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Preliminary X-Ray Studies on *Chromatium vinosum* Flavocytochrome c_{552}

Preliminary crystallographic data are given for *Chromatium vinosum* flavocytochrome c_{552}. This protein is a 72,000 M_r complex incorporating one flavin and two *c*-type cytochrome subunits. Interest attaches to the complex structure owing to observed rapid rates of electron transfer between the flavin and heme prosthetic groups. These results suggest that the structure determination of flavocytochrome c_{552} will allow direct examination of a productive interprotein electron transfer complex.

Chromatium vinosum is an anaerobic purple sulfur bacterium which utilizes H_2S, $S_2O_3^{2-}$, or organic substrates as electron donors for photophosphorylation. Flavocytochrome c_{552} is a 72,000 M_r complex (Bartsch, 1978), which apparently functions in the intact organism as a sulfide dehydrogenase (Fukumori & Yamanaka, 1979). The complex incorporates three polypeptide chains; a 42,000 M_r subunit containing a covalently bound FAD prosthetic group (Kenny & Singer, 1977), and two identical heme-*c*-containing subunits of M_r ~15,000 (Kennel, 1971). Recent kinetic studies (Cusanovich & Tollin, 1980) have demonstrated unusually fast interprosthetic group electron transfer between the hemes and flavin in the complex. These observations suggest that crystallographic studies of this complex may provide information concerning the structural factors responsible for facile electron transfer between proteins.

Crystallization of flavocytochrome c_{552} was carried out by layering 25 μl of a 45 mg/ml protein solution (0·02 M-Tris·HCl, pH 7·3, 0·5 M-NaCl) over 50 μl of similarly buffered 65% saturated ammonium sulfate solution, in a 6 mm × 20 mm test tube (Salemme, 1972). Crystals having a rectangular parallelopiped habit and average dimensions of 0·5 mm grew in two months. X-ray precession photography showed that the protein crystallizes in the monoclinic space group $C2$ with $a = 164{\cdot}3$ Å, $b = 84{\cdot}8$ Å, $c = 108{\cdot}0$ Å, $\beta = 106{\cdot}9°$, $V = 1{\cdot}44 \times 10^6$ Å^3. Assuming an average crystalline protein density of 0·422 dalton/Å^3 (Matthews, 1968), the unit cell data suggest each crystallographic asymmetric unit contains two flavocytochrome *c* complexes. Nevertheless, the crystals exhibit measurable diffraction intensities to a Bragg spacing of ~2·8 Å, and searches for suitable heavy-atom derivatives and non-crystallographic symmetry elements are underway.

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REFERENCES

Bartsch, R. G. (1978). In *The Photosynthetic Bacteria* (Clayton, R. K. & Sistrom, W. R., eds). pp. 249–279, Plenum Press, New York.
Cusanovich, M. A. & Tollin, G. (1980). *Biochemistry*, **19**, 3343–3347.
Fukumori, Y. & Yamanaka, T. (1979). *J. Biochem. (Tokyo)*, **85**, 1405–1413.
Kennel, S. J. (1971). Ph.D. thesis, University of California, San Diego.
Kenney, W. C. & Singer, T. P. (1977). *J. Biol. Chem.* **252**, 4767–4772.
Matthews, B. W. (1968). *J. Mol. Biol.* **33**, 491–497.
Salemme, F. R. (1972). *Arch. Biochem. Biophys.* **151**, 533–539.

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