

# Diabetic nephropathy

Written by Danielle Nicholson

Reviewed by Prof. Hans- Joachim Anders, Ludwig- Maximilians Universitat Munchen



**D**iabetes mellitus affects the blood vessels of the body. As the kidneys filtering function depends on a steady, high blood supply, kidney problems are a particular risk for people with diabetes. Diabetic nephropathy is kidney disease or damage that can occur in people with diabetes (type 1 and type 2). Approximately 40% of diabetes patients will develop nephropathy. Kidney disease is a major cause of sickness and death in people with diabetes. It can lead to the need for dialysis or a kidney transplant.

Early diabetic kidney disease is characterized by leaking of the renal filter, the nephron. Later stages of nephropathy involve progressive and irreversible scarring of the kidney.

High blood pressure often accompanies diabetic nephropathy. High blood pressure may begin quickly or be difficult to control.

The exact cause of diabetic nephropathy is unknown. However, kidney damage is more obvious in poorly controlled diabetes and concomitant high blood pressure.

## *Did you know?*

Each kidney is made of approximately one million small units called nephrons. These structures filter blood and help remove waste from the body.

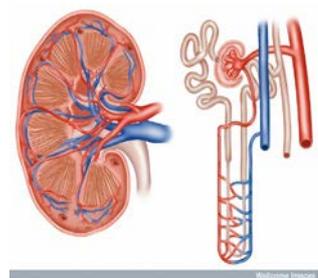
Kidneys regulate blood pressure, stimulate the making of red blood cells and maintain the body's vitamin D and calcium levels.

**D**iabetic nephropathy progression accelerates at more advanced stages of chronic kidney disease (CKD) finally leading to ESRD (end-stage renal disease). Symptoms of late CKD or ESRD include:

- Swelling of the ankles, feet, lower legs or hands caused by retention of water
- Becoming short of breath, for example when climbing the stairs
- Tiredness as a result of a lack of oxygen in the blood

**O**ften, there are no symptoms as the kidney damage starts and slowly gets worse. Kidney damage can begin up to 10 years before symptoms appear. Symptoms of diabetic nephropathy tend to become apparent once the condition has reached the later stages.

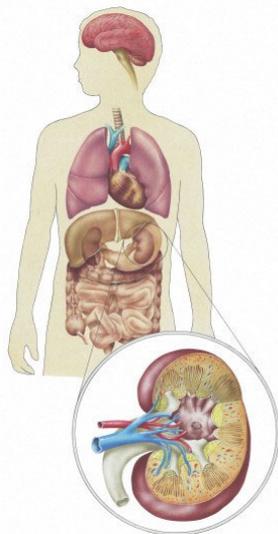
Kidney and one nephron



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Wellcome Images

**A doctor can order tests to detect signs of kidney problems in the early stages. An annual urinalysis is mandatory for any diabetes patient. This simple urine test will determine if the protein albumin is leaking into the urine. Too much albumin leaking is often the first sign of kidney damage and precedes any clinical symptoms or signs by up to ten years.**

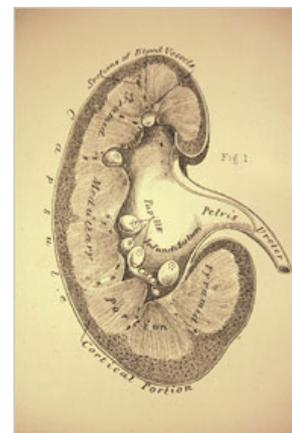
**A doctor may check the kidneys with these annual blood tests:**

- BUN- blood urea nitrogen**
- Serum creatinine- a non-protein waste product of metabolism by skeletal muscle tissue**

**A kidney biopsy confirms the diagnosis of diabetic nephropathy. A biopsy is usually only done when there is doubt about the diagnosis. When kidney damage is caught in its early stages, it can be slowed with treatment. Once larger amounts of protein appear in the urine, kidney damage will slowly get worse.**

## *Did you know?*

- Keeping blood pressure under control (130/80 mm or below) is one of the best ways to slow kidney damage. Medicines can be prescribed to lower blood pressure and protect kidneys from more damage. Even when blood pressure is normal, these medicines can help slow kidney damage if there is albumin leakage into the urine.
- Eating a low-fat diet, taking drugs to control blood cholesterol, and getting regular exercise can also help reduce complications of diabetic nephropathy.



**Funded by the European Commission's FP7, REDDSTAR is a three year, 10 partner project that will comprehensively examine if stromal stem cells derived from bone marrow can safely control blood glucose levels while also alleviate damage caused by six diabetic complications. [www.REDDSTAR.eu](http://www.REDDSTAR.eu)**