Supporting Information

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Crenarchaeota		
Thermoprotei		
Desulfurococcales		
Desulfurococcaceae Aeropyrum	gDNA -1 in tRNAHis	thg1
Aeropyrum pernix Kl	G G	-
Desulfurococcus	_	
Desulfurococcus kamchatkensis 1221n	G	-
Ignicoccus		
Ignicoccus hospitalis KIN4/I	G	degraded thg1
Staphylothermus	G	
Staphylothermus marinus Fl Pyrodictiaceae	G	-
Hyperthermus		
Hyperthermus butylicus DSM 5456	G	+
Sulfolobales		
Sulfolobaceae		
Metallosphaera	-	
Metallosphaera sedula DSM 5348 Sulfolobus	G	-
Sulfolobus acidocaldarius DSM 639	G	_
Sulfolobus islandicus L.S.2.15	G	-
Sulfolobus islandicus M.14.25	G	-
Sulfolobus islandicus M.16.27	G	-
Sulfolobus islandicus M.16.4	G	-
Sulfolobus islandicus Y.G.57.14	G	-
Sulfolobus islandicus Y.N.15.51	G	-
Sulfolobus solfataricus P2 Sulfolobus tokodaii 7	G	-
Thermoproteales	G	-
Thermofilaceae		
Thermofilum		
Thermofilum pendens Hrk 5	G	-
Thermoproteaceae		
Caldivirga		
Caldivirga maquilingensis IC-167	G	-
Pyrobaculum	А	+
Pyrobaculum aerophilum IM2 Pyrobaculum arsenaticum DSM 13514	A	+
Pyrobaculum calidifontis JCM 11548	G	+
Pyrobaculum islandicum DSM 4184	A	+
Thermoproteus		
Thermoproteus neutrophilus V24Sta	А	+
Euryarchaeota		
Archaeoglobi		
Archaeoglobales		
Archaeoglobaceae		
Archaeoglobus Archaeoglobus fulgidus DSM 4304	G	_
Candidatus Methanosphaerula	0	
unclassified		
unclassified		
Candidatus		
Candidatus Methanosphaerula palustris E1-9c	т	+
Halobacteria		
Halobacteriales Haloarculaceae		
Haloarcula		
Haloarcula marismortui ATCC 43049	G	-
Halobacteriaceae		
Halobacterium		
Halobacterium salinarum Rl	G	-
Halobacterium sp. NRC-1	G	-
Halogeometricum	G	-
Halogeometricum borinquense PR3, DSM 11551 Halomicrobium	G	-
Halomicrobium mukohataei arg-2, DSM 12286	G	-
Halorhabdus		
Halorhabdus utahensis AX-2, DSM 12940	G	-
Natronomonas		
Natronomonas pharaonis DSM 2160	G	-
Halogeometricaceae		
Haloquadratum	G	
Haloquadratum walsbyi DSM 16790 Halorubraceae	9	-
Halorubrum		
Halorubrum lacusprofundi ATCC 49239	G	-
unclassified		
Natrialba		
Natrialba magadii ATCC 43099	G	-
Methanobacteria Methanobacteriales		
Methanobacteriales Methanobacteriaceae		
Methanobacteriaceae Methanobrevibacter		
Methanobrevibacter smithii ATCC 35061	т	+
Methanobrevibacter smithii DSM 2375	т	+
Methanobrevibacter smithii F1, DSM 2374	т	+
Methanosphaera		
Methanosphaera stadtmanae DSM 3091	т	+
Methanothermobacter Methanothermobacter thermautotrophicus Delta 1	н т	+
	- ·	

Fig. S1. Archaeal taxonomy, according to the Integrated Microbial Genomes database, is shown with the identity of the genome encoded -1 residue for tRNA^{His} genes and the presence (+) or absence (-) of a *thg1* homolog.

