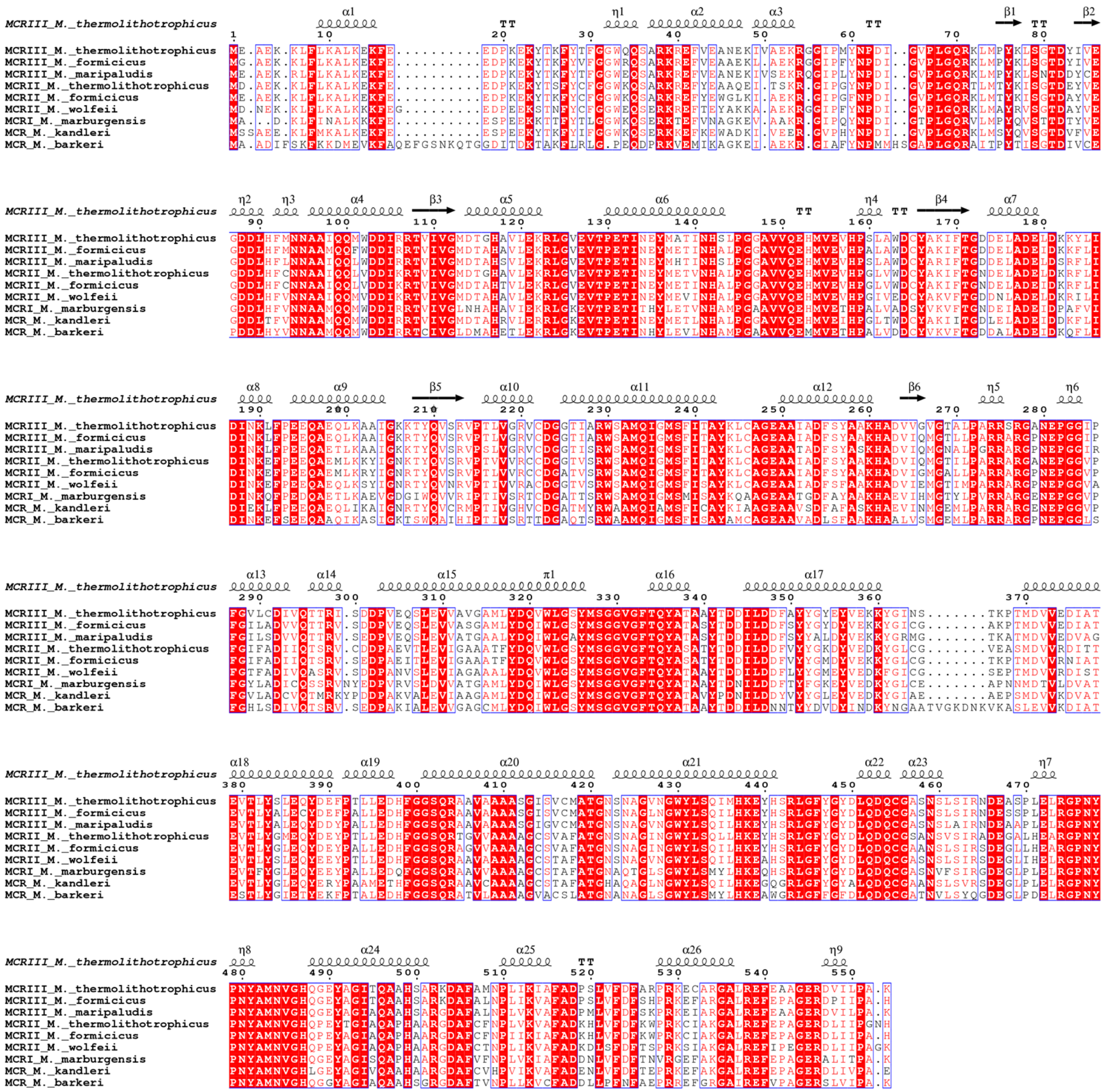
