Supplementary Materials

to "***Phylogenomic reconstruction of archaeal fatty acid metabolism***"
by Daria V. Dibrova, Michael Y. Galperin, and Armen Y. Mulkidjanian

Figure S1. **Reactions of β-oxidation of fatty acids** (modified from the charts in KEGG and MetaCyc databases).

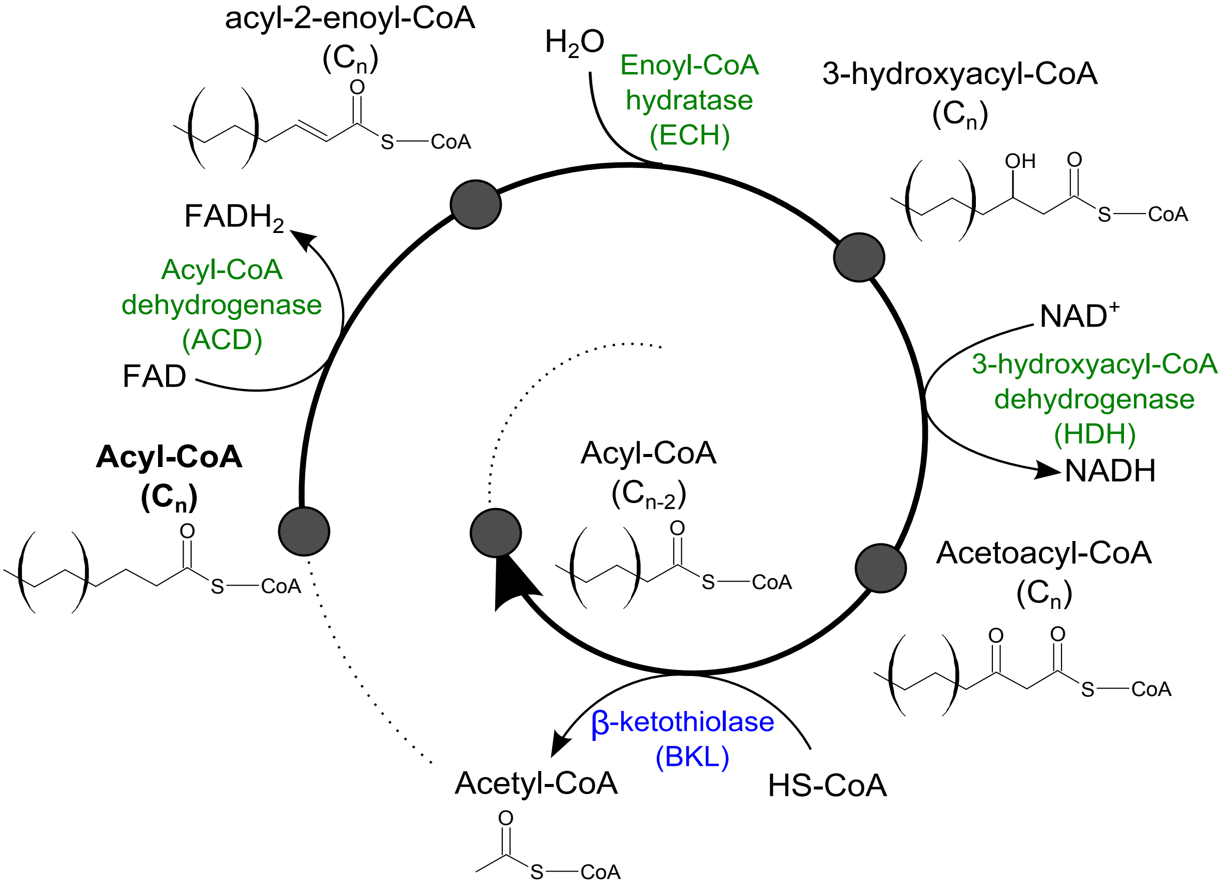

***Figure S2*. Phylogenetic tree of β-ketothiolase and its homologs.**

The tree was constructed based on conserved blocks (total 227 positions) from 511 sequences. Each protein sequence on the tree is listed under its gene identifier (gi) in the NCBI's RefSeq database and the name of the source organism. Eukaryotic proteins and clades are marked by bold orange branches. The names of bacterial and archaeal proteins are colored according to their taxonomy, as follows:

Archaea:
Crenarchaeota
Euryarchaeota
Korarchaeota
Nanoarchaeota
Thaumarchaeota

Well-sampled bacterial phyla[*]:
Actinobacteria
Aquificae
Bacteroidetes/Chlorobi group
Chlamydiae/Verrucomicrobia group
Chloroflexi
Cyanobacteria
Deinococcus-Thermus
Firmicutes
Proteobacteria
Thermotogae

Poorly sampled bacterial phyla[*]:
Chrysiogenetes
Deferribacteres
Dictyoglomi
Elusimicrobia
Fibrobacteres/Acidobacteria group
Fusobacteria
Gemmatimonadetes
Nitrospirae
Planctomycetes
Spirochaetes
Synergistetes
Thermodesulfobacteria
unclassified Bacteria

[*] The terms "poorly sampled" and "well-sampled" refer to the number of full genome sequences available for the respective phyla.


161528349 Nitrosopumilus maritimus SCM1
118575781 Cenarchaeum symbiosum A
A4
72392573 Trypanosoma brucei TREU927
226944317 Azotobacter vinelandii DJ
116326993 Leptospira borgpetersenii serovar Hardjo bovis L550
116328648 Leptospira borgpetersenii serovar Hardjo bovis L550
336322464 Flexistipes sinusarabici DSM 4947
291288413 Denitrovibrio acetiphilus DSM 12809
148262811 Geobacter uraniireducens Rf4
317051433 Desulfurispirillum indicum S5
110667933 Haloquadratum walsbyi DSM 16790
146304057 Metallosphaera sedula DSM 5348
15899415 Sulfolobus solfataricus P2
284165988 Haloterrigena turkmenica DSM 5511
55377730 Haloarcula marismortui ATCC 43049
257388330 Halomicrobium mukohataei DSM 12286
284164561 Haloterrigena turkmenica DSM 5511
284165516 Haloterrigena turkmenica DSM 5511
284164990 Haloterrigena turkmenica DSM 5511
289582965 Natrialba magadii ATCC 43099
336254523 Halopiger xanaduensis SH 6
300711277 Halalkalicoccus jeotgali B3
313126945 Halogeometricum borinquense DSM 11551
292655185 Haloferax volcanii DS2
222479063 Halorubrum lacusprofundi ATCC 49239
313117216 Halogeometricum borinquense DSM 11551
110667549 Haloquadratum walsbyi DSM 16790
169235779 Halobacterium salinarum R1
345004441 halophilic archaeon DL31
222481391 Halorubrum lacusprofundi ATCC 49239
76802461 Natronomonas pharaonis DSM 2160
A7
11497655 Archaeoglobus fulgidus DSM 4304
161529139 Nitrosopumilus maritimus SCM1
118576951 Cenarchaeum symbiosum A
76801750 Natronomonas pharaonis DSM 2160
284162195 Archaeoglobus profundus DSM 5631
11498889 Archaeoglobus fulgidus DSM 4304
148266364 Geobacter uraniireducens Rf4
289596016 Aciduliprofundum boonei T469
AM_3
11498050 Archaeoglobus fulgidus DSM 4304
288931562 Ferroglobus placidus DSM 10642
146303171 Metallosphaera sedula DSM 5348
15899350 Sulfolobus solfataricus P2
A3_1
118431262 Aeropyrum pernix K1
146303181 Metallosphaera sedula DSM 5348
15899585 Sulfolobus solfataricus P2
16081211 Thermoplasma acidophilum DSM 1728
288932297 Ferroglobus placidus DSM 10642
11497899 Archaeoglobus fulgidus DSM 4304
327310602 Thermoproteus uzoniensis 768 20
352682222 Thermoproteus tenax Kra 1
18312596 Pyrobaculum aerophilum str IM2
325967901 Vulcanisaeta moutnovskia 768 28
325968891 Vulcanisaeta moutnovskia 768 28
302347827 Acidilobus saccharovorans 345 15
A3_2
114561926 Shewanella frigidimarina NCIMB 400
196011150 Trichoplax adhaerens
145502871 Paramecium tetraurelia strain d4 2
145533254 Paramecium tetraurelia strain d4 2
241742051 Ixodes scapularis
24585051 Drosophila melanogaster
19921506 Drosophila melanogaster
156382563 Nematostella vectensis
291229736 Saccoglossus kowalevskii
41053664 Danio rerio
198428552 Ciona intestinalis
212528542 Penicillium marneffei ATCC 18224
17537653 Caenorhabditis elegans
71007652 Ustilago maydis 521
156361090 Nematostella vectensis