Methanocaldococcus jannaschii DSM 2661 Methanococcus Methanococcus Methanococcus aeolicus Nankai-3 Methanococcus maripaludis C5 Methanococcus maripaludis C6 Methanococcus maripaludis S2 Methanoccus maripaludis S2 Methanoccus vannielii SB Methanoccella SB Methanocellaes Methanocellaes Methanocella sp. RC-I Methanomicrobiales Methanocorpusculum Methanocorpusculum Methanocorpusculum labreanum Z Methanoculaceae	gDNA -1 in tRNAHis G G G G G G G G G G T	thg1 - - - - - - -
Methanocaldococcus Methanocaldococcus jannaschii DSM 2661 Methanococcaeae Methanococcus aeolicus Nankai-3 Methanococcus maripaludis C5 Methanococcus maripaludis C7 Methanococcus maripaludis S2 Methanococcus vanielii S5 Methanococlus valiae A3 Methanocellales Methanocellales Methanocella sp. RC-I Methanocorpusculum Methanocorpusculum Methanocorpusculum Methanocorpusculum labreanum Z Methanocorpusculum labreanum Z	in tRNAHis G G G G G G G G G G G	-
Methanocaldococcus jannaschii DSM 2661 Methanococcus Methanococcus Methanococcus aeolicus Nankai-3 Methanococcus maripaludis C5 Methanococcus maripaludis C6 Methanococcus maripaludis S2 Methanoccus maripaludis S2 Methanoccus vannielii SB Methanoccella SB Methanocellaes Methanocellaes Methanocella sp. RC-I Methanomicrobiales Methanocorpusculum Methanocorpusculum Methanocorpusculum labreanum Z Methanoculaceae	G G G G G G G	-
Methanococcaceae Methanococcus aeolicus Nankai-3 Methanococcus maripaludis C5 Methanococcus maripaludis C6 Methanococcus maripaludis C7 Methanococcus maripaludis S2 Methanococcus vannielii S8 Methanocoli S8 Methanocellaes Methanocellaes Methanocella sp. RC-I Methanocorpusculaes Methanocorpusculaes Methanocorpusculam Methanocorpusculum Labreanum Z Methanocorpusculum Labreanum Z	G G G G G G G	-
Methanococcus Methanococcus aeolicus Nankai-3 Methanococcus maripaludis C5 Methanococcus maripaludis C6 Methanococcus maripaludis C7 Methanococcus vanielii S8 Methanococlus vanielii S8 Methanocellaes Methanocellaes Methanocellaes Methanocella sp. RC-I Methanomicrobiales Methanocorpusculum Methanocorpusculum Methanocorpusculum labreanum Z Methanocorpusculum labreanum Z	6 6 6 6 6 6	-
Methanococcus aeolicus Nankai-3 Methanococcus maripaludis C5 Methanococcus maripaludis C6 Methanococcus maripaludis C7 Methanococcus maripaludis S2 Methanococcus vannielii SB Methanocella Methanocellacea Methanocellacea Methanocella sp. RC-I Methanocorpuscularea Methanocorpuscularea Methanocorpuscularea Methanocorpuscularea Methanocorpuscularea Methanocorpuscularea Methanocorpuscularea	6 6 6 6 6 6	-
Methanococcus maripaludis C5 Methanococcus maripaludis C6 Methanococcus maripaludis C7 Methanococcus vanielii S2 Methanococcus vanielii S8 Methanococlus vanielii S8 Methanocellaes Methanocellaes Methanocella sp. RC-I Methanomicrobiales Methanocorpusculus Methanocorpusculum Iabreanum Z Methanocorpusculum Iabreanum Z	6 6 6 6 6 6	-
Methanococcus maripaludis C6 Methanococcus maripaludis C7 Methanococcus maripaludis S2 Methanococcus vannielii SB Methanocellales Methanocellales Methanocellaceae Methanocella sp. RC-I Methanocmiscubiales Methanocorpusculum Methanocorpusculum Methanocorpusculum labreanum Z Methanoculaceae	G G G G	-
Methanococcus maripaludis C7 Methanococcus maripaludis S2 Methanococcus vannielii SB Methanococcus voltae A3 Methanocellales Methanocellaeae Methanocella sp. RC-I Methanomicrobiales Methanocorpusculuma Methanocorpusculum Methanocorpusculum labreanum Z Methanocorpusculum labreanum Z	G G G	-
Methanococcus maripaludis 52 Methanococcus vanielii 5B Methanococcus voltae A3 Methanocellales Methanocellaceae Methanocella sp. RC-I Methanomicrobiales Methanocorpusculuma Methanocorpusculum Z Methanocorpusculum labreanum Z Methanocolpusculum labreanum Z	G G G	-
