

## **Key Concepts: Module: Aging of the Urinary System**

Welcome to the Module: Aging of the Urinary System! This module will help us learn about the urinary system structure and function and age-related changes in and disorders of the urinary system (Saxon, et al 2022).

### **Key Concept 1: Structures of the urinary system (Saxon, et al, 2022):**

- Two kidneys, bean shaped with three main areas: cortex (outer layer), medulla (below the cortex, and the pelvis.
- Nephron: basic structure in the kidney, located in the cortex of the kidney, and produces urine, more than one million nephrons in each kidney.

### **Key Concept 2: General functions of the kidney include the following (Saxon, et al, 2022):**

- Excretion of waste, toxins
- Regulation of water and acid base balance in the body
- Control of the ridding and reabsorption of sodium and water (concentration of salt

### **Key Concept 3: Functions in urine creation and blood composition include the following (Saxon, et al, 2022):**

- Glomerular filtration: First step in creation of urine, filtering of the blood to get rid of waste, toxins.
- Tubular reabsorption: nephrons rid the filtrate of substances which are reabsorbed into the blood.
- Tubular secretion: substances are removed from the blood and into the kidney tubules and then excreted in the urine.

### **Key Concept 4: Structural/anatomical age-related changes in the urinary system include (Saxon, et al, 2022):**

- Decrease in kidney size
- Hardening of the glomeruli
- Decrease in number of renal tubule cells
- Tubular diverticula
- Tubular wall thickening
- Blood vessels in kidneys harden and thicken
- Less bladder capacity and thus more frequent voiding.

- **Key Concept 5: Functional changes in the urinary system** include (Saxon, et al, 2022):
- Reduction renal blood flow
- Reduced glomerular filtration rate
- Reduced ability of kidneys to concentrate urine
- More difficulty regulating acid-base balance and sodium and potassium levels.

**Key Concept 6: Age related disorders of the urinary system include** (Saxon, et al, 2022):

- **Urinary tract infections:** Infection of the urinary tract, tend to occur more in women.
- **Cystitis:** infection of the bladder which is often bacterial in origin.
- **Pyelonephritis:** infection and inflammation of the kidneys, symptoms include fever, chills, pain in back, nausea, vomiting.
- **Benign prostatic hyperplasia (BPH):** very common condition in older men, enlarged prostate gland that can cause problems with voiding.
- **Kidney stones:** stone like object made of substances in urine, there are different kinds of kidney stones, can cause pain if they are moving through the urinary tract. Drinking a lot of water may help pass the stone (s) . Medical intervention may be needed to resolve this problem.
- **Bladder cancer:** Malignant growth in the bladder, often with symptoms of bloody urine and pain.
- **Urinary incontinence:** involuntary seepage of urine. Stress incontinence occurs when there is pressure on the bladder such as when someone coughs. Urge incontinence is a sudden, strong urge to void and seepage of urine before one can get to the bathroom.
- **Renal failure:** refers to failure of the kidneys to function adequately, kidneys are unable to filter toxins and excess water from the blood and can be either acute or chronic.

**Key Concept 7: Promoting urinary wellness in older adults** includes the following (National Institute on Aging, 2022):

- Maintain a healthy diet
- Stay adequately hydrated
- Engage in regular exercise: Aerobic exercise at least 150 minutes/week, strength training 2-3 times/week, e.g.
- Kegal exercises to help strengthen bladder and pelvic floor muscles, involves contraction and relaxation of the muscles used to stop urination.
- Be familiar with your medications and their side effects, especially how these may affect the urinary system and report side effects to your health care provider

## **References**

National Institute on Aging (2022). *15 tips to keep your bladder healthy*. .

<https://www.nia.nih.gov/health/bladder-health-and-incontinence/15-tips-keep-your-bladder-healthy>

Saxon, S. et al (2022). *Physical change in aging*. New York, NY: Springer