

Alignment of sequences published in Haring et al.: Mol.Biol.Evol 18:1892-1904, 2001

ND1

start codon = green; stop codon = blue

```
-----+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7-----+-----8
bute  atgaccaacctttctaccctaacttaccttgctataaccttatcctacgcaatcccaatcctaattgctgtggcattcct
falc  atgaccaaccaacaccctaataatgcaccttaccatattcttagcctatgctcttccaatcctaatacgccgtagccttcct
cico  atgaccatccccctattataaccacctcatcatgtccctctcttacgcgattccaattctaatacgccgtagccttcct
gall  atgaccctgccaccctaacaaaccttctaatacataaccttatcctataattctccccatcctaatacgccgtagccttcct
ayth  atgccacaaatgacaataataagctacctcattatatacctcctatacgcctatccccattctaatacgccgtagccttcct
smit  atgtcctaccgtc---tagcaactaaccttaccatatacctatcctacgccatccccgctcctagttgccgtagccttcct
vidu  atgaccaaccaccctatcctgattaacctaattatagtcctatcctatgccttaccgatcctaatacgcagtagccttcct
corv  atggccaactatcccataccttagtcaacctcattatagcactttcttatgctatccctattctaatacgccgtagccttcct
rhea  atg--tgactca-ccacatcaaactacctaattatgtccctgtcatatgctatcccaattctaatacgcagtagccttcct
stru  atg--caattta-ccatctttacacacctgactatagcactctcatacgtgttccaatcctaattgcagtagccttcct
emeu  atg--caactca-caatcataaatcacctcattatatacctatcatacgtgtaccatcttagttgcagtagccttcct
casu  atg--caa-tcatctgctttaaacacctcaccatatacctgtcctatgcaatcccaattctaatacgcagtagcattcct
alli  ata---gactccctcactattgtacccc-----cagcatta--cta-attatctccatcttaatagcagttgcattttt
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bute  cacactagtagaacgcaaagtcttaagctatatacaagcccgaaaagggccaaacatcgtagggccctttgggtctactac
falc  aacactagtagaacgaaaagtcctaagctatatacaagcccgaaaagggccaaacattggtggccctttggactcctac
cico  aacactagtagagcgaaaagtcctaagctacatacaagctcgaaaaggtccaaacattgtagggccttttgggctattac
gall  aacacttgtagaacgaaaaatcctaagctacatgcaggcccgaaaagggccaaacattgtagggccttttgggtctactcc
ayth  aacccttgtagaacgaaaaatcctaagctacatgcaatctcgcaaaggcccaaacatcgtagggccttttggcctgctcc
smit  cacactaatcgaaacgaaaagtcctaagctacatacaagcccgaaaagggccaaacattgtagggccattcgggtctacttc
vidu  aacactagtagaacgcaaaatcctaagttacatacaaaaccgaaaagggccaaacattgtaggaccattcggactcctac
corv  aaccctagtagaacgcaaaatcctaagctacatgcaggcccgaaaagggcccaaatggttagggccttttgggcttctac
rhea  cacactggtcgaaacgaaaagtcctaagctacatgcaagcccgaaaagggcctaacattgtagggccggttcgggctcttac
stru  tacactagttgaacggaaagtcctaagttacatacaagctcgaaaagggaccaaacattgtaggggccccttcggacttcttc
emeu  cacactagttgaacgaaaagtcctaagttacatacaagcccgaaaagggaccaaacatcgtagggccattcggcttacttc
casu  cacactagtagagcgaaaagtcctaagctacatacaaggctcgaaaagggccaaacatcgtagggccattcggattactac
alli  aacagcgctagaacgaaaaattataggccacatacaactacgaaaaggaccaaacattggtggccccccttggcctacttc
```

bute aaccgtagccgatggcgtaaaactattcatcaaagaaccaatccgcccattctacctcctccccctctcctcttcactata
falc aaccagtagcagatgggtgtgaaactatttaccaaagaaccatccgaccatcaacctcctcccccttactcttcacccta
cico agccagtagcagatgggagtaaaactattcattaagagcccattcgaccatccaccgcctccccattcctctttatcata
gall aaccgtagcagacggggtaaaactattcattaagagccaatccgaccatctacctcctcccccttctcctcttcattatt
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smit aacctatagcagacgggagtaaaactattcattaagagccaatccgcccattctcattcatccccctgcccctctttacagca
vidu aaccctggcagatgggatcaaaactattcattaagagccaatccgaccatcgacatcctcccccaattctattcatcatc
corv agcccgtagcagatggggtaaaactattcatcaaagaaccaatccgcccgtcaacatcttcccccaatcctatztatcatt
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emeu aacctgtagcagacgggagtaaaactcttcattaaggaacctattcgcccactacaactcctctcccctactattcatcata
casu agcctgtagcagatgggagtaaaactattcattaagagccaatccgcccactacaacttccctccccctcctattcatcata
