

## **SUPPLEMENTAL DATA**

Title: Subunit D of RNA polymerase from *Methanosarcina acetivorans* contains two oxygen-labile [4Fe-4S] clusters: implications for oxidant-dependent regulation of transcription

Authors: Faith H. Lessner, Matthew E. Jennings, Akira Hirata, Eduardus C. Duin, and Daniel J. Lessner

TABLE S1

FIGURE S1

**TABLE S1.** Archaeal RNAP subunit D classification based on the number of cysteine residues comprising partial or complete [4Fe-S] cluster binding motifs in domain3.

Group 1: complete motif #1 and #2

Group 2: complete motif #1

Group 3: complete motif #2

Group 4: partial motif #1 and/or motif #2

Group 5: lack domain 3 cysteine residues

Group 6: domain 3 amino acids are missing (lack of domain 3)

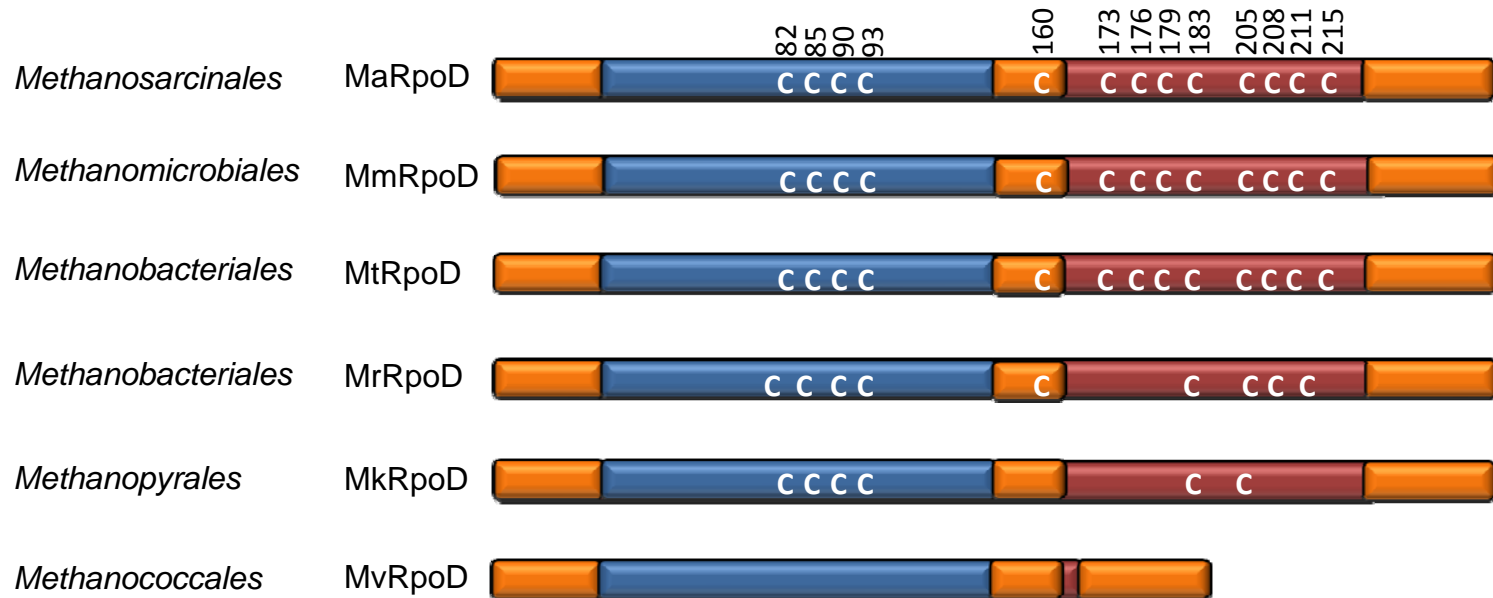
Phylum or Order	organism	<i>rpoD</i> gene ID	Cysteine residue content				[4Fe-4S] clusters	Subunit D Group
			Domain 2	Domain 1	Domain 3: Cluster #1	Domain 3: Cluster #2		
Desulfurococcales	Aeropyrum pernix K1	1446211	2	0	2	2	none	4
	Hyperthermus butylicus DSM 5456	4782414	2	0	2	2	none	4
	Pyrolobus fumarii 1A	11138404	2	0	2	2	none	4
	Desulfurococcus mucosus DSM 2162	10154080	2	0	4	4	#1, #2	1
	Desulfurococcus kamchatkensis 1221n	7171405	2	0	4	4	#1, #2	1
	Ignisphaera aggregans DSM 17230	9715509	4	0	4	4	#1, #2	1
	Staphylothermus hellenicus DSM 12710	9234945	2	0	4	4	#1, #2	1
	Staphylothermus marinus F1	4907289	2	0	4	4	#1, #2	1
	Thermosphaera aggregans DSM 11486	9166443	2	0	4	4	#1, #2	1
	Ignicoccus hospitalis KIN4/I	5562263	2	0	2	4	#2	3
Sulfolobales	Acidianus hospitalis W1	10600112	4	0	4	2	#1	2
	Metallosphaera cuprina Ar-4	10492339	4	0	4	2	#1	2
	Metallosphaera sedula DSM 5348	5104884	4	0	4	2	#1	2
	Sulfolobus acidocaldarius DSM 639	3473859	4	0	4	2	#1	2
	Sulfolobus islandicus L.S.2.15	7798192	4	0	4	2	#1	2
	Sulfolobus solfataricus	1455324	4	0	4	2	#1	2
	Sulfolobus tokodaii str. 7	1460132	4	0	4	2	#1	2
Thermoproteales	Caldivirga maquilingensis IC-167	5709429	2	0	3	3	none	4
	Pyrobaculum aerophilum str. IM2	1465165	2	0	3	3	none	4
	Pyrobaculum arsenaticum DSM 13514	5054812	2	0	3	3	none	4
	Pyrobaculum calidifontis JCM 11548	4910199	2	0	3	3	none	4
	Pyrobaculum islandicum DSM 4184	4616570	2	0	3	3	none	4
	Thermoproteus neutrophilus V24Sta	6164675	2	0	3	3	none	4
	Thermoproteus uzoniensis 768-20	10361352	2	0	3	3	none	4

