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Primary structure of the *Chlorella vulgaris* small subunit ribosomal RNA coding region

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The small subunit ribosomal RNA gene of Chlorella vulgaris (type strain 211-11b of the Göttingen collection, FRG) was amplified from bulk genomic DNA by a modification of the polymerase chain reaction technique (1) as previously described (2). Both orientations of the amplified small subunit rRNA coding region were cloned as BamHI/SalI fragments into M13 phage mp18 and mp19. Complete sequences for both strands were determined by initiating dideoxy-nucleotide sequencing reactions (3) with oligonucleotide primers complementary to conserved regions in eukaryotic small subunit rRNA coding regions (4). Sequences corresponding to the oligonucleotides used in the amplification reaction are indicated by lower case letters (they were not determined from genomic DNA). The C. vulgaris small subunit rRNA sequence is 1798 nucleotides long and similarities with other known green alga sequences range from 93% with Chlamydomonas reinhardtii (5) to 97% with Nanochlorum eukaryotum (6).

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   1 aaccugguug auccugccag uAGUCAUAUG CUUGUCUCAA AGAUUAAGCC AUGCAUGUCU AAGUAUAAAC UGCUUUAUAC
  81 UGUGAAACUG CGAAUGGCUC AUUAAAUCAG UUAUAGUUUA UUUGAUGGUA CUUACUACUC GGAUACCCGU AGUAAAUCUA
 161 GAGCUAAUAC GUGCGUAAAU CCCGACUUCU GGAAGGGACG UAUUUAUUAG AUAAAAGGCC GACCGGGCUU CUGCCCGACU
 241 CGCGGUGAAU CAUGAUAACU UCACGAAUCG CAUGGCCUUG UGCCGGCGAU GUUUCAUUCA AAUUUCUGCC CUAUCAACUU
 321 UUGAUGGUAG GAUAGAGGCC UACCAUGGUG GUAACGGGUG ACGGAGGAUU AGGGUUCGAU UCCGGAGAGG GAGCCUGAGA
 401 AACGGCUACC ACAUCCAAGG AAGGCAGCAG GCGCGCAAAU UACCCAAUCC UGACACAGGG AGGUAGUGAC AAUAAAUAAC
 481 AAUACUGGGC CUUUUCAGGU CUGGUAAUUG GAAUGAGUAC AAUCUAAACC CCUUAACGAG GAUCAAUUGG AGGGCaAGUC
 561 UGGUGCCAGC AGCCGCGGUA AUUCCAGCUC CAAUAGCGUA UAUUUAAGUU GCUGCAGUUA AAAAGCUCGU AGUUGGAUUU
 641 CGGGUGGGAC CUGCCGGUCC GCCGUUUCGG UGUGCACUGG CAGGGCUCAC CUUGUUGCCG GGGACGGGCU CCUGGGCUUC
 721 ACUGUCCGGG ACUCGGAGUC GGCGCUGUUA CUUUGAGUAA AUUAGAGUGU UCAAAGCAGG CCUACGCUCU GAAUACAUUA
 801 GCAUGGAAUA ACACGAUAGG ACUCUGGCCU AUCCUGUUGG UCUGUAGGAC CGGAGUAAUG AUUAAGAGGG ACAGUCGGGG
 881 GCAUUCGUAU UUCAUUGUCA GAGGUGAAAU UCUUGGAUUU AUGAAAGACG AACUACUGCG AAAGCAUUUG CCAAGGAUGU
 961 UUUCAUUAAU CAAGAACGAA AGUUGGGGGC UCGAAGACGA UUAGAUACCG UCCUAGUCUC AACCAUAAAC GAUGCCGACU
1041 AGGGAUCGGC GGAUGUUUCU UCGAUGACUC CGCCGGCACC UUAUGAGAAA UCAAAGUUUU UGGGUUCCGG GGGGAGUAUG
1121 GUCGCAAGGC UGAAACUUAA AGGAAUUGAC GGAAGGGCAC CACCAGGCGU GGAGcCUGCG GCUUAAUUUG ACUCAACACG
1201 GGAAAACUUA CCAGGUCCAG ACAUAGUGAG GAUUGACAGA UUGAGAGCUC UUUCUUGAUU CUAUGGGUGG UGGUGCAUGG
1281 CCGUUCUUAG UUGGUGGGUU GCCUUGUCAG GUUGAUUCCG GUAACGAACG AGACCUCAGC CUGCUAAAUA GUCACGGUUG
1361 GUUCGCCAGC CGGCGGACUU CUUAGAGGGA CUAUUGGCGA CUAGCCAAUG GAAGCAUGAG GCAAUAACAG GUCUGUGAUG
1441 CCCUUAGAUG UUCUGGGCCG CACGCGCGCU ACACUGAUGC AUUCAACGAG CCUAGCCUUG GCCGAGAGGC CCGGGUAAUC
1521 UUCGAAACUG CAUCGUGAUG GGGAUAGAUU AUUGCAAUUA UUAAUCUUCA ACGAGGAAUG CCUAGUAAGC GCAAGUCAUC
1601 AGCUUGCGUU GAUUACGUCC CUGCCCUUUG UACACACCGC CCGUCGCUCC UACCGAUUGG GUGUGCUGGU GAAGUGUUCG
1681 GAUUGGCGAC CUGGGGCGGU CUCCGCUCUC GGCCGCCGAG AAGUUCAUUA AACCCUCCCA CCUAGAGGAA GGAGAAGUCG
1761 UAACAAGGUU UCCguaggug aaccugcaga aggaucaa
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REFERENCES

1. Saiki, R.K., Gelfand, D.H., Stoffel, S., Scharf, S.J., Higuchi, R., Horn, G.T., Mullis, K.B., and Erlich, H.A. (1988) Science **239**:487-491.
2. Medlin, L., Elwood, H.J., Stickel, S. and Sogin, M.L. (1988) Gene **71**:491-499.
3. Messing, J. (1983) Methods Enzymol. **101**:20-78.
4. Elwood, H.J., Olsen, G.J., and Sogin, M.L. (1985) J. Mol. Biol. and Evol. **2**:399-410.
5. Gunderson, J.H., Elwood, H., Ingold, A., Kindle, K., and Sogin, M.L. (1987) Proc. Natl. Acad. Sci. USA **84**:5823-5827.
6. Sargent, M., Zahn, R., Walters, B., Gupta, R., and Kaine, B. (1988) Nucl. Acids Res. **16**:4156.

