## SUPPLEMENTARY MATERIAL

FIGURE S1. Distribution of Fe-S cluster biogenesis genes in archaea. The phylogenetic tree was based upon 16S rRNA sequences. The tree was constructed with the ME algorithm in MEGA4. Bootstrap analysis was performed with 1,000 replicates, and values greater than 70 % are labeled on the nodes. The hyperthermophilic bacteria *Thermotoga* and *Aquifex* represent the outgroup. CSD, cysteine desulfurse; U-type, U-type scaffold proteins; A-type, A-type scaffold proteins; ApbC/Nbp35, a potential Fe-S cluster carrier protein. The recombinant CSD homolog from *Methanothermobacter thermautotrophicus* (MTH1389) was shown not to possess cysteine desulfurase activity (unpublished data).

		SepRS/ SepCysS	CysRS	CSD	SufB/D	SufC	U-type	A-type	Apb Nbp3
	92 Methanosarcina barkeri	+	+	+	+	+	+	+	+
	Methanosarcina acetivorans	+	+	+	+	+	+	+	+
	ivietnanosarcina mazei	+	+	+	+	+	+	+	+
9	Methanococcoldes burtonii	+	-	+	+	+	+	+	+
	Wictinanosacta thermophila	+	-	+	+	+	+	+	+
	Methanocella sp. RC-I	+	+	+	+	+	+	+	+
	100 Methanocella paludicola Candidatus Methanoregula boonei	+	+	+	+	+	+	T	+
	Methanospirillum hungatei	+	+	+	+	+	+	-	+
	0.6-41	+	-	+	+	+	+	_	+
97	Methanoculleus marisnigri	+	-	+	+	+	+		+
	Methanosphaerula palustris	+	+	+	-	+	+	-	+
	Halorubrum lacusprofundi	-	+	+	+	+	+	+	+
	Natronomonas pharaonis	-	+	+	+	+	+	+	+
	Haloarcula marismortui	-	+	+	+	+	+	+	+
	Haloquadratum walsbyi		+	+	+	+	+	+	+
	Haloterrigena turkmenica	( <del>=</del> .)	+	+	+	+	+	+	+
	100 Halobacterium sp. NRC-1	4	+	+	+	+	+	-	+
	Halobacterium salinarum	-	+	+	+	+	+	-	+
	Halomicrobium mukohataei	-	+	+	+	+	+	+	+
	84 Halorhabdus utahensis	-	+	+	+	+	+	-	+
	Methanothermobacter thermautotrophic	us +	-	+	+	+	-	-	4
	Methanosphaera stadtmanae	-	+	+	+	+	+	-	+
	99 Methanobrevibacter smithii	-	+	+	+	+	+	-	-
9	89 Methanobrevibacter ruminantium	-	+	+	+	+	+	-	+
	Picrophilus torridus	2	+	2	+	+	-	-	+
	Thermoplasma volcanium	<i>₹</i>	+	7	+	+	5 <del>7</del> 2		+
	100 Thermoplasma acidophilum		+	-	+	+	-	-	- 4
	74 Methanocaldococcus fervens	+	-	-	+	+	-	-	+
	100 Methanocaldococcus jannaschii	+	-	-	+	+	-	-	+
	Methanoocaldococcus vulcanius	+		-	+	+	-	-	+
		+	+	-	+	+	-	-	+
	Methanococcus vannielii	+	+	+	+	+	+	-	+
	Methanococcus maripaludis	+	+	-	+	+	-	-	+
	Archaeoglobus fulgidus	+	+	+	+	+	+	-	14
	Archaeoglobus profundus Thermococcus sibiricus	-	+	+	+	+	-	-	+
78	Thermococcus onnurineus	-	+	+	+	+	-	-	+
	99 Thermococcus kodakaraensis	-	+	+	+	+	-	-	+
100	Thermococcus gammatolerans		+	+	+	+	_	-	4
	Pyrococcus furiosus	-	+	+	+	+	-	-	-
	Pyrococcus horikoshii	-	+	-	+	+	-	-	-
	95 99 Pyrococcus abyssi	_	+	+	+	+	-	_	+
91	Methanopyrus kandleri	+	-	+	+	+	-	-	4
	100 Nitrosopumilus maritimus	-	+	+	+	+	+	+	+
	Cenarchaeum symbiosum A	_	+	+	+	+	+	+	-
	Candidatus Korarchaeum cryptofilum	-	+	+	+	+	+	-	+
	Pyrobaculum islandicum	-	+	-	+	+	-	-	+
	94 Pyrobaculum calidifontis	-	+		+	+	(*)	-	+
	100 Pyrobaculum arsenaticum	-	+	-	+	+	-	-	4
	100 Pyrobaculum aerophilum	-	+	-	+	+	-	-	+
	Thermoproteus neutrophilus	-	+	-	+	+		-	+
	Caldivirga maquilingensis	-	+	14	+	+	-	-	-
	Thermofilum pendens	-	+	+	+	+	-	-	+
	79 Aeropyrum pernix	-	+	+	+	+	-	-	-
100	Hyperthermus butylicus	-	+	-	+	+	-	-	-
	Ignicoccus hospitalis	2	+	-	+	+	-	2	14
/ /	Staphylothermus marinus	-	+	+	+	+	>	-	+
98	Desulfurococcus kamchatkensis	-	+	+	+	+	-	-	+
	Metallosphaera sedula	-	+	3-	+	+	-	-	+
	96 Sulfolobus acidocaldarius	-	+	-	+	+	-	-	4
	Sulfolobus tokodaii	-	+	-	+	+	-	-	+
	91 Sulfolobus solfataricus	-	+	-	+	+	-	-	+
	100 Sulfolobus islandicus	2	+	/2	+	+	-	2	+
	Nanoarchaeum equitans	-	+	-	+	+	17.	-	+
	Thermotoga maritima	-	+	+	+	+	+	-	+