48478260 Picrophilus torridus DSM 9790
16081480 Thermoplasma acidophilum DSM 1728
289583624 Natrialba magadii ATCC 43099
146303055 Metallosphaera sedula DSM 5348
15898851 Sulfolobus solfataricus P2
352681788 Thermoproteus tenax Kra 1
327310124 Thermoproteus uzoniensis 768 20
18313382 Pyrobaculum aerophilum str IM2
302349060 Acidilobus saccharovorans 345 15
325968743 Vulcanisaeta moutnovskia 768 28
14602032 Aeropyrum pernix K1
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11498572 Archaeoglobus fulgidus DSM 4304
A2
11497750 Archaeoglobus fulgidus DSM 4304
11497818 Archaeoglobus fulgidus DSM 4304
284167043 Haloterrigena turkmenica DSM 5511
284167042 Haloterrigena turkmenica DSM 5511
A3
11497751 Archaeoglobus fulgidus DSM 4304
11497817 Archaeoglobus fulgidus DSM 4304
288932875 Ferroglobus placidus DSM 10642
11498573 Archaeoglobus fulgidus DSM 4304
118431856 Aeropyrum pernix K1
146303056 Metallosphaera sedula DSM 5348
15898850 Sulfolobus solfataricus P2
302349059 Acidilobus saccharovorans 345 15
325968742 Vulcanisaeta moutnovskia 768 28
18313381 Pyrobaculum aerophilum str IM2
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352681787 Thermoproteus tenax Kra 1
A1
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15899246 Sulfolobus solfataricus P2
15899821 Sulfolobus solfataricus P2
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288931413 Ferroglobus placidus DSM 10642
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A9
11499992 Archaeoglobus fulgidus DSM 4304
327401913 Archaeoglobus veneficus SNP6
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284161267 Archaeoglobus profundus DSM 5631
20094814 Methanopyrus kandleri AV19
304314945 Methanothermobacter marburgensis str Marburg
325959123 Methanobacterium sp AL 21
148643622 Methanobrevibacter smithii ATCC 35061
84488946 Methanosphaera stadtmanae DSM 3091
256811417 Methanocaldococcus fervens AG86
333911310 Methanotorris igneus Kol 5
336122445 Methanothermococcus okinawensis IH1
150400460 Methanococcus aeolicus Nankai 3
AM_1
282165418 Methanocella paludicola SANAE
219853073 Methanosphaerula palustris E1 9c
124486438 Methanocorpusculum labreanum Z
307352712 Methanoplanus petrolearius DSM 11571
88601467 Methanospirillum hungatei JF 1
126180302 Methanoculleus marisnigri JR1
154149704 Candidatus Methanoregula boonei 6A8
116754688 Methanosaeta thermophila PT
20092835 Methanosarcina acetivorans C2A
91773872 Methanococcoides burtonii DSM 6242
336477784 Methanosalsum zhilinae DSM 4017
294494852 Methanohalophilus mahii DSM 5219
298676115 Methanohalobium evestigatum Z 7303
48477455 Picrophilus torridus DSM 9790
16082423 Thermoplasma acidophilum DSM 1728
AM_4
313116894 Halogeometricum borinquense DSM 11551
55380274 Haloarcula marismortui ATCC 43049
292654065 Haloferax volcanii DS2
345006670 halophilic archaeon DL31
300712453 Halalkalicoccus jeotgali B3
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A6
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289580278 Natrialba magadii ATCC 43099
289937510 Natrialba magadii ATCC 43099
284165205 Haloterrigena turkmenica DSM 5511
76801945 Natronomonas pharaonis DSM 2160
257051684 Halorhabdus utahensis DSM 12940
284167038 Haloterrigena turkmenica DSM 5511
300711658 Halalkalicoccus jeotgali B3
76802357 Natronomonas pharaonis DSM 2160
292654998 Haloferax volcanii DS2
313127117 Halogeometricum borinquense DSM 11551
345006720 halophilic archaeon DL31
A5
222479436 Halorubrum lacusprofundi ATCC 49239
