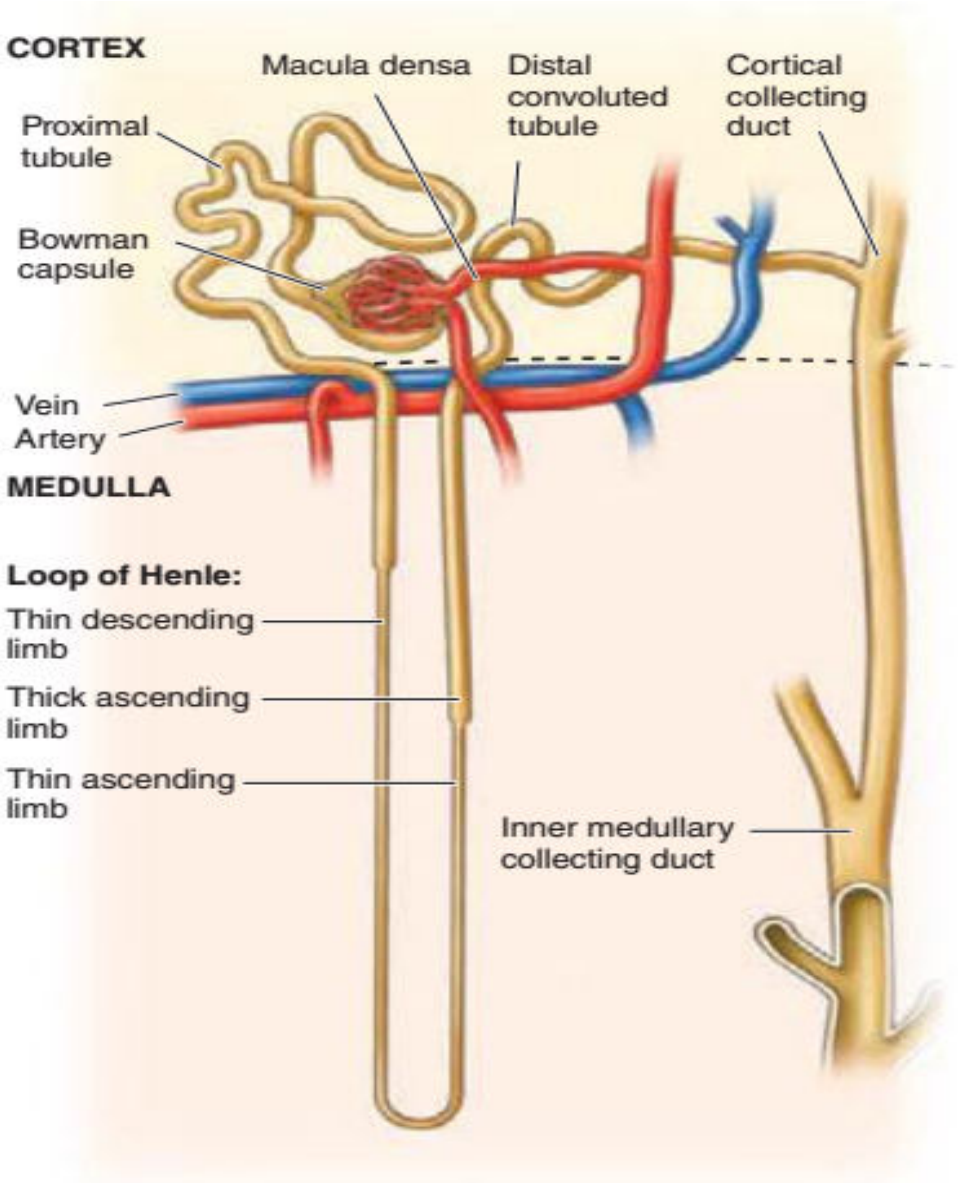
FirstRanker.com
Firstranker's choice
www.FirstRanker.com www.FirstRanker.com

