

A novel nuclear protein Np23 from the ancestral dinoflagellate *Oxyrrhis marina*

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SUMMARY

Dinoflagellates are unusual eukaryotes because of their nuclear characteristics. Chromosomes in dinoflagellates are permanently condensed throughout the whole cell cycle. Moreover, not all histone proteins that are well conserved in eukaryotes are found in dinoflagellate nuclei. Some nuclear proteins were identified in previous studies, but no identified protein was located in their chromosomes. Therefore, its molecular structure remains unclear. To elucidate the architecture of dinoflagellate chromosomes, we specifically examined the nuclear protein, Np23, which is co-localized on chromosomes in the most ancestral dinoflagellate *Oxyrrhis marina*. This study established a method for isolating the *Oxyrrhis* nucleus and obtained plural Np23 genes. Actually, Np23 comprises at least nine molecular species. Based on estimated amino acid sequences of all Np23, one bipartite nuclear localization signal located on the N terminal region, but other typical domains observed in other eukaryotic nuclear proteins were not found. Using BLASTN analyses, the amino acid sequences of Np23 proteins were shown to have homology to two proteins derived from typical dinoflagellates and to one protein derived from a virus. In conclusion, Np23 protein is a novel nuclear protein. Moreover, Np23 might be conserved among dinoflagellates; the protein might be derived via viral infection to the common ancestor of dinoflagellates.