Table S1 Presence/absence of DnaE2 in terrestrial vs. aquatic environment.

Bacteria	Phylum	Habitat	DnaE2	Gene#	HGT#	HGT%	Environmental Metadata from GOLD
Chitinophaga_pinensis_DSM_2588	Bacteroidetes		+	7396	2534	34.26	Pine litter in Australia
Dyadobacter_fermentans_DSM_18053	Bacteroidetes		+	5854	1558	26.61	Host, Soil
Niastella_koreensis_GR20-10	Bacteroidetes		+	7444	2494	33.5	Soil cultivated with Korean ginseng; Yeongju region of Korea
Pedobacter_heparinus_DSM_2366	Bacteroidetes		+	4339	652	15.03	Soil
Aequorivita_sublithincola_DSM_14238	Bacteroidetes		−	3242	2515	77.58	Sea water from Vestfold Hills Antarctica
Donghaeana_dokdonensis_DSW-6	Bacteroidetes		−				Sea water sampled in Dokdo
Echinicola_vietnamensis_DSM_17526	Bacteroidetes		−	4684	897	19.15	Seawater collected in a musselfarm; Vietnam, South China Sea, Nha Trang Bay
Owenweeksia_hongkongensis_DSM_17368	Bacteroidetes		−				Sea water (sand filtered); China, Hong Kong
Psychroflexus_torquis_ATCC_700755	Bacteroidetes		−				Prydz Bay, Antarctica from a sea-ice algal assemblage
Rhodothermus_marinus_DSM_4252	Bacteroidetes		−	2965	169	5.7	Marine, Hot spring, Aquatic
Deinococcus_deserti_VCD115	Deinococcus-Thermus		+	3511	911	25.95	Sahara Desert in Morocco and Tunisia
Deinococcus_ficus	Deinococcus-Thermus		+				Rhizosphere of Ficus religiosa
Deinococcus_peraridilitoris_DSM_19664	Deinococcus-Thermus		+	4466	2703	60.52	Arid soil collected from a coastal desert north of Antofagasta in Chile
Deinococcus_geothermalis_DSM_11300	Deinococcus-Thermus		−	3148	1524	48.41	Hot spring at Agnano in Naples Italy
Marinithermus_hydrothermalis_DSM_14884	Deinococcus-Thermus		−	2310	278	12.03	Deep-sea hydrothermal vent chimney sample collected from the Suiyo Seamount
Oceanithermus_profundus_DSM_14977	Deinococcus-Thermus		−	2445	387	15.83	Deep-sea hot vent; 13N, East Pacific Rise
Thermus_thermophilus_HB8	Deinococcus-Thermus		−	2302	35	1.52	Thermal vent in Japan
Truepera_radiovictrix_DSM_17093	Deinococcus-Thermus		−	3046	1845	60.57	Water sample from a hot spring runoffs on the Island of Sao Miguel in the Azores, Portugal
Acidiphilium_cryptum_JF-5	Proteobacteria-Alpha		+	3701	269	7.27	Coal mine lake sediment
Bradyrhizobium_sp._S23321	Proteobacteria-Alpha		+				Paddy field soil at the experimental farm of Tohoku University
Brucella_microti_CCM_4915	Proteobacteria-Alpha		+	3346	2	0.06	Host, Soil
Hirschia_baltica_ATCC_49814	Proteobacteria-Alpha		+	3266	1166	35.7	Brackish water
Jannaschia_sp._CCS1	Proteobacteria-Alpha		+	4339	556	12.81	isolated from Pacific coastal seawater, Bodega Head, CA
Maricaulis_maris_MCS10	Proteobacteria-Alpha		+	3138	821	26.16	Puget Sound in Washington
Mesorhizobium_ciceri_WSM1271	Proteobacteria-Alpha		+	6531	39	0.6	Root nodules of the pasture legume Biserrula pelecinus growing in the Mediterranean basin
Novosphingobium_aromaticivorans_DSM_12444	Proteobacteria-Alpha		+	4038	651	16.12	Fresh water, Host, Soil, Aquatic
Parvibaculum_lavamentivorans_DS-1	Proteobacteria-Alpha		+	3714	1593	42.89	Sludge, Host
Rhizobium_etli_CFN_42	Proteobacteria-Alpha		+	6109	126	2.06	Host, Plant root, Root nodule

