

Topoisomerase IB

Topoisomerase IA

Taxonomy

Archaeal type

Topoisomerase III

Reverse gyrase

Bacterial type

ARCHAEA

Crenarchaeota

- Aeropyrum pernix* K1
- Caldivirga maquilingensis* IC-167
- Hyperthermus butylicus* DSM 5456
- Ignicoccus hospitalis* KIN4/I
- Metallosphaera sedula* DSM 5348
- Pyrobaculum aerophilum* str. IM2
- Pyrobaculum arsenaticum* DSM 13514
- Pyrobaculum caldifontis* JCM 11548
- Pyrobaculum islandicum* DSM 4184
- Staphylothermus marinus* F1
- Sulfolobus acidocaldarius* DSM 639
- Sulfolobus solfataricus* P2
- Sulfolobus tokodaii* str. 7
- Thermofilum pendens* Hrk 5
- Thermoproteus neutrophilus* V24Sta

NP_148170

YP_001539953

YP_001013109

YP_001434598

NP_560414

YP_001153574

YP_001056006

YP_929913

YP_001041270

YP_255998

NP_342400

NP_377148

YP_920289

YP_001795099

NP_147880, NP_147906

YP_001540636

YP_001012435, YP_001013124

YP_001435008, YP_001435105

YP_001191827, YP_001192298

NP_559079

YP_001152524

YP_001055584

YP_930753

YP_001040974, YP_001041125

YP_255499

NP_341957, NP_342447

NP_376245, NP_377224

YP_919983

YP_001793605

YP_001190937

Desulfurococcales

Thermoproteales

Desulfurococcales

Desulfurococcales

Sulfolobales

Thermoproteales

Thermoproteales

Thermoproteales

Thermoproteales

Desulfurococcales

Sulfolobales

Sulfolobales

Sulfolobales

Thermoproteales

Thermoproteales

Korarchaeota

- Korarchaeum thermofilum* OPF8

YP_001736678

YP_001737502

Thaumarchaeota

- Nitrosopumilus maritimus* SCM1
- Cenarchaeum symbiosum*

YP_001582656

YP_875131

Nitrosopumilales

Cenarchaeales

Euryarchaeota

- Archaeoglobus fulgidus* DSM 4304
- Candidatus Methanoregula boonei* 6A8
- Haloarcula marismortui* ATCC 43049
- Halobacterium* sp. NRC-1
- Halobacterium salinarum* R1
- Haloquadratum walsbyi* DSM 16790
- Methanobrevibacter smithii* ATCC 35061
- Methanocaldococcus jannaschii* DSM 2661
- Methanococcoides burtonii* DSM 6242
- Methanococcus aeolicus* Nankai-3
- Methanococcus maripaludis* C5
- Methanococcus maripaludis* C6
- Methanococcus maripaludis* C7
- Methanococcus maripaludis* S2
- Methanococcus vannielii* SB
- Methanocorpusculum labreanum* Z
- Methanoculleus marisnigri* JR1
- Methanopyrus kandleri* AV19
- Methanosaeta thermophila* PT
- Methanosarcina acetivorans* C2A
- Methanosarcina barkeri* str. Fusaro
- Methanosarcina mazei* Go1
- Methanosphaera stadtmanae* DSM 3091
- Methanospirillum hungatei* JF-1
- Methanothermobacter thermautotrophicus* str. Delta H
- Natronomonas pharaonis* DSM 2160

NP_070633

YP_001404020

YP_136265

NP_444190

YP_001688526

YP_657047

YP_001273290

NP_248662

YP_564864, YP_565420

YP_001324231

YP_001097306

YP_001549743

YP_001329424

NP_988076

YP_001322681

YP_001030575

YP_001046685

NP_614887

YP_843026

NP_616715, NP_617416

YP_305639, YP_305910

NP_632207, NP_635100

YP_447412

YP_502480

NP_276736

YP_326271

NP_069857

NP_248519

NP_613576

Archaeoglobales

Methanomicrobiales

Halobacteriales

Halobacteriales

Halobacteriales

Halobacteriales

Methanobacteriales

Methanococcales

Methanosarcinales

Methanococcales

Methanococcales

Methanococcales

Methanococcales

Methanococcales

Methanococcales

Methanomicrobiales

Methanomicrobiales

Methanopyrales

Methanosarcinales

Methanosarcinales

Methanosarcinales

Methanosarcinales

Methanobacteriales

Methanomicrobiales

Methanobacteriales

Halobacteriales

Picrophilus torridus DSM 9790
Pyrococcus abyssi GE5
Pyrococcus furiosus DSM 3638
Pyrococcus horikoshii OT3
Thermococcus kodakarensis KOD1
Thermoplasma acidophilum DSM 1728
Thermoplasma volcanium GSS1
uncultured methanogenic archaeon RC-I

	YP_023525				Thermoplasmatales
	NP_127104			NP_126943	Thermococcales
	NP_578223			NP_578224	Thermococcales
	NP_142581			NP_142736	Thermococcales
	YP_183504			YP_182883	Thermococcales
	NP_393542				Thermoplasmatales
	NP_110538				Thermoplasmatales
	YP_686736, YP_686844				

Nanoarchaeota

Nanoarchaeum equitans Kin4-M

	NP_963339			NP_963605	
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BACTERIA

Acidobacteria

Acidobacteria bacterium Ellin345
Solibacter usitatus Ellin6076

	YP_592415				Acidobacteriaceae
YP_821734	YP_823673		YP_828915		Solibacteraceae

Actinobacteria

Acidothermus cellulolyticus 11B
Arthrobacter aureus TC1
Arthrobacter sp. FB24
Bifidobacterium adolescentis ATCC 15703
Bifidobacterium longum NCC2705
Clavibacter michiganensis subsp. *michiganensis* NCPPB 382
Clavibacter michiganensis subsp. *Sepedonicus*
Corynebacterium diphtheriae NCTC 13129
Corynebacterium efficiens YS-314
Corynebacterium glutamicum ATCC 13032
Corynebacterium glutamicum ATCC 13032
Corynebacterium glutamicum R
Corynebacterium jeikeium K411
Corynebacterium urealyticum DSM 7109
Frankia alni ACN14a
Frankia sp. Ccl3
Frankia sp. EAN1pec
Kineococcus radiotolerans SRS30216
Leifsonia xyli subsp. *xyli* str. CTCB07
Mycobacterium abscessus
Mycobacterium avium 104
Mycobacterium avium subsp. *paratuberculosis* K-10
Mycobacterium bovis AF2122/97
Mycobacterium bovis BCG str. Pasteur 1173P2
Mycobacterium gilvum PYR-GCK
Mycobacterium leprae TN
Mycobacterium smegmatis str. MC2 155
Mycobacterium sp. JLS
Mycobacterium sp. KMS
Mycobacterium sp. MCS
Mycobacterium tuberculosis CDC1551
Mycobacterium tuberculosis F11
Mycobacterium tuberculosis H37Ra
Mycobacterium tuberculosis H37Rv
Mycobacterium ulcerans Agy99
Mycobacterium vanbaalenii PYR-1

	YP_873730				Frankineae
YP_946110	YP_949030				Micrococcineae
YP_832570	YP_832830				Micrococcineae
	YP_909024				Bifidobacteriaceae
	NP_695678		NP_696628		Bifidobacteriaceae
YP_001223364	YP_001221668				Micrococcineae
YP_001709063	YP_001708973				Micrococcineae
	NP_938715				Corynebacterineae
	NP_736917				Corynebacterineae
	NP_599561				Corynebacterineae
	YP_224609				Corynebacterineae
	YP_001137261				Corynebacterineae
	YP_251753				Corynebacterineae
	YP_001801242				Corynebacterineae
YP_714104	YP_716706				Frankineae
	YP_483380				Frankineae
	YP_001504681				Frankineae
	YP_001360241				Frankineae
	YP_061514				Micrococcineae
YP_001703237	YP_001701242				Corynebacterineae
	YP_879799				Corynebacterineae
NP_962178	NP_959359				Corynebacterineae
	NP_857309				Corynebacterineae
	YP_979783				Corynebacterineae
YP_001133235	YP_001132664				Corynebacterineae
	NP_301268				Corynebacterineae
YP_886157	YP_890377				Corynebacterineae
YP_001069601	YP_001073437				Corynebacterineae
YP_937298	YP_940862				Corynebacterineae
YP_638447	YP_641956				Corynebacterineae
	NP_338295				Corynebacterineae
	YP_001289602				Corynebacterineae
	YP_001285032				Corynebacterineae
	NP_218163				Corynebacterineae
	YP_907724				Corynebacterineae
YP_955527	YP_956173				Corynebacterineae

