

Identification of nuclear localization signals in ciliate *Tetrahymena thermophila*

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SUMMARY

Ciliate macronucleus (MAC) and micronucleus (MIC) are functionally and structurally distinct, thus protein compositions are expected to be different between these two nuclei. To compose such distinct nuclei, a specific set of nuclear proteins must be transported to an each appropriate nucleus. It is well known that nuclear proteins often have a nuclear localization signal (NLS) by which nuclear transport receptors, namely importins, can carry the proteins to the nucleus. In ciliates, however, an NLS has never been identified in their own nuclear proteins. To identify such an NLS specific to each of the MAC and the MIC, we have tested localization of GFP-GST fusions of nucleus-specific proteins of *Tetrahymena thermophila* (macronuclear histone H1 and micronuclear linker histone), and found that certain fragments of these proteins are responsible for nucleus-specific nuclear localization. In this study, we demonstrate the first experimental identification of endogenous NLSs in nuclear proteins of *T. thermophila*. We also demonstrate the minimum functional sequences responsible for nucleus-specific transport to the MAC and the MIC. Our results suggest the existence of NLS-dependent nuclear transport pathways that define the two nuclei in ciliates.