

trnR-CCG is not unique to the plastid DNA of the liverwort *Marchantia*: gene identification from the moss *Physcomitrella patens*

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The entire sequences of the plastid genomes of the liverwort *Marchantia polymorpha*, tobacco and rice have been determined (1–3). Sequence comparisons revealed a high homology between the respective genes of the liverwort, the dicot and the monocot. Nevertheless, two genes, the Arg-tRNA gene *trnR*-CCG and the gene *rpl21* which encodes for a 50S ribosomal protein, appeared to be unique for plastid DNA of the liverwort (4), although the corresponding tRNA is found in prokaryotes, e.g. in *E. coli* (5).

As *trnR*-CCG in *Marchantia polymorpha* is located downstream of *rbcL*, we cloned the respective region from *Physcomitrella patens* plastid DNA as the *Bgl*III fragment 8 (6) and generated a 3055 bp *Bgl*II-*Hind*III subfragment which was subsequently sequenced after combined exonuclease III/S1 nuclease treatment. The *trnR*-CCG of the moss was identified by a 89.2% homology to the respective gene of the liverwort. A secondary structure of the *trnR* DNA sequence of *Physcomitrella* is shown in the figure. This is the first sequence data from moss plastid DNA.

This gene comprises, as it does in *Marchantia*, 74 bp and is situated 168 bp downstream of the *rbcL* and 200 bp upstream of ORF 315 which is homologous to ORF 316 of the liverwort. The respective values for *Marchantia* are 94 bp and 114 bp. The G+C content of the upstream spacer is 11.3% (*Marchantia*: 12.8%) and that of the downstream one is 8% (9.6%). Although both spacer regions of both organisms are rich in AT there is little homology between them.

Like in *Marchantia* *trnR*-CCG of *Physcomitrella* contains a pair of mismatching nucleotides (T6·T68) in the amino-acyl stem. This destabilizing of the aminoacyl-stem is also found in other *trnR* genes, e.g. in *trnR*-ACG of *Marchantia* and *Chlamydomonas* (7, 8) and may alter the codon-anticodon recognition.

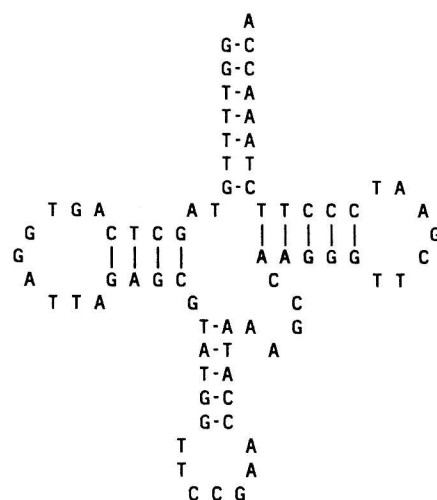
We found a close relationship between plastid DNAs of moss and liverwort concerning the existence, the localization and the nucleotide sequence of the *trnR*-CCG.

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