Nucleotide sequence of the *cox*A gene encoding subunit I of cytochrome aa_3 of *Bradyrhizobium japonicum*

Christian Gabel and Robert J.Maier*
Department of Biology, The Johns Hopkins University, Baltimore, MD 21218, USA

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Cytochrome aa_3 (cytochrome-c oxidase, EC 1.9.3.1) catalyzes the reduction of molecular oxygen to water as the final step in the ATP-generating electron transport pathway. Many, but not all aerobic bacteria have cytochrome aa_3 as a terminal oxidase. Cytochrome aa_3 is one of two terminal oxidases expressed by the nitrogen fixing bacterium *Bradyrhizobium japonicum* in the free-living aerobic state but is repressed under symbiotic (microaerobic) conditions. Here we report the nucleotide sequence of subunit I of the *B. japonicum* cytochrome aa_3. *The B. japonicum* gene, called *cox*A, was previously cloned (pCA1) and shown to complement a cytochrome aa_3 mutant strain both spectrally and functionally (1, 2). The *cox*A gene is contained within a 2 kb XhoI fragment, subcloned from pCA1, encoding an open reading frame of 541 amino acids with a molecular weight of 59,265 daltons. The predicted polypeptide exhibits 72% and 77% homology, respectively, to *Paracoccus denitrificans* and bovine subunit I of cytochrome aa_3.

