

# Urinary System

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# What does the Urinary System do?

- Excretion of waste products
- Fluid balance
- Acid-base balance
- Blood pressure regulation
- Regulation of red blood cell production

# Urea

- Formed in the liver
- Transported to the kidneys
- Excreted

# Fluid Balance

- Kidneys adapt so that amount of water in the body remains relatively stable.
- Dehydration: occurs when kidneys cannot adapt to loss of water or lack of intake of water
- Diuretics: medications that promote urine elimination (diureticos)
  - May contribute to dehydration
  - May help alleviate edema
    - Excess fluid retention

# Acid-Base Regulation

- Urinary system helps body maintain the normal pH balance needed for cells to live and function.
- Metabolism produces acids.
- Foods produce acids or bases
- Antacids neutralize acids

# Blood Pressure Regulation

- Kidneys depend on BP to filter blood.
- If BP falls too low kidneys release an enzyme that causes blood pressure to rise.
- (la presion)
- (la presion baja)
- (la presion alta)

# Red Blood Cell Production

- Hormone produced in kidney stimulates RBC production
  - If kidney is not getting enough oxygen



# Vocabulary

- Dialysis
  - Machine/process used to filter waste from kidneys and return nutrients
- Dialysis Nurse
  - RN who specializes in dialysis
- Urologist
  - Doctor who specializes in disorders of the urinary tract
- Nephrologist
  - Doctor who specialized in disorders of the kidney

# Vocabulary

- Dysuria
  - Painful, difficult urination
- Incontinence
  - Loss of control over urination
- Retention
  - Inability to empty the bladder