Nocardia farcinica IFM 10152
Nocardioides sp. JS614
Propionibacterium acnes KPA171202
Renibacterium salmoninarum ATCC 33209
Rhodococcus sp. RHA1
Rubrobacter xylanophilus DSM 9941
Saccharopolyspora erythraea NRRL 2338
Salinispora arenicola CNS-205
Salinispora tropica CNB-440
Streptomyces avermitilis MA-4680
Streptomyces coelicolor A3(2)
Thermobifida fusca YX
Tropheryma whippelii str. Twist
Tropheryma whippelii TW08/27

YP_119639	YP_116573		Corynebacterineae
YP_921940	YP_921608		Propionibacterineae
	YP_054960		Propionibacterineae
	YP_001625873		Micrococceae
	YP_704301		Corynebacterineae
	YP_644723	YP_643532	Rubrobacterineae
	YP_001102651		Pseudonocardineae
YP_001536631	YP_001539176		Micromonosporineae
YP_001158608	YP_001160835		Micromonosporineae
	NP_825798		Streptomycineae
	NP_627741		Streptomycineae
	YP_290840		Streptosporangineae
	NP_787824		Micrococceae
	NP_789636		Micrococceae

Aquificae

Aquifex aeolicus VF5

	NP_213453	NP_213599, NP_213790	Aquificaceae
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Bacteroidetes/Chlorobi

Bacteroides fragilis NCTC 9343
Bacteroides fragilis YCH46
Bacteroides thetaiotaomicron VPI-5482
Bacteroides vulgatus ATCC 8482
Candidatus Sulcia muelleri GWSS
Chlorobium chlorochromatii CaD3
Chlorobium phaeobacteroides DSM 266
Chlorobium tepidum TLS
Cytophaga hutchinsonii ATCC 33406
Flavobacterium johnsoniae UW101
Flavobacterium psychrophilum JIP02/86
Gramella forsetii KT0803
Parabacteroides distasonis ATCC 8503
Pelodictyon luteolum DSM 273
Porphyromonas gingivalis W83
Prosthecochloris vibrioformis DSM 265
Salinibacter ruber DSM 13855

	YP_213781	YP_213185, YP_210918, YP_211372	Bacteroidales
	YP_101691	YP_101074, YP_098658, YP_097427	Bacteroidales
	NP_811739	NP_811002, NP_809018, NP_811237, NP_811557	Bacteroidales
	YP_001298646	YP_001299249, YP_001298037, YP_001298832	Bacteroidales
	YP_378397		Flavobacteriales
	YP_910603		Chlorobiales
	NP_660961		Chlorobiales
YP_678894	YP_678943	YP_680178	Sphingobacteriales
YP_001195701	YP_001194202	YP_001194635, YP_001195361	Flavobacteriales
	YP_001296841		Flavobacteriales
YP_861935	YP_863029		Flavobacteriales
	YP_001304919	YP_001303061	Bacteroidales
	YP_375958		Chlorobiales
	NP_905022	NP_904451, NP_905641	Bacteroidales
	YP_001131226		Chlorobiales
	YP_445245		Sphingobacteriales

PVC

Candidatus Protochlamydia amoebophila UWE25
Chlamydia muridarum Nigg
Chlamydia trachomatis 434/Bu
Chlamydia trachomatis A/HAR-13
Chlamydia trachomatis D/UW-3/CX
Chlamydia trachomatis L2b/UCH-1/proctitis
Chlamydomphila abortus S26/3
Chlamydomphila caviae GPIC
Chlamydomphila felis Fe/C-56
Chlamydomphila pneumoniae AR39
Chlamydomphila pneumoniae CWL029
Chlamydomphila pneumoniae J138
Chlamydomphila pneumoniae TW-183
Rhodopirellula baltica SH 1

YP_008181	YP_007070		Parachlamydiaceae
	NP_296396		Chlamydiaceae
	YP_001654102		Chlamydiaceae
	YP_328468		Chlamydiaceae
	NP_220161		Chlamydiaceae
	YP_001653114		Chlamydiaceae
	YP_220342		Chlamydiaceae
	NP_829849		Chlamydiaceae
	YP_514942		Chlamydiaceae
	NP_445640		Chlamydiaceae
	NP_224964		Chlamydiaceae
	NP_300826		Chlamydiaceae
	NP_877069		Chlamydiaceae
	NP_868117		Planctomycetales

Chloroflexi

Chloroflexus aurantiacus J-10-fl
Dehalococcoides ethenogenes 195

	YP_001637483		Chloroflexaceae
	YP_181458		Dehalococcoides

<i>Dehalococcoides</i> sp. BAV1	YP_001214115		Dehalococcoides
<i>Dehalococcoides</i> sp. CBDB1	YP_307755		Dehalococcoides
<i>Herpetosiphon aurantiacus</i> ATCC 23779	YP_001547149		Herpetosiphonaceae
<i>Roseiflexus castenholzii</i> DSM 13941	YP_001431800		Chloroflexaceae
<i>Roseiflexus</i> sp. RS-1	YP_001275778		Chloroflexaceae

Cyanobacteria

<i>Acaryochloris marina</i> MBIC11017	YP_001516372, YP_001519161, YP_001521896		unclassified
<i>Anabaena variabilis</i> ATCC 29413	YP_320551, YP_324284		Nostocaceae
<i>Cyanothece</i> sp. ATCC 51142	YP_001802651, YP_001806222		Chroococcales
<i>Gloeobacter violaceus</i> PCC 7421	NP_923966, NP_926144		Gloeobacteriales
<i>Microcystis aeruginosa</i> NIES-843	YP_001660677		Microcystis
<i>Nostoc</i> sp. PCC 7120	NP_486671, NP_486820		Nostocaceae
<i>Prochlorococcus marinus</i> str. AS9601	YP_001008886		Prochlorococcaceae
<i>Prochlorococcus marinus</i> str. MIT 9211	YP_001550318		Prochlorococcaceae
<i>Prochlorococcus marinus</i> str. MIT 9215	YP_001483717		Prochlorococcaceae
<i>Prochlorococcus marinus</i> str. MIT 9301	YP_001090684		Prochlorococcaceae
<i>Prochlorococcus marinus</i> str. MIT 9303	YP_001016647		Prochlorococcaceae
<i>Prochlorococcus marinus</i> str. MIT 9312	YP_396932		Prochlorococcaceae
<i>Prochlorococcus marinus</i> str. MIT 9313	NP_895180		Prochlorococcaceae
<i>Prochlorococcus marinus</i> str. MIT 9515	YP_001010814		Prochlorococcaceae
<i>Prochlorococcus marinus</i> str. NATL1A	YP_001014318		Prochlorococcaceae
<i>Prochlorococcus marinus</i> str. NATL2A	YP_292959		Prochlorococcaceae
<i>Prochlorococcus marinus</i> subsp. <i>marinus</i> str. CCMP1375	NP_874826		Prochlorococcaceae
<i>Prochlorococcus marinus</i> subsp. <i>pastoris</i> str. CCMP1986	NP_892554		Prochlorococcaceae
<i>Synechococcus elongatus</i> PCC 6301	YP_170849		Chroococcales
<i>Synechococcus elongatus</i> PCC 7942	YP_400433		Chroococcales
<i>Synechococcus</i> sp. CC9311	YP_731316		Chroococcales
<i>Synechococcus</i> sp. CC9605	YP_380926		Chroococcales
<i>Synechococcus</i> sp. CC9902	YP_377766		Chroococcales
<i>Synechococcus</i> sp. JA-2-3B'a(2-13)	YP_478560		Chroococcales
<i>Synechococcus</i> sp. JA-3-3Ab	YP_474040		Chroococcales
<i>Synechococcus</i> sp. PCC 7002	YP_001735778		Chroococcales
<i>Synechococcus</i> sp. RCC307	YP_001226916		Chroococcales
<i>Synechococcus</i> sp. WH 7803	YP_001225606		Chroococcales
<i>Synechococcus</i> sp. WH 8102	NP_897963		Chroococcales
<i>Synechocystis</i> sp. PCC 6803	NP_441184		Chroococcales
<i>Thermosynechococcus elongatus</i> BP-1	NP_682671		Chroococcales
<i>Trichodesmium erythraeum</i> IMS101	YP_720023		Oscillatoriales

Deinococcus-Thermus

<i>Deinococcus geothermalis</i> DSM 11300	YP_605521	YP_605464		Deinococcales
<i>Deinococcus radiodurans</i> R1	NP_294413	NP_295097		Deinococcales
<i>Thermus thermophilus</i> HB27		YP_005900		Thermales
<i>Thermus thermophilus</i> HB8		YP_143340	YP_145411	Thermales