alli aaccattgtagccgatgggacttaaaactattaccaaagagtaaaccttccccctgcttgcccaccctacccttttcatcctg

bute acacctatactagccctcctcctagcactaaccatttgaattccccttcccctacccttctccctcgccgacctgaatct
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bute tagtctcagggtttcaacgtagagtagcgcgcaggaccattcgcctatttcttcctagccgagtagcgaacattatatta
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alli acctcctatgaaaaaacttctaccataaactaacctctgcctatgacactcatcagtgccaatatcaatggtttgga

```

bute  gtacccct-----tgcttaagg
falc  ct-cccccc-----agcttaa--
cico  ctgcctcct-----tatctaagg
gall  ct-cccccc-----aatctaa--
ayth  ctacctcct-----tccataagg
smit  ctacctcctcaccttacctaa--
vidu  ctgccacca-----tccataaga
corv  ctgcctccc-----tacctaagg
rhea  ctccccct-----tacctaagg
stru  atccccct-----cacttaagg
emeu  cttcctccc-----tattaa--
casu  ctccccct-----cactaa--
alli  ctaccacca---atgacttag--
      -----1-----2-----3-----4-----5-----6-----7-----8

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ND2

start codon = green; stop codon = blue

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      -----1-----2-----3-----4-----5-----6-----7-----8
bute  atgaaccctcacacaaaactaatctccgccttaagtctaatacctagggcacaaccactacaatctcaagcaccactgaat
falc  atgagccccctcacaaaactaatattctccttaagccttctactgggaacaaccattacaatctcaagcaaccactgaat
cico  atgaaccacatgcaacactaattttctcactaagccttctcctaggaacaaccatcacaatctcaagcaaccattgaat
gall  atgaacccccatgcaaaaactaatctgcacagtaagcctcatcatgggaaccagcatcacaatctccagcaaccattgaat
ayth  atgaacccccatgcaacccaatttctagtcctcagcctcatattagggcagacaatcacaatctccagcaaccactgggt
smit  atgcacctcaggctaaatctatctcctcattaagccttttcttaggaacaaccactgtaatctcaagcaaccactgaat
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corv  atgaacccacaggcaaaaactaattttgtcactagcctactcctaggtacaaccatcacaatctcaagcaatcattgaat
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stru  atgaatccccatgccaattaatctcctcatcagcctcctcctaggtacaacaattaccatctcgagcaatcattgaat
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casu  atgaaccctcacgctaaactcatctgcacacttagtctcatcttgggttcaaccattaccatctcaagcaaccactgagt
alli  atgcccctctcccaaccaattatcctag-caaca--ctaaccattacaacactaatttttctactatcaaccatctggt

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bute aatagcctgaaccggactagaactcagcaccctcgctatcatcccattcatttcaaaatctcaccaccctcgagccatcg
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```

bute -----
falc -----
cico -----
gall -----
ayth -----
smit -----
vidu -----
corv -----
rhea -----
stru -----
emeu -----
casu -----
alli aaacaagaataactctctaggctaa
-----+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7-----+-----8

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ND3

start codon = green; stop codon = blue

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-----+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7-----+-----8
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rhea gagcccaaggaggcctagagtgagcagaatag
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casu gaaccaagggggcctagaatgagcagaataa
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-----1-----2-----3-----4-----5-----6-----7-----8

ND4L+ND4

start codon = green; stop codon = blue

-----+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7-----+-----8
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alli aataactattacacacactaccatcaattatcctcatcacaaccacgacttattt-acca-tga-c-taa-
-----+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7-----+-----8

