Identification of the enzyme responsible for the acp3U modification in bacteria

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tRNAs are molecules that translate mRNA into proteins. tRNAs must receive chemical modifications for proper function, and incorrect modifications can lead to defects such as cancer. The 3-(3-amino-3-carboxypropyl) uridine (acp3U) modification is formed on some bacterial, plant, and animal tRNAs by an unknown enzyme.  To identify this enzyme, primer extension of tRNA from *E. coli* strains lacking genes encoding predicted methyltransferases with no known function were tested for the presence of acp3U, which causes a primer extension block. Eleven candidate genes have been tested, and none appear to be responsible for the modification. In a complementary approach to identify the enzyme, acp3U formation activity is being purified from *E. coli* using various protein separation techniques. To detect enzyme activity, a radiolabeled tRNA is incubated with protein, digested, and analyzed by thin layer chromatography to detect modified nucleotides. Identification of the bacterial enzyme will allow study of the function of acp3U.