Firmicutes

<i>Alkaliphilus metalliredigens</i> QYMF	YP_001320545	YP_001321135, YP_001319011		Clostridiales
<i>Alkaliphilus oremlandii</i> OhLAs	YP_001513014	YP_001513687, YP_001512577		Clostridiales
<i>Acholeplasma laidlawii</i> PG-8A	YP_001620337			Mollicutes
<i>Aster yellows witches'-broom phytoplasma</i> AYWB	YP_456638			Mollicutes
<i>Bacillus amyloliquefaciens</i> FZB42	YP_001421189	YP_001420078		Bacillales
<i>Bacillus anthracis</i> str. Ames	NP_846214	NP_844316, NP_842919		Bacillales
<i>Bacillus anthracis</i> str. 'Ames Ancestor'	YP_020610	YP_018548, YP_016995, YP_022474		Bacillales
<i>Bacillus anthracis</i> str. Sterne	YP_029935	YP_028031, YP_026641		Bacillales

<i>Bacillus cereus</i> ATCC 10987	NP_980172	NP_978300, NP_976812, NP_982147	Bacillales
<i>Bacillus cereus</i> ATCC 14579	NP_833552	NP_831605, NP_830256	Bacillales
<i>Bacillus cereus</i> E33L	YP_085174	YP_083320, YP_081956	Bacillales
<i>Bacillus cereus</i> subsp. <i>cytotoxis</i> NVH 391-98	YP_001375716	YP_001374784, YP_001373711	Bacillales
<i>Bacillus clausii</i> KSM-K16	YP_175774	YP_177445, YP_175615	Bacillales
<i>Bacillus halodurans</i> C-125	NP_243333	NP_244253	Bacillales
<i>Bacillus licheniformis</i> ATCC 14580	YP_079005	YP_077752	Bacillales
<i>Bacillus licheniformis</i> ATCC 14580	YP_091420	YP_090167	Bacillales
<i>Bacillus pumilus</i> SAFR-032	YP_001486753	YP_001485655	Bacillales
<i>Bacillus subtilis</i> subsp. <i>subtilis</i> str. 168	NP_389494	NP_388307	Bacillales
<i>Bacillus thuringiensis</i> serovar <i>konkukian</i> str. 97-27	YP_037894	YP_036076, YP_034701, YP_173315, YP_035921	Bacillales
<i>Bacillus thuringiensis</i> str. <i>Al Hakam</i>	YP_896206	YP_894518, YP_893279	Bacillales
<i>Bacillus weihenstephanensis</i> KBAB4	YP_001646455	YP_001644629, YP_001643250, YP_001642732	Bacillales
<i>Caldicellulosiruptor saccharolyticus</i> DSM 8903	YP_001180043		Clostridiales
<i>Carboxydotherrmus hydrogenofrans</i> Z-2901	YP_360614		Clostridiales
<i>Clostridium acetobutylicum</i> ATCC 824	NP_348410	NP_350150, NP_349549	Clostridiales
<i>Candidatus Desulfurudis audaxviator</i> MP104C	YP_001716766		Clostridiales
<i>Clostridium beijerinckii</i> NCIMB 8052	YP_001308324	YP_001309000, YP_001308008	Clostridiales
<i>Clostridium botulinum</i> A str. ATCC 19397	YP_001384612	YP_001383644, YP_001383854	Clostridiales
<i>Clostridium botulinum</i> A str. ATCC 3502	YP_001254936	YP_001253811, YP_001254018	Clostridiales
<i>Clostridium botulinum</i> A str. <i>Hall</i>	YP_001388129	YP_001387193, YP_001387404	Clostridiales
<i>Clostridium botulinum</i> A3 str. <i>Loch Maree</i>	YP_001787749	YP_001786678, YP_001786927, YP_001715628	Clostridiales
<i>Clostridium botulinum</i> B1 str. <i>Okra</i>	YP_001781980	YP_001780912, YP_001781141	Clostridiales
<i>Clostridium botulinum</i> F str. <i>Langeland</i>	YP_001391735	YP_001390639, YP_001390851	Clostridiales
<i>Clostridium difficile</i> 630	YP_001087768	YP_001086889, YP_001088366, YP_001087593, YP_001088787, YP_001088916	Clostridiales
<i>Clostridium kluyveri</i> DSM 555	YP_001394805	YP_001394458, YP_001393961	Clostridiales
<i>Clostridium novyi</i> NT	YP_878224	YP_878833, YP_878362	Clostridiales
<i>Clostridium perfringens</i> ATCC 13124	YP_696389	YP_696196, YP_696662	Clostridiales
<i>Clostridium perfringens</i> SM101	YP_698989	YP_698808, YP_699260	Clostridiales
<i>Finegoldia magna</i> ATCC 29328	YP_001692013	YP_001692264, YP_001691185	Clostridiales
<i>Clostridium perfringens</i> str. 13	NP_562618	NP_562424, NP_562899, NP_150040	Clostridiales
<i>Clostridium phytofermentans</i> ISDg	YP_001559822	YP_001560365	Clostridiales
<i>Clostridium tetani</i> E88	NP_781889	NP_781100, NP_782419	Clostridiales
<i>Clostridium thermocellum</i> ATCC 27405	YP_001036891		Clostridiales
<i>Desulfotobacterium hafniense</i> Y51	YP_518787	YP_518305, YP_521140	Clostridiales
<i>Desulfotomaculum reducens</i> MI-1	YP_001113327	YP_001112334, YP_001113202, YP_001114550	Clostridiales
<i>Enterococcus faecalis</i> V583	NP_815358	NP_815968, NP_815727	Lactobacillales
<i>Exiguobacterium sibiricum</i> 255-15	YP_001814357	YP_001813458	Bacillales
<i>Geobacillus kaustophilus</i> HTA426	YP_147064	YP_147668, YP_147541	Bacillales
<i>Geobacillus thermodenitrificans</i> NG80-2	YP_001125185	YP_001125811, YP_001125646, YP_001127557	Bacillales
<i>Helibacterium modesticaldum</i> Ice1	YP_001680778	YP_001680501	Clostridiales
<i>Lactobacillus acidophilus</i> NCFM	YP_193863		Lactobacillales
<i>Lactobacillus brevis</i> ATCC 367	YP_794972		Lactobacillales
<i>Lactobacillus casei</i> ATCC 334	YP_806621		Lactobacillales
<i>Lactobacillus delbrueckii</i> subsp. <i>bulgaricus</i> ATCC 11842	YP_619140		Lactobacillales
<i>Lactobacillus delbrueckii</i> subsp. <i>bulgaricus</i> ATCC BAA-365	YP_813159	YP_813304	Lactobacillales
<i>Lactobacillus gasserii</i> ATCC 33323	YP_814743		Lactobacillales
<i>Lactobacillus helveticus</i> DPC 4571	YP_001577426		Lactobacillales
<i>Lactobacillus johnsonii</i> NCC 533	NP_964964		Lactobacillales
<i>Lactobacillus plantarum</i> WCFS1	NP_785400	YP_133736	Lactobacillales
<i>Lactobacillus reuteri</i> F275	YP_001271380		Lactobacillales
<i>Lactobacillus sakei</i> subsp. <i>sakei</i> 23K	YP_395600	YP_395375	Lactobacillales

