thalassobium</i> sp. R2A62	WP_009157616			
β-Proteobacteria				
<i>Comamonas testosteroni</i> NBRC 100989			WP_019042838	

Table 2 Distribution of genes of the DMS cleavage pathway in culturable microorganisms. Entries are gene bank accession numbers. Bold entries represent characterised genes or enzymes (see text). Asterisks indicate probe sequences used for BLAST searches. Marine microorganisms are shown in blue, terrestrial microorganisms are in brown.

Strain	DddD	DddL	DddP	DddQ	DddW	DddY
α-Proteobacteria						
<i>Agrobacterium</i> sp. H13-3	WP_013637020					
<i>Agrobacterium radiobacter</i> K84					WP_012652969	
<i>Agrobacterium rhizogenes</i> ATCC 15834					KEA04722	
<i>Agrobacterium tumefaciens</i> 5A	WP_003518692					
<i>Ahrensia kielensis</i> DSM 5890	WP_018690356					
<i>Amorphus coralli</i> DSM 19760		WP_026318838				
<i>Caenispirillum salinarum</i> AK4		WP_009539054				
<i>Citricella</i> sp. SE45	WP_008888086				WP_008884166	
<i>Defluviimonas</i> sp. 20V17	KDB03729					
<i>Dinoroseobacter shibae</i> DFL-12	WP_012187170	WP_012179973				
<i>Ensifer</i> sp. BR816	WP_018238093					
<i>Fulvimarina pelagi</i> HTCC2506		WP_007067665				
<i>Hoeflea phototrophica</i> DFL-43	WP_007196018					
<i>Hoeflea</i> sp. 108				WP_018428346		
<i>Jannaschia</i> sp. CCS1			WP_011454901			
<i>Labrenzia aggregata</i> IAM 12614		WP_006936138				
<i>Labrenzia alexandrii</i> DFL-11			WP_008189764			
<i>Labrenzia</i> sp. C1B10		ERP98415				
<i>Labrenzia</i> sp. DG1229			WP_029064725			
<i>Leisingera aquimarina</i> DSM 24565			WP_027259160	WP_027256321		
<i>Leisingera methylohalidivorans</i> DSM 14336			WP_024089880	WP_024089056		
<i>Leisingera nanhaiensis</i> DSM 24252			WP_027260909			
<i>Loktanella cinnabarina</i> LL-001	WP_021695383					
<i>Loktanella hongkongensis</i> DSM 17492					WP_017928939	
<i>Loktanella vestfoldensis</i> DSM 16212		WP_019955302				
<i>Loktanella vestfoldensis</i> SKA53		WP_007204311				
<i>Maritimibacter alkaliphilus</i> HTCC2654		WP_008330373				
<i>Mesorhizobium plurifarium</i> ORS3356			CDX27265			
			CDX21082			
<i>Mesorhizobium</i> sp. L103C105A0			WP_023835405			
<i>Mesorhizobium</i> sp. LNHC220B00			WP_023785102			
<i>Mesorhizobium</i> sp. LNJC405B00			WP_023731463			
<i>Mesorhizobium</i> sp. LSJC264A00	WP_031209821					
<i>Mesorhizobium</i> sp. ORS3324			CDX14705			
			CDX15034			
<i>Oceanicola batsensis</i> HTCC2597		WP_009805827				
<i>Oceanicola granulosus</i> HTCC2516			WP_007254158			
<i>Oceanicola nanhaiensis</i> DSM 18065		WP_028285536				
<i>Oceanicola</i> sp. HL-35					WP_024809463	
<i>Oceaniovalibus guishaninsula</i> JLT2003					WP_007426027	
<i>Octadecabacter arcticus</i> 238			WP_015494462			
<i>Paracoccus yeei</i> ATCC BAA-599			WP_028718905			
<i>Phaeobacter arcticus</i> DSM 23566					WP_027241318	
<i>Phaeobacter caeruleus</i> DSM 24564			WP_027237865	WP_027235028		
<i>Phaeobacter daeponensis</i> DSM 23529			WP_027244042	WP_027243972		
<i>Phaeobacter gallaeciensis</i> 2.10			WP_014874898			
<i>Phaeobacter gallaeciensis</i> ANG1	WP_019294457		WP_019295472	WP_019297762		
<i>Phaeobacter gallaeciensis</i> DSM 26640			WP_024096965			
<i>Phaeobacter inhibens</i> DSM 16374			WP_027247162			
<i>Phaeobacter inhibens</i> DSM 17395		WP_014880246				
<i>Planktomarina temperata</i> RCA23			AII87350	AII86720		
<i>Pseudorhodobacter ferrugineus</i> DSM 5888			WP_022704753			
<i>Pseudovibrio</i> sp. FO-BEG1	WP_014285489					
<i>Pseudovibrio</i> sp. JE062	WP_008546234					
<i>Rhizobium freirei</i> PRF 81					WP_004127259	
<i>Rhizobium leguminosarum</i> bv. <i>trifolii</i> WSM2297	WP_003583615					
<i>Rhizobium leguminosarum</i> bv. <i>trifolii</i> WSM2304	WP_012555641					
<i>Rhizobium mongolense</i> USDA 1844	WP_022715102					
<i>Rhizobium tropici</i> CIAT 899	WP_015342288				WP_015341718	
<i>Rhizobium</i> sp. AP16					WP_007698893	
<i>Rhodobacter sphaeroides</i> 2.4.1		WP_011336734⁷				
<i>Rhodobacter</i> sp. CACIA14H1			WP_023666153			
<i>Rhodovibrio salinarum</i> DSM 9154		WP_027287281				
<i>Roseibacterium elongatum</i> DSM 19469		AHM04761				
<i>Roseibium</i> sp. TrichSKD4			WP_009759730			
<i>Roseivivax halodurans</i> JCM 10272					ETX15481	
<i>Roseivivax isopora</i> LMG 25204		ETX29332				