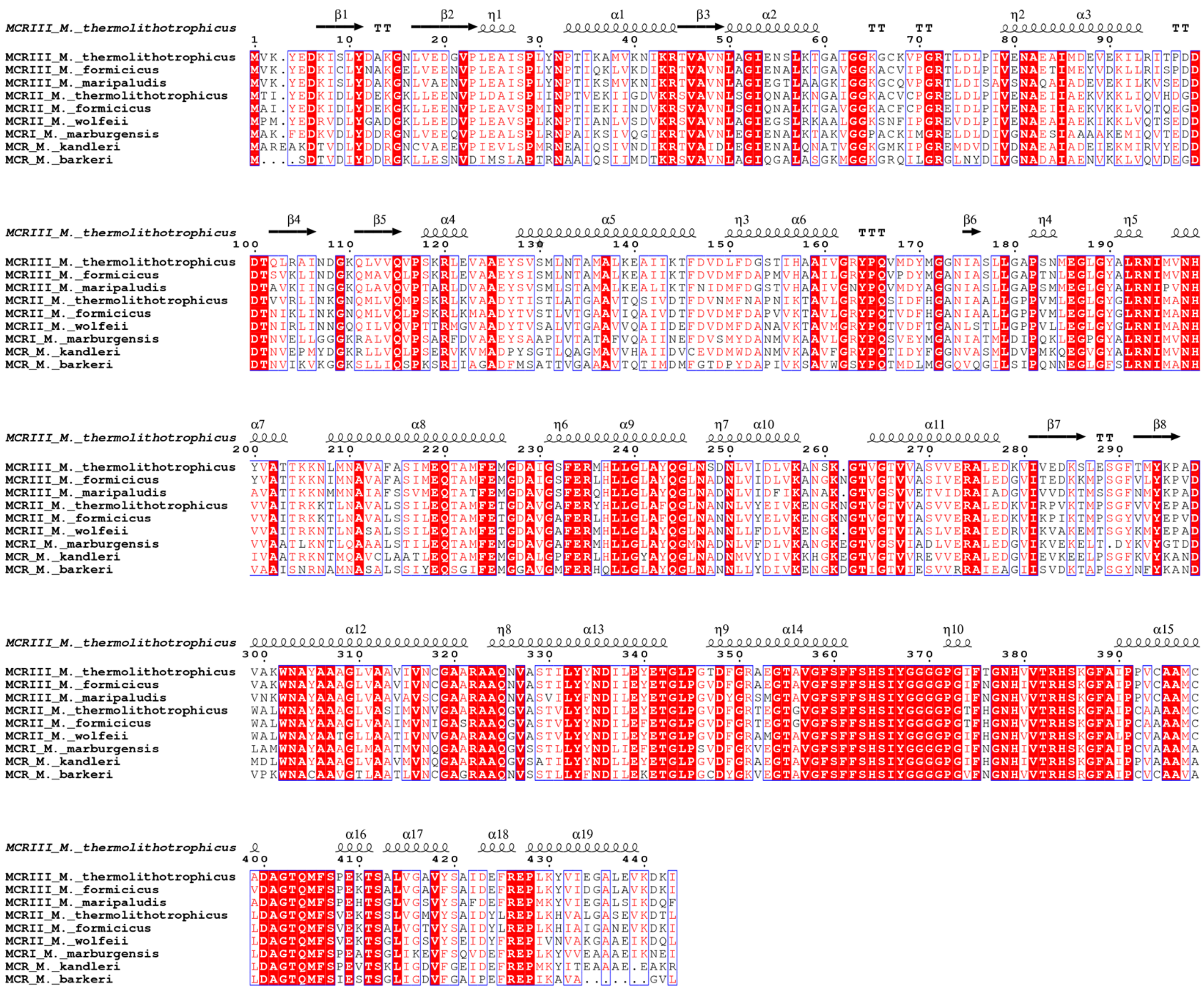
Supplemental material