<i>Lactobacillus salivarius</i> UCC118	YP_535613	YP_536196,YP_536712	Lactobacillales
<i>Lactococcus lactis</i> subsp. <i>cremoris</i> MG1363	YP_001032579		Lactobacillales
<i>Lactococcus lactis</i> subsp. <i>cremoris</i> SK11	YP_809252		Lactobacillales
<i>Lactococcus lactis</i> subsp. <i>lactis</i> II1403	NP_267386		Lactobacillales
<i>Leuconostoc mesenteroides</i> subsp. <i>mesenteroides</i> ATCC 8293	YP_818229	YP_817910	Lactobacillales
<i>Leuconostoc citreum</i> KM20	YP_001728008	YP_001728672	Lactobacillales
<i>Listeria innocua</i> Clip11262	NP_470650		Bacillales
<i>Listeria monocytogenes</i> EGD-e	NP_464800	NP_466278	Bacillales
<i>Listeria monocytogenes</i> str. 4b F2365	YP_013891	YP_015332	Bacillales
<i>Listeria welshimeri</i> serovar 6b str. SLCC5334	YP_849489	YP_850900	Bacillales
<i>Lysinibacillus sphaericus</i> C3-41		YP_001698117,YP_001696638	Bacillales
<i>Mesoplasma florum</i> L1	YP_053894		Mollicutes
<i>Moorella thermoacetica</i> ATCC 39073	YP_429883	YP_429226	Thermoanaerobacteriales
<i>Mycoplasma agalactiae</i> PG2	YP_001256417		Mollicutes
<i>Mycoplasma capricolum</i> subsp. <i>capricolum</i> ATCC 27343	YP_424741		Mollicutes
<i>Mycoplasma gallisepticum</i> R	NP_853416		Mollicutes
<i>Mycoplasma genitalium</i> G37	NP_072784		Mollicutes
<i>Mycoplasma hyopneumoniae</i> 232	YP_115611		Mollicutes
<i>Mycoplasma hyopneumoniae</i> 7448	YP_287680		Mollicutes
<i>Mycoplasma hyopneumoniae</i> J	YP_279077		Mollicutes
<i>Mycoplasma mobile</i> 163K	YP_015779		Mollicutes
<i>Mycoplasma mycoides</i> subsp. <i>mycoides</i> SC str. PG1	NP_975898		Mollicutes
<i>Mycoplasma penetrans</i> HF-2	NP_757800		Mollicutes
<i>Mycoplasma pneumoniae</i> M129	NP_109949		Mollicutes
<i>Mycoplasma pulmonis</i> UAB CTIP	NP_326302		Mollicutes
<i>Mycoplasma synoviae</i> 53	YP_278650		Mollicutes
<i>Oceanobacillus theyensis</i> HTE831	NP_692467	NP_693511	Bacillales
<i>Oenococcus oeni</i> PSU-1	YP_810595	YP_809757	Lactobacillales
<i>Onion yellows phytoplasma</i> OY-M	NP_950531		Mollicutes
<i>Pediococcus pentosaceus</i> ATCC 25745	YP_804463		Lactobacillales
<i>Pelotomaculum thermopropionicum</i> SI	YP_001211796		Clostridiales
<i>Staphylococcus aureus</i> RF122	YP_416592		Bacillales
<i>Staphylococcus aureus</i> subsp. <i>aureus</i> COL	YP_186125	YP_187053	Bacillales
<i>Staphylococcus aureus</i> subsp. <i>aureus</i> JH1	YP_001316473	YP_001317434	Bacillales
<i>Staphylococcus aureus</i> subsp. <i>aureus</i> JH9	YP_001246683	YP_001247637	Bacillales
<i>Staphylococcus aureus</i> subsp. <i>aureus</i> MRSA252	YP_040637	YP_041694	Bacillales
<i>Staphylococcus aureus</i> subsp. <i>aureus</i> MSSA476	YP_043310	YP_044257	Bacillales
<i>Staphylococcus aureus</i> subsp. <i>aureus</i> Mu3	YP_001441830	YP_001442828	Bacillales
<i>Staphylococcus aureus</i> subsp. <i>aureus</i> Mu50	NP_371774	NP_372778	Bacillales
<i>Staphylococcus aureus</i> subsp. <i>aureus</i> MW2	NP_645950	NP_646990	Bacillales
<i>Staphylococcus aureus</i> subsp. <i>aureus</i> N315	NP_374366	NP_375367	Bacillales
<i>Staphylococcus aureus</i> subsp. <i>aureus</i> NCTC 8325	YP_499758	YP_500982	Bacillales
<i>Staphylococcus aureus</i> subsp. <i>aureus</i> str. Newman	YP_001332194	YP_001333190	Bacillales
<i>Staphylococcus aureus</i> subsp. <i>aureus</i> USA300	YP_493840	YP_494843,YP_492704	Bacillales
<i>Staphylococcus aureus</i> subsp. <i>aureus</i> USA300_TCH1516	YP_001575075	YP_001576107	Bacillales
<i>Staphylococcus epidermidis</i> ATCC 12228	NP_764481	NP_765383,NP_765037	Bacillales
<i>Staphylococcus epidermidis</i> RP62A	YP_188398	YP_189399	Bacillales
<i>Staphylococcus haemolyticus</i> JCSC1435	YP_253579	YP_252713	Bacillales
<i>Staphylococcus saprophyticus</i> subsp. <i>saprophyticus</i> ATCC 15305	YP_301608	YP_300749	Bacillales
<i>Streptococcus agalactiae</i> 2603V/R	NP_688016		Lactobacillales
<i>Streptococcus agalactiae</i> A909	YP_329721		Lactobacillales
<i>Streptococcus agalactiae</i> NEM316	NP_735489	NP_734855,NP_735167,NP_735440	Lactobacillales

Streptococcus gordonii str. Challis substr. CH1
Streptococcus mutans UA159
Streptococcus pneumoniae D39
Streptococcus pneumoniae Hungary19A-6
Streptococcus pneumoniae R6
Streptococcus pneumoniae TIGR4
Streptococcus pyogenes M1 GAS
Streptococcus pyogenes MGAS10270
Streptococcus pyogenes MGAS10394
Streptococcus pyogenes MGAS10750
Streptococcus pyogenes MGAS2096
Streptococcus pyogenes MGAS315
Streptococcus pyogenes MGAS5005
Streptococcus pyogenes MGAS6180
Streptococcus pyogenes MGAS8232
Streptococcus pyogenes MGAS9429
Streptococcus pyogenes SSI-1
Streptococcus pyogenes str. *Manfredo*
Streptococcus sanguinis SK36
Streptococcus suis 05ZYH33
Streptococcus suis 98HAH33
Streptococcus thermophilus CNRZ1066
Streptococcus thermophilus LMD-9
Streptococcus thermophilus LMG 18311
Symbiobacterium thermophilum IAM 14863
Syntrophomonas wolfei subsp. *wolfei* str. *Goettingen*
Thermoanaerobacter pseudethanolicus ATCC 33223
Thermoanaerobacter sp. X514
Thermoanaerobacter tengcongensis MB4
Ureaplasma parvum serovar 3 str. ATCC 27815
Ureaplasma parvum serovar 3 str. ATCC 700970

YP_001450484		Lactobacillales
NP_721397		Lactobacillales
YP_816589		Lactobacillales
YP_001694689		Lactobacillales
NP_358734		Lactobacillales
NP_345727		Lactobacillales
NP_269314	YP_603190	Lactobacillales
YP_598608		Lactobacillales
YP_060199		Lactobacillales
YP_602528		Lactobacillales
YP_600555		Lactobacillales
NP_664624		Lactobacillales
YP_282248		Lactobacillales
YP_280327		Lactobacillales
NP_607246		Lactobacillales
YP_596734		Lactobacillales
NP_802283		Lactobacillales
YP_001128464		Lactobacillales
YP_001035139		Lactobacillales
YP_001198351		Lactobacillales
YP_001200558		Lactobacillales
YP_141300		Lactobacillales
YP_820344		Lactobacillales
YP_139379		Lactobacillales
YP_075310	YP_075501	Lactobacillales
YP_753530	YP_753202	Clostridiales
YP_001665254		Thermoanaerobacteriales
YP_001663322		Thermoanaerobacteriales
NP_623067	NP_623335	Thermoanaerobacteriales
YP_001752675		Mollicutes
NP_078429		Mollicutes

Fusobacteria

Fusobacterium nucleatum subsp. *nucleatum* ATCC 25586

NP_603966		Fusobacteriaceae
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Alphaproteobacteria

Acidiphilium cryptum JF-5
Agrobacterium tumefaciens str. C58
Anaplasma marginale str. *St. Maries*
Anaplasma phagocytophilum HZ
Azorhizobium caulinodans ORS 571
Bartonella bacilliformis KC583
Bartonella henselae str. *Houston-1*
Bartonella quintana str. *Toulouse*
Bartonella tribocorum CIP 105476
Bradyrhizobium japonicum USDA 110
Bradyrhizobium sp. *BTAi1*
Bradyrhizobium sp. *ORS278*
Brucella abortus biovar 1 str. 9-941
Brucella canis ATCC 23365
Brucella melitensis 16M
Brucella melitensis biovar *Abortus 2308*
Brucella ovis ATCC 25840
Brucella suis 1330

YP_001233869		Rhodospirillales
NP_356605	NP_354310	Rhizobiales
YP_153787		Rickettsiales
YP_505187		Rickettsiales
YP_001524777		Rhizobiales
YP_989131		Rhizobiales
YP_033622		Rhizobiales
YP_032289		Rhizobiales
YP_001609502		Rhizobiales
NP_767212	NP_771751	Rhizobiales
YP_001236532	YP_001240665	Rhizobiales
YP_001202546	YP_001206466	Rhizobiales
YP_223392		Rhizobiales
YP_001594552		Rhizobiales
NP_541644		Rhizobiales
YP_418811		Rhizobiales
YP_001257591		Rhizobiales
NP_699788		Rhizobiales