Nephrology – Basics



www.FirstRanker.com

FirstRanker.com
Firstranker's choice
www.FirstRanker.com www.FirstRanker.com

Renal Physiology

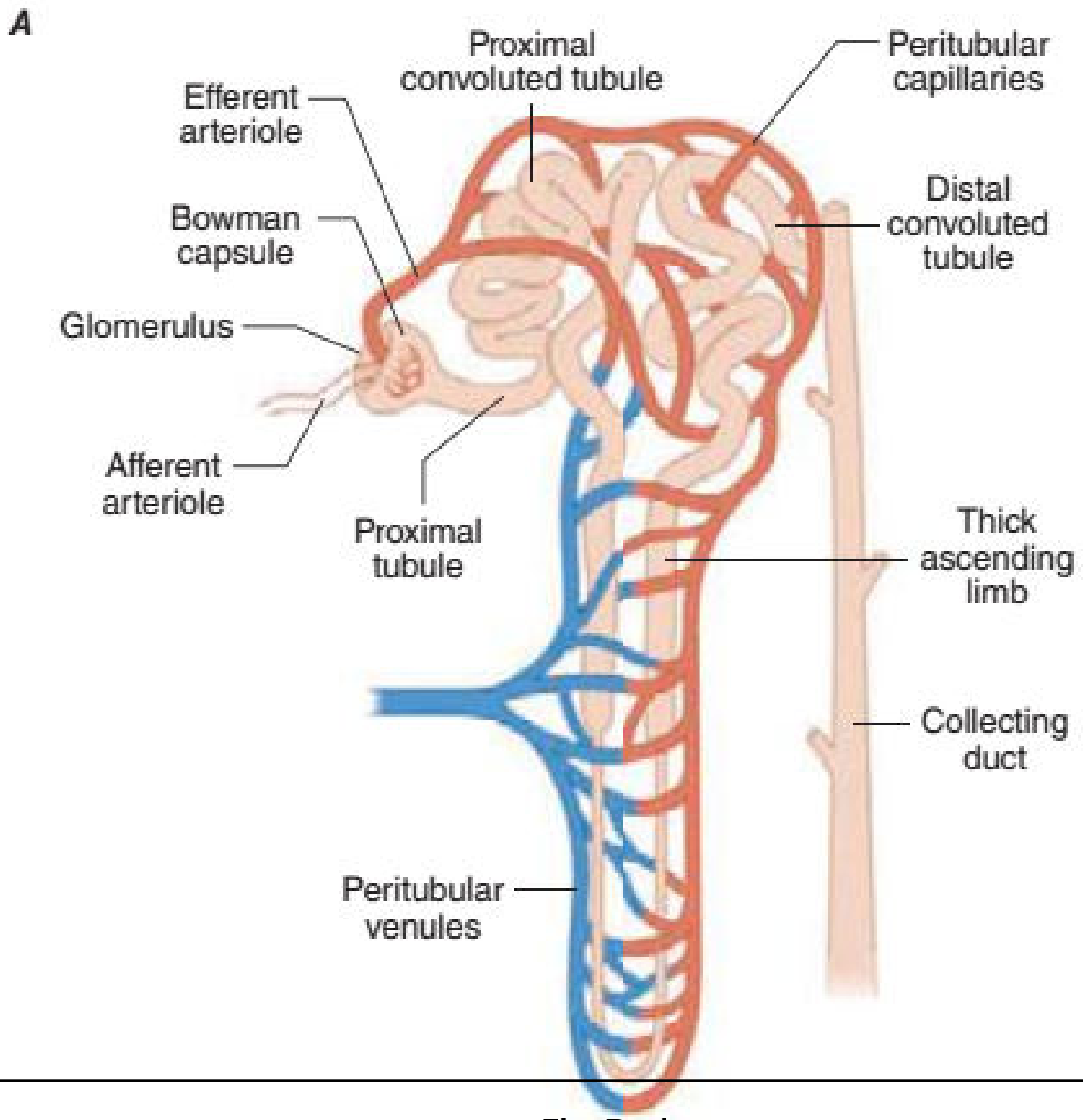
- Glomerular Filteration
- Tubular Function
- Endocrine Functions

- Renal blood flow normally drains pproximately 20% of the cardiac output, or 1000 mL/min.
- Blood reaches each nephron through the afferent arteriole leading into a glomerular capillary where large amounts of fluid and solutes are filtered to form the tubular fluid.

