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A plant-ferredoxin-like gene is located upstream of ferredoxin I gene (*fdxN*) of *Rhodobacter capsulatus*

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The gene encoding the ferredoxin I (fdxN) of the *Rhodobacter* capsulatus SB1003 was obtained by screening a Lorist2 cosmid library using an oligonucleotide probe based on the complete sequence of the protein. The gene was subcloned into pUC118/119 and sequenced. Just upstream of the ferredoxin I gene, we found an open reading frame (282bp) encoding a protein whose primary structure was quite similar to those of plant-type ferredoxins. A partial sequence of this ORF from strain B10 was reported together with fdxN by another group recently (1), however, discrepancies were observed between our sequence and theirs. Discrepant nucleotides are underlined and in uppercase. Possible ribosome binding sites are indicated with dots. The amino acid sequence predicted by the ORF was compared to those of ferredoxins from Horsetail (2) and Spinach (3). Residues in

common with the R. capsulatus gene product are indicated by (+) and possible ligand binding Cys residues are stressed.

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REFERENCES

- 1. Schatt, E., Jouanneau, Y. and Vignais, P.M. (1989) J. Bacteriol. 171, 6218-6226.
- 2. Hase, T., Wada, K. and Matsubara, H. (1977) J. Biochem. 82, 267-277.
- 3. Matsubara, H. and Sasaki, R.M. (1968) J. Biol. Chem. 243, 1732-1757.

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c) AAYKVTLVTPTGNVEFQCPDDVYILDAAEEEGIDLPYSC RAGSCSSCAGKLKTGSLNQDDQSF----LDDDQIDEGWVLTC AAYPVSDVTIETHKEEELTA

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Comparison of the ORF Product and Plant Ferredoxins: a) R. capsulatus; b) Horsetail I; c) Spinach I.

Sequence Strategy of the Plant-type Ferredoxin Gene and Ferredoxin I Gene of *Rhodobacter capsulatus* SB1003. A 2.6kbp EcoRI and HindIII fragment, which was screened from a Lorist2 cosmid library and subcloned into pUC118 or pUC119, was subjected to a partial digestion by exonuclease III to generate directed partial deletion fragments. The resulting nucleotides were sequenced by the use of a Sequenase version 2.0 DNA sequencing kit from United States Biochemical Corporation. Usually, each ssDNA was sequenced with both GTP and ITP labeling mix, respectively, to get reliable data from this GC rich organism.