

LAB 8: URINARY SYSTEM

ACTIVITY 17: URINARY SYSTEM ANATOMY

INDICATE LEFT/RIGHT WHERE APPLICABLE & ARTERY/VEIN WHERE APPLICABLE ON QUIZ/EXAM.

Locate the following items on the models.

Kidney Models and Preserved Sheep/Pig Kidneys (Left/right is not needed on single kidneys)

1. Adrenal gland
2. Hilus
3. Arteries
 - a. Renal
 - b. Segmental
 - c. Interlobar
 - d. Arcuate
 - e. Cortical radiate (interlobular)
4. Veins
 - a. Renal
 - b. Interlobar
 - c. Arcuate
 - d. Cortical radiate (interlobular)
5. Renal capsule
6. Renal cortex
 - a. Renal columns
7. Renal medulla
 - a. Renal pyramids
 1. Renal papillae
8. Pelvis (region)
 - a. Major calyces
 - b. Minor calyces
9. Ureter
10. Urethra
11. Urinary bladder
 - a. trigone
12. Kidney

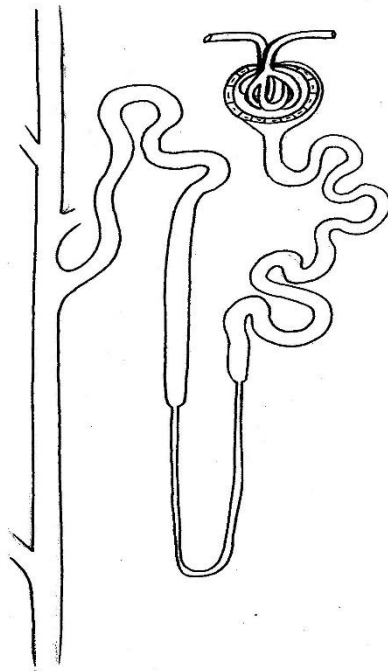
Nephron Models (Left or right is not needed)

13. Afferent arteriole
 14. Glomerulus (glomerular capillaries)
 15. Efferent arteriole
 16. Peritubular capillaries
 17. Venule
 18. Nephron (glomerular/Bowman's) capsule
 19. Proximal convoluted tubule (PCT)
 20. Nephron loop (loop of Henle)
 - a. Descending limb
 - b. Ascending limb
 21. Distal convoluted tubule (DCT)
 22. Collecting duct
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LAB 8: URINARY SYSTEM

Trace a drop of filtrate from the glomerulus until it is excreted through the urethra:

Trace an RBC through the kidney from the renal artery to the renal vein:



LAB 8: URINARY SYSTEM DISORDERS

LAB OBJECTIVES

By the end of today's lab, you should be able to:

- Define specific gravity and explain the clinical significance of deviations from normal.
- Identify abnormal constituents of urine and the terms used to indicate their presence and associated causes (normal vs. pathological) for their presence.
- Identify disorders of urine by observing color, turbidity, and consistency of a urine sample.
- Describe the underlying cause and give two signs or symptoms for the following diseases.

Name of Disorder	Cause	Signs/Symptoms
Cystitis (lower UTI)	Infection of the bladder	Painful urination, urge to urinate, cloudy urine, hematuria
Renal calculi	Dehydration, UTI.	Severe groin/flank pain, hematuria, nausea/vomiting
Pyelonephritis (upper UTI)	Bacterial infection of the kidney	Fever, flank pain, painful urination, vomiting
Nephrosis	Disease glomeruli	Proteinuria, body wide edema
Polycystic disease	Genetic disorder causing malformed renal tubules	High blood pressure, abdominal pain, hematuria, polyuria
Diabetes Insipidus	Hyposecretion of ADH	Polydipsia, polyuria, very dilute urine, dehydration

USEFUL HINTS

- Master lab objectives 2a, 3a, 3b, 3c, 3d, & 3e for lab test 4 before lab meets again.
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LAB 8: URINARY SYSTEM

ACTIVITY 18: URINALYSIS

Specific Gravity

When one drinks lots of liquids, the specific gravity will be higher, closer to 1.001. If one has not drunk very much liquid, one would expect the specific gravity to be lower, closer to 1.035.

Urine pH

The pH of urine can vary from 4 to 8. An alkaline-ash meal high in vegetables and low in meat produces urine with a pH closer to 8 while a protein-enriched meal produces urine with a pH closer to 4. Acid-base imbalances can also cause changes in urine pH.

Chart 12: Abnormal Constituents of Urine

Abnormal Constituents	Disorder	Cause
leukocytes	pyuria	inflammation of the urinary tract
nitrites	N/A	bacterial infection of the urinary tract
urobilinogen	urobilinogenuria	liver disease
protein (albumin)	albuminuria	<i>Nonpathological:</i> excessive physical exertion, pregnancy <i>Pathological:</i> heart failure, severe hypertension, or glomerulonephritis
erythrocytes	hematuria	bleeding urinary tract (due to renal trauma, kidney stones, renal infection, or renal cancer) or glomerulonephritis.
hemoglobin	hemoglobinuria	transfusion reaction, hemolytic anemia, severe burns
ketones	ketonuria	diabetes mellitus, starvation, low-carb diets
bilirubin	bilirubinuria	liver disease (hepatitis, cirrhosis) or obstruction of bile ducts from liver or gallbladder
glucose	glycosuria	<i>Nonpathological:</i> excess intake of sugary food <i>Pathological:</i> diabetes mellitus

Gross Analysis	Normal	Abnormal	Possible Problem
Color	yellow	red, brown, amber	hematuria, bilirubinuria
Turbidity (clarity)	clear	cloudy, hazy	UTI, mineral crystals
Consistency	non-foamy	foamy	albuminuria