Methanococcus vannielii SB Methanococcus voltae A3 Methanocellales Methanocellaceae Methanocella sp. RC-I Methanocorpusculares Methanocorpusculares Methanocorpusculum Methanocorpusculum labreanum Z Methanocellaceae	G G	1
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Methanomicrobia Methanocellales Methanocella Methanocella sp. RC-I Methanocorpusculares Methanocorpusculares Methanocorpusculum Methanocorpusculum labreanum Z Methanoculum	_	-
Methanocellales Methanocella Methanocella Methanocorla sp. RC-I Methanocorpusculaceae Methanocorpusculum <i>Methanocorpusculum labreanum</i> Z Methanocullaceae	т	
Methanocellaceae Methanocella sp. RC-I Methanomicrobiales Methanocorpusculaceae Methanocorpusculum Methanocorpusculum labreanum Z Methanocullaceae	т	
Methanocella Methanocella sp. RC-I Methanomicrobiales Methanocorpusculaceae Methanocorpusculum Methanocorpusculum labreanum Z Methanocullaceae	т	
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Methanomicrobiales Methanocorpusculaceae Methanocorpusculum <i>Methanocorpusculum labreanum</i> Z Methanoculaceae	т	
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Methanocorpusculum Methanocorpusculum labreanum Z Methanocullaceae		
Methanocorpusculum labreanum Z Methanocullaceae		
Methanocullaceae	G	+
	G	+
Methanoculleus	_	
Methanoculleus marisnigri JR1	т	+
Methanoregulaceae		
Candidatus Methanoregula		
Candidatus Methanoregula boonei 6A8	т	+
Methanospirillaceae		
Methanospirillum		
Methanospirillum hungatei JF-1	т	+
Methanosarcinales		
Methanosaetaceae		
Methanosaeta		
Methanosaeta thermophila PT	С	+
Methanosarcinaceae		
Methanococcoides		
Methanococcoides burtonii DSM 6242	т	+
Methanosarcina		
Methanosarcina acetivorans C2A	G	+ thg1 (UAG at codon 142
Methanosarcina barkeri fusaro	G	+
Methanosarcina mazei Gol	G	+
Methanopyri		
Methanopyrales		
Methanopyraceae		
Methanopyrus		
Methanopyrus kandleri AV19	С	+
Thermococci	c	
Thermococcales		
Thermococcaceae		
Pyrococcus		
Pyrococcus abyssi GE5	G	
Pyrococcus furiosus DSM 3638	G	
Pyrococcus horikoshii OT3	G	-
	G	-
Thermococcus		
Thermococcus kodakaraensis KOD1	G	-
Thermococcus onnurineus NA1	G	-
Thermoplasmata		
Thermoplasmatales		
Ferroplasmaceae		
Ferroplasma		
Ferroplasma acidarmanus Ferl	G	-
Picrophilaceae		
Picrophilus		
Picrophilus torridus DSM 9790	G	-
Thermoplasmataceae		
Thermoplasma		
Thermoplasma acidophilum DSM 1728	G	-
Thermoplasma volcanium GSS1	G	-
rarchaeota		
Korarchaea		
Korarchaeales		
Korarchaeaceae		
Candidatus Korarchaeum		
	А	+
Candidatus Korarchaeum cryptofilum OPF8		
Candidatus <i>Korarchaeum cryptofilum</i> OPF8 noarchaeota		
Candidatus Korarchaeum cryptofilum OPF8 noarchaeota Nanoarchaea		
Candidatus Korarchaeum cryptofilum OPF8 noarchaeota Nanoarchaea Nanoarchales		
Candidatus Korarchaeum cryptofilum OPF8 Nanoarchaea Nanoarchales Nanoarchaceae		
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Candidatus Korarchaeum cryptofilum OPF8 Nanoarchaea Nanoarchales Nanoarchaceae Nanoarchaeum Nanoarchaeum Nanoarchaeum equitans Kin4-M aumarchaeota	G	-
Candidatus Korarchaeum cryptofilum OPF8 Nanoarchaea Nanoarchales Nanoarchaceae Nanoarchaeum Nanoarchaeum Nanoarchaeum Cenarchaeota	G	-
Candidatus Korarchaeum cryptofilum OPF8 Nanoarchaeaa Nanoarchaes Nanoarchaceae Nanoarchaeum <i>Nanoarchaeum equitans</i> Kin4-M aumarchaeota Cenarchaeales	G	-
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Candidatus Korarchaeum cryptofilum OPF8 Nanoarchaea Nanoarchales Nanoarchaeea Nanoarchaeum Nanoarchaeum Cenarchaeata Cenarchaeaea Cenarchaeaceae	G	-
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Candidatus Korarchaeum cryptofilum OPF8 Nanoarchaeas Nanoarchales Nanoarchaceae Nanoarchaceae Nanoarchaeum Nanoarchaeum equitans Kin4-M aumarchaeota Cenarchaeales Cenarchaeaceae Cenarchaeaceae Cenarchaeaum Cenarchaeaum Cenarchaeaum Nitrosopumilus	G	-

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