Subunit α



Subunit β


MCRIII_M._thermolithotrophicus
MCRIII_M._formicicus
MCRIII_M._maripaludis
MCRII_M._thermolithotrophicus
MCRII_M._formicicus
MCRII_M._wolfeii
MCRI_M._marburgensis
MCR_M._kandleri
MCR_M._barkeri

Subunit γ

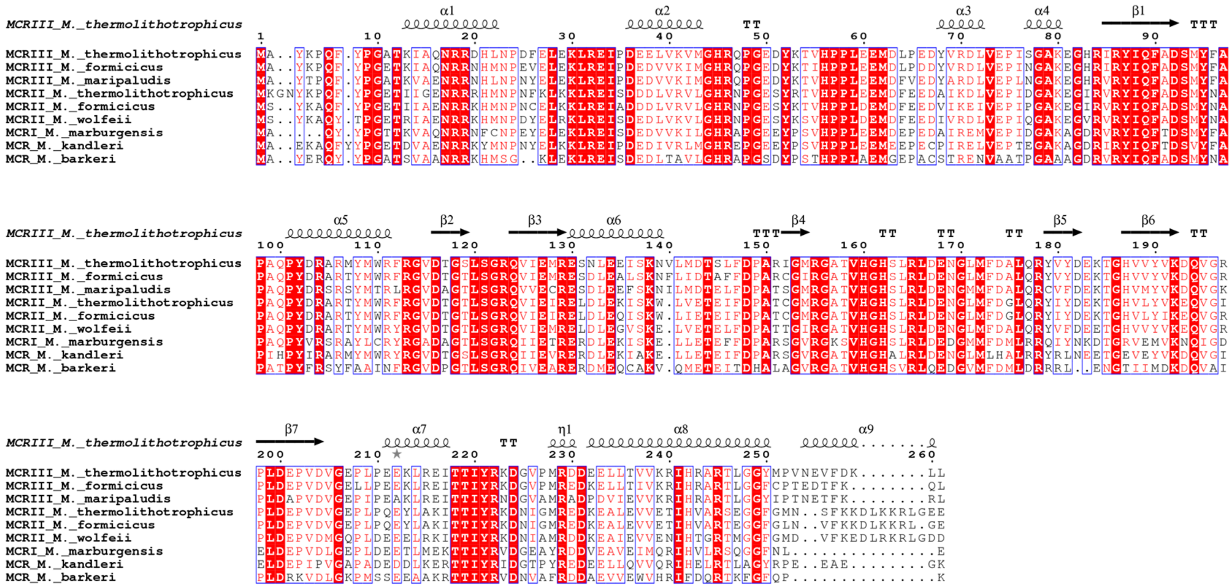


Fig. S1. Primary structure comparison of subunits α, β and γ of MCR.