Strain	DddD	DddL	DddP	DddQ	DddW	DddY
<i>Roseivivax</i> sp. 22II-s10s		ETW11890				
<i>Roseobacter denitrificans</i> OCh 114			WP_011568740 ⁸			
<i>Roseobacter litoralis</i> OCh 149			WP_013961899			
<i>Roseobacter</i> sp. GAI101		WP_008229197				
<i>Roseobacter</i> sp. MED193					WP_009809458	
<i>Roseobacter</i> sp. SK209-2-6			WP_008207275	WP_008209146		
<i>Roseovarius mucosus</i> DSM 17069			KGM87053			
<i>Roseovarius nubinhibens</i> ISM			*WP_009813101 ⁹	*WP_009814826 ¹⁰		
				WP_009814827 ¹⁰		
<i>Roseovarius</i> sp. 217			WP_009818332			
<i>Roseovarius</i> sp. TM1035			WP_008282438			
<i>Rubellimicrobium thermophilum</i> DSM 16684			WP_021096729			
<i>Ruegeria conchae</i> TW15			WP_029622004			
<i>Ruegeria lacuscaerulensis</i> ITI-1157			WP_005982391	WP_005978225 ¹¹		
<i>Ruegeria mobilis</i> F1926			WP_005667838			
<i>Ruegeria pomeroyi</i> DSS-3	WP_011047438 ¹²		WP_011048016	WP_011047333 ¹⁰	*WP_011046214 ¹³	
<i>Ruegeria</i> sp. R11			WP_008561861			
<i>Ruegeria</i> sp. TM1040			WP_011538359			
<i>Sagittula stellata</i> E-37	WP_005858710					
<i>Serinicoccus marinus</i> DSM 15273		WP_022923713				
<i>Silicibacter</i> sp. TrichCH4B			WP_009179075			
<i>Sinorhizobium fredii</i> NGR234	WP_012706546 ¹⁴					
<i>Stappia stellulata</i> DSM 5886		WP_029059026				
<i>Sulfitobacter donghicola</i> DSW-25		WP_025058113	WP_025057920			
<i>Sulfitobacter guttiformis</i> KCTC 32187		WP_025061449				
<i>Sulfitobacter mediterraneus</i> 1FIGIMAR09			KAJ01919			
			KAJ01417			
			WP_025048733			
<i>Sulfitobacter mediterraneus</i> KCTC 32188						
<i>Sulfitobacter</i> sp. 20_GPM-1509m	WP_028957304	WP_028957939				
<i>Sulfitobacter</i> sp. EE-36		*WP_005852376 ⁷				
<i>Sulfitobacter</i> sp. H3		KEJ93781				
<i>Sulfitobacter</i> sp. MM-124	WP_025042490		WP_025044182			
<i>Sulfitobacter</i> sp. NAS-14.1		WP_009826532				
<i>Sulfitobacter</i> sp. NB-68		WP_025053558	WP_025052576			
<i>Sulfitobacter</i> sp. NB-77		WP_025056738	WP_025056532			
<i>Thalassobacter stenotrophicus</i> 1CONIMAR09		KGK80030	KGK80037			
<i>Thalassobacter arenae</i> DSM 19593			WP_021100522			
<i>Thalassobacter</i> sp. 16PALIMAR09		KGL02473				
<i>Thalassobaculum salexigens</i> DSM 19539		WP_028795575				
<i>Thalassobium</i> sp. R2A62			WP_009159900	WP_009157698		
<i>Thalassospira</i> sp. NP3b2	WP_033068981					
<i>Thioclava dalianensis</i> DLFJ1-1	KEP67945					
<i>Thioclava pacifica</i> DSM 10166		KEO51151				

