Sequence of a cDNA specifying subunit VIIa of human cytochrome *c* oxidase

Gian Maria Fabrizi[1], Rosario Rizzuto[1], Hirofumi Nakase[1], Shuji Mita[1], Margaret I.Lomax[3], Lawrence I.Grossman[4] and Eric A.Schon[1,2]*

Departments of [1]Neurology and [2]Genetics and Development, Columbia University College of Physicians & Surgeons, 630 West 168th Street, New York, NY 10032, [3]Department of Anatomy and Cell Biology, University of Michigan Medical School, Ann Arbor, MI 48109 and [4]Department of Molecular Biology and Genetics and the Center for Molecular Biology, Wayne State University School of Medicine, Detroit, MI 48201, USA
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Cytochrome c oxidase (COX; EC 1.9.3.1), the last component of the mitochondrial respiratory chain, catalyzes the transfer of electrons from reduced cytochrome c to molecular oxygen. In mammals, the apoprotein is composed of three large catalytic subunits, encoded by the mitochondrial genome, and by ten smaller, nuclear-encoded subunits, which may play a regulatory role (1); subunits VIa, VIIa, and VIII have been shown to have heart- and liver-specific isoforms in cows and pigs (2,3).

Using a bovine liver COX VIIa cDNA (4) as a probe, we isolated a full-length cDNA (clone pCOX7.22; sequence below) from a human adult endothelial cell cDNA library (a gift of M. Chao and D. Littman), specifying the liver-specific isoform of human COX VIIa. The deduced amino sequence of the mature polypeptide is 83% identical to beef liver COX VIIa (3,4) but is only 57% identical to beef heart COX VIIa (5). Human COX VIIa contains a 23-aa cleavable presequence for importation into mitochondria (underlined).

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                                                [GAATTCGG]AGTAACAGCCAAG  (13)

ATGCTGCGGAATCTGCTGGCTCTTCGTCAGATTGGGCAGAGGACGATAAGCACTGCTTCC  (73)
M  L  R  N  L  L  A  L  R  Q  I  G  Q  R  T  I  S  T  A  S    [-4]

CGCAGGCATTTTAAAAATAAAGTTCCGGAGAAGCAAAAACTGTTCCAGGAGGATGATGAA (133)
R  R  H  F  K  N  K  V  P  E  K  Q  K  L  F  Q  E  D  D  E    [17]

ATTCCACTGTATCTAAAGGGTGGGGTAGCTGATGCCCTCCTGTATAGAGCCACCATGATT (193)
I  P  L  Y  L  K  G  G  V  A  D  A  L  L  Y  R  A  T  M  I    [37]

CTTACAGTTGGTGGAACAGCATATGCCATATATGAGCTGGCTGTGGCTTCATTTCCCAAG (253)
L  T  V  G  G  T  A  Y  A  I  Y  E  L  A  V  A  S  F  P  K    [57]

AAGCAGGAGTGACTTCAGTCATCCCAGCAATGGCTTGGTTCAGTTTCATTCAGCTCTCTA (313)
K  Q  E  *                                                     [60]

TGGACCAGTAATCTGATAAATAACCGAGCTCTTCTTTGGGGATCAATATTTATTGACTTG (373)

TAGTAACTGCCACCAATAAAGCAGTCTTTACCATG-AAAAAAAAAAAAAA[CCGAATTC] (408)
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*To whom correspondence should be addressed

Notes: (1) Kadenbach et al. (1987) Curr. Top. Bioenerg. 15, 113; (2) Kadenbach et al. (1983) TIBS 8, 398; (3) Yanamura et al. (1988) Biochemistry 27, 4909; (4) Seelan et al. (1989) Nucl. Acids Res., in press; (5) Meinecke and Buse (1986) Biol. Chem. Hoppe-Seyler 367, 67. Supported by grants from NIH (NS11766 [E.A.S.], RR05384 [L.I.G.], and GM37086 [M.I.L.]); the Muscular Dystrophy Association; the Aaron Diamond Foundation; the Center for Molecular Biology, Wayne State University; and Dr. and Mrs. Libero Danesi.

