

# The Kidneys and How They Work

National Kidney and Urologic Diseases Information Clearinghouse



National Institute of  
Diabetes and Digestive  
and Kidney Diseases

ADULT UROLOGY &  
PEDIATRIC UROGYNECOLOGY

## What are the kidneys and what do they do?

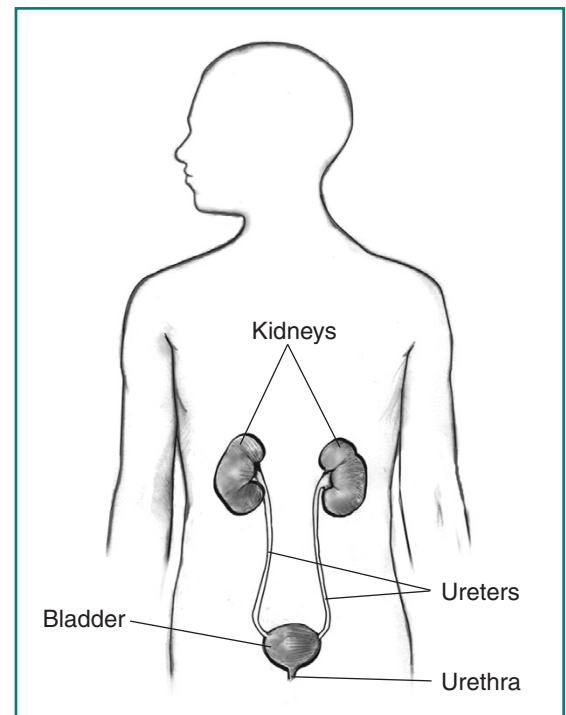
The kidneys are two bean-shaped organs, each about the size of a fist. They are located just below the rib cage, one on each side of the spine. Every day, the two kidneys filter about 120 to 150 quarts of blood to produce about 1 to 2 quarts of urine, composed of wastes and extra fluid. The urine flows from the kidneys to the bladder through two thin tubes of muscle called ureters, one on each side of the bladder. The bladder stores urine. The muscles of the bladder wall remain relaxed while the bladder fills with urine. As the bladder fills to capacity, signals sent to the brain tell a person to find a toilet soon. When the bladder empties, urine flows out of the body through a tube called the urethra, located at the bottom of the bladder. In men the urethra is long, while in women it is short.

Read more about the ureters, bladder, and urethra in *The Urinary Tract and How It Works* at [www.urologic.niddk.nih.gov](http://www.urologic.niddk.nih.gov).

## Why are the kidneys important?

The kidneys are important because they keep the composition, or makeup, of the blood stable, which lets the body function. They

- prevent the buildup of wastes and extra fluid in the body

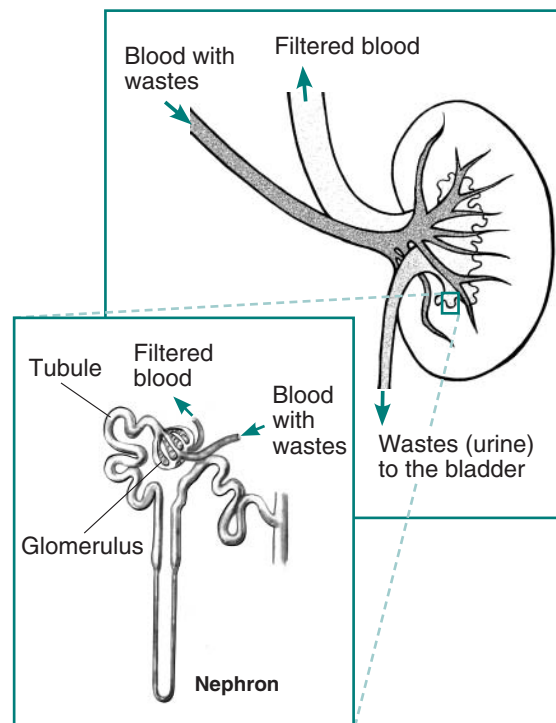


The urinary tract

- keep levels of electrolytes stable, such as sodium, potassium, and phosphate
- make hormones that help
  - regulate blood pressure
  - make red blood cells
  - bones stay strong

## How do the kidneys work?

The kidney is not one large filter. Each kidney is made up of about a million filtering units called nephrons. Each nephron filters a small amount of blood. The nephron includes a filter, called the glomerulus, and a tubule. The nephrons work through a two-step process. The glomerulus lets fluid and waste products pass through it; however, it prevents blood cells and large molecules, mostly proteins, from passing. The filtered fluid then passes through the tubule, which sends needed minerals back to the bloodstream and removes wastes. The final product becomes urine.



Each kidney is made up of about a million filtering units called nephrons.