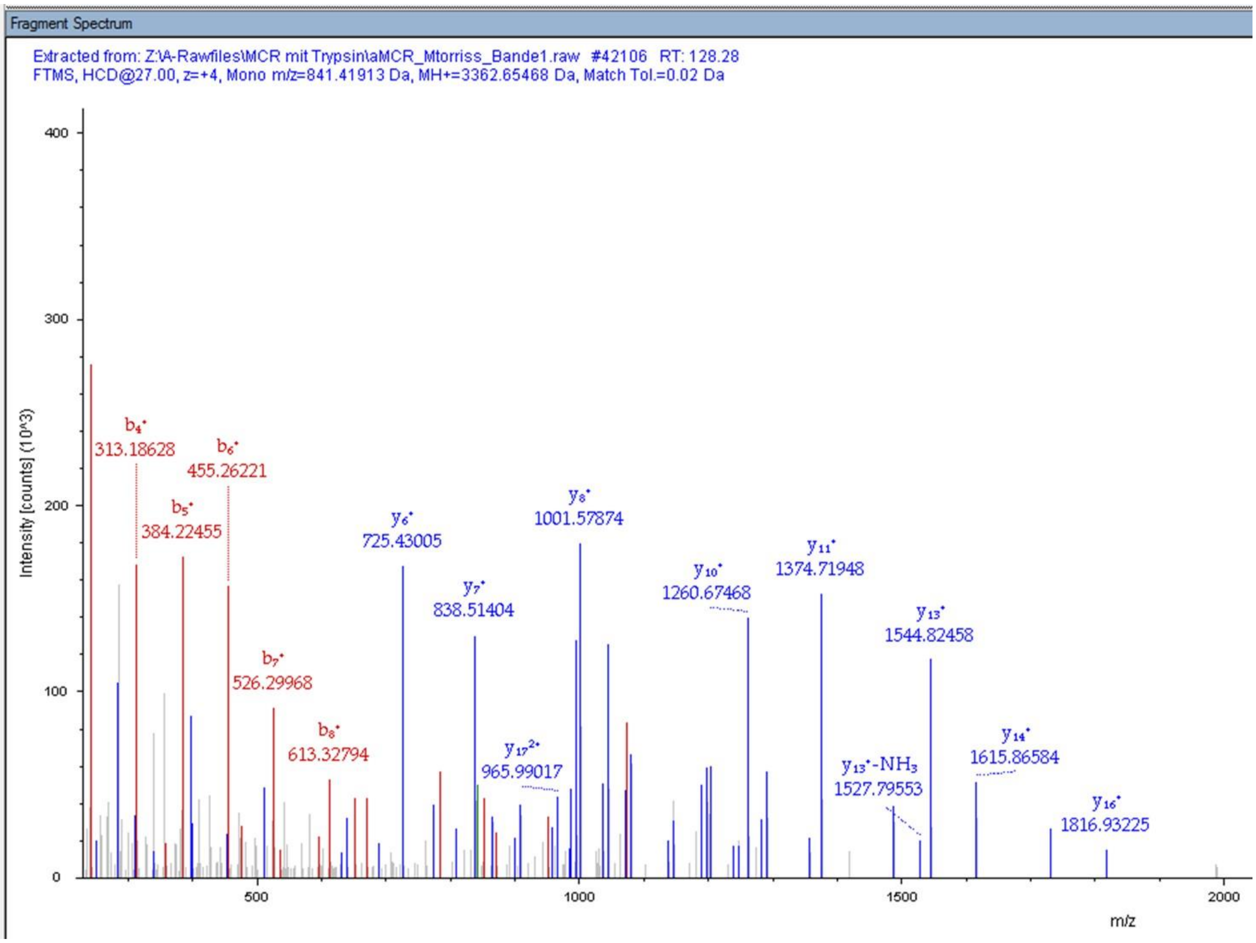


Fig. S2. A part of MALDI-TOF-MS (MS/MS) mass fragmentation spectrum of a trypsin-digested peptide, ^{403}AAVAAAASGISVCMATGNSNAGLNGWYLSQILHK^{437} from the α-subunit of MCR from *M. formicicus*. The amino acid sequence of the relevant peaks are given in Table 3.

Table S1. Substrates and habitats of methanogenic archaea. If not indicated otherwise information was retrieved from Bergeys Manual of Systematics of Archaea and Bacteria (18, 65-69)

Group / Genera	Substrate range	Habitat / Isolated from	Environment / Temperature (pH) preference
Methanobacteriales			
Methanobacterium spp.	hydrogenotrophic, varying co-substrates with CO_2, formatotrophic	sewage sludge, anaerobic digestors, oil-bearing rock cores, rice fields	aquatic / soil, mesophilic
Methanothermobacter spp.	hydrogenotrophic, formatotrophic	sewage sludge, river sediments	aquatic, mesophilic
Methanothermus spp.	hydrogenotrophic	sulfurous mud springs	aquatic, thermophilic
Methanosphaera spp.	hydrogenotrophic, alcoholotrophic (methanol)	human large intestine, feces	intestinal tracts, mesophilic
Methanobrevibacter spp.	hydrogenotrophic, formatotrophic	rumen, anaerobic digestors, termite gut, gingiva, feces	intestinal tracts, mesophilic
Methanopyrales			
Methanopyrus kandleri	hydrogenotrophic	hydrothermal vents	aquatic, hyperthermophilic
Methanococcales			
Methanocaldococcus spp.	hydrogenotrophic	hydrothermal vents	aquatic, thermophilic
Methanotorris spp.	hydrogenotrophic	hydrothermal vents	aquatic, thermophilic
Methanococcus spp.	hydrogenotrophic, formatotrophic, methylamines, alcoholotrophic (methanol), methyl sulfides	marine environments (primarily sediments)	aquatic, mesophilic
Methanothermococcus spp.	hydrogenotrophic, formatotrophic	geothermally heated marine sediments	aquatic, thermophilic
Methanocellales			