<i>Brucella suis</i> ATCC 23445	YP_001622411		Rhizobiales
<i>Candidatus Pelagibacter ubique</i> HTCC1062	YP_266491		Rickettsiales
<i>Caulobacter crescentus</i> CB15	NP_421254		Caulobacterales
<i>Caulobacter</i> sp. K31	YP_001683133	YP_001685265	Caulobacterales
<i>Dinoroseobacter shibae</i> DFL 12	YP_001532480		Rhodobacterales
<i>Ehrlichia canis</i> str. Jake	YP_302965		Rickettsiales
<i>Ehrlichia chaffeensis</i> str. Arkansas	YP_507548		Rickettsiales
<i>Ehrlichia ruminantium</i> str. Gardel	YP_196269		Rickettsiales
<i>Ehrlichia ruminantium</i> str. Welgevonden	YP_180204		Rickettsiales
<i>Ehrlichia ruminantium</i> str. Welgevonden	YP_197223		Rickettsiales
<i>Erythrobacter litoralis</i> HTCC2594	YP_457851	YP_458571	Sphingomonadales
<i>Gluconacetobacter diazotrophicus</i> PAI 5	YP_001600342		Rhodospirillales
<i>Gluconobacter oxydans</i> 621H	YP_191680		Rhodospirillales
<i>Granulibacter bethesdensis</i> CGDNIH1	YP_744625		Rhodospirillales
<i>Hyphomonas neptunium</i> ATCC 15444	YP_760971		Rhodobacterales
<i>Jannaschia</i> sp. CCS1	YP_511102	YP_508220	Rhodobacterales
<i>Magnetospirillum magneticum</i> AMB-1	YP_420045		Rhodospirillales
<i>Maricaulis maris</i> MCS10	YP_756512		Rhodobacterales
<i>Mesorhizobium loti</i> MAFF303099	NP_102557		Rhizobiales
<i>Mesorhizobium</i> sp. BNC1	YP_673915	YP_675314	Rhizobiales
<i>Methylobacterium</i> sp. 4-46	YP_001771127	YP_001771806	Rhizobiales
<i>Methylobacterium extorquens</i> PA1	YP_001640766	YP_001639444	Rhizobiales
<i>Methylobacterium radiotolerans</i> JCM 2831	YP_001753697, YP_001766487	YP_001753451	Rhizobiales
<i>Neorickettsia sennetsu</i> str. Miyayama	YP_506474		Rickettsiales
<i>Nitrobacter hamburgensis</i> X14	YP_577687	YP_579129	Rhizobiales
<i>Nitrobacter winogradskyi</i> Nb-255	YP_318325		Rhizobiales
<i>Novosphingobium aromaticivorans</i> DSM 12444	YP_497077	YP_497864	Sphingomonadales
<i>Ochrobactrum anthropi</i> ATCC 49188	YP_001372206	YP_001372842	Rhizobiales
<i>Orientia tsutsugamushi</i> Boryong	YP_001249094		Rickettsiales
<i>Paracoccus denitrificans</i> PD1222	YP_914467		Rhodobacterales
<i>Parvibaculum lavamentivorans</i> DS-1	YP_001414095		Rhizobiales
<i>Rhizobium etli</i> CFN 42	YP_469164	YP_472371	Rhizobiales
<i>Rhizobium leguminosarum</i> bv. viciae 3841	YP_767339	YP_771338	Rhizobiales
<i>Rhodobacter sphaeroides</i> 2.4.1	YP_352231	YP_354029	Rhodobacterales
<i>Rhodobacter sphaeroides</i> ATCC 17025	YP_001168510	YP_001169159	Rhodobacterales
<i>Rhodobacter sphaeroides</i> ATCC 17029	YP_001042733	YP_001044479	Rhodobacterales
<i>Rhodopseudomonas palustris</i> BisA53	YP_782291		Rhizobiales
<i>Rhodopseudomonas palustris</i> BisB18	YP_532112		Rhizobiales
<i>Rhodopseudomonas palustris</i> BisB5	YP_570160		Rhizobiales
<i>Rhodopseudomonas palustris</i> CGA009	NP_948463		Rhizobiales
<i>Rhodopseudomonas palustris</i> HaA2	YP_486035		Rhizobiales
<i>Rhodospirillum rubrum</i> ATCC 11170	YP_428284		Rhodospirillales
<i>Rickettsia akari</i> str. Hartford	YP_001493295		Rickettsiales
<i>Rickettsia bellii</i> OSU 85-389	YP_001496307		Rickettsiales
<i>Rickettsia bellii</i> RML369-C	YP_537882		Rickettsiales
<i>Rickettsia canadensis</i> str. McKiel	YP_001492485		Rickettsiales
<i>Rickettsia conorii</i> str. Malish 7	NP_360086		Rickettsiales
<i>Rickettsia felis</i> URRWXCa2	YP_246546		Rickettsiales
<i>Rickettsia massiliae</i> MTU5	YP_001499231		Rickettsiales
<i>Rickettsia prowazekii</i> str. Madrid E	NP_220709		Rickettsiales
<i>Rickettsia rickettsii</i> str. Iowa	YP_001649818		Rickettsiales
<i>Rickettsia rickettsii</i> str. 'Sheila Smith'	YP_001494563		Rickettsiales

<i>Rickettsia typhi</i> str. Wilmington	YP_067279		Rickettsiales
<i>Roseobacter denitrificans</i> OCh 114	YP_682413		Rhodobacterales
<i>Silicibacter pomeroyi</i> DSS-3	YP_168282		Rhodobacterales
<i>Silicibacter</i> sp. TM1040	YP_614333		Rhodobacterales
<i>Sinorhizobium medicae</i> WSM419	YP_001326622		Rhizobiales
<i>Sinorhizobium melliloti</i> 1021	NP_385406		Rhizobiales
<i>Sphingomonas wittichii</i> RW1	YP_001260160,YP_001263436		Sphingomonadales
<i>Sphingopyxis alaskensis</i> RB2256	YP_616260		Sphingomonadales
<i>Wolbachia endosymbiont of Drosophila melanogaster</i>	NP_966850		Rickettsiales
<i>Wolbachia endosymbiont strain TRS of Brugia malayi</i>	YP_197871		Rickettsiales
<i>Xanthobacter autotrophicus</i> Py2	YP_001418795		Rhizobiales
<i>Zymomonas mobilis</i> subsp. <i>mobilis</i> ZM4	YP_162928		Sphingomonadales

Betaproteobacteria

<i>Acidovorax avenae</i> subsp. <i>citrulli</i> AAC00-1	YP_969856	YP_968937,YP_972836	Burkholderiales
<i>Acidovorax</i> sp. JS42		YP_985731,YP_985607,YP_986473,YP_974145,YP_988170	Burkholderiales
<i>Azoarcus</i> sp. BHT2	YP_933299	YP_931600	Rhodocyclales
<i>Azoarcus</i> sp. EbN1	YP_160972	YP_195373,YP_158408,YP_195596,YP_158693	Rhodocyclales
<i>Bordetella bronchiseptica</i> RB50	NP_889376	NP_891494	Burkholderiales
<i>Bordetella parapertussis</i> 12822	NP_884889	NP_886500	Burkholderiales
<i>Bordetella pertussis</i> Tohama I		NP_879317	Burkholderiales
<i>Bordetella petrii</i> DSM 12804	YP_001631006	YP_001630053,YP_001629640,YP_001632921,YP_001629903,YP_001628636	Burkholderiales
<i>Burkholderia ambifaria</i> AMMD	YP_778070	YP_771691,YP_775075	Burkholderiales
<i>burkholderia ambifaria</i> MC40-6	YP_001815913	YP_001809760	Burkholderiales
<i>Burkholderia cenocepacia</i> AU 1054	YP_625473	YP_622389	Burkholderiales
<i>Burkholderia cenocepacia</i> HI2424	YP_839621	YP_836771	Burkholderiales
<i>Burkholderia cenocapacia</i> MC0-3	YP_001774097	YP_001766426	Burkholderiales
<i>Burkholderia mallei</i> ATCC 23344		YP_101979	Burkholderiales
<i>Burkholderia mallei</i> NCTC 10229		YP_001028234	Burkholderiales
<i>Burkholderia mallei</i> NCTC 10247		YP_001081875	Burkholderiales
<i>Burkholderia mallei</i> SAVP1		YP_994105	Burkholderiales
<i>Burkholderia multivorans</i> ATCC 17616	YP_001585914	YP_001581308	Burkholderiales
<i>Burkholderia pseudomallei</i> 1106a		YP_001064439	Burkholderiales
<i>Burkholderia pseudomallei</i> 1710b		YP_331758	Burkholderiales
<i>Burkholderia pseudomallei</i> 668		YP_001057200	Burkholderiales
<i>Burkholderia pseudomallei</i> K96243		YP_106745	Burkholderiales
<i>Burkholderia</i> sp. 383		YP_370719	Burkholderiales
<i>Burkholderia thailandensis</i> E264		YP_440684	Burkholderiales
<i>Burkholderia vietnamiensis</i> G4	YP_001115703	YP_001119960,YP_001121114,YP_001110078,YP_001110413,YP_001110058	Burkholderiales
<i>Burkholderia xenovorans</i> LB400	YP_554144	YP_559782,YP_556633	Burkholderiales
<i>Chromobacterium violaceum</i> ATCC 12472		NP_903939	Neisseriales
<i>Dechloromonas aromatica</i> RCB		YP_283247	Rhodocyclales
<i>Delftia acidovorans</i> SPH-1	YP_001565359	YP_001565166,YP_001561915	Burkholderiales
<i>Herminiimonas arsenicoxydans</i>		YP_001100248,YP_001098479	Burkholderiales
<i>Janthinobacterium</i> sp. Marseille		YP_001351829	Burkholderiales
<i>Leptothrix cholodnii</i> SP 6		YP_001789269	Burkholderiales
<i>Methylibium petroleiphilum</i> PM1		YP_001021533,YP_001019462,YP_001023411	Burkholderiales
<i>Methylobacillus flagellatus</i> KT	YP_544669		Methylophilales
<i>Neisseria gonorrhoeae</i> FA 1090		YP_544339	Neisseriales
<i>Neisseria meningitidis</i> 053442		YP_208895	Neisseriales
<i>Neisseria meningitidis</i> FAM18		YP_001600116	Neisseriales
<i>Neisseria meningitidis</i> FAM18		YP_974241	Neisseriales
<i>Neisseria meningitidis</i> MC58		NP_273176	Neisseriales
<i>Neisseria meningitidis</i> Z2491		NP_283005	Neisseriales

