

TABLE S3**Archaeal strains used in this study**

	King	Group	Size (Mb)	GC content (%)
<i>Aeropyrum pernix</i> K1	A	Crenarchaeota	1.7	56.3
<i>Archaeoglobus fulgidus</i> DSM 4304	A	Euryarchaeota	2.2	48.6
<i>Archaeoglobus profundus</i> DSM 5631	A	Euryarchaeota	1.6	42.0
<i>Caldivirga maquilingensis</i> IC-167	A	Crenarchaeota	2.1	43.1
<i>Candidatus Korarchaeum cryptofilum</i> OPF8	A	Other Archaea	1.6	49.0
<i>Candidatus Methanoregula boonei</i> 6A8	A	Euryarchaeota	2.5	54.5
<i>Desulfurococcus kamchatkensis</i> 1221n	A	Crenarchaeota	1.4	45.3
<i>Halobacterium salinarum</i> R1	A	Euryarchaeota	2.0	68.0
<i>Halobacterium</i> sp. NRC-1	A	Euryarchaeota	2.0	67.9
<i>Halomicrobium mukohataei</i> DSM 12286	A	Euryarchaeota	3.1	65.6
<i>Haloquadratum walsbyi</i> DSM 16790	A	Euryarchaeota	3.1	47.9
<i>Halorhabdus utahensis</i> DSM 12940	A	Euryarchaeota	3.1	62.9
<i>Haloterrigena turkmenica</i> DSM 5511	A	Euryarchaeota	3.9	65.8
<i>Hyperthermus butylicus</i> DSM 5456	A	Crenarchaeota	1.7	53.7
<i>Ignicoccus hospitalis</i> KIN4/I	A	Crenarchaeota	1.3	56.5
<i>Metallosphaera sedula</i> DSM 5348	A	Crenarchaeota	2.2	46.2
<i>Methanobrevibacter smithii</i> ATCC 35061	A	Euryarchaeota	1.9	31.0
<i>Methanocaldococcus fervens</i> AG86	A	Euryarchaeota	1.5	32.2
<i>Methanocaldococcus jannaschii</i> DSM 2661	A	Euryarchaeota	1.7	31.4
<i>Methanocaldococcus vulcanius</i> M7	A	Euryarchaeota	1.7	31.5
<i>Methanocella paludicola</i> SANAE	A	Euryarchaeota	3.0	54.9
<i>Methanococcoides burtonii</i> DSM 6242	A	Euryarchaeota	2.6	40.8
<i>Methanococcus aeolicus</i> Nankai-3	A	Euryarchaeota	1.6	30.0
<i>Methanococcus maripaludis</i> C5	A	Euryarchaeota	1.8	33.0
<i>Methanococcus maripaludis</i> C6	A	Euryarchaeota	1.7	33.4
<i>Methanococcus maripaludis</i> C7	A	Euryarchaeota	1.8	33.3
<i>Methanococcus maripaludis</i> S2	A	Euryarchaeota	1.7	33.1
<i>Methanococcus vannielii</i> SB	A	Euryarchaeota	1.7	31.3
<i>Methanocorpusculum labreanum</i> Z	A	Euryarchaeota	1.8	50.0
<i>Methanoculleus marisnigri</i> JR1	A	Euryarchaeota	2.5	62.1
<i>Methanopyrus kandleri</i> AV19	A	Euryarchaeota	1.7	61.2
<i>Methanosacta thermophila</i> PT	A	Euryarchaeota	1.9	53.5
<i>Methanosarcina acetivorans</i> C2A	A	Euryarchaeota	5.8	42.7
<i>Methanosarcina barkeri</i> str. Fusaro_1	A	Euryarchaeota	4.8	39.3
<i>Methanosarcina mazei</i> Go1	A	Euryarchaeota	4.1	41.5
<i>Methanosphaera stadtmanae</i> DSM 3091	A	Euryarchaeota	1.8	27.6
<i>Methanosphaerula palustris</i> E1-9c	A	Euryarchaeota	2.9	55.4
<i>Methanospirillum hungatei</i> JF-1	A	Euryarchaeota	3.5	45.1
<i>Nanoarchaeum equitans</i> Kin4-M	A	Nanoarchaeota	0.5	31.6

<i>Natronomonas pharaonis</i> DSM 2160	A	Euryarchaeota	2.6	63.4
<i>Nitrosopumilus maritimus</i> SCM1	A	Crenarchaeota	1.6	34.2
<i>Picrophilus torridus</i> DSM 9790	A	Euryarchaeota	1.5	36.0
<i>Pyrobaculum aerophilum</i> str. IM2	A	Crenarchaeota	2.2	51.4
<i>Pyrobaculum arsenaticum</i> DSM 13514	A	Crenarchaeota	2.1	55.1
<i>Pyrobaculum calidifontis</i> JCM 11548	A	Crenarchaeota	2.0	57.2
<i>Pyrobaculum islandicum</i> DSM 4184	A	Crenarchaeota	1.8	49.6
<i>Pyrococcus abyssi</i> GE5	A	Euryarchaeota	1.8	44.7
<i>Pyrococcus furiosus</i> DSM 3638	A	Euryarchaeota	1.9	40.8
<i>Pyrococcus horikoshii</i> OT3	A	Euryarchaeota	1.7	41.9
<i>Staphylothermus marinus</i> F1	A	Crenarchaeota	1.6	35.7
<i>Sulfolobus acidocaldarius</i> DSM 639	A	Crenarchaeota	2.2	36.7
<i>Sulfolobus islandicus</i> L.S.2.15	A	Crenarchaeota	2.7	35.1
<i>Sulfolobus islandicus</i> M.14.25	A	Crenarchaeota	2.6	35.1
<i>Sulfolobus islandicus</i> M.16.27	A	Crenarchaeota	2.7	35.0
<i>Sulfolobus islandicus</i> M.16.4	A	Crenarchaeota	2.6	35.0
<i>Sulfolobus islandicus</i> Y.G.57.14	A	Crenarchaeota	2.7	35.4
<i>Sulfolobus islandicus</i> Y.N.15.51	A	Crenarchaeota	2.8	35.3
<i>Sulfolobus solfataricus</i> P2	A	Crenarchaeota	3.0	35.8
<i>Sulfolobus tokodaii</i> str. 7	A	Crenarchaeota	2.7	32.8
<i>Thermococcus gammatolerans</i> EJ3	A	Euryarchaeota	2.0	53.6
<i>Thermococcus kodakarensis</i> KOD1	A	Euryarchaeota	2.1	52.0
<i>Thermococcus onnurineus</i> NA1	A	Euryarchaeota	1.8	51.3
<i>Thermococcus sibiricus</i> MM 739	A	Euryarchaeota	1.8	40.2
<i>Thermofilum pendens</i> Hrk 5	A	Crenarchaeota	1.8	57.7
<i>Thermoplasma acidophilum</i> DSM 1728	A	Euryarchaeota	1.6	46.0
<i>Thermoplasma volcanium</i> GSS1	A	Euryarchaeota	1.6	39.9
<i>Thermoproteus neutrophilus</i> V24Sta	A	Crenarchaeota	1.8	59.9
uncultured methanogenic archaeon RC-I	A	Euryarchaeota	3.2	54.6

These sequence data were downloaded from NCBI website (www.ncbi.nlm.nih.gov/sites/genome).