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DNA transfer between the chloroplast, mitochondrion and nucleus

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Abstract

To date, there are a lot of reports on transfer of DNA between plastid, mitochondrion and nuclear genomes. In particular, during the plant evolution, most organellar genes have been transferred to the nucleus and this process is seemingly continued now. Here, we present results of detailed search for traces of organellar DNA in the nucleus of four higher plants (*Populus trichocarpa*, *Vitis vinifera*, *Glycine max*, *Zea mays*), as well as DNA exchange between plastid and mitochondrion genomes of five plants (*Arabidopsis thaliana*, *V.vinifera Brassica napus, Oryza sativa japonica* and *Zea mays*). ~73%, ~90%, ~97% and ~99.5% of the plastid genome of black cottonwood, wine grape, soybean and maize, respectively, as well as ~51% and ~94% of mitochondrion genomes of *V.vinifera* and *Z.mays* are present in the nuclear genome, as multiple DNA fragments with intact copies of many organellar genes. The nuclear copy of vine grape mitochondrion *rpl14* gene encoding a putative ribosomal L14 protein targeted to the mitochondria, seems, to be expressed. Moreover, our results suggest a presence of ~17%, ~40% and ~29% of the plastid DNA in the mitochondrion genome of rice, maize and rape, respectively. By contrast, for only a few persents of Arabidopsis and rape plastid DNA is presented in the mitochondrian genome.

Biography

Professor Jalal A. Aliyev has started his studies in biology 65 years ago. His research activity covers different fields of biology (molecular biology, molecular genetics, gene and cellular biotechnology, biochemistry, etc.). In particular, activities in computational biology and Bioinformatics in Azerbaijan have been initiated by J.Aliyev in 1970 and now his former students in this area continue their studies in USA, UK, Japan and Turkey. He has published more than 600 papers in reputed journals. At present, he is a head of Department of Fundamental problems of biological productivity in the Institute of Botany, Azerbaijan National Academy of Sciences.