Nucleotide sequence of the gene encoding cytochrome *c* oxidase subunit VII from *Saccharomyces cerevisiae*

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Cytochrome *c* oxidase from the yeast *Saccharomyces cerevisiae* is composed of 9 subunits (1): 3 encoded in mitochondrial DNA and 6 in nuclear DNA. The genes for all of the nuclear subunits were previously cloned, with the exception of *COX7*, which encodes subunit VII. To clone that gene, two sets of degenerated oligonucleotides were made, corresponding to all possible DNA sequences for the first 8 and last 7 amino acids of the known protein sequence (2). The oligonucleotides were used in the polymerase chain reaction (PCR) to amplify the coding region from genomic DNA. A PCR product of the correct size was obtained and used to make a probe for colony hybridization of a yeast genomic library (3). Two different *COX7* clones were identified, bearing overlapping fragments. The sequence of the gene, on a 329 bp *TaqI* fragment, is given below. The deduced amino acid sequence of the coding region is in complete agreement with the known protein sequence (2), except for a two amino acid extension at the carboxy terminus. Interestingly, carboxy terminal extensions have also been reported for cytochrome *c* oxidase subunits VIIa (4) and VIII (5). At the amino

terminus, there is an initial methionine which is removed from the protein, but no cleaved presequence. Hence, the import of subunit VII into mitochondria must depend upon targeting information present in the mature protein.

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REFERENCES

1. Power, S.D., Lochrie, M.A., Sevarino, K.A., Paterson, T.E. and Poyton, R.O. (1984) *J. Biol. Chem.* **259**, 6564–6570.
2. Power, S.D., Lochrie, M.A. and Poyton, R.O. (1986) *J. Biol. Chem.* **261**, 9206–9209.
3. Nasymth, K.A. and Tatchell, K. (1980) *Cell* **19**, 753–764.
4. Wright, R.M., Dircks, L.K. and Poyton, R.O. (1986) *J. Biol. Chem.* **261**, 17183–17191.
5. Patterson, T.E. and Poyton, R.O. (1986) *J. Biol. Chem.* **261**, 17192–17197.

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-52          TCGATATAAGATTCTAAACCAACAAGTACAGAAAGCAAAACAATAATAAATA
      1      ATGGCTAATAAAGTTATTCAACTACAGAAAATCTTCCAATCTTCCACTAAACCTCTATGGTGG
            M  A  N  K  V  I  Q  L  Q  K  I  F  Q  S  S  T  K  P  L  W  W
      63      AGACATCCAAGGTCAGCTTTATACCTGTATCCATTTTATGCTATTTTTCGGGTAGCCGTCGTT
            R  H  P  R  S  A  L  Y  L  Y  P  F  Y  A  I  F  A  V  A  V  V
     126      ACACCACTTCTATACATTCCAAATGCTATTAGAGGTATCAAAGCCAAGAAGGCATAGTTAGGT
            T  P  L  L  Y  I  P  N  A  I  R  G  I  K  A  K  K  A
     189      AAAAAATAACATCCGTTTCATAGCATCTTTATAATTGTTCTTTGATATTAAGTGTGTATGCTCAA
     252      TACACATCACCCAAAACATTTTTATTTCGA
  
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