REFERENCES

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1      GAATTCGCCTCCTGGGTCGAAACGGCGAAGAAGAAGTTTGCGAGCGGTGGCCACCGGCACCTACGCCTTCCGCGGCCGGCGACGCAGT
89   AGGCGTCGGGTAAAGGCTCGAGGGGACTGAAAGCGACATAAAGGGCGGGACCTCCAAAGGTCCGATTGGGACGCAAGGCAGGATTTGAAA
179  ATGGCAACCAGCGCAGCGGCACACGGCGATCACGCGCAAGACCACGGACATGACGAGCACGCCCATCCGACCGGATGGCGACGCTACGTC
1      M  A  T  S  A  A  A  H  G  D  H  A  Q  D  H  G  H  D  E  H  A  H  P  T  G  W  R  R  Y  V
269  TATTCGACCAACCACAAGGACATCGGCACGATGTACCTGATCTTCGCGGTCATCGCCGGCGTCATCGGTGCCGCGATGTCGATCGCGATC
31     Y  S  T  N  H  K  D  I  G  T  M  Y  L  I  F  A  V  I  A  G  V  I  G  A  A  M  S  I  A  I
359  CGTGCCGAGCTGATGTATCCGGGCGTGCAGATCTTCCACGAGACGCACACCTACAACGTCTTCGTGACCTCCCACGGCCTGATCATGATC
61     R  A  E  L  M  Y  P  G  V  Q  I  F  H  E  T  H  T  Y  N  V  F  V  T  S  H  G  L  I  M  I
449  TTCTTCATGGTCATGCCGGCGATGATCGGCGGCTTCGGCAACTGGTTCGTGCCGCTGATGATCGGCGCGCCCGACATGGCGTTCCCGCGC
91     F  F  M  V  M  P  A  M  I  G  G  F  G  N  W  F  V  P  L  M  I  G  A  P  D  M  A  F  P  R
539  ATGAACAACATCTCGTTCTGGCTGCTGCCGGCCTCCTTCGGGCTGCTGCTGATGTCGACCTTCGTCGAGGGCGAGCCGGGCGCCAACGGC
121    M  N  N  I  S  F  W  L  L  P  A  S  F  G  L  L  L  M  S  T  F  V  E  G  E  P  G  A  N  G
629  GTCGGCGCCGGCTGGACCATGTACGTGCCGCTGTCGAGCTCCGGCCATCCCGGCCCGGCAGTCGACTTCGCGATCCTGTCGCTGCATCTG
151    V  G  A  G  W  T  M  Y  V  P  L  S  S  S  G  H  P  G  P  A  V  D  F  A  I  L  S  L  H  L
719  GCGGGTGCCTCGTCGATCCTCGGCGCCATCAACTTCATCACCACGATCTTCAACATGCGCGCGCCGGGCATGACCCTGCACAAGATGCCG
181    A  G  A  S  S  I  L  G  A  I  N  F  I  T  T  I  F  N  M  R  A  P  G  M  T  L  H  K  M  P
809  CTGTTCGTGTGGTCGATCCTGGTGACCGTGTTCCTGCTGCTGTTGTCGCTGCCGGTGCTCGCCGGTGCGATCACCATGCTGCTCACCGAC
211    L  F  V  W  S  I  L  V  T  V  F  L  L  L  L  S  L  P  V  L  A  G  A  I  T  M  L  L  T  D
899  CGCAATTTCGGCACGACCTTCTTCGCGCCCGACGGCGGCGGCGACCCCGTGCTGTTCCAGCACCTGTTCTGGTTCTTCGGCCATCCCGAG
241    R  N  F  G  T  T  F  F  A  P  D  G  G  G  D  P  V  L  F  Q  H  L  F  W  F  F  G  H  P  E
989  GTGTACATCCTGATCCTGCCCGGCTTCGGCATGATCAGCCAGATCGTCTCCACCTTCTCGCGCAAGCCCGTGTTCGGCTATCTCGGCATG
271    V  Y  I  L  I  L  P  G  F  G  M  I  S  Q  I  V  S  T  F  S  R  K  P  V  F  G  Y  L  G  M
1079 GCCTACGCCATGGTCGCGATCGGCGGCATCGGCTTCGTGGTGTGGGCGCACCACATGTACACGGTCGGCATGTCGTCGGCGACGCAGGCC
301    A  Y  A  M  V  A  I  G  G  I  G  F  V  V  W  A  H  H  M  Y  T  V  G  M  S  S  A  T  Q  A
1169 TATTTCGTCGCGGCGACGATGGTGATCGCGGTTCCGACCGGCGTGAAGATCTTCTCGTGGATCGCCACGATGTGGGGCGGCTCGATCGAA
331    Y  F  V  A  A  T  M  V  I  A  V  P  T  G  V  K  I  F  S  W  I  A  T  M  W  G  G  S  I  E
1259 TTCCGCGCGCCGATGATCTGGGCCGTGGGCTTCATCTTCCTGTTCACGGTCGGTGGCGTCACCGGCGTCGTGCTGGCGAACGCCGGCGTC
361    F  R  A  P  M  I  W  A  V  G  F  I  F  L  F  T  V  G  G  V  T  G  V  V  L  A  N  A  G  V
1349 GACCGCGTGCTCCAGGAGACCTACTACGTCGTCGCGCACTTCCACTACGTGCTGTCGCTCGGTGCAGTGTTCGCGATCTTCGCCGGCTGG
391    D  R  V  L  Q  E  T  Y  Y  V  V  A  H  F  H  Y  V  L  S  L  G  A  V  F  A  I  F  A  G  W
1439 TACTACTGGTTCCCGAAGATGACGGGCTACATGTACAACGAGACGCTGGCGAAGGCGCACTTCTGGGTCACCTTCATCGGCGTGAACCTG
421    Y  Y  W  F  P  K  M  T  G  Y  M  Y  N  E  T  L  A  K  A  H  F  W  V  T  F  I  G  V  N  L
1529 GTGTTCTTCCCGCAGCACTTCCTCGGCCTGTCGGGCATGCCGCGCCGCTACGTCGACTATCCCGACGCGTTCGCCGGCTGGAACCTGGTC
451    V  F  F  P  Q  H  F  L  G  L  S  G  M  P  R  R  Y  V  D  Y  P  D  A  F  A  G  W  N  L  V
1619 TCGTCGGTCGGCTCCTACATTTCCGGCTTCGGCGTCCTGATCTTCCTCTATTGCGTGATCGATGCCTTTGCGAAAAAGGTGCCGGCTGGC
481    S  S  V  G  S  Y  I  S  G  F  G  V  L  I  F  L  Y  C  V  I  D  A  F  A  K  K  V  P  A  G
1709 GACAATCCGTGGGGTGCCGGCGCGACCACGCTGGAGTGGACGCTGCCCTCGCCGCCGCCCTTCCATCAGTTCGAAGTGCTGCCCCGCGTG
511    D  N  P  W  G  A  G  A  T  T  L  E  W  T  L  P  S  P  P  P  F  H  Q  F  E  V  L  P  R  V
1799 CAGTGAGCGATCACCCGCGGCGCCATGACGGGC
541    Q  -
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* To whom correspondence should be addressed