

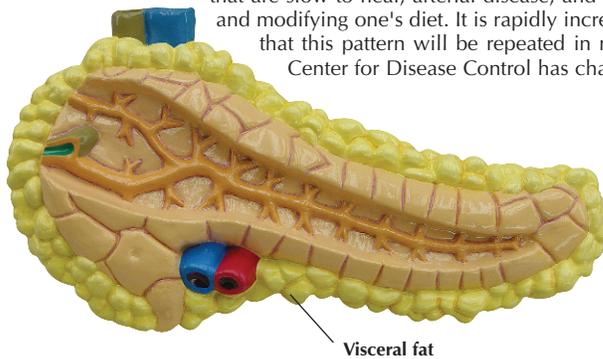
DIABETES TYPE II

Type 2 Diabetes is a metabolic disorder that is primarily characterized by insulin resistance, relative insulin deficiency, and hyperglycemia (high blood sugar). Insulin resistance means that body cells do not respond appropriately when insulin is present. Insulin is needed to move glucose (blood sugar) into cells, where it is used for energy.

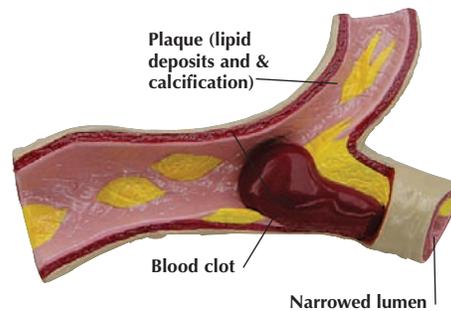
Family history and genetics, lack of exercise, and a high fat diet, all play a significant role in the development of Type 2 diabetes. About 90% of all North American cases of diabetes are Type 2. Diabetes Type 2 is of unknown origin. Onset usually occurs in middle age and later life. About 20% of the population over the age of 65 has diabetes Type 2. Type 2, however, is now seen more frequently in adolescents and young adults due to the significant increase of obesity in these groups. About 55 % of those with Type 2 are obese. Chronic obesity involving excess visceral fat (fat surrounding the abdominal organs), leads to increased insulin resistance because it is a source of several chemical signals (hormones and cytokines) which negatively effect other tissues.

Complex metabolic changes Diabetes induced hypertension very often lead to damage and functional impairment of many organ systems, most importantly the cardiovascular system. This leads to substantially increased morbidity and mortality.

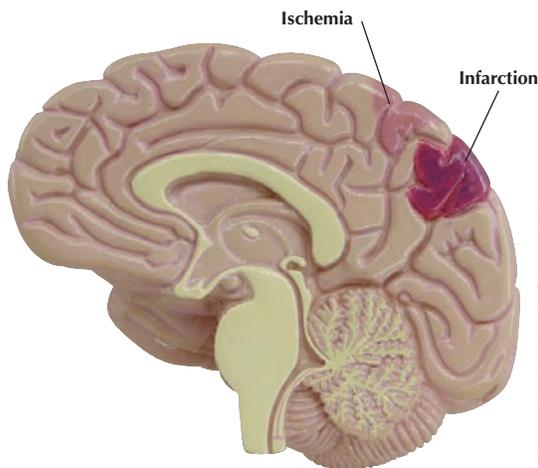
Severe complications can result from improperly managed Type 2 diabetes, including renal failure, blindness, wounds that are slow to heal, arterial disease, and nerve damage. Type 2 is often managed by exercise and modifying one's diet. It is rapidly increasing in the developed world, and there is evidence that this pattern will be repeated in much of the rest of the world in coming years. The Center for Disease Control has characterized the increase as an epidemic.



PANCREAS: The pancreas is the organ that produces insulin. Insulin is needed to move glucose (blood sugar) into cells, where it is used for energy. The pancreas shown represents that of an obese person and is surrounded by **visceral fat**.

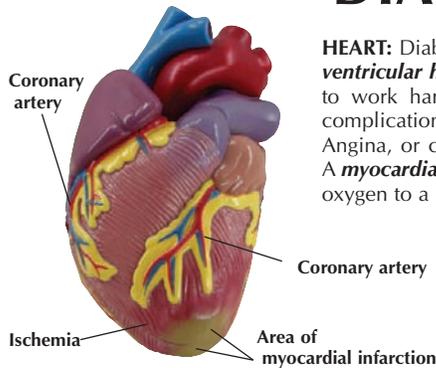


ARTERY: Diabetes induced hypertension can lead to atherosclerosis (hardening of the arteries). Plaque (fatty deposits and calcification) may collect in the inner lining (*tunica intima*) which causes the artery to lose elasticity and can obstruct the flow of blood. Atherosclerosis can cause **aortic dissection** (rupture of artery wall) and coronary artery disease, which may lead to blood clots.