www.FirstRanker.com

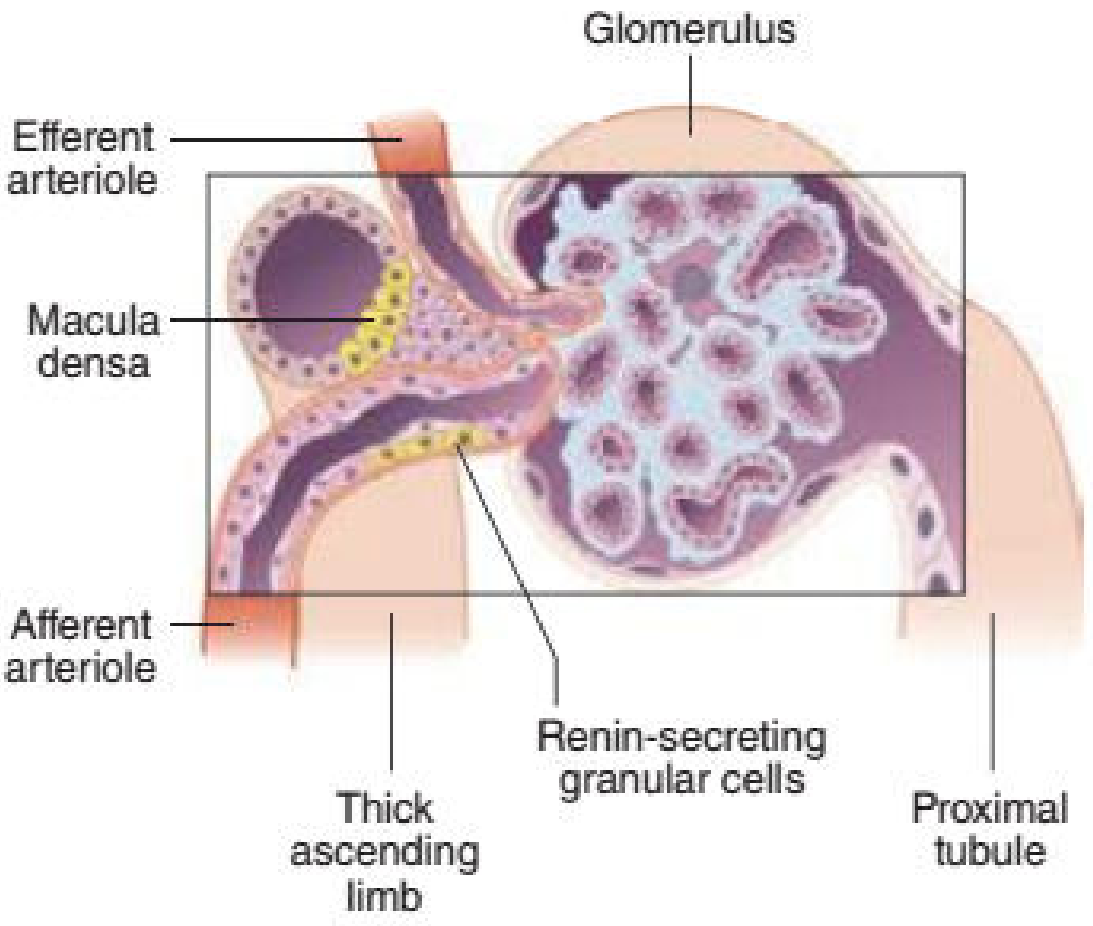
FirstRanker.com
Firstranker's choice
www.FirstRanker.com www.FirstRanker.com

- The distal ends of the glomerular capillaries coalesce to form an efferent arteriole leading to the first segment of a second capillary network (cortical peritubular capillaries or medullary vasa recta) surrounding the tubules.
- Thus, nephrons have two capillary beds arranged in a series separated by the efferent arteriole that regulates the hydrostatic pressure in both capillary beds.
- The distal capillaries empty into small venous branches that coalesce into larger veins to eventually form the renal vein.



www.FirstRanker.com

FirstRanker.com
Firstranker's choice
www.FirstRanker.com www.FirstRanker.com



- The **proximal tubule** is responsible for reabsorbing ~60% of filtered NaCl and water, as well as ~90% of filtered bicarbonate and most critical nutrients such as glucose and amino acids.
- The proximal tubule uses both cellular and paracellular transport mechanisms.

www.FirstRanker.com

FirstRanker.com
Firstranker's choice
www.FirstRanker.com www.FirstRanker.com

- The **loop of Henle** consists of three major segments: descending thin limb, ascending thin limb, and ascending thick limb.
- These divisions are based on cellular morphology and anatomic location, but also correlate with specialization of function.
- Approximately 15–25% of filtered NaCl is reabsorbed in the loop of Henle, mainly by the thick ascending limb.

- The loop of Henle has an important role in urinary concentration by contributing to the generation of a hypertonic medullary interstitium in a process called *countercurrent multiplication*.
- The loop of Henle is the site of action for the most potent class of diuretic agents (loop diuretics) and also contributes to reabsorption of calcium and magnesium ions

www.FirstRanker.com

FirstRanker.com
Firstranker's choice
www.FirstRanker.com www.FirstRanker.com

- The distal convoluted tubule reabsorbs ~5% of the filtered NaCl.
- This segment is composed of a tight epithelium with little water permeability.

