SNM1 encodes an essential subunit of the enzyme RNase MRP, along with the protein subunits Rpp1p, Pop1p, Pop3p, Pop4p, Pop5p, Pop6p, Pop7p, Pop8p, and Rmp1p, and the RNA subunit NME1. Both genetic and direct physical interactions are observed between Snm1p and the NME1 RNA. All of the protein subunits of RNase MRP except for Snm1p and Rmp1p are shared with the related enzyme RNase P. RNase MRPis required for processing of pre-rRNA, and in vitro performs cleavage of pre-5.8S rRNA at the A3 site. In S. cerevisiae, RNase MRP has also been shown to be required for progression of the cell cycle at the end of mitosis: mutations in genes encoding several RNase MRP subunits, including SNM1, cause delays in late mitosis and the accumulation of cells in telophase, with large buds and dumbbell-shaped nuclei. This cell cycle delay is due to a defect in degradation of the CLB2 mRNA, which must occur in order for mitosis to be completed. RNase MRP has a role in degradation of the CLB2 mRNA, and likely also degradation of other specific mRNA substrates, via cleavage of the mRNA 5' untranslated region which allows further degradation of the mRNA by Kem1p.The localization of RNase MRP changes during the cell cycle, reflecting these multiple roles in RNA processing. Most RNase MRP is located in the nucleolus, where it performs pre-rRNA processing. However, during mitosis, RNase MRP is localized throughout the nucleus and also localizes, along with the Kem1p nuclease, to a specialized type of mRNA processing bodycalled the TAM bodythat is present in a single copy in the cytoplasm of daughter cells. The TAM body is the site of specific degradation of the CLB2 mRNA and probably other mRNAs as well. Asymmetric localization of the TAM body to daughter cells is dependent on the locasome, which is a protein-mRNA complex that transports at least 30 different mRNAs, for example the ASH1 mRNA, specifically to daughter cells. This degradation of cell cycle-regulated, daughter cell-specific mRNAs is required for completion of mitosis.RNase MRP is also thought to have a role in the initiation of mitochondrial DNA replication in mammals, via site-specific cleavage of mitochondrial RNAs to create replication primers, and a portion of RNase P has been detected in mammalian mitochondria. Although S. cerevisiae RNase MRP can cleave both yeast and mammalian RNAs in a site-specific manner in vitro, it has not been detected in mitochondria, nor has a role in mitochondrial DNA replication been demonstrated.RNase MRP is highly conserved throughout evolution, although putative orthologs of the Snm1p subunit have not been identified outside of the fungi. Mutations of the human homolog of the NME1 RNA subunit, RMRP, are associated with the developmental disorder cartilage-hair hypoplasia.Note: Three enzyme complexes involved in RNA processing are evolutionarily and physically related, and are easily confused with each other. Mitochondrial RNase P is composed of the mitochondrially-encoded RPM1 RNA and the nuclear-encoded protein Rpm2p; it removes the 5' leaders from mitochondrial tRNA precursors. Nuclear RNase P, which removes the 5' leaders from cytoplasmic tRNA precursors, is composed of the RPR1 RNA subunit and Pop1p, Pop3p, Pop4p, Pop5p, Pop6p, Pop7p, Pop8p, Rpp1p, and Rpr2p. RNase MRPshares some subunits with nuclear RNase P: it is composed of an RNA subunit encoded by the nuclear NME1 gene and the protein subunits Rpp1p, Snm1p, Pop1p, Pop3p, Pop4p, Pop5p, Pop6p, Pop7p, Pop8p, and Rmp1p. RNase MRP processes pre-rRNAs in the nucleolus and is also present during mitosis in cytoplasmic RNA processing bodies, where it has a role in degradation of daughter cell-specific mRNAs via cleavage of 5' untranslated regions. In mammals, a portion of RNase MRP enters mitochondria and processes RNAs to create RNA primers for DNA replication, but this has not been shown in fungi.