

# Renal Physiology: Mosby Physiology Mosby Physiology Monograph

The kidneys are essential organs for maintaining homeostasis in the body. They filter waste products from the blood, regulate blood pressure, and produce hormones that help to control red blood cell production and calcium metabolism. Renal physiology is the study of the function of the kidneys.

The kidneys are located on either side of the spine, just below the rib cage. Each kidney is about the size of a fist and weighs about 4 ounces. The kidneys are divided into two main regions: the cortex and the medulla. The cortex is the outer layer of the kidney and contains the glomeruli, which are small clusters of blood vessels that filter waste products from the blood. The medulla is the inner layer of the kidney and contains the tubules, which are small tubes that transport urine from the glomeruli to the renal pelvis.

The kidneys perform a number of important functions, including:



## Renal Physiology: Mosby Physiology Series (Mosby's Physiology Monograph) by Asunta Simoloka

★★★★☆ 4.7 out of 5

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- **Filtering waste products from the blood.** The glomeruli filter waste products, such as urea and creatinine, from the blood. These waste products are then transported to the tubules, where they are concentrated and excreted in the urine.
- **Regulating blood pressure.** The kidneys help to regulate blood pressure by controlling the amount of sodium and water that is excreted in the urine. When blood pressure is high, the kidneys excrete more sodium and water, which helps to lower blood pressure. When blood pressure is low, the kidneys excrete less sodium and water, which helps to raise blood pressure.
- **Producing hormones.** The kidneys produce a number of hormones, including erythropoietin, which stimulates the production of red blood cells, and renin, which helps to regulate blood pressure.

The function of the kidneys is controlled by a number of hormones and other factors. These include:

- **The renin-angiotensin-aldosterone system (RAAS).** The RAAS is a hormonal system that helps to regulate blood pressure. When blood pressure is low, the kidneys release renin, which converts angiotensinogen to angiotensin I. Angiotensin I is then converted to angiotensin II, which causes the blood vessels to constrict and the kidneys to retain sodium and water. This helps to raise blood pressure.
- **The sympathetic nervous system.** The sympathetic nervous system is a part of the nervous system that helps to control the body's response to stress. When the body is under stress, the sympathetic nervous system causes the kidneys to release renin and constrict the

blood vessels. This helps to raise blood pressure and prepare the body for a fight-or-flight response.

- **Atrial natriuretic peptide (ANP).** ANP is a hormone that is produced by the heart. ANP causes the kidneys to excrete more sodium and water, which helps to lower blood pressure.

Renal disease is a condition that affects the function of the kidneys. Renal disease can be caused by a number of factors, including diabetes, high blood pressure, and autoimmune disorders. Renal disease can lead to a number of complications, including kidney failure, heart disease, and stroke.

The treatment of renal disease depends on the underlying cause. Treatment options may include medication, lifestyle changes, and dialysis. Dialysis is a procedure that removes waste products from the blood when the kidneys are no longer able to do so.

Renal physiology is a complex and fascinating field of study. The kidneys are essential organs for maintaining homeostasis in the body. Renal disease is a serious condition that can lead to a number of complications. However, with early diagnosis and treatment, renal disease can be managed and patients can live full and active lives.



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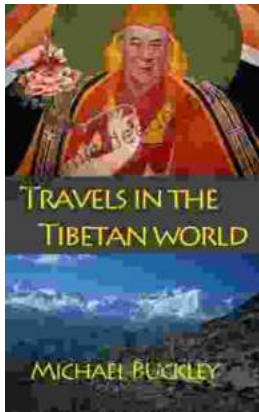
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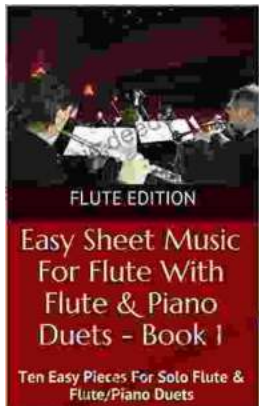
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