110668238 Haloquadratum walsbyi DSM 16790
169235587 Halobacterium salinarum R1
284164185 Haloterrigena turkmenica DSM 5511
336255328 Halopiger xanaduensis SH 6
289582133 Natrialba magadii ATCC 43099
55377759 Haloarcula marismortui ATCC 43049
257388849 Halomicrobium mukohataei DSM 12286
76802348 Natronomonas pharaonis DSM 2160
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A8
327310839 Thermoproteus uzoniensis 768 20
18313369 Pyrobaculum aerophilum str IM2
352682307 Thermoproteus tenax Kra 1
124028375 Hyperthermus butylicus DSM 5456
347523317 Pyrolobus fumarii 1A
156937171 Ignicoccus hospitalis KIN4 I
170290789 Candidatus Korarchaeum cryptofilum OPF8
118431627 Aeropyrum pernix K1
302348834 Acidilobus saccharovorans 345 15
15897458 Sulfolobus solfataricus P2
332796984 Acidianus hospitalis W1
146304410 Metallosphaera sedula DSM 5348
325969797 Vulcanisaeta moutnovskia 768 28
159041807 Caldivirga maquilingensis IC 167
327311069 Thermoproteus uzoniensis 768 20
352681405 Thermoproteus tenax Kra 1
AM_2
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18313161 Pyrobaculum aerophilum str IM2
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119719675 Thermofilum pendens Hrk 5
297527004 Staphylothermus hellenicus DSM 12710
126466314 Staphylothermus marinus F1
296242161 Thermosphaera aggregans DSM 11486
218883972 Desulfurococcus kamchatkensis 1221n
320100592 Desulfurococcus mucosus DSM 2162
159900385 Herpetosiphon aurantiacus ATCC 23779
163845832 Chloroflexus aurantiacus J 10 fl
242398786 Thermococcus sibiricus MM 739
18977345 Pyrococcus furiosus DSM 3638
21224359 Streptomyces coelicolor A3 2
226943544 Azotobacter vinelandii DJ
300114857 Nitrosococcus watsonii C 113
374288524 Bacteriovorax marinus SJ
116329106 Leptospira borgpetersenii serovar Hardjo bovis L550
83312088 Magnetospirillum magneticum AMB 1
108804572 Rubrobacter xylanophilus DSM 9941
108804673 Rubrobacter xylanophilus DSM 9941
374288116 Bacteriovorax marinus SJ
340788642 Collimonas fungivorans Ter331
21222887 Streptomyces coelicolor A3 2
340794200 Corynebacterium variabile DSM 44702
146301065 Flavobacterium johnsoniae UW101
239917674 Micrococcus luteus NCTC 2665
16130275 Escherichia coli str K 12 substr MG1655 (FadI)
145599292 Yersinia pestis Pestoides F
15641059 Vibrio cholerae O1 biovar El Tor str N16961
114563842 Shewanella frigidimarina NCIMB 400
262196641 Haliangium ochraceum DSM 14365
300114045 Nitrosococcus watsonii C 113
226228263 Gemmatimonas aurantiaca T 27
108805256 Rubrobacter xylanophilus DSM 9941
297624951 Truepera radiovictrix DSM 17093
219120775 Phaeodactylum tricornutum CCAP 1055 1
223997500 Thalassiosira pseudonana CCMP1335
198427827 Ciona intestinalis
156369857 Nematostella vectensis
242002890 Ixodes scapularis
50745166 Gallus gallus
41053347 Danio rerio
196001471 Trichoplax adhaerens
17551802 Caenorhabditis elegans
66507594 Apis mellifera
17137578 Drosophila melanogaster
302038403 Candidatus Nitrospira defluvii
226311782 Brevibacillus brevis NBRC 100599
226311252 Brevibacillus brevis NBRC 100599
116327036 Leptospira borgpetersenii serovar Hardjo bovis L550
47085765 Danio rerio
57529492 Gallus gallus
156375071 Nematostella vectensis
195997821 Trichoplax adhaerens
291226682 Saccoglossus kowalevskii
241174246 Ixodes scapularis
71018429 Ustilago maydis 521
331212737 Puccinia graminis
133906874 Caenorhabditis elegans
167533261 Monosiga brevicollis MX1
219119079 Phaeodactylum tricornutum CCAP 1055 1
224003771 Thalassiosira pseudonana CCMP1335
