## **RNA-DNA** ratio

## Methanococcus 13 (FS848)

- 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)

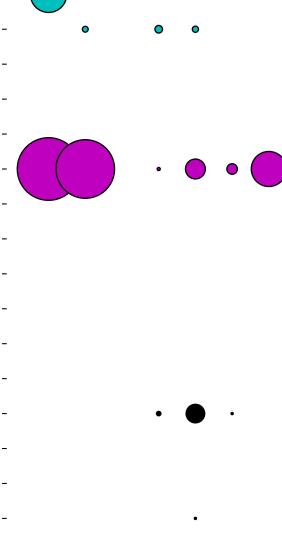


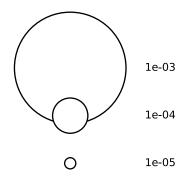
1e-03

Shrimp Canyon

## siderophore biosynthesis (Condensation) Methanococcus 13b (FS854)

- 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
    - sulfité reductasé (dsrAB)
    - sulfate adenylyltransferase (sat, met3)
    - sulfur-oxidizing protein Sox (soxABCXYZ)
    - sulfide:quinone oxidoreductase \_ (sqr) -





Shrimp Canyon

Shrimp Gulley #2

X-19 at BV #4

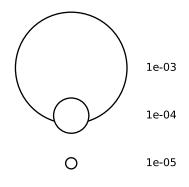
Ginger Castle

Hot Cracks #2

Old Man Tree (2013)

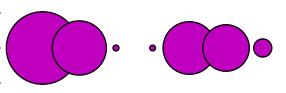
Shrimp Hole (2012)

- siderophore biosynthesis (Condensation)
- TonB-dependent Fe acquisition (Plug)
  - iron transport protein (FeoB C,N) -
  - iron transport protein (FeoA) -
  - siderophore biosynthesis \_ (IucA\_IucC)
    - 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)

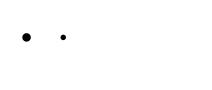


## Methanococcus 69 (FS854)











Shrimp Canyon Shrimp Gulley #2 X-19 at BV #4 Ginger Castle Hot Cracks #2 -

Old Man Tree (2013) -Shrimp Hole (2012) -

Shrimp Hole (2013) -