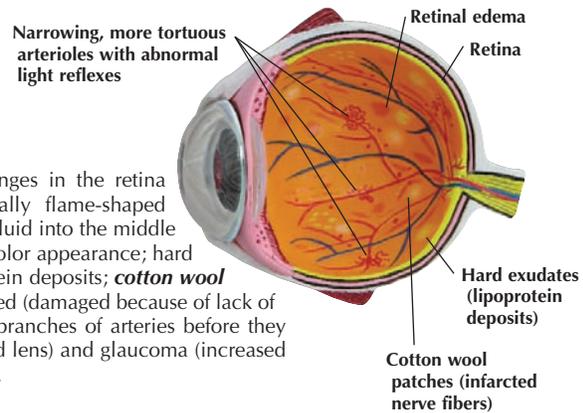


BRAIN: Diabetes induced hypertension can cause a cerebral vascular accident (CVA)(broken blood vessels) or stroke. Strokes are a result of either a **hemorrhage** (bleeding) within the brain or **infarction** (lack of blood flow resulting in irreversible damage or necrosis). Transient **ischemic** attacks (TIA's) occur when there is reduced oxygen flow to the tissues. Symptoms of above include temporary left or right-sided weakness, slurred speech or visual problems which resolve over time. Because the arteries in the brain may be sclerosed (hardening of the arteries), the brain tissue receives less oxygen which can result in vascular dementia (deterioration of mental faculties including memory, reasoning and personality).

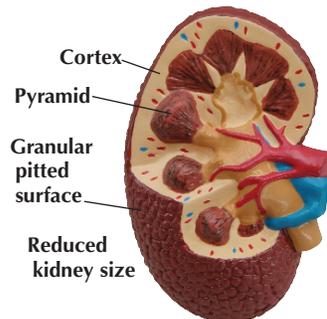
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HEART: Diabetes induced hypertension facilitates congestive heart failure (CHF). **Left ventricular hypertrophy** (increased muscle size) occurs because the left ventricle has to work harder due to a consistently higher blood pressure. The atherosclerotic complications (hardening of the arteries) lead to **coronary artery disease** (CAD). Angina, or chest pain is a consequence of **ischemia** or lack of oxygen to the heart. A **myocardial infarction** (MI) or heart attack occurs when both lack of blood flow and oxygen to a portion of the heart results in irreversible damage or necrosis.

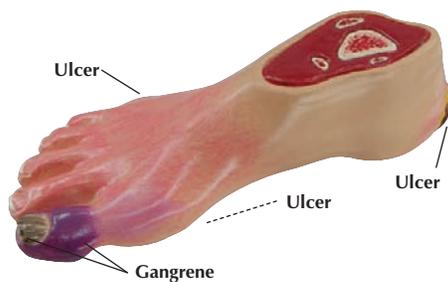
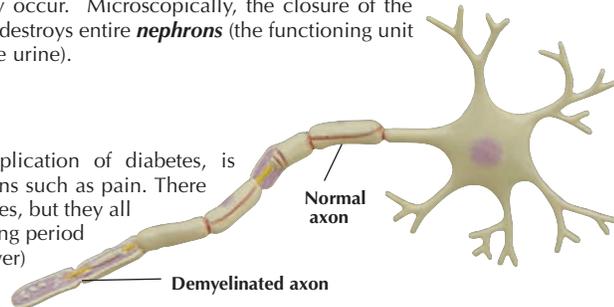


EYE: Diabetes induced hypertension causes various changes in the retina (sensory membrane of the eye). These include: typically flame-shaped **hemorrhages**; **retinal edema** (swelling) causing leaking of fluid into the middle retinal layers giving a thickened, or cloudy grayish white color appearance; hard **exudates** (deposits) caused by an accumulation of lipoprotein deposits; **cotton wool** patches which occur when the nerve fibers become infarcted (damaged because of lack of blood flow); and narrowed, more tortuous **arterioles** (the branches of arteries before they become capillaries). Type 2 may also cause cataract (fogged lens) and glaucoma (increased pressure in the eye), both of which may lead to vision loss.



KIDNEY: Diabetes induced hypertension causes renal (kidney) **arteriosclerosis** (hardening of the arteries in the kidney) which after time causes nephrosclerosis (hardening of the kidney). This is a leading cause of chronic renal failure. Nephrosclerosis is the direct result of **ischemia** (lack of blood flow) due to narrowed lumen (opening or space) of the blood vessels. The kidney may be reduced in size with a **granular pitted surface**. Microscopic **hematuria** (blood in the urine) may occur. Microscopically, the closure of the small arteries, destroys entire **nephrons** (the functioning unit that creates the urine).

NEURON: Diabetic neuropathy, a common complication of diabetes, is damage to the nerves that allow you to feel sensations such as pain. There are a number of ways that diabetes damages the nerves, but they all seem related to blood glucose being too high for a long period of time. Eventually, the myelin sheath (insulating layer) of the nerves deteriorates (**demyelinated axon**) causing impairment of nerve signals along the axon.



FOOT: The areas of the body most commonly affected by diabetic peripheral neuropathy are the feet and legs. Nerve damage in the feet can result in a loss of foot sensation, increasing your risk of foot problems which often include **ulcers and gangrene**. Injuries and sores on the feet may go unrecognized due to lack of sensation. Therefore, proper skin and foot care is essential. Rarely, other areas of the body such as the arms, abdomen, and back are affected. Symptoms of diabetic peripheral neuropathy may include tingling, numbness (severe or long-term numbness can become permanent), burning (especially in the evening) and pain. Early symptoms can be moderated when blood glucose levels are controlled. Medications help control the discomfort.