

The gene for mitochondrial ribosomal protein S14 has been transferred to the nucleus in *Arabidopsis thaliana*

Figuerola, P., Gómez, I., Carmona, R. et al. The gene for mitochondrial ribosomal protein S14 has been transferred to the nucleus in *Arabidopsis thaliana*. *Mol Gen Genet* 262, 139–144 (1999). <10.1007/s004380051068> Accessed 09 Nov 2022.

Abstract

The transfer of genetic information from the mitochondrion to the nucleus is thought to be still underway in higher plants. The mitochondrial genome of *Arabidopsis thaliana* contains only one *rps14* pseudogene. In this paper we show that the functional gene encoding mitochondrial ribosomal protein S14 has been translocated to the nucleus. This gene transfer is a recent evolutionary event, which occurred within Cruciferae, probably after the divergence of *Arabidopsis* and *Brassica napus*. A 5' extension of the *rps14* reading frame encodes a presequence which, in vitro, targets the polypeptide to isolated mitochondria and is cleaved off during or after import. No intron was found at the junction of the targeting presequence with the mitochondrially derived sequence, which are directly connected. By contrast, a 90-bp intron, which is removed by splicing to give a mature poly(A)+mRNA of 0.9 kb, is located in the 3' non-coding region. To our knowledge, this is the first report of an intron in such a position in a functional transferred gene in higher plants, and suggests that exon shuffling may have been involved in the acquisition of elements necessary for expression in the nucleus. Putative roles of this intron in polyadenylation and enhancement of gene expression are discussed.

Keywords

Evolutionary gene transfer, Plant mitochondria, Ribosomal protein S14, Mitochondrial targeting peptide, Nuclear intron.