A Characterization of the Maillard Reaction of Ribose 5-Phosphate and Amino Acids

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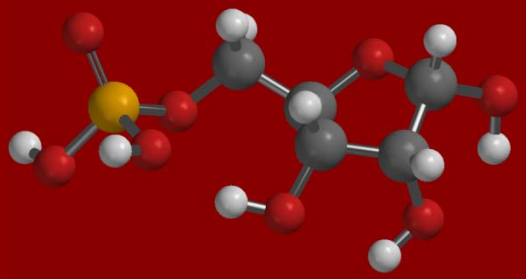
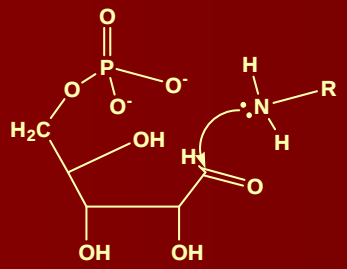
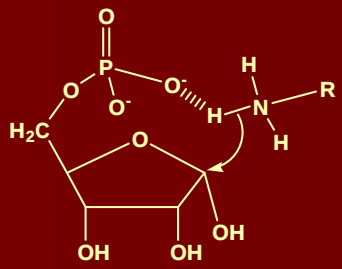
The goal of our research is to determine why ribose 5-phosphate (R5P) undergoes a Maillard reaction with amines at rates significantly higher than most other sugars and sugar phosphates. It is believed that the intramolecular phosphate group is either responsible for causing a higher level of acyclic form of the ribose sugar or for enhancing the rate of reaction through a general acid/base mechanism.



Ribose 5-Phosphate



Promotion of Acyclic Form



General Base Catalysis

The kinetics of the Maillard reaction between R5P and various amino acids is fully characterized and will be compared to the rates of similar reactions with and without intramolecular phosphate and of molecules containing methylated phosphate moieties. Some novel UV-absorbing compounds have been determined using 2-deoxyribose 5-phosphate analogues to R5P.