

## DIABETES

Several disorders classified under the term **diabetes** (Gr. *diabetes*, syphon) are associated with insulin deficiency or with the inability of cells to take up glucose. In type I diabetes (juvenile diabetes), the afflicted person (or other mammal, such as a dog or cat) has little or no insulin because the beta cells have been destroyed. This form of diabetes is relatively uncommon and usually occurs early in life as a result of a genetic susceptibility, viral infection, or an autoimmune response mounted against the beta cells. If insulin is insufficient, glucose accumulates in the blood but does not enter the cells. Because the cells cannot use the accumulated glucose, the body actually begins to starve. Brain, retinal, and gonadal tissues are particularly endangered because glucose is the only nutrient that these tissues can use. The use of fats (to replace glucose) for energy production in other tissues causes acetoacetic acid and keto

acids to accumulate in the blood. This buildup leads to acidosis, which can cause coma and death. Survival for type I diabetes depends on regular injections of insulin. (Insulin is a small protein molecule and cannot be taken by mouth because protein-digesting enzymes in the digestive tract would rapidly inactivate it.) Without injections, the person (or other mammal) suffers severe metabolic and urinary disruptions.

In type II (maturity-onset) diabetes, insulin concentrations are nearly normal or even above normal; however, the target cells cannot respond to the hormone. Either the cells have an insufficient number of insulin receptors, or the receptors themselves are abnormal. Diet, exercise, and oral glycemic agents, which facilitate glucose uptake, are used to treat this type of diabetes.