

OUTLINE

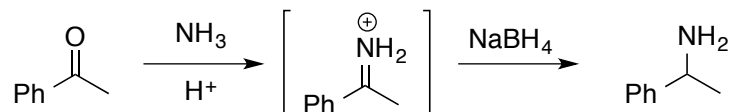
## Amino Acid Synthesis

- Organic Synthesis – Reductive Amination - McMurry 26.3
- Biosynthesis of Asparagine and Proline – not in the textbook, use lecture notes
- Catabolism – Transamination – McMurry 29.9
  - Biosynthesis of Alanine, Glutamate, and Aspartate

**HW assignment at the end of these notes (L5-6)**

Organic Synthesis

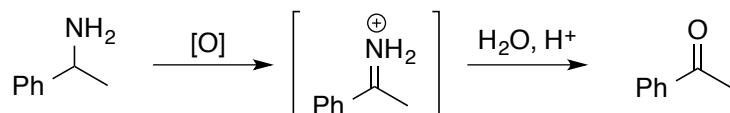
*Reductive Amination (Ketone → [Imine] → Amine)*

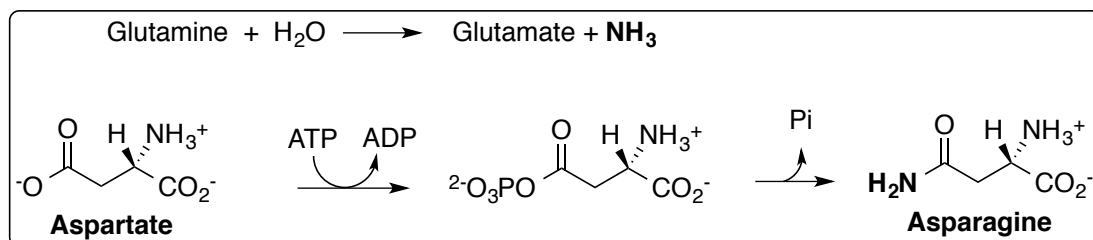


Applied to amino acid synthesis:

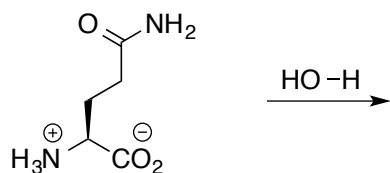
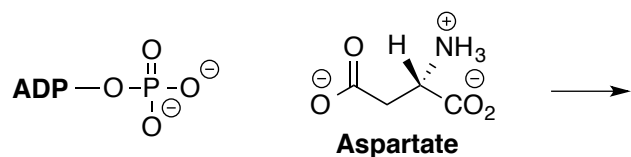
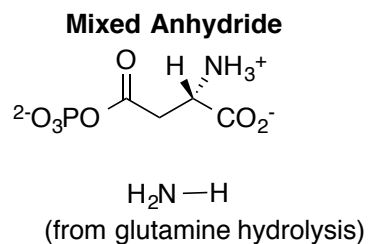


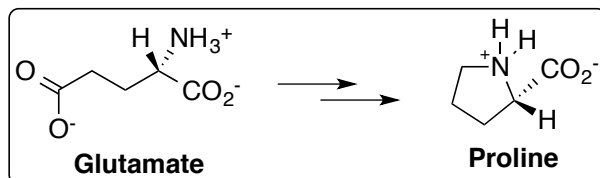
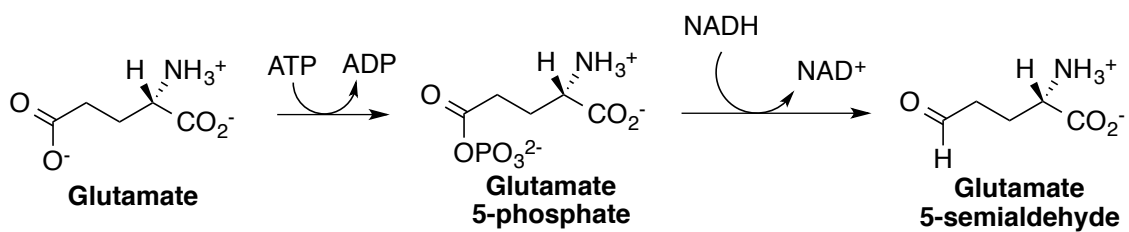
*Reverse Reductive Amination (Amine → [Imine] → Ketone)*



**Biosynthesis of Asparagine**

**\*\*Each step takes place in the active site of an enzyme, which contains all acids (H<sup>+</sup>) and bases (:B) necessary to complete each transformation (more on that later). Until then, feel free to use H<sup>+</sup> and :B as needed.\*\***

*Hydrolysis of Glutamine**Phosphate Transfers with ATP**Amide Formation*

**Biosynthesis of Proline***Formation and NADH Reduction of Phosphoester**Intramolecular Reductive Amination*