

Nichapa Chanawungmuang 2012: The Deacylation of Aminoacyl-tRNAs: An Effort toward the Synthesis of Alanyl Adenosine. Master of Science (Chemistry), Major Field: Chemistry, Department of Chemistry. Thesis Advisor: Mr.Pitak Chuawong, Ph.D. 100 pages.

Protein biosynthesis is one of the most important biological processes in all kind of living organisms. The major component for protein translation is the aminoacyl-tRNAs, formed by the action of enzymes called aminoacyl-tRNA synthetases (AARSs). Several biochemical investigations related to tRNA aminoacylation rely on stability of aminoacylated tRNAs. It has been reported that, under physiological condition, aminoacylated tRNAs are not stable and undergo deacylation releasing free tRNAs and amino acids. The half -life of this process is approximately 20 minutes at 37 °C.

However, the deacylation process is significantly slower if the α -amino group of an amino acid is formylated or acylated. It has been speculated that the unusual stability toward hydrolysis of acylated amino acids is a result of the lack of an intramolecular hydrogen bond within the molecule. Here we report an effort toward the synthesis of free and acylated alanyladenosine, aminoacyl-tRNA mimics for deacylation study. The synthesis started from a commercially available adenosine. The 5'-TBDMS protected adenosine was then subjected to amino acid coupling under various conditions. The final step is the deprotection of TBDMS and Boc groups. However, the deprotection often results in the deacylation of the amino acid from adenosine moiety. The screening for optimal deprotection condition is needed in order to complete the synthesis of our aminoacyl-tRNA mimics.

Student's signature

Thesis Advisor's signature