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ND5

start codon = green; stop codon = blue

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-----+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7-----+-----8
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corv aaacttctaggccctgaaggactagccaacctgcaataatagcatcaaaaaccgctaccaccttccacacagggtaat
rhea aaaaaaataggaccagaaggactagctgatcttcaactcatggcctccaagacctccactcacctgcacaccggacttat
stru aaaaaaataggaccagaaggactagccgacctacaacttatagcagctaaaacctcaactccactacacaccggattaat
emeu aaaaaaataggaccagaaggattagccaacctacaactcatagcagccaaaacctctacctcactacataccggaataat
casu aaaaaaatagggccagaagggtggccgacttacaactcatggcagctaaaacttcaactcccctgcacaccggactaat
alli gaagccctcgggccaanaataataaccacctacaacccctaatagccaaaatcctcacaccatatcataaaggaaaaat

bute caaacctacctaggaaccttcgccctatcaatcttcat---catcctcctgtcaacacac^{taa}-----
falc caaacatatctaggatctttcgccctatcaatcctaac---catcctactcactcaaaa^{aga}-----
cico caaacctacctaggatccttcgccgtatccatcctcct---tatcctatcaacacag^{agg}-----
gall taaatcttacctgggttccttcgccctcacaatccttacaacgatcctacttatccaaaa^{taa}-----
ayth caaacctacttagggtccttcgccctatctattctagtaatgatcttaaccacacagaccct^{taa}-----
smit caaacatacctaggatcctttaccctatctaccctcattataattttatcaata^{taa}-----
vidu taaagcctacctaggatcatttcgccctatccatcatcatcactcatctccacatat^{aga}-----
corv taaagcctacctaggatctttcgccctatcaatcttcattatccttctatccacata^{aga}-----
rhea caaacctacctagggacatttcgccctatccatcctcactctcctcctactcacc^{caataa}-----
stru taaaacctacttaggaacatttcgcactgtccatcctcattctactcacactcacc^{acaga}-----
emeu caaacctacctaggatcatttcgccctgtccatcatcattctacttatatcaatccaa^{aga}-----
casu caaacctacctagggtcatttcgccctatctattctcatcctgctcctatcaacc^{caaga}-----
alli aaaacaatatttcaaaatcttcatattaactattattataattatctttttcacctcctttat^{atcaccttaa}-----
----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

ND6 (antiparallel)

start codon = green; stop codon = blue

```
-----+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7-----+-----8
bute  atg-----gcttattttgtccttcttctggttgatgggggtttggttttaggggggtttggcgggtggcatctaaccgctcgcc
falc  atg-----acttattttgtggtttttctaggggtgtggtttggttttggggcggttagcgggttgcacctaataccatctcc
cico  atg-----gcttattttatgcttcttttagggggatggtttgctttgggagcgttggcgggttgcacctaataccttctcc
gall  atg-----acttattttgtgatttttctggttattggtttatgctgggggttttagctgtggcgtctaataccttctcc
ayth  atg-----acttattttgtatttttctaggggtttgctttgtagttggtggtttggggcgtagcatcgaataccttctcc
smit  atg-----atatatttttgttgctggtgggatggtgtttgttctgggaggggtggctggtgcgtctaataccttctcc
vidu  atg-----atagagttcgttttatttttaggactacttttcgctctgggggggctggcagtagcctccaaccctctcc
corv  atg-----ataaattttgtactttttataaccctatgctttgttctaggaggggttagcgggttgcgtctaaccctctcc
rhea  atg---acttcataattttgtcctttttataggggtgagttttattctaggagcactagctgtagcgtccaacccttccc
stru  atg-----acctactttgttatggttttgggattttgttctattttgggagcggtagctggggcggtctaatacgtctcc
emeu  atg-----acttattttgttcttttttaggggtgtggtttattttgggggcttggcagtggtcctaataccttctcc
casu  atg-----acctattttattttttcttaggggtgtggtttattttaggagcgttagcggtagcgtctaatacgtctcc
alli  atgggatttacgttgtttcttgtgtttgatattagcatgtgcatgatgggtggcggcaagttcaataattcattttgc
```

```
bute  ttattatggggtagttgggttgggtgttggggctggttgtaggggtgtgggtgggttggtaagtctaggagtaccgtttgtgg
falc  atactatggagttgttgggttgggtgttggggctggttggttgggtgtgggtgggttgatgagtttgggggttcttttatct
cico  ctattatggggtagttgggttgggtgtggcctctggttggtgggtgctggctactgagtttgggagcttctttgtgt
