Urea Encyclopedia Article

Urea

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Urea

Urea is a nitrogenous compound excreted in the urine by humans and most other mammals. A product of protein metabolism, urea is formed by the liver primarily from the ammonia that results when excess amino acids are deaminated (or broken down). In this process--basically, splitting off the amino acid's amine group--the resting ammonia is either used to make other nitrogen-containing compounds or transported to the liver, where it is converted to urea (actually, two molecules of ammonia bonded together by a carbon atom) and then excreted by way of the urine.

Urea was first discovered in the urine in 1773 by the French chemist Jean Rouelle. Over fifty years later, in 1828, it was synthesized by the German chemist, Friedrich Wöhler--a feat more remarkable than it sounds. In the early 1800s, it was widely believed that an organic compound like urea--a product formed by the human body itself--could not be manufactured in the laboratory as though it were a common chemical. And when Wöhler accidentally found he had synthesized crystals of urea while evaporating a solution of ammonium cyanate, he was as surprised as any other chemist would be. In his excitement, he dashed off a letter to his friend, the famous Swedish chemist Jöns Berzelius, and declared, "I can make urea without needing a kidney, whether of man or dog!" Wohler's historic preparation of "artificial" urea demonstrated to the scientific world that an organic compound could be synthesized, not only by a living organism, but by the working chemist. For many, then, Wöhler is considered the true father of organic chemistry.