SEPARATION OF SEVEN LYSINE tRNA ISOACCEPTOR SPECIES AND THEIR RELATIONSHIP TO THE GROWTH STATE OF MAMMALIAN CELLS

by

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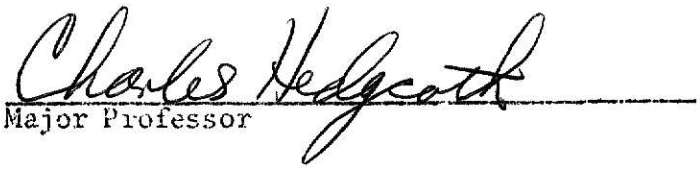

Major Professor

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INTRODUCTION

Transfer ribonucleic acid (tRNA) has the cellular function of serving as a link between the genetic word encoded in messenger ribonucleic acid and the corresponding amino acid. Hence, its role in the protein biosynthetic system of the cell is of prime importance. However, it is clear that tRNA is a multifunctional molecule with additional roles of fundamental importance to the cell.

Besides its function in protein biosynthesis, tRNA serves in bacteria (1) as well as in mammals (2), as a mediator in the non-ribosomal enzymatic transfer of certain amino acids to the amino terminal end of specific proteins. Also, in some gram-positive bacteria specific tRNA's work exclusively in the synthesis of cell wall peptidoglycans, such as $tRNA^{Gly}$ in Staphylococcus aureus (3). tRNA may also function as an allosteric effector of specific enzymes in procaryotes (4) and eukaryotes (5).

That tRNA could have a regulatory role in the biosynthesis of proteins has been suggested by several researchers (6,7,8). They have postulated that tRNA, when present in limiting amounts, may modulate the translation of the genetic message. This view is supported by experiments done using an in vitro hemoglobin synthesizing system which indicate that there are isoaccepting tRNAs for a single amino acid with a specificity for certain codons (9,10). It was also shown that the rates of synthesis of the alpha and beta chains are susceptible to variations in the specific concentration of tRNA isoacceptors (11). This effect also is observed with artificial messenger (12).