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Introduction

This special issue of *Molecular Biology Reports* represents an effort to summarize several aspects of the precursor RNA processing enzymes RNase MRP and RNase P.

RNase MRP (abbreviated from *Mitochondrial RNA Processing*) is involved in the cleavage of mitochondrial transcripts *in vitro* in a manner that implies its role in primer formation for mitochondrial DNA replication. However, it is also known that the largest fraction of RNase MRP is located by far in the nucleolus where it is involved in ribosomal RNA processing.

RNase P is responsible for the generation of the mature 5' end of transfer RNAs by a single endonucleolytic cleavage. In the *Escherichia coli* enzyme, the RNA subunit (also called M1 RNA) is able to cleave precursors of tRNAs in the absence of protein *in vitro*. However, the protein subunit (also called C5 protein) is essential for the activity *in vivo*.

RNases MRP and TNases P share several additional characteristics. Like other endonucleases, the enzymes produce 3' hydroxyls and 5' phosphates and they can process similar model substrates. In most instances the archaeal, bacterial, plant and mammalian enzymes have been found to be associated with a number of proteins. Although the exact composition of these complexes remains unclear, it has been postulated for the human enzymes that they may contain at least 4–6 proteins. However, only a few cDNAs coding for proteins contained in these ribonucleoprotein enzymes have been isolated so far. One of them is the yeast POP1 (abbreviated from *Processing of Precursor RNAs*), an essential gene that encodes a protein product of 100.5 kD associated with both the RNase MRP and RNase P RNAs. The human homologue of POP1 (115 kD) has been cloned recently (Z. Lygerou, H. Pluk, W. J. van Venrooij and B. Séraphin, submitted) and was shown to be recognized by human autoantibodies. However, the hPOP1 appears to be different from the RNase MRP and RNase P associated 40 kD antigen (in this issue referred to as Th40) identified using immunoprecipitation with human anti-Th/To antibodies. The fact that both (human) enzymes share some common protein components and that they catalyze a common enzymatic reaction indicates that they belong to the same family.

Another protein is encoded by the SNM1 gene. This yeast gene encodes an RNA binding protein of 22 kD that is associated exclusively with the RNase MRP RNA and not the RNase P RNA. Thus, next to a set of common or core proteins (POP1, Th40), both enzymes may contain specific proteins as well. This is reminiscent of the situation of the U snRNPs which also contain common or core proteins (the so-called Sm proteins) and specific proteins are present only on one type of particle.

Although the reviews presented in this issue show that, in the last decade, considerable progress has been made concerning the widespread appearance of RNase MRP and RNase P, ranging from bacteria to plants and humans, the structure of their RNAs and the behaviour of the purified RNA or RNA-protein complexes in enzymatic catalysis, it is clear that much work still has to be done.

We hope that this collection of papers may help readers in addressing the questions that still have to be answered.

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