Nitrosomonas europaea ATCC 19718
Nitrosomonas eutropha C91
Nitrosospira multiformis ATCC 25196
Polaromonas naphthalenivorans CJ2
Polaromonas sp. JS666
Polynucleobacter necessarius STIR1
Polynucleobacter sp. QLW-P1DMWA-1
Ralstonia eutropha H16
Ralstonia eutropha JMP134
Ralstonia metallidurans CH34
Ralstonia solanacearum GMI1000
Rhodoferax ferrireducens T118
Thiobacillus denitrificans ATCC 25259
Verminephrobacter eiseniae EF01-2

		NP_841983	Nitrosomonadales
		YP_746369,YP_746639	Nitrosomonadales
YP_410740		YP_411096	Nitrosomonadales
		YP_984179	Burkholderiales
		YP_551491	Burkholderiales
		YP_001798447	Burkholderiales
		YP_001156856	Burkholderiales
YP_725990		YP_728128	Burkholderiales
YP_298569		YP_293678,YP_297614	Burkholderiales
		YP_584446,YP_585710	Burkholderiales
		NP_518187	Burkholderiales
		YP_525185	Burkholderiales
YP_314503	YP_313768		Hydrogenophilaes
		YP_997925	Burkholderiales

Deltaproteobacteria

Anaeromyxobacter dehalogenans 2CP-C
Anaeromyxobacter sp. Fw109-5
Bdellovibrio bacteriovorus HD100
Desulfococcus oleovorans Hxd3
Desulfotalea psychrophila LSV54
Desulfovibrio desulfuricans G20
Desulfovibrio vulgaris subsp. *vulgaris* DP4
Desulfovibrio vulgaris subsp. *vulgaris* str. *Hildenborough*
Geobacter metallireducens GS-15
Geobacter sulfurreducens PCA
Geobacter uraniireducens Rf4
Lawsonia intracellularis PHE/MN1-00
Myxococcus xanthus DK 1622
Pelobacter carbinolicus DSM 2380
Pelobacter propionicus DSM 2379
Sorangium cellulosum 'So ce 56'
Syntrophobacter fumaroxidans MPOB
Syntrophus aciditrophicus SB

YP_466158	YP_465906		Myxococcales
YP_001378897	YP_001379878		Myxococcales
	NP_967909		Bdellovibrionales
	YP_001530326		Desulfobacterales
		YP_066353	Desulfobacterales
	YP_386602	YP_387814	Desulfovibrionales
	YP_965462	YP_966391	Desulfovibrionales
	YP_012598	YP_011529	Desulfovibrionales
	YP_383858		Desulfuromonadales
	NP_953595		Desulfuromonadales
	YP_001232415		Desulfuromonadales
	YP_595029		Desulfovibrionales
	YP_631211	YP_628804	Myxococcales
	YP_355836		Desulfuromonadales
	YP_900217		Desulfuromonadales
YP_001611798	YP_001615758	YP_001614054	Myxococcales
	YP_844349		Syntrophobacterales
	YP_461419		Syntrophobacterales

Epsilonproteobacteria

Arcobacter butzleri RM4018
Campylobacter concisus 13826
Campylobacter curvus 525.92
Campylobacter fetus subsp. *fetus* 82-40
Campylobacter hominis ATCC BAA-381
Campylobacter jejuni RM1221
Campylobacter jejuni subsp. *doylei* 269.97
Campylobacter jejuni subsp. *jejuni* 81116
Campylobacter jejuni subsp. *jejuni* 81-176
Campylobacter jejuni subsp. *jejuni* NCTC 11168
Helicobacter acinonychis str. *Sheeba*
Helicobacter hepaticus ATCC 51449
Helicobacter pylori 26695
Helicobacter pylori HPAG1
Helicobacter pylori J99
Nitratiruptor sp. SB155-2
Sulfurimonas denitrificans DSM 1251
Sulfurovum sp. NBC37-1

	YP_001491118		Campylobacterales
	YP_001467625		Campylobacterales
	YP_001408974		Campylobacterales
	YP_891380		Campylobacterales
	YP_001407082	YP_001405772	Campylobacterales
	YP_179824		Campylobacterales
	YP_001398963		Campylobacterales
	YP_001483157		Campylobacterales
	YP_001001325,YP_980071	YP_001004049	Campylobacterales
	NP_282812		Campylobacterales
	YP_665198		Campylobacterales
	NP_861329		Campylobacterales
	NP_206916, NP_207238		Campylobacterales
	YP_626857		Campylobacterales
	NP_222829, NP_223637, NP_223648		Campylobacterales
	YP_001357114	YP_001357221	unclassified
	YP_392687		Campylobacterales
	YP_001357405		unclassified