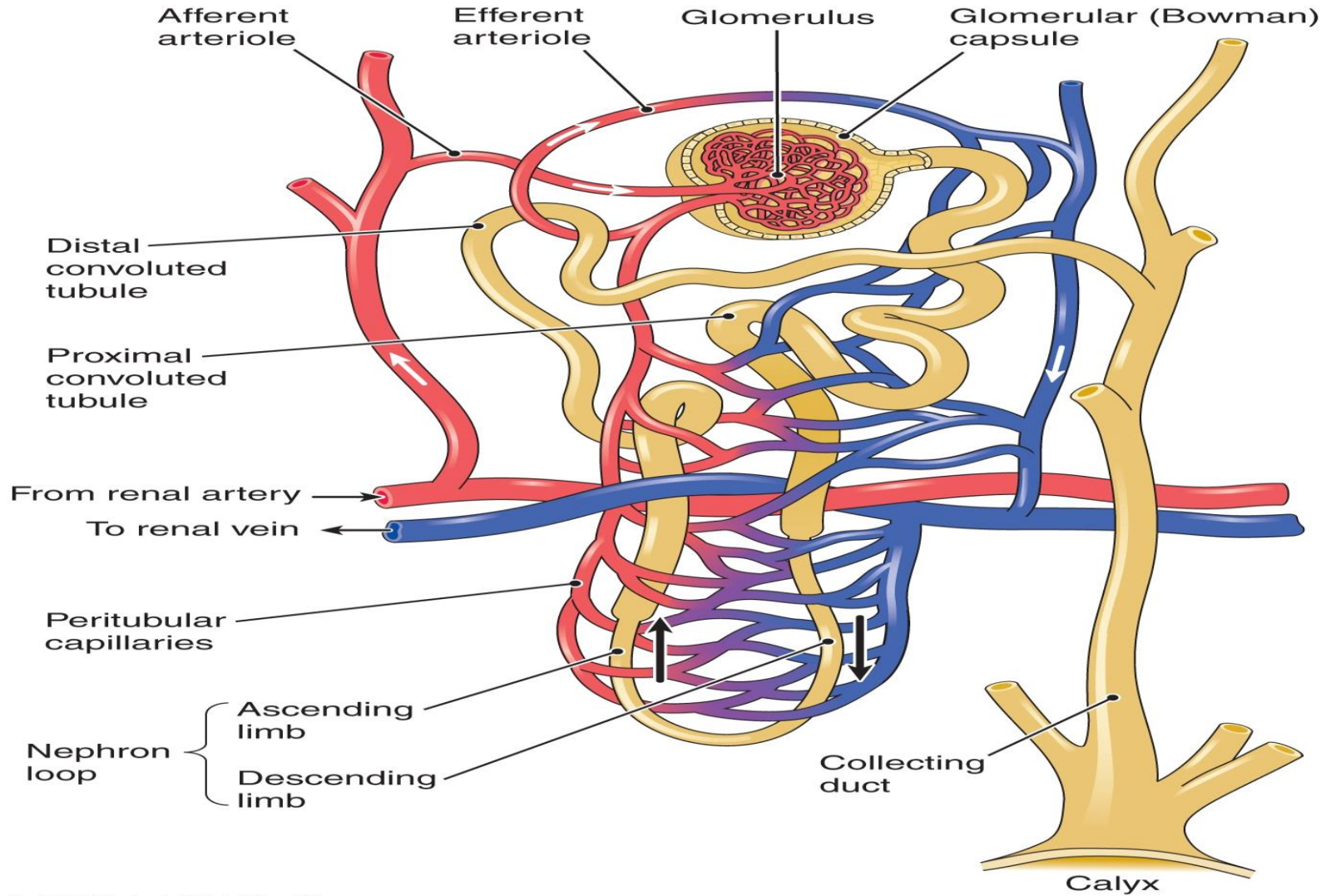
# Organs

- Kidneys
  - Nephron is the functional unit
- Ureters
  - Carry urine from kidney to bladder
- Urinary bladder
  - Stores urine
- Urethra
  - Carries urine from bladder to outside

# Vocabulary

- Nephromegaly: enlarged kidney
- Void: urinate
- Nocturia: excessive urination at night
- Oliguria: abnormally diminished urine production
- Polyuria: excessive urine production
- Pyuria: pus in the urine
- Hematuria: blood in the urine