	Vulcanisaeta distributa DSM 14429	9751000	2	0	3	3	none	4
	Vulcanisaeta moutnovskia 768-28	10288618	2	0	3	3	none	4
	Thermofilum pendens Hrk 5	4602090	0	0	0	4	#1	2
Archaeoglobales	Archaeoglobus fulgidus DSM 4304	1485514	4	1	4	4	#1,#2	1
	Archaeoglobus profundus DSM 5631	8739703	4	1	4	4	#1,#2	1
	Archaeoglobus veneficus SNP6	10393458	4	1	4	4	#1,#2	1
	Ferroglobus placidus DSM 10642	8778351	4	1	4	4	#1,#2	1
Halobacteriales	Haladaptatus paucihalophilus DX253		0	0	0	0	none	5
	Halalkalicoccus jeotgali B3	9419552	0	0	0	0	none	5
	Haloarcula hispanica ATCC 33960	11049700	0	0	0	0	none	5
	Haloarcula marismortui ATCC 43049	3129579	0	0	0	0	none	5
	Halobacterium salinarum R1	5954259	0	0	0	0	none	5
	Haloferax volcanii DS2	8926874	0	0	0	0	none	5
	Halogeometricum borinquense DSM 11551	9993073	0	0	0	0	none	5
	Halomicrobium mukohataei DSM 12286	8412139	0	0	0	0	none	5
	Haloquadratum walsbyi DSM 16790	4194635	0	0	0	0	none	5
	Halopiger xanaduensis SH-6	10799252	0	0	0	0	none	5
	Halorhabdus utahensis DSM 12940	8384824	0	0	0	0	none	5
	Halorubrum lacusprofundi ATCC 49239	7399695	0	0	0	0	none	5
	Haloterrigena turkmenica DSM 5511	8743163	0	0	0	0	none	5
	Natrialba magadii ATCC 43099	8823246	0	0	0	0	none	5
	Natronomonas pharaonis DSM 2160	3703154	0	0	0	0	none	5
Methanobacteriales	Methanobacterium sp. AL-21	10277257	4	1	4	4	#1,#2	1
	Methanobrevibacter ruminantium M1	8770560	3	1	4	0	#1	2
	Methanobrevibacter smithii ATCC 35061	5217217	0	1	4	1	#1	2
	Methanosphaera stadtmanae DSM 3091	3854742	4	1	4	0	#1	2
	Methanothermobacter marburgensis str. Marburg	9704233	4	1	4	4	#1,#2	1
	Methanothermobacter thermautotrophicus str. Delta H	1469999	4	1	4	4	#1,#2	1
	Methanothermus fervidus DSM 2088	9962622	4	1	4	4	#1,#2	1
Methanococcales	Methanocaldococcus fervens AG86	8365160	1	0	0	0	no domain 3	6
	Methanocaldococcus infernus ME	9131706	1	0	0	0	no domain 3	6
	Methanocaldococcus jannaschii DSM 2661	1451040	1	0	0	0	no domain 3	6
	Methanocaldococcus sp. FS406-22	8803920	1	0	0	0	no	6