gall  gtattatgggggtgggtgggttgggtggttagcgtctgtgataggatgtgggtgggttagtgagtttgggtgttcttttgttt
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smit  ttattatggggtagttgggttgggtgatggcgtcgggtgggtgggggtgtgggtgggttgatgagtttggggctgtctttgtgt
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corv  ttattatgggggtgggtgggtctgggtgtggccttctattgcgggatgtgggtgattggttaagtaggggggttcttttgtct
rhea  ctattatgggcttttaggggttgggtgggttggatcgctttaggggtgtgggtggctattgagtttaggggtctcttttatct
stru  ctattatgggtgtagttgggttgggtgttgggtctggttggttgggtgtgggtgggttgggtgagtttgggggtgtcatttatct
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casu  ttattatgggggtgcttgggttgggtggttaggggtctggttggttgggtgtgggtgggttgctaagcttgggggtgtctttattt
alli  cg----tggttaagtttactttttaggtt-gtattcggtagtggtttggttaattattgaggggtggaagt----tttatgc
```

bute ctttagtggtggttatgggtgatttaggtggaatggttagtggtttttgtttattcagtcgcttagcagcggatcctttt
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cico cactcgtactggttatgggtgatttgggggggatgctgggtggtttttgtttattcgggtgctcctggcggcggatcctttt
gall ccttggcgttatttttgggtgatttaggggggatggtgggtggtttttgtttattctgtgtcatttagctgaggatccttat
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emeu ctctgggtggttttttgggtgatttggggggaataactgggtggtcctttgtgtactctgtgtccttggctgctgatcctttt
casu ctttagtattggtccttgggtgatttaggggggatggtgggtggtttttgtgtactctgtgtccttagctgctgatcctttt
alli ctttagtggtggttattaggttatgggggggttattgggtggtggtttgtctttttgtgttgggttactgatgatccattt

bute ccggagacttgaggggattgacgagttttaggggatggagcagggatggttctgggtgcttgttgtgggggtggttgttgg
falc cctgaggcctgggggaattgacgggttgtgggggtggtggtggtggttattttattggttgtttgttggggctgtgattgg
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bute tgg---ggttgagtgctggaagattgggggtgggttactgtagataatggaggtacttttgtggatcggttggatttttagtg
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casu ggattttataggggtgggggttcaggggtgtgggtactgtagactgtgggggtgctgtttccggttcgtatagatttttagtg
alli atattggcgtttgtggtgttggggaaagactagtgccgggggagttttggggcga-ggtagtttagtagtgagttgttag--

bute gtggtgccatgtttttattcgtggggggcagggatgttcttggcggccgggtgaggggttgttgttgacttattttgttgtgta
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casu ggggtggctatgtttttattcctggggcgggggatgtttttgggttgcgggatgggggttgttgcctaactttgtttgtgggtt
alli ggggttagtcagatgtattctgatgggtgggcgttcattgtggtgtgctgggtgagctttactgggtggtgttattcgtaaatt

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bute ctggagcttgtgcggtgggttgtc-ttgtggggcgattcgggcggttag
falc ttggagcttgtgcggggggttgtc-tcgtggggcaattcgggcggttag
cico ttggaggtgtacgaggggtatc-tcgtgggacgattcgagcagtttag
gall ctagagcttgtgcggtgggttgtc-tcggggggcaattcgggcggttaa
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rhea ttggagttagtgcgtggattatc-tcggggggcgattcgggctgttag
stru ttggagttagtgcgggggtctatc-tcggggggcaattcgggcagtttag
emeu ttggagcttgtacgggggttattc-tcggggggcaattcgagcgggttag
casu ttagagcttgtgcggggggttattc-tcggggggcgattcgggctgttag
alli acagggtttgttcgaggg-tatcgtcagggggcgtttcgctcttttagg
-----+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7-----+-----8

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ATP8+6

start codon = green; stop codon = blue; overlap = yellow

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-----+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7-----+-----8
bute atg cctcagctcaacccaacaccatggtttctcatcatagcactatcatgattaaccttcacaataattatccaacccaa
falc atg ccccaactaaacccaacccatgattcctaaccatacttgccacctgagcaatcttcttactaattatccaacctaa
