

## Preliminary Studies on the Secondary Structure of Cytochrome c Oxidase and Some of Its Subunits

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Cytochrome c oxidase (E.C. 1.9.3.1), complex IV of the respiratory chain, is an integral constituent of the inner mitochondrial membrane. The aim of this study is an estimation of the secondary structural composition for the whole complex and for subunits II, VIIIa and VIIIb (1) by both, prediction methods (2,3) and analysis of circular dichroism spectra.

The low molecular weight peptides VIIIa and b (4) show similar secondary structures, in particular with respect to the localization of the  $\beta$ -turns, though their amino acid sequences are not homologous. A decrease of the dielectric constant of the solvent leads to an increase of the  $\alpha$ -helical contents as indicated by CD spectroscopy.

For component II (5) the results of the two prediction methods used are not only contradictory, but they are also incompatible with the CD spectrum which is indicative of a helical content higher than predicted. As to this discrepancy it has to be kept in mind that so far prediction methods are all based on the known three-dimensional structures of water-soluble globular proteins.

Further experiments on solubilized oxidase are reported. According to the CD spectrum the average helical content of the whole enzyme complex amounts to about 30 per cent. Upon addition of SDS a partial helix/coil transition takes place which is completed at about 0.1 per cent SDS concentration.

1. Steffens, G.J. and Buse, G. (1976)  
Z. Physiol. Chem. 357, 1125 - 1137.
2. Lim, O.I. (1974)  
J. Mol. Biol. 88, 873 - 894.
3. Chou, P.Y. and Fasman, G.D. (1978)  
Adv. Enzymol. 47, 45 - 148.
4. Buse, G. and Steffens, G.J. (1978)  
Z. Physiol. Chem. 359, 10005 - 10009.
5. Steffens, G.J. and Buse, G. (1979)  
Z. Physiol. Chem. 360, 613 - 619.