	Methanocaldococcus vulcanius M7	8513993	1	0	0	0	domain 3 no domain 3	6
	Methanococcus aeolicus Nankai-3	5326605	1	0	0	0	domain 3 no domain 3	6
	Methanococcus maripaludis S2	2762136	1	0	0	0	domain 3 no domain 3	6
	Methanococcus vannielii SB	5324690	1	0	0	0	domain 3 no domain 3	6
	Methanococcus voltae A3	9275437	1	0	0	0	domain 3 no domain 3	6
	Methanothermococcus okinawensis IH1	10773159	1	0	0	0	domain 3 no domain 3	6
	Methanotorris igneus Kol 5	10643705	1	0	0	0	domain 3 no domain 3	6
Methanomicrobiales	Methanocorpusculum labreanum Z	4794628	4	1	4	4	#1,#2	1
	Methanoculleus marisnigri JR1	4846177	4	1	4	4	#1,#2	1
	Methanoplanus petrolearius DSM 11571	9743205	4	1	4	4	#1,#2	1
	Methanoregula boonei 6A8	5410157	4	1	4	4	#1,#2	1
	Methanosphaerula palustris E1-9c	7272107	4	1	4	4	#1,#2	1
	Methanospirillum hungatei JF-1	3924460	4	1	4	4	#1,#2	1
Methanopyrales	Methanopyrus kandleri AV19	1478069	4	0	2	0	none	4
Methanosarcinales	Methanococcoides burtonii DSM 6242	3996903	4	1	4	4	#1,#2	1
	Methanohalobium evestigatum Z-7303	9346454	4	1	4	4	#1,#2	1
	Methanohalophilus mahii DSM 5219	8983411	4	1	4	4	#1,#2	1
	Methanosaeta concilii GP-6	10460370	4	1	4	4	#1,#2	1
	Methanosaeta thermophila PT	4462198	4	1	4	4	#1,#2	1
	Methanosarcina acetivorans C2A	1473000	4	1	4	4	#1,#2	1
	Methanosarcina barkeri str. Fusaro	3627569	4	1	4	4	#1,#2	1
	Methanosarcina mazei Go1	1480500	4	1	4	4	#1,#2	1
Thermococcales	Pyrococcus abyssi GE5	1495432	0	0	0	0	none	5
	Pyrococcus furiosus DSM 3638	1469524	0	0	0	0	none	5
	Pyrococcus horikoshii OT3	1442487	0	0	0	0	none	5
	Pyrococcus sp. NA2	10553683	0	0	0	0	none	5
	Pyrococcus yayanosii CH1	10836830	0	0	0	0	none	5
	Thermococcus barophilus MP	10040449	0	0	0	0	none	5
	Thermococcus gammatolerans EJ3	7987168	0	0	0	0	none	5
	Thermococcus kodakarensis KOD1	3234626	0	0	0	0	none	5

	Thermococcus onnurineus NA1	7017753	0	0	0	0	none	5
	Thermococcus sibiricus MM 739	8095316	0	0	0	0	none	5
	Thermococcus sp. AM4	7419843	0	0	0	0	none	5
Thermoplasmatales	Ferroplasma acidarmanus fer1	ZP_05571044	4	0	2	0	none	4
	Picrophilus torridus DSM 9790	2844373	4	0	2	0	none	4
	Thermoplasma acidophilum DSM 1728	1456551	4	0	2	0	none	4
	Thermoplasma volcanium GSS1	1441081	4	0	2	0	none	4
Nanoarchaeaota	Nanoarchaeum equitans Kin4-M	2654414	0	0	0	0	none	5
Korarchaeaota	Candidatus Korarchaeum cryptofilum OPF8	Kcr_1582	0	0	2	4	#2	3

FIGURE S1



**Figure S1:** Comparison of the domain organization and cysteine residue content of subunit D of RNAP from representative species from the five orders of methanogens. Mt, *Methanothermobacter thermautotrophicus*; Mm, *Methanoculleus marisnigri*; Ms, *Methanosphaera stadtmanae*; Mk, *Methanopyrus kandleri*; Mv, *Methanococcus vannielii*; Mr, *Methanobrevibacter ruminantium*.