374287022 Bacteriovorax marinus SJ
17648125 Drosophila melanogaster
48097100 Apis mellifera
340793855 Corynebacterium variabile DSM 44702
23098131 Oceanobacillus iheyensis HTE831
49482805 Staphylococcus aureus subsp aureus MRSA252
16078099 Bacillus subtilis subsp subtilis str 168
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297624982 Truepera radiovictrix DSM 17093
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302816007 Selaginella moellendorffii
302820258 Selaginella moellendorffii
302786128 Selaginella moellendorffii
302760661 Selaginella moellendorffii
168023493 Physcomitrella patens subsp patens
168020147 Physcomitrella patens subsp patens
302829022 Volvox carteri f nagariensis
66820687 Dictyostelium discoideum AX4
237833355 Toxoplasma gondii ME49
145545969 Paramecium tetraurelia strain d4 2
145543456 Paramecium tetraurelia strain d4 2
71005142 Ustilago maydis 521
212532251 Penicillium marneffei ATCC 18224
212543841 Penicillium marneffei ATCC 18224
212532371 Penicillium marneffei ATCC 18224
212540264 Penicillium marneffei ATCC 18224
71006648 Ustilago maydis 521
331231088 Puccinia graminis
6322031 Saccharomyces cerevisiae S288c
212542205 Penicillium marneffei ATCC 18224
71015996 Ustilago maydis 521
331233970 Puccinia graminis
219118847 Phaeodactylum tricornutum CCAP 1055 1
224013830 Thalassiosira pseudonana CCMP1335
50345072 Danio rerio
118085518 Gallus gallus
196002635 Trichoplax adhaerens
291244548 Saccoglossus kowalevskii
226943851 Azotobacter vinelandii DJ
15806445 Deinococcus radiodurans R1
114563234 Shewanella frigidimarina NCIMB 400
340795889 Corynebacterium variabile DSM 44702
262199847 Haliangium ochraceum DSM 14365
148263655 Geobacter uraniireducens Rf4
317051583 Desulfurispirillum indicum S5
336322687 Flexistipes sinusarabici DSM 4947
340785729 Collimonas fungivorans Ter331
30249497 Nitrosomonas europaea ATCC 19718
187479038 Bordetella avium 197N
108804876 Rubrobacter xylanophilus DSM 9941
226314483 Brevibacillus brevis NBRC 100599
16080335 Bacillus subtilis subsp subtilis str 168
23099849 Oceanobacillus iheyensis HTE831
225874378 Acidobacterium capsulatum ATCC 51196
167628209 Heliobacterium modesticaldum Ice1
15807466 Deinococcus radiodurans R1
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55980860 Thermus thermophilus HB8
163848756 Chloroflexus aurantiacus J 10 fl
159900906 Herpetosiphon aurantiacus ATCC 23779
49482464 Staphylococcus aureus subsp aureusMRSA2 52
110639956 Cytophaga hutchinsonii ATCC 33406
256426059 Chitinophaga pinensis DSM 2588
146302482 Flavobacterium johnsoniae UW101
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145600637 Yersinia pestis Pestoides F
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15642752 Vibrio cholerae O1 biovar El Tor str N16961
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284163683 Haloterrigena turkmenica DSM 5511
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284164713 Haloterrigena turkmenica DSM 5511
B2
313125290 Halogeometricum borinquense DSM 11551
292656043 Haloferax volcanii DS2
300710172 Halalkalicoccus jeotgali B3
55379427 Haloarcula marismortui ATCC 43049
257386801 Halomicrobium mukohataei DSM 12286
76801773 Natronomonas pharaonis DSM 2160
76801948 Natronomonas pharaonis DSM 2160
289582549 Natrialba magadii ATCC 43099
256420251 Chitinophaga pinensis DSM 2588
239918492 Micrococcus luteus NCTC 2665
15807721 Deinococcus radiodurans R1
297622899 Truepera radiovictrix DSM 17093
262193816 Haliangium ochraceum DSM 14365