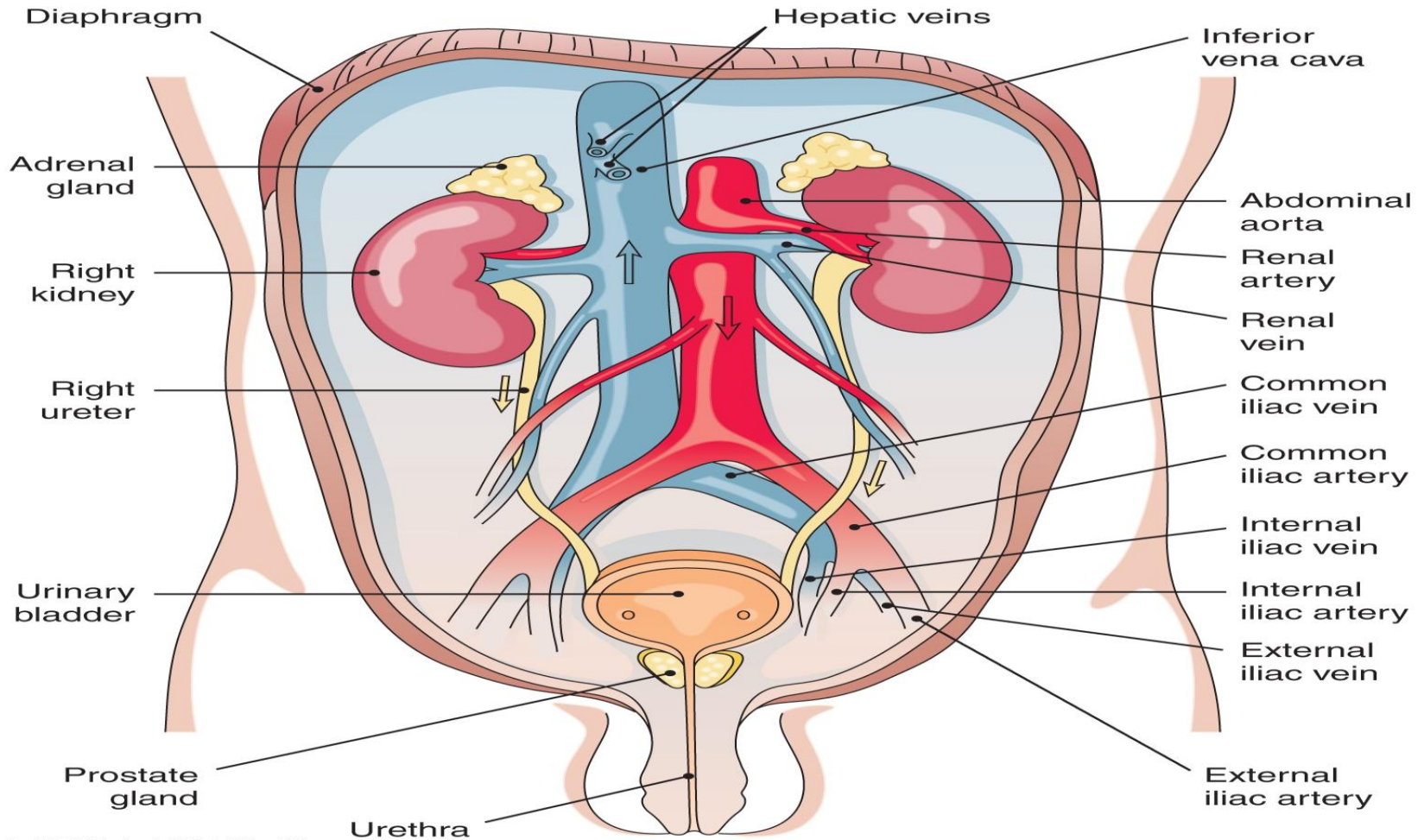
# Nephron and Blood Supply



# Nephron

- Basic working unit of kidney (1 million in kidneys)
- Tiny coiled tube with bulb at one end
- **Glomerulus:** cluster of capillaries in nephron
- Filters out water, electrolytes, wastes, nutrients, & toxins from blood
  - Returns water, electrolytes, & nutrients to blood
  - Eliminates wastes & toxins
- Regulates fluid's composition, concentration, & pH

# Male Urinary System



# Urine

- 95% water
- 5% dissolved solids & gases
  - **Waste products:** urea, uric acid, creatinine
  - Electrolytes
  - Pigment
- **Urinalysis:** laboratory study of urine



# Effects of Aging

- Loss of ability to concentrate urine in kidneys
- Need to drink more water
- Elimination of more urine, even at night
- Greater susceptibility to urinary tract infections
- Enlargement of prostate
- Decreased bladder capacity & muscle tone in bladder: incontinence

# Common Diseases/Conditions

- Urinary tract infections (UTIs)
- Pyelonephritis
- Kidney stones
- Kidney failure

# Urinary Tract Infection (UTI)

- Usual cause e-coli (cystitis)
- More common in females
  - Urethra is shorter
    - Bladder (la Vejiga)
- Symptoms & Treatment
  - Frequency
  - Urgency
  - Pain on urination (burning)
  - antibiotics

# Pyelonephritis

- Inflammation of the kidney
  - Usually caused by spread of infection from UTI
- Symptoms
  - Frequency
  - Urgency
  - Pain
  - General body symptoms
- Treatment
  - Antibiotics

# Kidney Stones

- Develop from crystals in the urine.
- Pain, Pain and more Pain
  - analgesics
- Usually pass on their own
- Sometimes require surgery
- Recur
  - Lifestyle changes

# Kidney (Renal) Failure

- Inability of kidneys to perform basic functions
  - Acute or chronic
- Kidneys can fail significantly before the patient feels symptoms
- Acute (caused by strep) usually resolves
  - glomerulonephritis
- Chronic may lead to need for dialysis or transplant.
  - Low or no salt diet

# Test your understanding

- Who treats disorders of the kidneys?
- What condition is caused by bacteria in the urinary tract, especially the bladder?
- What is the name of the tubes that transfer urine from the kidneys to the bladder?
- What is the name of the waste product of metabolism that is excreted in urine?
- Which organ stores urine?