cico atg ccacagctcaacccaacccatgattttacatcatactagccacctgactaactcttttactagctattcaacctaa
gall atg ccccaattaaacccaacccatgattctccatcatactcctaacttgattcaccttctctctgcttatccaacccaa
ayth atg cctcaactcaaccccgcacccatgattctcaatcatgatcataacctgactaactctcgcactcctgatccagccaaa
smit atg ccccaactaaacccaacccatgacttttcattatactaacaatcatgagttactttctcccttatcctccaacccaa
vidu atg cctcaactaaacccaacccctgactttttatcatgttcatttcatgattcactttctccatgatcatccagccaaa
corv atg cctcaactaaacccaatccatgattttttatcatgtaacttcgtgactcacctactccataatcatccaacccaa
rhea atg ccccagctcaacccaacccatgattcttcatcataatcatatcctgagcagtcctcctactgctcatccagccaaa
stru atg ccccagcttaacccaacccctgggtctttatcataatttatcctgaacagtcctcctctttcttatacaacccaa
emeu atg cctcaactaaacccacacccatgattctccatcttacttatagtatgattcatcctcctacttctcatccagcctaa
casu atg ccacaactcaacccaacccatgattccttattatactcacatcatgggcaatcttctcctcctcatacaacctaa
alli atg ccacaactaaacccagaaccttgactaacaaccttccctaatcgtttgaatctccttattggtatttctccaacccaa

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bute actcctaccctttattcccactaataactccctctaccaaaccactacaatcaccacacccccctcctgaaactgaccat
falc actcctaccgttcacccccaccaacccccccataaataaaaaccaatacctctaacaaatccacccccctgaacctgaccat
cico actcctatcatttaccactaccaatcagccctctaacaaacttcctacaaccattaaaaccacaccctgagcctgaccat
gall acttctttcattcactctaacaacaaccctgcaaacaaaat---tacaacaactaaaccacccccctgaacctgaccat
ayth actactaacctttaccacaacaaccccccatcaagcaaacctccctcaccactaaaccacaccatgagcctgaccat
smit actcacactcttcatccctactaatccccctcaactaaaacctcaacaacaataaaaccctctccctgaaactgaccat
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corv actactatcctttatcaccataaacctccacttaacaaaactcaacaaccctaacaccctccccctgaacctgaccat
rhea actcctatcattcaccacacaaaacctcccatacaaaaaccctatctaccctaacccaacccccctgaacctgaccat
stru actgacatcctttatctctacaaaactcaccatcgaacaaaaataaaaactaccctcactcccactccctgaacctgaccat
emeu atttctttcctttatctacacaaaacctcccatccaacaagacccaaaatagccctatccccctacatgaacctgaccat
casu actcctatccttcatccctacaaaaccacccctccaacaaaacccaaaacaaccgcaacccccagccatgagcttgaccat
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bute gaacttaagcttcttcgaccaatttacaagcccacatctcctaggtatcccacttatcctaattctcaacactattccccca
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cico acaaaacaactaataattccactaaacaaaagcggccacaagtgagccctaatcctaacatcactaataataactactact
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casu accaaacaattaataactccactaaacaaccaggacataaatgagcccttatcctgtcatcactaataatcttctcttt
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bute tataatcaacttactaggtctcctaccatacacatthaccctactaccaactatcaataaacatagccctcgccttcc
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-----1-----2-----3-----4-----5-----6-----7-----8

COX1

start codon = green; stop codon = blue

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-----+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7-----+-----8
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-----1-----2-----3-----4-----5-----6-----7-----8

COX2

start codon = green; stop codon = blue

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-----+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7-----+-----8
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smit ttatgaatacacagacttcaaagacctatctttcgactcttatatagctacacacagatctcccacccggacactttc
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bute  ccccttaaccacttcgaacactgatcttcactcatatcttc---ctaa--
falc  cccccctaaccatttcgaacactgatccacactcctatcatc---ctaa--
cico  ctccacttaccacttcgagagctgatcttcactactatcatc---ctaa--