83311694 Magnetospirillum magneticum AMB 1
83311853 Magnetospirillum magneticum AMB 1
222082751 Agrobacterium radiobacter K84
16129358 Escherichia coli str K 12 substr MG1655 (PaaJ)
226226466 Gemmatimonas aurantiaca T 27
226945864 Azotobacter vinelandii DJ
340785356 Collimonas fungivorans Ter331
187478587 Bordetella avium 197N
55980956 Thermus thermophilus HB8
108804419 Rubrobacter xylanophilus DSM 9941
374288694 Bacteriovorax marinus SJ
21225254 Streptomyces coelicolor A3 2
21224995 Streptomyces coelicolor A3 2
21221520 Streptomyces coelicolor A3 2
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116329089 Leptospira borgpetersenii serovar Hardjo bovis L550
262197806 Haliangium ochraceum DSM 14365
340786402 Collimonas fungivorans Ter331
340793246 Corynebacterium variabile DSM 44702
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21225081 Streptomyces coelicolor A3 2
294676075 Rhodobacter capsulatus SB 1003
222084818 Agrobacterium radiobacter K84
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76802923 Natronomonas pharaonis DSM 2160
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B2_1
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55980659 Thermus thermophilus HB8
239918431 Micrococcus luteus NCTC 2665
21219830 Streptomyces coelicolor A3 2
23100127 Oceanobacillus iheyensis HTE831
15004782 Clostridium acetobutylicum ATCC 824
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226944454 Azotobacter vinelandii DJ
90111494 Escherichia coli str K 12 substr MG1655 (YqeF)
226947138 Azotobacter vinelandii DJ
83309941 Magnetospirillum magneticum AMB 1
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294678694 Rhodobacter capsulatus SB 1003
24655093 Drosophila melanogaster
42476267 Danio rerio
156376494 Nematostella vectensis
291224417 Saccoglossus kowalevskii
226315043 Brevibacillus brevis NBRC 100599
23100087 Oceanobacillus iheyensis HTE831
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16800521 Listeria innocua Clip11262
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51473904 Rickettsia typhi str Wilmington
16272712 Haemophilus influenzae Rd KW20
221632724 Thermomicrobium roseum DSM 5159
163847104 Chloroflexus aurantiacus J 10 fl
226226695 Gemmatimonas aurantiaca T 27
159897052 Herpetosiphon aurantiacus ATCC 23779
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15806958 Deinococcus radiodurans R1
49482584 Staphylococcus aureus subsp aureus MRSA252
327401339 Archaeoglobus veneficus SNP6
11498797 Archaeoglobus fulgidus DSM 4304
288932773 Ferroglobus placidus DSM 10642
B3_1
160901991 Petrotoga mobilis SJ95
239616998 Kosmotoga olearia TBF 19 5 1
15601447 Vibrio cholerae O1 biovar eltor str N16961
162447365 Acholeplasma laidlawii PG 8A
19703830 Fusobacterium nucleatum subsp nucleatum ATCC 25586
55380024 Haloarcula marismortui ATCC 43049
284176192 Haloterrigena turkmenica DSM 5511
336254416 Halopiger xanaduensis SH 6
48478577 Picrophilus torridus DSM 9790
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170290652 Candidatus Korarchaeum cryptofilum OPF8
269797714 Veillonella parvula DSM 2008
327310314 Thermoproteus uzoniensis 768 20
352682095 Thermoproteus tenax Kra 1
18312485 Pyrobaculum aerophilum str IM2
B3
171184729 Thermoproteus neutrophilus V24Sta
159042496 Caldivirga maquilingensis IC 167
325967741 Vulcanisaeta moutnovskia 768 28
156938188 Ignicoccus hospitalis KIN4 I
347523896 Pyrolobus fumarii 1A
14601847 Aeropyrum pernix K1
302348121 Acidilobus saccharovorans 345 15
