Remarkable diversity of the small Rab GTPases in a ciliate, *Tetrahymena thermophila*

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SUMMARY

The small Rab GTPases are highly conserved in unicellular and multicellular eukaryotes. Rab proteins play an essential role in regulation of membrane traffic. We have identified 89 open reading frames of Rab genes from the unicellular protozoan ciliate, *Tetrahymena thermophila.* We cloned 86 cDNAs and determined their nucleotide sequences. Their deduced encoded amino acid sequences are compared with human and yeast Rab sequences by multiple alignment and phylogenetic analysis. The results indicate that 42 *Tetrahymena* Rab proteins have a high similarity to Rab from other organisms. The remaining 44 *Tetrahymena* Rab proteins have a low similarity to Rab from other organisms. These may be species-specific Rab proteins. In addition, we identified 229 open reading frames of Rab genes from the unicellular protozoan ciliate, *Paramecium tetraurelia.* Analysis of *Tetrahymena* and *Paramecium* Rab proteins indicated the presence of ciliate-specific Rab proteins. *T. thermophila* and *P. tetraurelia* seem to have acquired species-specific Rab proteins that are different from evolutionarily conserved Rab proteins. It is possible that the function of these Rab proteins may be important for expansion of cellular functions in ciliates.