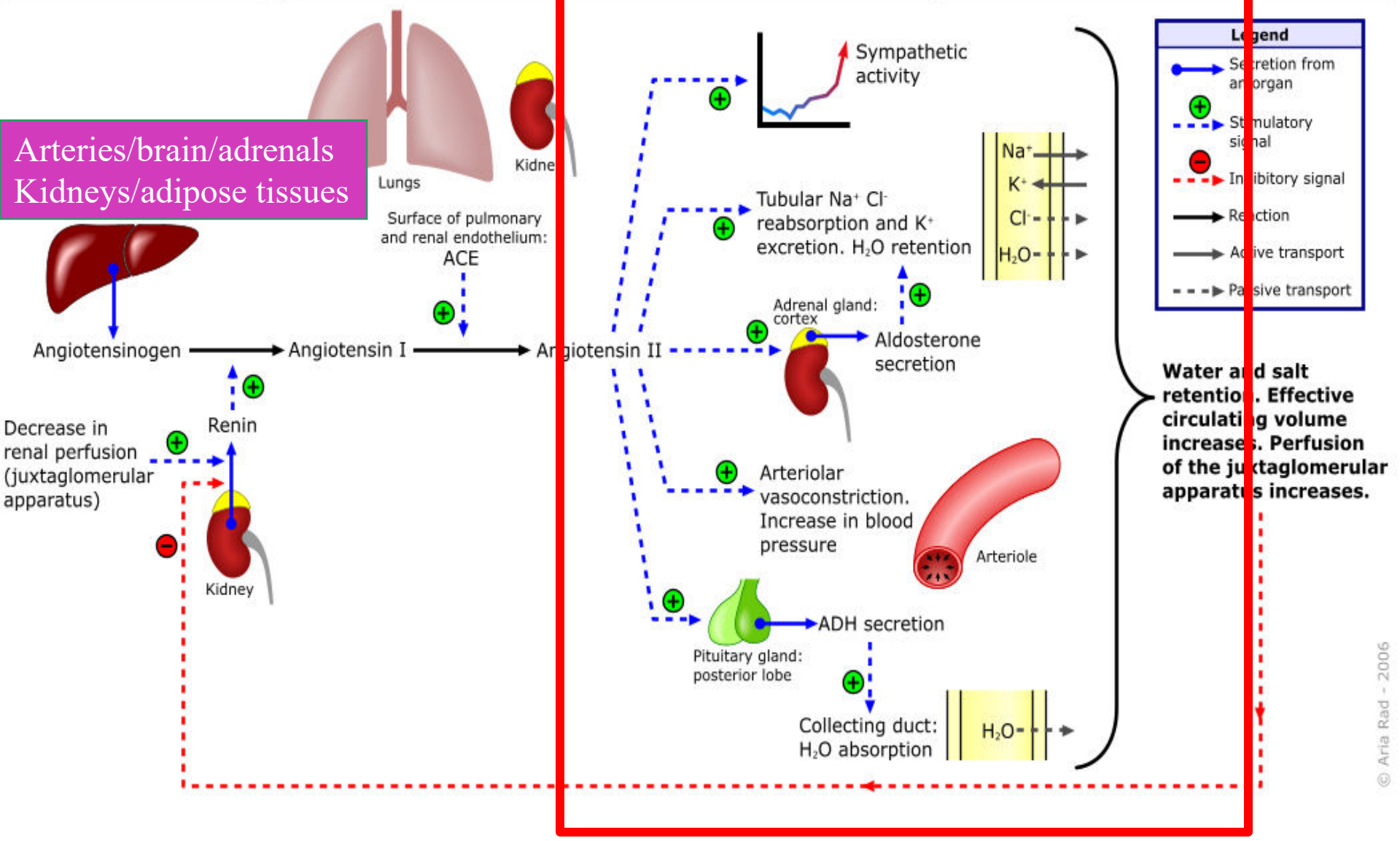
- The collecting duct modulates the final composition of urine.
- The two major divisions, the cortical collecting duct and inner medullary collecting duct, contribute to reabsorbing ~4-5% of filtered Na+ and are important for hormonal regulation of salt and water balance.

