* 1. **Nitrogen Excretion and the Urea Cycle**
* In ureotelic organisms, the ammonia deposited in the mitochondria of liver is converted to urea in the **urea cycle**.
* The urea passes into the blood and thus to the kidneys and is excreted into the urine.

**Urea Is Produced from Ammonia in Five Enzymatic Steps**

* The urea cycle begins inside liver mitochondria, but three of the subsequent steps take place in the cytosol (**Fig. 18-10)**.
* NH4 and CO2 (as HCO3-) are converted to carbamoyl phosphate by **carbamoyl phosphate synthetase I**.
* The cycle has four enzymatic steps.
* Carbamoyl phosphate and ornithine are converted to citrulline by **ornithine transcarbamoylase**. The citrulline passes into the cytosol.
* The second amino group now enters from aspartate. Citrulline and aspartate are converted to argininosuccinate by **argininosuccinate synthetase**.
* The argininosuccinate is then cleaved by **argininosuccinase** to form free arginine and fumarate.
* **Arginase** cleaves arginine to yield **urea** and ornithine.
* Ornithine is transported into the mitochondrion to initiate another round of the urea cycle.







**FIGURE 18-10** The urea cycle and reactions that feed amino groups into the cycle.