

“Generating Functional tRNAs in *Escherichia coli*”

In the Gram negative bacterium *Escherichia coli*, there are 86 tRNA genes. Many are transcribed as monocistronic transcripts, while a large number are part of polycistronic transcripts that include multiple tRNAs or tRNAs and mRNAs. Eleven of the 86 tRNAs are embedded in the seven ribosomal RNA operons. All of the tRNAs are transcribed with extra nucleotides at both their 5' and 3' ends that must be removed to generate a functional tRNA that can be aminoacylated with the correct amino acid.



Polycistronic transcripts are initially processed by endoribonucleases, either RNase E or RNase P, to generate pre-tRNAs that retain extra nucleotides at both their 5' and 3' ends. The mature 5' ends are subsequently generated by RNase P, which is a ribozyme. The mature 3' end arises primarily from the action of a series of 3' → 5' exonucleases including RNase T, RNase PH, RNase BN/Z, RNase D and polynucleotide phosphorylase. Of particular interest is the fact the pre-tRNAs with extra nucleotides at their 3' termini are excellent substrates for poly(A) polymerase (PAP I). In fact, there is a competition among RNase T, RNase PH and PAP I for pre-tRNAs. New work will be presented that suggests an interaction between RNase P and PAP I in the generation of functional tRNAs.