Read more in *Questions and Answers about the Kidneys and Kidney Disease* at [www.nkdep.nih.gov](http://www.nkdep.nih.gov).

## Points to Remember

- Every day, the two kidneys filter about 120 to 150 quarts of blood to produce about 1 to 2 quarts of urine, composed of wastes and extra fluid.
- The kidneys are important because they keep the composition, or makeup, of the blood stable, which lets the body function.
- Each kidney is made up of about a million filtering units called nephrons. The nephron includes a filter, called the glomerulus, and a tubule.
- The nephrons work through a two-step process. The glomerulus lets fluid and waste products pass through it; however, it prevents blood cells and large molecules, mostly proteins, from passing. The filtered fluid then passes through the tubule, which sends needed minerals back to the bloodstream and removes wastes.

## Hope through Research

In recent years, researchers have learned a great deal about how the kidneys work. The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) sponsors several programs aimed at understanding what happens when the kidneys are damaged. The NIDDK's Division of Kidney, Urologic, and Hematologic Diseases supports basic research into normal kidney function and the diseases that impair normal function at the cellular and molecular levels, including diabetes, high blood pressure, glomerulonephritis, and cystic kidney diseases.

Clinical trials are research studies involving people. Clinical trials look at safe and effective new ways to prevent, detect, or treat disease. Researchers also use clinical trials to look at other aspects of care, such as improving the quality of life for people with chronic illnesses. To learn more about clinical trials, why they matter, and how to participate, visit the NIH Clinical Research Trials and You website at [www.nih.gov/health/clinicaltrials](http://www.nih.gov/health/clinicaltrials). For information about current studies, visit [www.ClinicalTrials.gov](http://www.ClinicalTrials.gov).

## For More Information

**American Association of Kidney Patients**  
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Tampa, FL 33607  
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Fax: 813-636-8122  
Email: [info@aakp.org](mailto:info@aakp.org)  
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**American Kidney Fund**  
11921 Rockville Pike, Suite 300  
Rockville, MD 20852  
Phone: 1-800-638-8299  
Internet: [www.kidneyfund.org](http://www.kidneyfund.org)

**Life Options**  
c/o Medical Education Institute, Inc.  
414 D'Onofrio Drive, Suite 200  
Madison, WI 53719  
Phone: 1-800-468-7777 or 608-833-8033  
Fax: 608-833-8366  
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Internet: [www.lifeoptions.org](http://www.lifeoptions.org)  
[www.kidneyschool.org](http://www.kidneyschool.org)

**National Kidney Foundation**  
30 East 33rd Street  
New York, NY 10016-5337  
Phone: 1-800-622-9010 or 212-889-2210  
Fax: 212-689-9261  
Internet: [www.kidney.org](http://www.kidney.org)

**The NephCure Foundation**  
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Berwyn, PA 19312  
Phone: 1-866-NephCure (1-866-637-4287)  
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## Acknowledgments

Publications produced by the Clearinghouse are carefully reviewed by both NIDDK scientists and outside experts. This publication was reviewed by Bessie Young, M.D., University of Washington. The publication was originally reviewed by William McClellan, M.D., Emory University, and Dr. Young. Harold Feldman, M.D., University of Pennsylvania, reviewed the 2009 version of the publication.

## National Kidney Disease Education Program

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The National Kidney Disease Education Program (NKDEP) is an initiative of the National Institute of Diabetes and Digestive and Kidney Diseases, National Institutes of Health, U.S. Department of Health and Human Services. The NKDEP aims to raise awareness of the seriousness of kidney disease, the importance of testing those at high risk, and the availability of treatment to prevent or slow kidney disease.

You may also find additional information about this topic by visiting MedlinePlus at [www.medlineplus.gov](http://www.medlineplus.gov).

This publication may contain information about medications and, when taken as prescribed, the conditions they treat. When prepared, this publication included the most current information available. For updates or for questions about any medications, contact the U.S. Food and Drug Administration toll-free at 1-888-INFO-FDA (1-888-463-6332) or visit [www.fda.gov](http://www.fda.gov). Consult your health care provider for more information.

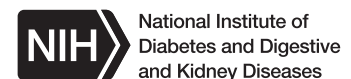
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The National Kidney and Urologic Diseases Information Clearinghouse (NKUDIC) is a service of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK). The NIDDK is part of the National Institutes of Health of the U.S. Department of Health and Human Services. Established in 1987, the Clearinghouse provides information about diseases of the kidneys and urologic system to people with kidney and urologic disorders and to their families, health care professionals, and the public. The NKUDIC answers inquiries, develops and distributes publications, and works closely with professional and patient organizations and Government agencies to coordinate resources about kidney and urologic diseases.

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NIH Publication No. 14-3195  
May 2014