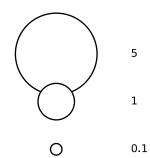
siderophore biosynthesis DNA abundance

(Plug)

(Condensation) Methanococcus 13 (FS848)



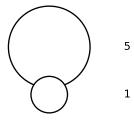
- (FeoB_C,N)
- iron transport protein (FeoA)
- siderophore biosynthesis (lucA_lucC)
 - ech hydrogenase (echABCE)
- energy-converting hydrogenase A (ehaBCEGNOP)
- energy-converting hydrogenase B (ehbABFIJKLNO)
 - coenzyme F420 hydrogenase (frhABDG)
 - hydrogenase (hyaABC, hybO, hybC)
 - [NiFe] hydrogenase (hydA2A3B2B3)
- methane/ammonia monooxygenase (pmoA-amoA)
 - methyl-coenzyme M reductase (mcrABCDG)
 - nitrous-oxide reductase (nosZ)
 - nitrite reductase (NO-forming)/ hydroxylamine reductase (nirKS)
 - nitric oxide reductase (norB)
- nitrite reductase (cytochrome c-552) (nrfA)
 - cytochrome c oxidase (coxABCD,AC, ctaF)
 - cytochrome c oxidase cbb3-type (ccoNOPQ NO)
 - carbon-monoxide dehydrogenase (cooCFS, acsA)
 - ATP-citrate lyase (aclAB)
 - fumarate reductase
 - (frdAB)
 - 2-oxoglutarate/
- 2-oxoacid ferredoxin oxidoreductase -(korABCD, oorABCD)
 - sulfite reductase
 - (dsrAB)
 - sulfate adenylyltransferase (sat, met3)
 - sulfur-oxidizing protein Sox (soxABCXYZ)
 - sulfide:quinone oxidoreductase (sqr)



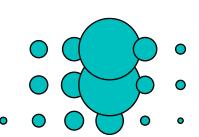
Shrimp Gulley #2 X-19 at BV #4

Methanococcus 13b (FS854)

- (Condensation)
- TonB-dependent Fe acquisition (Plug)
 - iron transport protein (FeoB_C,N)
 - iron transport protein (FeoA)
 - siderophore biosynthesis (lucA_lucC)
 - ech hydrogenase (echABCE)
- energy-converting hydrogenase A (ehaBCEGNOP)
- energy-converting hydrogenase B (ehbABFIJKLNO)
 - coenzyme F420 hydrogenase (frhABDG)
 - hydrogenase
 - (hyaABC, hybO, hybC)
 - [NiFe] hydrogenase (hydA2A3B2B3)
- methane/ammonia monooxygenase (pmoA-amoA)
 - methyl-coenzyme M reductase (mcrABCDG)
 - nitrous-oxide reductase (nosZ)
 - nitrite reductase (NO-forming)/ hydroxylamine reductase (nirKS)
 - nitric oxide reductase
 - (norB)
- nitrite reductase (cytochrome c-552) (nrfA)
 - cytochrome c oxidase (coxABCD,AC, ctaF)
 - cytochrome c oxidase cbb3-type (ccoNOPQ NO)
 - carbon-monoxide dehydrogenase (cooCFS, acsA)
 - ATP-citrate lyase (aclAB)
 - fumarate reductase
 - (frdAB)
 - 2-oxoglutarate/
- 2-oxoacid ferredoxin oxidoreductase -(korABCD, oorABCD)
 - sulfite reductase
 - (dsrAB)
 - sulfate adenylyltransferase (sat, met3)
 - sulfur-oxidizing protein Sox (soxABCXYZ)
 - sulfide:quinone oxidoreductase (sqr)



0.1



X-19 at BV #4

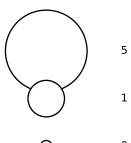
Shrimp Gulley #2

siderophore biosynthesis (Condensation)

TonB-dependent Fe acquisition (Plug)

iron transport protein (FeoB_C,N)

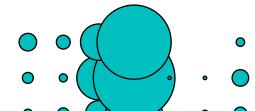
- iron transport protein (FeoA)
- siderophore biosynthesis (lucA_lucC)
 - ech hydrogenase (echABCE)
- energy-converting hydrogenase A (ehaBCEGNOP)
- energy-converting hydrogenase B (ehbABFIJKLNO)
 - coenzyme F420 hydrogenase (frhABDG)
 - hydrogenase (hyaABC, hybO, hybC)
 - [NiFe] hydrogenase (hydA2A3B2B3)
- methane/ammonia monooxygenase (pmoA-amoA)
 - methyl-coenzyme M reductase (mcrABCDG)
 - nitrous-oxide reductase (nosZ)
 - nitrite reductase (NO-forming)/ hydroxylamine reductase (nirKS)
 - nitric oxide reductase (norB)
- nitrite reductase (cytochrome c-552) (nrfA)
 - cytochrome c oxidase (coxABCD,AC, ctaF)
 - cytochrome c oxidase cbb3-type (ccoNOPQ NO)
 - carbon-monoxide dehydrogenase (cooCFS, acsA)
 - ATP-citrate lyase (aclAB)
 - fumarate reductase
 - (frdAB)
 - 2-oxoglutarate/
- 2-oxoacid ferredoxin oxidoreductase -(korABCD, oorABCD)
 - sulfite reductase
 - (dsrAB)
 - sulfate adenylyltransferase (sat, met3)
 - sulfur-oxidizing protein Sox (soxABCXYZ)
 - sulfide:quinone oxidoreductase (sqr)

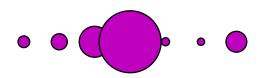


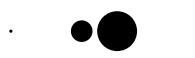
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Methanococcus 69 (FS854)



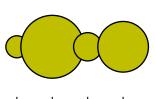








X-19 at BV #4



Shrimp Hole (2013)