55980528 Thermus thermophilus HB8
332797845 Acidianus hospitalis W1
15899132 Sulfolobus solfataricus P2
146303439 Metallosphaera sedula DSM 5348
340793918 Corynebacterium variabile DSM 44702
21223759 Streptomyces coelicolor A3 2
239917288 Micrococcus luteus NCTC 2665
340795046 Corynebacterium variabile DSM 44702
108805322 Rubrobacter xylanophilus DSM 9941
23100468 Oceanobacillus iheyensis HTE831
226315084 Brevibacillus brevis NBRC 100599
16079473 Bacillus subtilis subsp subtilis str 168
167629181 Heliobacterium modesticaldum Ice1
288931381 Ferroglobus placidus DSM 10642
B4
269925484 Thermobaculum terrenum ATCC BAA 798
336324286 Flexistipes sinusarabici DSM 4947
327399557 Hippea maritima DSM 10411
148265082 Geobacter uraniireducens Rf4
317051574 Desulfurispirillum indicum S5
154412909 Trichomonas vaginalis G3
123479785 Trichomonas vaginalis G3
302855643 Volvox carteri f nagariensis
302840794 Volvox carteri f nagariensis
168041478 Physcomitrella patens subsp patens
302770795 Selaginella moellendorffii
302784768 Selaginella moellendorffii
167998352 Physcomitrella patens subsp patens
302807945 Selaginella moellendorffii
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302785039 Selaginella moellendorffii
224002851 Thalassiosira pseudonana CCMP1335
219130135 Phaeodactylum tricornutum CCAP 1055 1
6325229 Saccharomyces cerevisiae S288c
212541422 Penicillium marneffei ATCC 18224
66824465 Dictyostelium discoideum AX4
145550886 Paramecium tetraurelia strain d4 2
145551239 Paramecium tetraurelia strain d4 2
156100305 Plasmodium vivax Sal 1
237844673 Toxoplasma gondii ME49
146302339 Flavobacterium johnsoniae UW101
256425395 Chitinophaga pinensis DSM 2588
110638309 Cytophaga hutchinsonii ATCC 33406
291228777 Saccoglossus kowalevskii
118085057 Gallus gallus
51230650 Danio rerio
240978517 Ixodes scapularis
156399861 Nematostella vectensis
196014135 Trichoplax adhaerens
198415834 Ciona intestinalis
198415832 Ciona intestinalis
198415830 Ciona intestinalis
328791773 Apis mellifera
24640423 Drosophila melanogaster
71018975 Ustilago maydis 521
167524264 Monosiga brevicollis MX1
25147385 Caenorhabditis elegans
17535921 Caenorhabditis elegans
331245866 Puccinia graminis
212526082 Penicillium marneffei ATCC 18224
374289414 Bacteriovorax marinus SJ
297624207 Truepera radiovictrix DSM 17093
340789444 Collimonas fungivorans Ter331
187479840 Bordetella avium 197N
226942885 Azotobacter vinelandii DJ
294678511 Rhodobacter capsulatus SB 1003
83312697 Magnetospirillum magneticum AMB 1
222087637 Agrobacterium radiobacter K84
114562516 Shewanella frigidimarina NCIMB 400
302038413 Candidatus Nitrospira defluvii
262196965 Haliangium ochraceum DSM 14365
15645313 Helicobacter pylori 26695
336066874 Erysipelothrix rhusiopathiae str Fujisawa
23098144 Oceanobacillus iheyensis HTE831
262197778 Haliangium ochraceum DSM 14365
108805192 Rubrobacter xylanophilus DSM 9941
30250194 Nitrosomonas europaea ATCC 19718
187478964 Bordetella avium 197N
163847034 Chloroflexus aurantiacus J 10 fl
226943755 Azotobacter vinelandii DJ
340785684 Collimonas fungivorans Ter331
294678965 Rhodobacter capsulatus SB 1003
18314226 Pyrobaculum aerophilum str IM2
325968167 Vulcanisaeta moutnovskia 768 28
15899236 Sulfolobus solfataricus P2
327310595 Thermoproteus uzoniensis 768 20
352682228 Thermoproteus tenax Kra 1
B1
48478095 Picrophilus torridus DSM 9790
16081433 Thermoplasma acidophilum DSM 1728
11498633 Archaeoglobus fulgidus DSM 4304
11499825 Archaeoglobus fulgidus DSM 4304
0.5