<i>Wolinella succinogenes</i> DSM 1740	NP_907653		Campylobacteriales
Gammaproteobacteria			
<i>Acinetobacter baumannii</i> ATCC 17978	YP_001083496 , YP_001083702		Pseudomonadales
<i>Acinetobacter baumannii</i> AYE	YP_001715103		Pseudomonadales
<i>Acinetobacter baumannii</i> SDF	YP_001708199		Pseudomonadales
<i>Acinetobacter</i> sp. ADP1	YP_045242		Pseudomonadales
<i>Actinobacillus pleuropneumoniae</i> L20	YP_001053401		Pasteurellales
<i>Actinobacillus pleuropneumoniae</i> serovar 3 str. JL03	YP_001651707	YP_001053449, YP_001651753	Pasteurellales
<i>Actinobacillus succinogenes</i> 130Z	YP_001344693	YP_001344993	Pasteurellales
<i>Aeromonas hydrophila</i> subsp. <i>hydrophila</i> ATCC 7966	YP_857604	YP_858472	Aeromonadales
<i>Aeromonas salmonicida</i> subsp. <i>salmonicida</i> A449	YP_001142853	YP_001140206, YP_001144217	Aeromonadales
<i>Alcanivorax borkumensis</i> SK2	YP_692732		Oceanospirillales
<i>Alkalilimnicola ehrlichei</i> MLHE-1	YP_743462		Chromatiales
<i>Baumannia cicadellinicola</i> str. Hc (<i>Homalodisca coagulata</i>)	YP_588751		unclassified
<i>Buchnera aphidicola</i> str. APS (<i>Acyrtosiphon pisum</i>)	NP_240108		Enterobacteriales
<i>Buchnera aphidicola</i> str. Bp (<i>Baizongia pistaciae</i>)			Enterobacteriales
<i>Buchnera aphidicola</i> str. Cc (<i>Cinara cedri</i>)			Enterobacteriales
<i>Buchnera aphidicola</i> str. Sg (<i>Schizaphis graminum</i>)	NP_660620		Enterobacteriales
<i>Candidatus Blochmannia floridanus</i>			Enterobacteriales
<i>Candidatus Blochmannia pennsylvanicus</i> str. BPEN			Enterobacteriales
<i>Candidatus Carsonella ruddii</i> PV			unclassified
<i>Candidatus Ruthia magnifica</i> str. Cm (<i>Calyptogenia magnifica</i>)	YP_904210		sulfur-oxidizing symbionts
<i>Candidatus Vesicomosocius okutanii</i> HA	YP_001219759		sulfur-oxidizing symbionts
<i>Chromohalobacter salexigens</i> DSM 3043	YP_573612	YP_574196	Oceanospirillales
<i>Citrobacter koseri</i> ATCC BAA-895	YP_001452924	YP_001453355	Enterobacteriales
<i>Colwellia psychrethytraea</i> 34H	YP_267940	YP_271431	Alteromonadales
<i>Coxiella burnetii</i> Dugway 5J108-111	YP_001425405		Legionellales
<i>Coxiella burnetii</i> RSA 331	YP_001595977		Legionellales
<i>Coxiella burnetii</i> RSA 493	NP_820975		Legionellales
<i>Dichelobacter nodosus</i> VCS1703A	YP_001209082		Cardiobacteriales
<i>Enterobacter sakazakii</i> ATCC BAA-894	YP_001437661	YP_001438246	Enterobacteriales
<i>Enterobacter</i> sp. 638	YP_001176922	YP_001176414	Enterobacteriales
<i>Erwinia carotovora</i> subsp. <i>atroseptica</i> SCRI1043		YP_050432, YP_048644	Enterobacteriales
<i>Escherichia coli</i> 536	YP_669237	YP_669615	Enterobacteriales
<i>Escherichia coli</i> DH10B	YP_001730271	YP_001730740	Enterobacteriales
<i>Escherichia coli</i> APEC O1	YP_852447	YP_852847	Enterobacteriales
<i>Escherichia coli</i> CFT073	NP_753645	NP_754060	Enterobacteriales
<i>Escherichia coli</i> E24377A	YP_001462571	YP_001463061	Enterobacteriales
<i>Escherichia coli</i> HS	YP_001458097	YP_001458543	Enterobacteriales
<i>Escherichia coli</i> K12	NP_415790	NP_416277	Enterobacteriales
<i>Escherichia coli</i> O157:H7 EDL933	NP_287925	NP_288196	Enterobacteriales
<i>Escherichia coli</i> O157:H7 str. Sakai	NP_309873	NP_310496	Enterobacteriales
<i>Escherichia coli</i> SECEC SMS-3-5	YP_001743911	YP_001743486	Enterobacteriales
<i>Escherichia coli</i> UTI89	AP_001900	YP_540965	Enterobacteriales
<i>Escherichia coli</i> W3110	YP_540552	AP_002382	Enterobacteriales
<i>Francisella philomiragia</i> subsp. <i>Philomiragia</i> ATCC25017	YP_001677125		Thiotrichales
<i>Francisella tularensis</i> subsp. <i>holarctica</i>	YP_001427881		Thiotrichales
<i>Francisella tularensis</i> subsp. <i>holarctica</i> FTA	YP_763048		Thiotrichales
<i>Francisella tularensis</i> subsp. <i>holarctica</i> OSU18	YP_513198		Thiotrichales
<i>Francisella tularensis</i> subsp. <i>novicida</i> U112	YP_898089		Thiotrichales
<i>Francisella tularensis</i> subsp. <i>tularensis</i> FSC198	YP_667035		Thiotrichales
<i>Francisella tularensis</i> subsp. <i>tularensis</i> SCHU S4	YP_169903		Thiotrichales

<i>Francisella tularensis</i> subsp. <i>tularensis</i> WY96-3418	YP_001122172		Thiotrichales
<i>Haemophilus ducreyi</i> 35000HP	NP_873809	NP_873711, NP_873446	Pasteurellales
<i>Haemophilus influenzae</i> 86-028NP	YP_249232	YP_248156, YP_247759	Pasteurellales
<i>Haemophilus influenzae</i> PittEE	YP_001290656	YP_001290029	Pasteurellales
<i>Haemophilus influenzae</i> PittGG	YP_001291588	YP_001292393	Pasteurellales
<i>Haemophilus influenzae</i> Rd KW20	NP_439516	NP_438605	Pasteurellales
<i>Haemophilus somnus</i> 129PT	YP_719124	YP_719522, YP_719942	Pasteurellales
<i>Haemophilus somnus</i> 2336	YP_001784712	YP_001783658, YP_001785040	Pasteurellales
<i>Hahella chejuensis</i> KCTC 2396	YP_435874		Oceanospirillales
<i>Halorhodospira halophila</i> SL1	YP_001003891		Chromatiales
<i>Idiomarina loihiensis</i> L2TR	YP_155399		Alteromonadales
<i>Klebsiella pneumoniae</i> subsp. <i>pneumoniae</i> MGH 78578	YP_001334933	YP_001334871	Enterobacteriales
<i>Legionella pneumophila</i> str. <i>Corby</i>	YP_001249874		Legionellales
<i>Legionella pneumophila</i> str. <i>Lens</i>	YP_127851		Legionellales
<i>Legionella pneumophila</i> str. <i>Paris</i>	YP_124957		Legionellales
<i>Legionella pneumophila</i> subsp. <i>pneumophila</i> str. <i>Philadelphia 1</i>	YP_096604		Legionellales
<i>Mannheimia succiniciproducens</i> MBEL55E	YP_088288	YP_087922	Pasteurellales
<i>Marinobacter aquaeolei</i> VT8	YP_956966, YP_958425	YP_959791	Alteromonadales
<i>Marinomonas</i> sp. <i>MWYL1</i>	YP_001340971	YP_001342115	Oceanospirillales
<i>Methylococcus capsulatus</i> str. <i>Bath</i>	YP_115233		Methylococcales
<i>Nitrosococcus oceani</i> ATCC 19707	YP_344982		Chromatiales
<i>Pasteurella multocida</i> subsp. <i>multocida</i> str. <i>Pm70</i>	NP_245552	NP_245144	Pasteurellales
<i>Pectobacterium atrosepticum</i> SCRI1043	YP_050381		Enterobacteriales
<i>Photobacterium profundum</i> SS9	YP_130661	YP_130771	Vibrionales
<i>Photorhabdus luminescens</i> subsp. <i>laumondii</i> TTO1	NP_929674	NP_929786, NP_928366	Enterobacteriales
<i>Pseudoalteromonas atlantica</i> T6c	YP_662415	YP_660358	Alteromonadales
<i>Pseudoalteromonas haloplanktis</i> TAC125	YP_339866	YP_340847, YP_340837	Alteromonadales
<i>Pseudomonas aeruginosa</i> PA7	YP_001348358	YP_001347520, YP_001349815	Pseudomonadales
<i>Pseudomonas aeruginosa</i> PAO1	NP_250934	NP_251701	Pseudomonadales
<i>Pseudomonas aeruginosa</i> UCBPP-PA14	YP_790992	YP_790161, YP_792914	Pseudomonadales
<i>Pseudomonas entomophila</i> L48	YP_607900	YP_609232	Pseudomonadales
<i>Pseudomonas fluorescens</i> Pf-5	YP_260520	YP_259061, YP_261755	Pseudomonadales
<i>Pseudomonas fluorescens</i> PfO-1	YP_348675	YP_349604	Pseudomonadales
<i>Pseudomonas mendocina</i> ymp	YP_001188262	YP_001187079	Pseudomonadales
<i>Pseudomonas putida</i> F1	YP_001267266	YP_001268911	Pseudomonadales
<i>Pseudomonas putida</i> W619	YP_001750059	YP_001748529	Pseudomonadales
<i>Pseudomonas putida</i> GB-1		YP_001667918	Pseudomonadales
<i>Pseudomonas putida</i> KT2440	NP_745961	NP_744288	Pseudomonadales
<i>Pseudomonas stutzeri</i> A1501	YP_001172718	YP_001172249	Pseudomonadales
<i>Pseudomonas syringae</i> pv. <i>phaseolicola</i> 1448A	YP_274601	YP_275367	Pseudomonadales
<i>Pseudomonas syringae</i> pv. <i>syringae</i> B728a	YP_235836	YP_236357	Pseudomonadales
<i>Pseudomonas syringae</i> pv. <i>tomato</i> str. <i>DC3000</i>	NP_792773	NP_793294	Pseudomonadales
<i>Psychrobacter arcticus</i> 273-4		YP_264942	Pseudomonadales
<i>Psychrobacter cryohalolentis</i> K5	YP_580104	YP_581162	Pseudomonadales
<i>Psychrobacter</i> sp. <i>PRwf-1</i>	YP_001279766	YP_001279298	Pseudomonadales
<i>Psychromonas ingrahamii</i> 37		YP_943338	Alteromonadales
<i>Saccharophagus degradans</i> 2-40		YP_527255	Alteromonadales
<i>Salmonella enterica</i> subsp. <i>arizonae</i> serovar 62		YP_001570290	Enterobacteriales
<i>Salmonella enterica</i> subsp. <i>enterica</i> serovar <i>Choleraesuis</i> str. <i>SC-B67</i>		YP_216698	Enterobacteriales
<i>Salmonella enterica</i> subsp. <i>enterica</i> serovar <i>Paratyphi A</i> str. <i>ATCC 9150</i>		YP_150435	Enterobacteriales
<i>Salmonella enterica</i> subsp. <i>enterica</i> serovar <i>Paratyphi B</i> str. <i>SPB7</i>		YP_001587763	Enterobacteriales
<i>Salmonella enterica</i> subsp. <i>enterica</i> serovar <i>Typhi</i> str. <i>CT18</i>		NP_455783	Enterobacteriales