β-Proteobacteria

<i>Alcaligenes faecalis</i> M3A						*ADT64689 ¹⁵
<i>Burkholderia</i> sp. AU4i	WP_021158303					
<i>Burkholderia</i> sp. WSM4176	WP_018419957					
<i>Burkholderia ambifaria</i> AMMD	WP_011659284 ¹⁴					
<i>Burkholderia ambifaria</i> MC40-6	WP_012366555					
<i>Burkholderia dilworthii</i> WSM3556	WP_027803661					
<i>Burkholderia phymatum</i> STM815	WP_012401764					
<i>Burkholderia sprengii</i> WSM5005	WP_027197165					

γ-Proteobacteria

<i>Acinetobacter baylyi</i> DSM 14961						WP_017385178
<i>Acinetobacter bereziniae</i> NIPH 3						WP_004831354
<i>Acinetobacter</i> sp. GG2						WP_019456518
<i>Cobetia marina</i> KMM 296	KGA01134					
<i>Colwellia psychrerythraea</i> ND2E	WP_033091834					
<i>Enterovibrio calviensis</i> 1F-211	WP_017013949					
<i>Enterovibrio calviensis</i> 1F-230	WP_017016513					
<i>Enterovibrio calviensis</i> DSM 14347	WP_028024022					
<i>Enterovibrio calviensis</i> FF-85	WP_017008237					
<i>Enterovibrio norvegicus</i> FF-33	WP_016960450					
<i>Enterovibrio norvegicus</i> FF-162	WP_017005441					
<i>Ferrimonas balearica</i> DSM 9799						WP_013344058
<i>Ferrimonas futsuensis</i> DSM 18154						WP_028109462
<i>Ferrimonas kyonanensis</i> DSM 18153						WP_028114584
<i>Ferrimonas senticii</i> DSM 18821						WP_028116309
<i>Glaciecola psychrophila</i> 170	WP_007638251					
<i>Glaciecola punicea</i> DSM 14233	WP_006004513					