Figure S3. **Reactions of fatty acids biosynthesis in bacteria** (modified from the charts in KEGG and MetaCyc databases). The gene-based enzyme names in *Escherichia coli* and/or *Bacillus subtilis* are in red; the same names are used in the ***Table S2***. Abbreviations: ACP, acyl-carrier protein, CoA, coenzyme A.

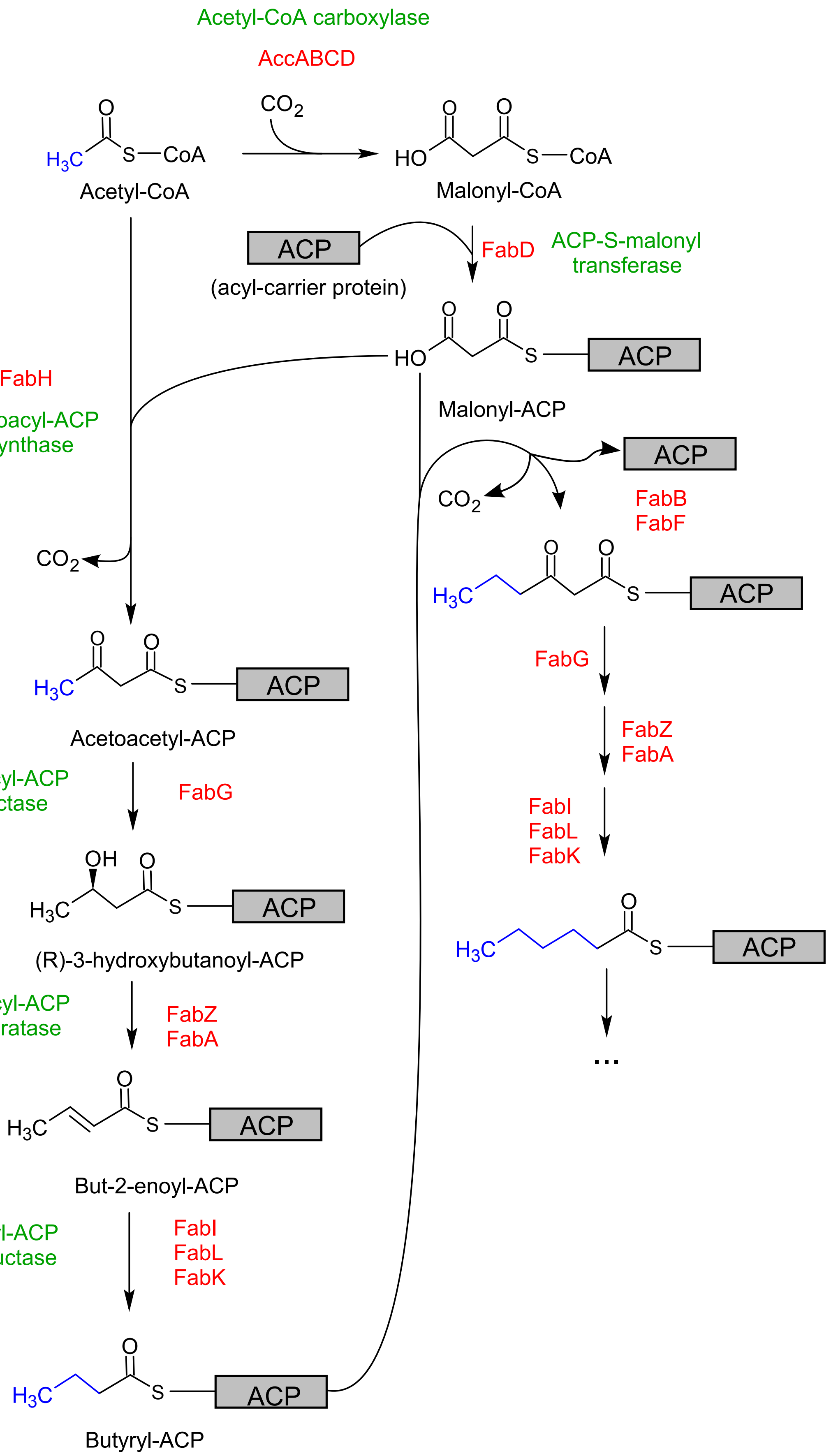

***Figure S4*. Phylogenetic tree of the 4-hydroxybutyryl-CoA dehydratase and its homologs (COG2368) from bacteria and archaea**.

The tree was constructed based on conserved blocks (total 227 positions) from 511 sequences. Each protein sequence on the tree is listed under its gene identifier (gi) in the NCBI's RefSeq database and the name of the source organism. The names of bacterial and archaeal proteins are colored as in Fig. S2.


Group 4
Group 1
Group 1
Clostridia
Group 1
Group 3
Group 2
0.2