

Supplementary File S4. Phylogenetic trees in Newick format

Enolase family

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TiIS/MesJ family

(((((296109679|Metha|Methanocaldococcus_infernus_ME:0.14183,(261402621|Metha|Methanocal
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cterium_paludis:0.17688)0.751:0.09160,(((15679197|Metha|Methanothermobacter_thermautotrophicus_str-Delta_H:0.11269,304315308|Metha|Methanothermobacter_marburgensis_str-Marburg:0.17244)1.000:0.32176,(509155614|Metha|Methanobrevibacter_sp-AbM4:0.14392,(148643088|Metha|Methanobrevibacter_smithii_ATCC_35061:0.18391,288561212|Metha|Methanobrevibacter_ruminantium_M1:0.13258)0.937:0.06995)0.994:0.17746)0.741:0.06858,312137453|Metha|Methanothermobacter_fervidus_DSM_2088:0.58553)0.901:0.07864)0.113:0.03316,84489110|Metha|Methanosphaera_stadtmanae_DSM_3091:0.71338)0.289:0.07507)0.999:0.45495,((511059631|Therm|Candidatus_Methanomassiliicoccus_intestinalis:0.37323,(474934290|Therm|Thermoplasma_ales_archaeon_BRNA1:0.13985,478483048|uncla|Candidatus_Methanomethylophilus_alvus_Mx1201:0.07359)1.000:0.36467)0.991:0.18021,((289596819|uncla|Aciduliprofundum_boonei_T469:0.12091,432329346|uncla|Aciduliprofundum_sp-MAR08-339:0.07315)1.000:0.40537,((13541276|Therm|Thermoplasma_volcanium_GSS1:0.14621,16082141|Therm|Thermoplasma_acidophilum_DSM_1728:0.18111)0.999:0.20861,(48477224|Therm|Picropilus_torridus_DSM_9790:0.29353,518651809|Therm|Ferroplasma_acidarmanus_fer1:0.16158)0.987:0.13643)0.999:0.27834)0.907:0.08328)0.996:0.17387)0.102:0.03785,(((119719832|Therm|Thermofilum_pendens_Hrk_5:0.15565,530780780|Therm|Thermofilum_sp-1910b:0.13548)1.000:0.68710,((389861274|Therm|Thermogladius_cellulolyticus_1633:0.22268,((126464914|Therm|Staphylothermus_marinus_F1:0.04215,297526784|Therm|Staphylothermus_hellenicus_DSM_12710:0.01031)0.996:0.15315,(124027476|Therm|Hyperthermus_butylicus_DSM_5456:0.06485,347524311|Therm|Pyrolobus_fumariorum_1A:0.10741)1.000:0.22521)0.975:0.12432,(296242202|Therm|Thermosphaera_aggregans_DSM_11486:0.22313,(320100819|Therm|Desulfurococcus_mucosus_DSM_2162:0.11089,(218883803|Therm|Desulfurococcus_kamchatkensis_1221n:0.01239,390938185|Therm|Desulfurococcus_fermentans_DSM_16532:0.01332)0.999:0.13962)0.997:0.15708)0.918:0.09463)0.757:0.06362)0.995:0.27952,(490715585|uncla|Nanoarchaeote_Nst1:0.59721,41615304|Nanoeukaryote|Nanoarchaeum_equitans_Kin4-M:0.43047)0.999:0.38082)0.287:0.12972)0.902:0.13491,((315231685|Therm|Thermococcus_barophilus_MP:0.02903,((242399147|Therm|Thermococcus_sibiricus_MM_739:0.03873,530547516|Therm|Thermococcus_litoralis_DSM_5473:0.01821)0.997:0.06061,(((57641756|Therm|Thermococcus_kodakarensis_KOD1:0.02302,(240102078|Therm|Thermococcus_gammatolerans_EJ3:0.00748,223477482|Therm|Thermococcus_sp-AM4:0.00374)0.864:0.00766)0.857:0.00767,(390961162|Therm|Thermococcus_sp-CL1:0.01727,212224843|Therm|Thermococcus_onnurineus_NA1:0.03825)0.903:0.01375)0.549:0.01163,341582453|Therm|Thermococcus_sp-4557:0.03127)0.996:0.07811)0.758:0.02179)0.863:0.06241,(337284013|Therm|Pyrococcus_yayanosii_CH1:0.08731,(18978130|Therm|Pyrococcus_furiosus_DSM_3638:0.04819,(332157910|Therm|Pyrococcus_sp-NA2:0.00364,(14520709|Therm|Pyrococcus_abyssi_GE5:0.00761,14591444|Therm|Pyrococcus_horikoshii_OT3:0.01514)0.608:0.00396)0.849:0.01434)0.194:0.03122)0.840:0.03374)0.996:0.21000)0.990:0.15516)0.478:0.03295,((((336477052|Metha|Methanosalsum_zhilinae_DSM_4017:0.22738,((73670143|Metha|Methanosarcina_barkeri_str-Fusaro:0.03723,(20090822|Metha|Methanosarcina_acetivorans_C2A:0.01743,(21228898|Metha|Methanosarcina_mazei_Go1:0.0,452211286|Metha|Methanosarcina_mazei_Tuc01:0.0)0.03909)0.976:0.06578)1.000:0.14167,(294496034|Metha|Methanohalophilus_mahii_DSM_5219:0.20433,91772989|Metha|Methanococcoides_burtonii_DSM_6242:0.15823)0.922:0.08676)0.763:0.03018,((410669608|Metha|Methanolobus_psychrophilus_R15:0.14345,435851183|Metha|Methanomethylovorans_hollandica_D

SM_15978:0.19883)0.959:0.07442,298674631|Metha|Methanohalobium_evestigatum_Z-
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phila_PT:0.25860,386001198|Metha|Methanosaeta_harundinacea_6Ac:0.41075)0.999:0.24887)0.365:0
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la_paludicola_SANAE:0.09665,383320454|Metha|Methanocella_conradii_HZ254:0.12075)0.721:0.0655
9)1.000:0.30675,(307354722|Metha|Methanoplanus_petrolearius_DSM_11571:0.35132,(154151861|
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30180)0.895:0.16570,88603458|Metha|Methanospirillum_hungatei_JF-
1:0.94706)0.831:0.09356)0.998:0.27510)0.874:0.12130)0.973:0.10042,(288932186|Archa|Ferroglobus_
placidus_DSM_10642:0.23854,(((11499188|Archa|Archaeoglobus_fulgidus_DSM_4304:0.11653,284162
492|Archa|Archaeoglobus_profundus_DSM_5631:0.17842)0.757:0.05385,327401180|Archa|Archaeogl
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