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Synergistic Effects of Nucleosides on Amino Acid Dipeptide Yields in Aqueous Conditions

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Abstract: Submarine hydrothermal systems could be the sites for the origin of life on earth.^[1,2] Since then, researchers' interested in studying the chemical origin of life have dramatically increased in aqueous solutions. It was found that amino acids can form dipeptide in the presence of the trimetaphosphate (P_3m) aqueous solution.^[3] However, how do the nucleotides activate amino acids to produce the dipeptides? We focus on the relationship between the nucleoside and efficiency for amino acid peptide formation to dissect the origin of genetic code from modern ribosome system. Our previous study showed that the dipeptide yield was dependent on the type of nucleosides. In this paper, our concern is the synergistic effect of codon and anticodon (A/U, C/G) on the forming peptide of amino acid. The detailed experimental strategy is showed as Figure 1 a. To take the peptide formation of phenylalanine (Phe) as an example, the preliminary experimental results reveal that the synergistic effect of the A/U, anticodon/codon of Phe, could be more promoted the formation of Phe-Phe dipeptide than C/G (Figure 1 b, 1 c). The above results imply that there are some synergistic effects of nucleosides on dipeptide yields, which might give novel view to understand the genetic code origin.

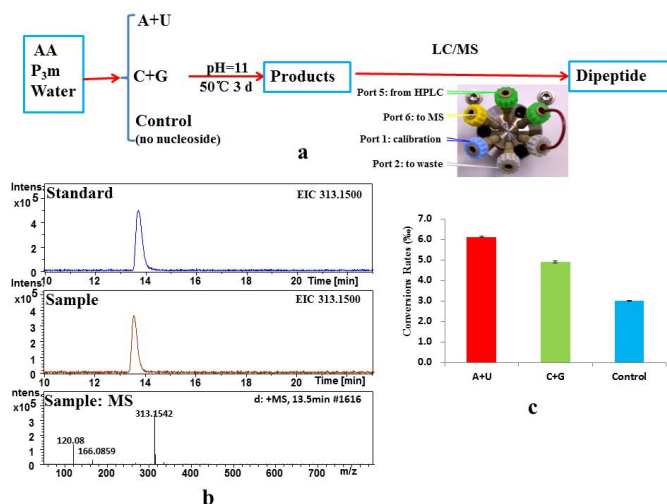


Figure 1 Reaction and analysis of Phe-Phe product

a: Synthesis of Phe-Phe; b: HPLC-ESI-MS/MS spectra of Phe-Phe product and Standard; c: Yields of the Phe-Phe dipeptide

References:

[1] Corliss J B et al. 1979. *Science*, 203(4385): 1073-1083. [2] Corliss J B et al. 1981. *Oceanologica Acta*, 4(59): 9. [3] Rabinowitz J et al. 1969. *Nature*. 224: 795-796.

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