<i>Salmonella enterica</i> subsp. <i>enterica</i> serovar <i>Typhi</i> str. <i>Ty2</i>		NP_805405	NP_807836, NP_804985	Enterobacteriales
<i>Salmonella typhimurium</i> LT2		NP_460673	NP_460264	Enterobacteriales
<i>Serratia proteamaculans</i> 568		YP_001478886	YP_001478947, YP_001480330, YP_001476548	Enterobacteriales
<i>Shewanella amazonensis</i> SB2B		YP_927199	YP_928020	Alteromonadales
<i>Shewanella baltica</i> OS155		YP_001050858	YP_001051092, YP_001041729	Alteromonadales
<i>Shewanella baltica</i> OS185		YP_001366689	YP_001366950	Alteromonadales
<i>Shewanella baltica</i> OS195		YP_001555037	YP_001555256, YP_001557130	Alteromonadales
<i>Shewanella denitrificans</i> OS217		YP_563331	YP_563403	Alteromonadales
<i>Shewanella frigidimarina</i> NCIMB 400		YP_751161	YP_750091	Alteromonadales
<i>Shewanella halifaxensis</i> HAW EB4		YP_001673830	YP_001674850	Alteromonadales
<i>Shewanella loihica</i> PV-4		YP_001094349	YP_001094424	Alteromonadales
<i>Shewanella oneidensis</i> MR-1		NP_718289	NP_718626	Alteromonadales
<i>Shewanella pealeana</i> ATCC 700345		YP_001501395	YP_001501485	Alteromonadales
<i>Shewanella putrefaciens</i> CN-32		YP_001183770	YP_001183955	Alteromonadales
<i>Shewanella sediminis</i> HAW-EB3		YP_001474576	YP_001473397	Alteromonadales
<i>Shewanella</i> sp. ANA-3		YP_869368	YP_869126	Alteromonadales
<i>Shewanella</i> sp. MR-4		YP_733719	YP_733568	Alteromonadales
<i>Shewanella</i> sp. MR-7		YP_737712	YP_737554	Alteromonadales
<i>Shewanella</i> sp. W3-18-1		YP_963149	YP_962964	Alteromonadales
<i>Shewanella woodyi</i> ATCC 51908		YP_001760182	YP_001761342	Alteromonadales
<i>Shigella boydii</i> Sb227		YP_408219	YP_407779	Enterobacteriales
<i>Shigella dysenteriae</i> Sd197		YP_402982	YP_403139	Enterobacteriales
<i>Shigella flexneri</i> 2a str. 2457T		NP_836967	NP_837145	Enterobacteriales
<i>Shigella flexneri</i> 2a str. 301		NP_707181	NP_707350	Enterobacteriales
<i>Shigella flexneri</i> 5 str. 8401		YP_688795	YP_688950	Enterobacteriales
<i>Shigella sonnei</i> Ss046		YP_310776	YP_310338	Enterobacteriales
<i>Sodalis glossinidius</i> str. 'morsitans'		YP_455088	YP_455041	Enterobacteriales
<i>Thiomicrospira crunogena</i> XCL-2		YP_390466		Thiotrichales
<i>Vibrio cholerae</i> O1 biovar <i>eltor</i> str. N16961		NP_231366	NP_231677	Vibrionales
<i>Vibrio cholerae</i> O395		YP_001217276	YP_001217569	Vibrionales
<i>Vibrio fischeri</i> ES114		YP_204434	YP_207176, YP_205024	Vibrionales
<i>Vibrio harveyi</i> ATCC BAA-1116		YP_001444771	YP_001436068, YP_001446218	Vibrionales
<i>Vibrio parahaemolyticus</i> RIMD 2210633		NP_797401	NP_798528	Vibrionales
<i>Vibrio vulnificus</i> CMCP6		NP_760989	NP_761924	Vibrionales
<i>Vibrio vulnificus</i> YJ016		NP_935107	NP_933948	Vibrionales
<i>Wigglesworthia glossinidia</i> endosymbiont of <i>Glossina brevipalpis</i>				Enterobacteriales
<i>Xanthomonas axonopodis</i> pv. <i>citri</i> str. 306	NP_640391	NP_644113	NP_642529	Xanthomonadales
<i>Xanthomonas campestris</i> pv. <i>campestris</i> str. 8004	YP_241148	YP_244885	YP_243144	Xanthomonadales
<i>Xanthomonas campestris</i> pv. <i>campestris</i> str. ATCC 33913	NP_635429	NP_639100		Xanthomonadales
<i>Xanthomonas campestris</i> pv. <i>vesicatoria</i> str. 85-10	YP_361770	YP_365663	YP_364018, YP_364137, YP_361711	Xanthomonadales
<i>Xanthomonas oryzae</i> pv. <i>oryzae</i> KACC10331	YP_198814	YP_199218		Xanthomonadales
<i>Xanthomonas oryzae</i> pv. <i>oryzae</i> MAFF 311018	YP_449184	YP_449569		Xanthomonadales
<i>Xylella fastidiosa</i> 9a5c		NP_061659, NP_298210	NP_299064, NP_299339	Xanthomonadales
<i>Xylella fastidiosa</i> M12		YP_001776438	YP_001775704	Xanthomonadales
<i>Xylella fastidiosa</i> Temecula1		NP_779952		Xanthomonadales
<i>Yersinia enterocolitica</i> subsp. <i>enterocolitica</i> 8081		YP_001006438	YP_001006485	Enterobacteriales
<i>Yersinia pestis</i> Angola		YP_001606739	YP_001606772	Enterobacteriales
<i>Yersinia pestis</i> Antiqua		YP_651488	YP_651434	Enterobacteriales
<i>Yersinia pestis</i> biovar <i>Microtus</i> str. 91001		NP_993355	NP_993305	Enterobacteriales
<i>Yersinia pestis</i> CO92		NP_405760	NP_405710	Enterobacteriales
<i>Yersinia pestis</i> KIM		NP_669373	NP_669467	Enterobacteriales
<i>Yersinia pestis</i> Nepal516		YP_647615	YP_647561	Enterobacteriales

Yersinia pestis Pestoides F
Yersinia pseudotuberculosis IP 31758
Yersinia pseudotuberculosis YPIII
Yersinia pseudotuberculosis IP 32953

	YP_001162290	YP_001162342		Enterobacteriales
	YP_001400898	YP_001400952,YP_001393284,YP_001393331		Enterobacteriales
	YP_001720773	YP_001720827		Enterobacteriales
	YP_070657	YP_068538,YP_070608		Enterobacteriales

Proteobacteria

Magnetococcus sp. MC-1

	YP_867551	YP_866447		unclassified
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Spirochaetes

Borrelia afzelii PKo
Borrelia burgdorferi B31
Borrelia garinii PBi
Leptospira borgpetersenii serovar *Hardjo-bovis* JB197
Leptospira borgpetersenii serovar *Hardjo-bovis* L550
Leptospira interrogans serovar *Copenhageni* str. *Fiocruz* L1-130
Leptospira interrogans serovar *Lai* str. 56601
Treponema denticola ATCC 35405
Treponema pallidum subsp. *pallidum* str. *Nichols*

	YP_710281			Spirochaetaceae
	NP_212962			Spirochaetaceae
	YP_073267			Spirochaetaceae
	YP_800587			Leptospiraceae
	YP_797709			Leptospiraceae
	YP_002014			Leptospiraceae
	NP_711902			Leptospiraceae
	NP_971815			Spirochaetaceae
	NP_218834			Spirochaetaceae

Thermotogae

Fervidobacterium nodosum Rt17-B1
Petrogoga mobilis SJ95
Thermosipho melanesiensis BI429
Thermotoga lettingae TMO
Thermotoga maritima MSB8
Thermotoga petrophila RKU-1

	YP_001410533		YP_001410867	Thermotogaceae
	YP_001568661			Thermotogaceae
	YP_001306270			Thermotogaceae
	YP_001469829			Thermotogaceae
	NP_228071		NP_227988	Thermotogaceae
	YP_001244262		YP_001244347	Thermotogaceae