Methanocella spp.	hydrogenotrophic	soils, especially rice fields	soil, mesophilic
Methanomicrobiales			
Methanocalculus spp.	hydrogenotrophic, formatotrophic	alkaline lakes	aquatic, mesophilic (alkaliphilic)
Methanocorpusculum spp.	hydrogenotrophic, formatotrophic	anaerobic digestors, waste water, coal beds, shale	aquatic / soil, mesophilic
Methanoculleus spp.	hydrogenotrophic, formatotrophic	marine sediments, biogas plants	aquatic, mesophilic
Methanofollis spp.	hydrogenotrophic, formatotrophic, alcoholotrophic(propanol, butanol, pentanol)	waste water reactors	aquatic, mesophilic
Methanogenium spp.	hydrogenotrophic, formatotrophic	freshwater sediments	aquatic, mesophilic
Methanolacina spp.	---	marine sediments	aquatic, mesophilic
Methanomicrobium spp.	hydrogenotrophic	marine sediments	aquatic, mesophilic
Methanoplanus spp.	hydrogenotrophic, formatotrophic, alcoholotrophic (propanol)	marine sediments, oil fields	aquatic, mesophilic
Methanolinea spp.	hydrogenotrophic, formatotrophic	sewage sludge, marine sediments, fen sediments	aquatic, mesophilic (acidophilic)
Methanoregula spp.	hydrogenotrophic	acidic bog	aquatic, mesophilic (acidophilic)
Methanosphaerula spp.	hydrogenotrophic, formatotrophic	acidic peatlands	aquatic, mesophilic (acidophilic)
Methanospirillum spp.	hydrogenotrophic, formatotrophic, alcoholotrophic (propanol)	sewage sludge, digestors	aquatic, mesophilic
Methanosarcinales			
Methanosaeta spp.	aceticlastic	anaerobic digestors, anoxic sediments / soils, hot springs, thermal lakes	aquatic / soil, mesophilic / thermophilic

Methanimicrococcus spp.	methylotrophic	cockroach gut	intestinal tracts, mesophilic
Methanococcoides spp.	methylotrophic	submarine canyon, Ace lake	aquatic, psychrophilic / mesophilic
Methanohalobium spp.	methylotrophic	highly saline environments	aquatic / sediment, mesophilic / thermophilic
Methanohalophilus spp.	methylotrophic	saline environments	aquatic / sediment, mesophilic
Methanolobus spp.	methyloptrophic	mesophilic, anoxic environments (e.g. rocks)	terrestrial / aquatic, psychrophilic / mesophilic
Methanomethylovorans spp.	methylotrophic	sludge reactors, lake sediments	aquatic, mesophilic / thermophilic
Methanosalsum spp.	methylotrophic	hypersaline soda lakes	aquatic, mesophilic / moderately thermophilic
Methanosarcina spp.	hydrogenotrophic, aceticlastic, methylotrophic	almost ubiquitious in anoxic environments	ubiquitious, mesophilic / moderately thermophilic
Methermicoccus spp.	methylotrophic	oil field	aquatic, thermophilic
Methanomassilicoccales			
Methanomassilicoccus spp.	methylotrophic	intestinal tracts	intestinal tracts / mesophilic
Bathyarchaeota			
Bathyarchaeota	methylotrophic	ubiquitious, fresh water, open ocean	-