

Examination of the annotated tRNA^{Arg}_{GCG} in *Physcomitrella patens*

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tRNAs play an important role as an adapter between mRNA and proteins. Each type of tRNA molecule can only bind one type of amino acid. Since the genetic code is degenerate, tRNAs containing different anticodons can carry the same amino acid.

Arginine is one of the amino acids for which six codons were assigned in the genetic code. In the genome of plants five of the six tRNA^{Arg} anticodons were identified. Namely the anticodons: ACG, UCG, CCG, UCU and CCU. The sixth anticodon GCG was not identified in plants (1). All five tRNA^{Arg} that were identified in plants show high similarities in their sequence and structure; in some plants the corresponding tRNA^{Arg} isoacceptors are identical (1).

However in *P.patens* the sixth tRNA^{Arg} with the anticodon GCG was annotated (2) although TFAM 1.3 (<http://tfam.lcb.uu.se/>) that uses information from the entire sequence, and not just the anticodon, to analyse the function or aminoacylation charging potential of tRNAs does not predict this tRNA to be an arginine isoacceptor. The potential existence of a GCG isoacceptor is interesting, since it has been assumed that the CGC codon, which occurs quite often in the genome, is read by the ACG anticodon. The A in this anticodon is maybe modified into an inosine. To see if the annotated tRNA^{Arg}_{GCG} is a functional tRNA we analyzed the charging level and structure of a tRNA^{Arg}_{GCG} transcript. The arginine charging level was measured with aminoacyl-tRNA synthetases from *E.coli*, soybean and jack bean.

(1) <http://gtrnadb.ucsc.edu/GtRNAdb/>

(2) Rensing S.A, et al. (2007) The genome of the moss *Physcomitrella patens* reveals evolutionary insights into the conquest of land by plants. Science Dec 13th 2007

(3) Delannoy E., et al. (2009) *Arabidopsis* tRNA adenosine deaminase arginine edits the wobble nucleotide of chloroplast tRNA^{Arg}(ACG) and is essential for efficient chloroplast translation. The Plant Cell, 21: 2058-2071