Rhizobium_leguminosarum_WSM1325	Proteobacteria-Alpha		+	7292	132	1.81	Host, Plant root, Root nodule, Soil
Rhodobacter_sphaeroides_KD131	Proteobacteria-Alpha		+	4635	191	4.12	Sea mud off the coast of DaeBu Island, South Korea
Rhodopseudomonas_palustris_HaA2	Proteobacteria-Alpha		+	4788	206	4.3	Fresh water, Soil, Aquatic
Sphingobium_sp._SYK-6	Proteobacteria-Alpha		+				Soil
Sphingomonas_wittichii_RW1	Proteobacteria-Alpha		+	5463	1877	34.36	Elbe River, downstream Hamburg harbour
Starkeya_novella_DSM_506	Proteobacteria-Alpha		+	4563	649	14.22	Soil
alpha_proteobacterium_HIMB5	Proteobacteria-Alpha		–				Seawater of Kaneohe Bay, Oahu, Hawaii
Candidatus_Endolissoclinum_patella_L2	Proteobacteria-Alpha		–				Coral reef, Host, Marine
Candidatus_Pelagibacter_sp._IMCC9063	Proteobacteria-Alpha		–				Seawater sample collected off the coastal region near the Dasan Korean Arctic Station
Candidatus_Pelagibacter_ubique_HTCC1062	Proteobacteria-Alpha		–	1394	39	2.8	Aquatic, Marine
Magnetococcus_sp._MC-1	Proteobacteria-Alpha		–	3823	505	13.21	Water from the Pettaquamscutt Estuary in Rhode Island
Parvularcula_bermudensis_HTCC_2503	Proteobacteria-Alpha		–	2733	369	13.5	Seawater collected from the Bermuda Atlantic Time Series station in the Sargasso Sea
Rhodospirillum_rubrum_ATCC_11170	Proteobacteria-Alpha		–	3933	1633	41.52	Fresh water
Alicycliphilus_denitrificans_K601	Proteobacteria-Beta		+	4898	148	3.02	Anaerobic sewage sludge
Aromatoleum_aromaticum_EbN1	Proteobacteria-Beta		+	4686	1652	35.25	Isolated from sediment contaminated with ethylbenzene
Burkholderia_cenocepacia_MC0-3	Proteobacteria-Beta		+	7169	62	0.86	Soil associated with maize roots
Collimonas_fungivorans_Ter331	Proteobacteria-Beta		+	4493	569	12.66	Soil
Comamonas_testosteroni_CNB-1	Proteobacteria-Beta		+				activated sludge from a chemical plant
Cupriavidus_necator_N-1	Proteobacteria-Beta		+	7915	365	4.61	Soil, University Park, PA
Cupriavidus_taiwanensis_LMG_19424	Proteobacteria-Beta		+				Root nodule of the legume Mimosa pudica in Ping-Tung Taiwan, China
Delftia_sp._Cs1-4	Proteobacteria-Beta		+	6028	225	3.73	PAH contaminated soils in Wisconsin
Herbaspirillum_seropedicae_SmR1	Proteobacteria-Beta		+	4799	737	15.36	Roots of rice plants
Leptothrix_cholodnii_SP-6	Proteobacteria-Beta		+	4420	638	14.43	Fresh water, Soil, Aquatic
Methylibium_petroleiphilum_PM1	Proteobacteria-Beta		+	4601	754	16.39	Fresh water, Fresh water, Sludge, Host, Aquatic
Pusillimonas_sp._T7-7	Proteobacteria-Beta		+	3826	584	15.26	benthal mud of petroleum-contaminated site in Bohai Sea, China
Ralstonia_pickettii_12D	Proteobacteria-Beta		+	5518	284	5.15	Copper-contaminated sediment from a lake in Michigan
Ramlibacter_tataouinensis_TTB310	Proteobacteria-Beta		+	3926	468	11.92	Sand particles buried in a sandy soil of a semi-arid region of South Tunisia
Rhodoferax_ferrireducens_T118	Proteobacteria-Beta		+	4561	917	20.11	Aquifer sediment collected at a depth of 18 feet
Thiomonas_arsenitoxydans_3As	Proteobacteria-Beta		+				acid mine drainage
Variovorax_paradoxus_S110	Proteobacteria-Beta		+	6450	587	9.1	Soil