gall  cccccctaaaacactttgaagcctgatcctcactactgtcatc---ttaa--
ayth  ccccactcccacactttgaagcctgatcatcccttctatcctcctcctaa--
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rhea  cccctctcacacacttcgagagttgatcctcacttttatcctcctcctcat#
stru  cccctcttacataacttcgagagctgatcatcactactctctaccgactcat#
emeu  ctccactcacacatttcgagaactgatcatcactactctcctc---ctcat#
casu  ccccactcacacatttcgagaactgatcatcactactttctatttcctcat#
alli  tcccactaaaccacttccaactctgattagaag-attctattct--ctcct#
-----+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7-----+-----8
```

COX3

start codon = green; stop codon = blue

```
-----+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7-----+-----8
bute  atggcccaccaagcacactcctaccacatagtagaccccagcccctgacctatcttcgggcgcagcagctgccctactcac
falc  atggcccaccaagcacacccttccacatagtagaccccagcccatgaccaatctccgggagctgctgccgccctcctcac
cico  atggcccaccaagcacactcctaccacatagtagacccaagcccctgacctatcttcgggagcaactgccgccctgctcac
gall  atggcacaccaagcacactcctaccacatagttgacccaagcccatgaccaatcttcgggcgcagccgcagcactactaac
ayth  atggcacaccaagcacactcctaccacatagtagacccaagcccctgaccaatcttcgggggcagctgccgccctgctcac
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stru  atggcacaccaagcacactcatatcatatagtagacccaagcccatgaccaatcttcgggcgccactgctgccctacttac
emeu  atggcacaccaagcacactcctatcacatagtagatccaagcccatggcccatcttcgggcgctgctgccgccctacttac
casu  atggcacaccaagcacattcctaccacatagtagaccccagcccatggccaatctttggcgccgctgctgctctgctaac
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```

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bute  tacctcagggtcatcacatgattccactacaactcctcccaactcctatccctaggcctcctcgctataactccttggtta
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```

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alli tactgacactttgtagacgtcgtctgacttttctctatatactcgatctactgatgaggatcgt#

----+----1----+----2----+----3----+----4----+----5----+----6----+----7----+----8

Cyt-b

start codon = green; stop codon = blue

```
-----+-----1-----+-----2-----+-----3-----+-----4-----+-----5-----+-----6-----+-----7-----+-----8
bute  atggcccccaacccccgaaaatcccaccccctcctcaaaaataatcaacaactccctaattgacctccccaccccctcaaa
falc  atggcaccacaacattcgaaaatcacaccccctaataaaaataatcaacaactccctaattgacctccccaccccacccaa
cico  atggcccccaacatccgaaaatcacacccgctactaaaaatagtcaacaactccctaattgaccttcccaccccctcaaa
gall  atggcaccacaacattcgaaaatcccaccccctactaaaaataattaacaactccctaattgacctcccagccccatccaa
ayth  atggcccccaacatccgaaaatcccaccccctactaaaaataatcaacaactccctaattgacctccccgcaccctctaa
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corv  atgggcctaataatctacgaaaaaacaccccactactaaaaatcatcaacaattccctaattgaccttccaaccccacatcaaa
rhea  atggcccccaatatccgaaaatcccaccccctactaaaaattatcaacagctccttaattgacctccccctccccctcaaa
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casu  atggcccccaacatccggaaaatcccacccctctactcaaaatcatcaacagctcctaattgatctcccttccccctcgaa
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bute  catctccatctgatgaaatctcggatccctcctagggatctgcttactaacacaaaatcataaccggcctcctactagcaa
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gall  aaaacaaaataactcaa---ctactaa
ayth  aaaataaaaataacttaa---ctgctaa
smit  aaaacaaattcctcaa---cctataa
vidu  aaaacaaactactaaa---gctctaa
corv  aaaataaaaattctcaa---actttaa
rhea  aaaataaaaatgctcta-----ctaa
stru  aaaacaaaataattta-----ctaa
emeu  aaaacaaaatcctcta---tcaataa
casu  aaaataagataactcta-----ctag
alli  agaacaaaatagttgaaccacctatggtaccctaagt#
```