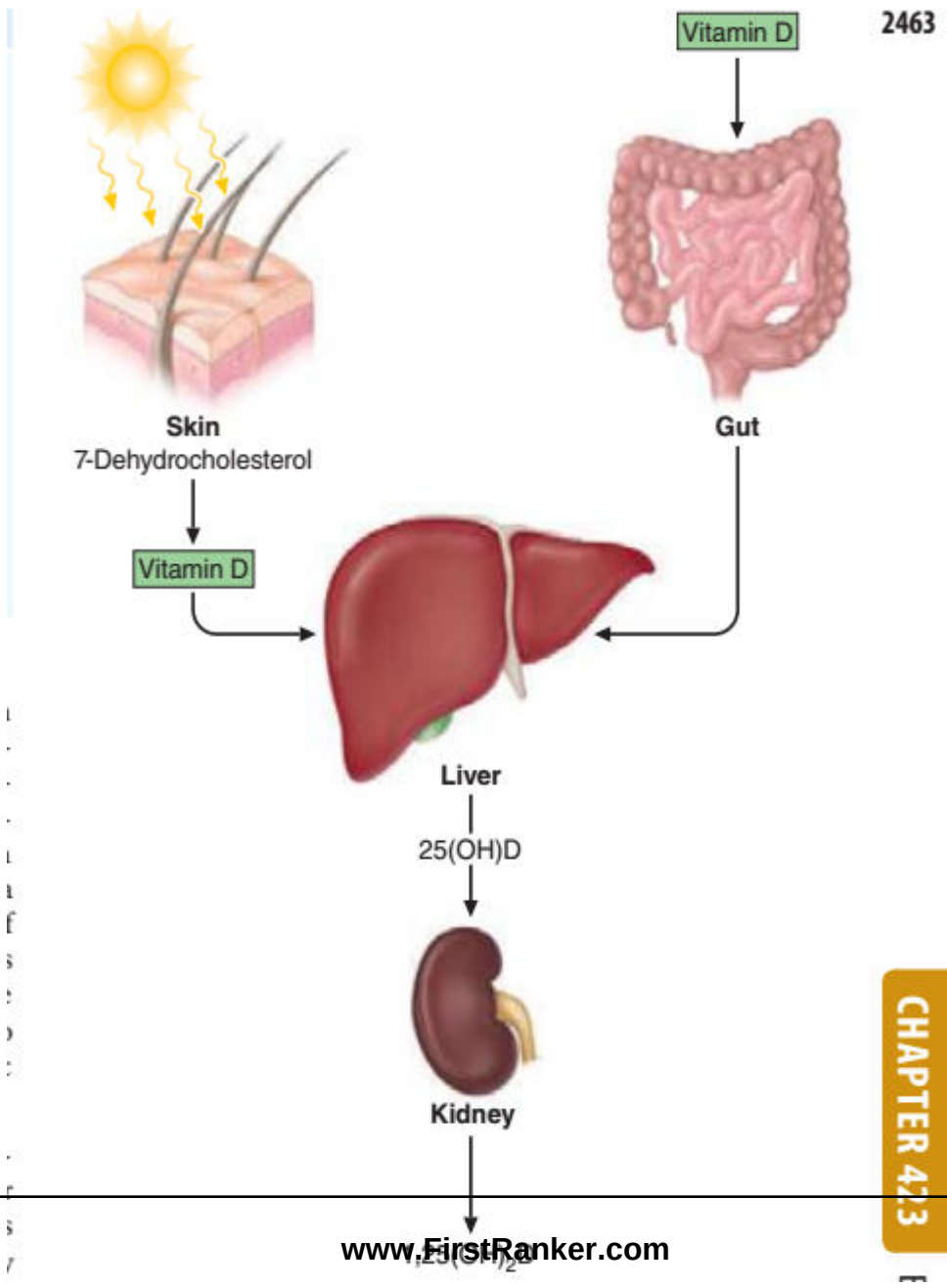
www.FirstRanker.com

FirstRanker.com
Firstranker's choice
www.FirstRanker.com www.FirstRanker.com

Renin-angiotensin-aldosterone system

Arteries/brain/adrenals
Kidneys/adipose tissues





CHAPTER 423

www.FirstRanker.com

FirstRanker.com
Firstranker's choice
www.FirstRanker.com www.FirstRanker.com

Renal Function Tests

- Blood Urea
- Serum Creatinine
- Serum Electrolytes
- Serum Calcium
- Serum Phosphate

Urine Examination

- Dip stick
- Microscopy
- 24 hrs Urine

www.FirstRanker.com

FirstRanker.com
Firstranker's choice
www.FirstRanker.com www.FirstRanker.com

Renal Imaging

- Skiagram
- USG
- CT scan
- MRI

www.FirstRanker.com