Chromobacterium_violaceum_ATCC_12472	Proteobacteria-Beta		−	4550	1921	42.22	Freshwater
Methylobacillus_flagellatus_KT	Proteobacteria-Beta		−	2824	681	24.11	Sludge, Host, Wastewater
Methylotenera_mobilis_JLW8	Proteobacteria-Beta		−	2400	383	15.96	Fresh water, Aquatic, Sediment
Methylotenera_versatilis_301	Proteobacteria-Beta		−	2858	678	23.72	Fresh water, Aquatic, Sediment
Nitrosomonas_eutropha_C91	Proteobacteria-Beta		−	2695	545	20.22	Fresh water, Host
Nitrosomonas_sp._Is79A3	Proteobacteria-Beta		−	3597	28	0.78	Aquatic, Fresh water
Polynucleobacter_necessarius_STIR1	Proteobacteria-Beta		−	1782	1	0.06	Endosymbiont, Fresh water, Fresh water, Host
Sideroxydans_lithotrophicus_ES-1	Proteobacteria-Beta		−	3049	1324	43.42	Fresh water
Anaeromyxobacter_sp._Fw109-5	Proteobacteria-Delta		+	4549	727	15.98	Subsurface sediments (ca 15 m) at the ERSP-FRC, Oak Ridge, TN.
Bdellovibrio_bacteriovorus_HD100	Proteobacteria-Delta		+	3636	2635	72.47	Soil
Corallococcus_coralloides_DSM_2259	Proteobacteria-Delta		+				Soil
Haliangium_ochraceum_DSM_14365	Proteobacteria-Delta		+	6952	2760	39.7	Coastal sands from Miura Peninsula, Japan
Myxococcus_xanthus_DK_1622	Proteobacteria-Delta		+	7454	609	8.17	Terrestrial, Soil
Sorangium_cellulosum_So_ce_56	Proteobacteria-Delta		+	9700	3621	37.33	Soil, Terrestrial
Stigmatella_aurantiaca_DW4_/3-1	Proteobacteria-Delta		+	8407	155	1.84	Commonly isolated from wood and bark
Bacteriovorax_marinus_SJ	Proteobacteria-Delta		−	3291	1928	58.58	Water sample from Saint John's Island in the Caribbean
Desulfohalobium_retbaense_DSM_5692	Proteobacteria-Delta		−	2612	664	25.42	Retba Lake in Senegal Africa
Desulfotalea_psychrophila_LSv54	Proteobacteria-Delta		−	3332	1437	43.13	Marine sediments off of the coast of Svalbard
Hippea_maritima_DSM_10411	Proteobacteria-Delta		−	1780	1034	58.09	Papua New Guinea, Matupi Harbour
Alcanivorax_dieselolei_B5	Proteobacteria-Gamma		+	4470	1580	35.35	Oil-contaminated sea water
Ferrimonas_balearica_DSM_9799	Proteobacteria-Gamma		+	3947	829	21	Surface sediment in harbor of Palma de Mallorca, Spain
Marinobacter_aquaeolei_VT8	Proteobacteria-Gamma		+	4342	601	13.84	Offshore oil platform
Pseudomonas_aeruginosa_LESB58	Proteobacteria-Gamma		+	6026	162	2.69	Fresh water, Host, Soil
Pseudomonas_putida_GB-1	Proteobacteria-Gamma		+	5515	238	4.32	Fresh water, Host, Soil, Aquatic
Shewanella_loihica_PV-4	Proteobacteria-Gamma		+	4010	225	5.61	Iron-rich mat; hydrothermal vent; on the south rift of Loihi, Hawaii
Shewanella_piezotolerans	Proteobacteria-Gamma		+	5047	420	8.32	Sediment; under 1,914 m of water depth collected in the west Pacific Ocean
Simiduia_agarivorans_SA1	Proteobacteria-Gamma		+	3836	251	6.54	Seawater of coastal region of Keelung, Taiwan
Thioflavicoccus_mobilis_8321	Proteobacteria-Gamma		+	3786	660	17.43	Flat, laminated microbial mat in a salt marsh near Woods Hole, Massachusetts, USA
Alcanivorax_borkumensis_SK2	Proteobacteria-Gamma		−	2817	265	9.41	Seawater sediment sample in the Isle of Borkum, North Sea
Candidatus_Ruthia_magnifica_Cm	Proteobacteria-Gamma		−	1118	43	3.85	Host, Hydrothermal vent, Marine

Halomonas_elongata_DSM_2581	Proteobacteria-Gamma	■	−	3556	743	20.89	Fresh water
Kangiella_koreensis_DSM_16069	Proteobacteria-Gamma	■■	−	2694	1833	68.04	Sea water of tidal flat sediment in the Daepo Beach, of the Yellow Sea in South Korea
Marinomonas_posidonica_IVIA-Po-181	Proteobacteria-Gamma	■	−	3651	351	9.61	Marine
Pseudoalteromonas_haloplanktis_TAC125	Proteobacteria-Gamma	■	−	3634	263	7.24	Coastal sea water near a French Antarctic station, Adelia Land
Psychromonas_ingrahamii_37	Proteobacteria-Gamma	■	−	3877	1194	30.8	Arctic polar sea ice; USA, Alaska, Point Barrow, Elson Lagoon
Serratia_sp._WW4	Proteobacteria-Gamma	■	−				Waste water of paper machine
Shewanella_baltica_BA175	Proteobacteria-Gamma	■	−				Seawater from the Gotland Deep, Baltic Sea
Shewanella_denitrificans_OS217	Proteobacteria-Gamma	■	−	3914	446	11.39	Gotland Deep an anoxic basin in the central Baltic Sea in 1986 from a depth of 120-130m
Shewanella_halifaxensis_HAW-EB4	Proteobacteria-Gamma	■■	−	4462	203	4.55	Marine, Sediment
Shewanella_sediminis_HAW-EB3	Proteobacteria-Gamma	■■	−	4666	346	7.42	Marine, Sediment

Note:

■ aquatic environment; ■ terrestrial environment; ■■ bacteria can live in both aquatic and terrestrial environments or boundary zones like marine sediment and ditch mud; + presence of DnaE2; − absence of DnaE2; the environmental metadata and HGT% are collected from Genomes Online Database (GOLD; http://www.genomesonline.org/). It is indicated in this table that presence of DnaE2 is associated with terrestrial environment whereas absence of DnaE2 is correlated with aquatic environment except for 7 bacteria (in grey background) and these correlations are independent of taxonomy.