Strain	DddD	DddL	DddP	DddQ	DddW	DddY
<i>Grimontia</i> sp. AK16	WP_002538430					
<i>Halomonas anticariensis</i> FP35	WP_016417474					
<i>Halomonas smyrnensis</i> AAD6	WP_016855430					
<i>Halomonas</i> sp. HTNK1	ACV84065 ¹⁶					
<i>Leucothrix mucor</i> DSM 2157	WP_022951302		WP_022953530			
<i>Marinobacter manganoxydans</i> Mnl7-9		WP_008172346				
<i>Marinobacter similis</i> A3d10		AHI28305				
<i>Marinobacter</i> sp. BSs20148	WP_014872721					
<i>Marinobacter</i> sp. ELB17	WP_007348488					
<i>Marinobacterium jannaschii</i> DSM 6295	WP_027855832		WP_027857873			
<i>Marinomonas posidonica</i> IV1A-Po-181	WP_013794834					
<i>Marinomonas mediterranea</i> MMB-1	WP_013661500					
<i>Marinomonas ushuaiensis</i> DSM 15871			ETX09690			
<i>Marinomonas</i> sp. MED121	WP_009833943					
<i>Marinomonas</i> sp. MWYL1	*WP_012071702 ¹⁴					
<i>Oceanimonas doudoroffii</i> DSM 7028	AEQ39135 ¹⁷		AEQ39091 ¹⁷ AEQ39103 ¹⁷			
<i>Pseudomonas corrugata</i> CFBP 5454			WP_024778802			
<i>Pseudomonas mosselii</i> DSM 17497	WP_028689342					
<i>Pseudomonas putida</i> B6-2	WP_019751222					
<i>Pseudomonas putida</i> S16			WP_013972247			
<i>Pseudomonas taeanensis</i> MS-3	WP_025167282					
	WP_029866026					
<i>Pseudomonas</i> sp. FGI182			AHD14271			
<i>Pseudomonas</i> sp. GM84			WP_008098385			
<i>Pseudomonas</i> sp. H2			KGI90475			
<i>Pseudomonas</i> sp. J465	ACY01992 ¹⁸					
<i>Pseudomonas</i> sp. LAIL14HWK12:17			WP_027593644			
<i>Pseudomonas</i> sp. LAMO17WK12:12			WP_027603293			
<i>Pseudomonas</i> sp. StFLB209			BAP44883 BAP45702 KEY88181			
<i>Pseudomonas</i> sp. WCS358						
<i>Psychrobacter</i> sp. J466	ACY02894 ¹⁸					
<i>Psychrobacter</i> sp. JCM 18900			GAF53163			
<i>Shewanella algae</i> JCM 21037						WP_025010765
<i>Shewanella baltica</i> OS117						WP_011845515
<i>Shewanella colwelliana</i> ATCC 39565						WP_028762920
<i>Shewanella fidelis</i> ATCC BAA-318						WP_028769365
<i>Shewanella frigidimarina</i> NCIMB 400						WP_011639304
<i>Shewanella halifaxensis</i> HAW-EB4						WP_012275464
<i>Shewanella haliotis</i> JCM 14758						WP_025889899
<i>Shewanella marina</i> JCM 15074						WP_025821852
<i>Shewanella pealeana</i> ATCC 700345						WP_012157128
<i>Shewanella piezotolerans</i> WP3						WP_020910448
<i>Shewanella putrefaciens</i> CN-32						WP_011920089
<i>Shewanella waksmanii</i> ATCC BAA-643						WP_028773592
<i>Shewanella woodyi</i> ATCC 51908						WP_012322927
<i>Shewanella</i> sp. 38A_GOM-205m						WP_028780026
<i>Shewanella</i> sp. MR-4						WP_011622914
<i>Shewanella</i> sp. MR-7						WP_011626359
<i>Vibrio fortis</i> Dalian14			WP_032550763			
<i>Vibrio nigripulchritudo</i> MADA3029			WP_022593153			
<i>Vibrio orientalis</i> CIP 102891			WP_004418477			
δ-Proteobacteria						
<i>Desulfobulbus mediterraneus</i> DSM 13871		WP_028584772				
<i>Desulfhalobium retbaense</i> DSM 5692		WP_015751902				
<i>Desulfovibrio acrylicus</i> DSM 10141						WP_027362072
<i>Desulfovibrio desulfuricans</i> DSM 17919						WP_019999216
<i>Desulfovibrio</i> sp. L21-Syr-AB		WP_029897582				
ε-Proteobacteria						
<i>Arcobacter nitrofigilis</i> DSM 7299						WP_013133925 WP_013136560
Actinobacteria						
<i>Geodermatophilus obscurus</i> DSM 43160					WP_012948841	
Flavobacteria						
<i>Gramella portivictoriae</i> DSM 23547						WP_026915824

Strain	DddD	DddL	DddP	DddQ	DddW	DddY
Ascomycete fungi						
<i>Aspergillus oryzae</i> RIB40			XP_001823911			
<i>Fusarium culmorum</i> Fu42			ACF19795			
<i>Fusarium fujikuroi</i> IMI 58289			CCT75082			
<i>Fusarium graminearum</i> CC19			ACF19794			
<i>Fusarium graminearum</i> CS3005			EYB22087			
<i>Fusarium graminearum</i> PH-1			ESU15620			
<i>Fusarium oxysporum</i> Fo5176			EGU73019			
<i>Fusarium oxysporum</i> FOSC 3-a			EWY83170			
<i>Fusarium oxysporum</i> f. sp. <i>cubense</i> race 1			ENH64105			
<i>Fusarium oxysporum</i> f. sp. <i>melonis</i> 26406			EXK27685			
<i>Fusarium oxysporum</i> f. sp. <i>pisii</i> HDV247			EXA33102			
<i>Fusarium oxysporum</i> f. sp. <i>raphani</i> 54005			EXK82670			
<i>Fusarium pseudograminearum</i> CS3096			XP_009258781			

References

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