

The evolutionary history of Cys-tRNA^{Cys} formation

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Contributed by Carl R. Woese, November 4, 2005

The recent discovery of an alternate pathway for indirectly charging tRNA^{Cys} has stimulated a re-examination of the evolutionary history of Cys-tRNA^{Cys} formation. In the first step of the pathway, O-phosphoseryl-tRNA synthetase charges tRNA^{Cys} with O-phosphoserine (Sep), a precursor of the cognate amino acid. In the following step, Sep-tRNA^{Cys} synthase (SepCysF) converts

of a putative class II CysRS in *Methanococcus jannaschii* (gene MJ1660) and related euryarchaea. MJ1660 and its orthologs form a monophyletic gene family that is obviously unrelated to the typical class I CysRS (9). The story was soon confirmed and elaborated by the elegant biochemical and genetic work of Söll and colleagues (10), which indicated that the SepCysF-like II