

**Urogenital and Circulatory systems Exercise 48****RENAL SYSTEM -**

Understand the main functions of the kidney and this system (excretion of nitrogenous waste (urea), homeostasis (salt and water balance), removal of harmful or unnecessary substances (drugs, excess vitamins). If you study these processes in your textbook, you are likely to have less trouble remembering the more general features.

Can you answer these questions about nitrogenous wastes: how are they produced, why do we need to eliminate them, and what structures work on expelling them from our body? If these questions are unfamiliar to you, your understanding of the renal system needs to be improved.

You should know the structures that we discussed in class (listed below) and be able to identify structures from the human and rat renal systems (male and female). Be able to compare and contrast the human and rat systems and the male and female renal systems.

You should have located these structures during the rat dissection:

**Kidney, ureter, urinary bladder, urethra.**

Can you readily identify these on a rat? There are good diagrams in your lab manual of these structures.

There are also a number of other terms, relating to the kidney's anatomy, which you should be familiar with.

**Cortex: Renal corpuscles (glomerulus, Bowman's capsule).**

**Proximal and distal convoluted tubules**

**Medulla: Loop of Henle**

**Collecting ducts**

**Renal pelvis**

**Renal artery**

**Renal vein**

Nephron Anatomy - There is no diagram of a nephron in your lab manual but there is one in your text on page 883. You should be able to trace the various fluids into, through, and out of this system. Look to your text for a good explanation of this, and other, renal system functions.

Trace the flow of blood and urine formation in the nephron (afferent arteriole to the collecting duct):  
 Renal artery → afferent arteriole → glomeruli → Bowman's capsule → Proximal convoluted tubule  
 → descending, ascending Loop of Henle → distal convoluted tubule → collecting duct → renal pelvis  
 → ureter → urinary bladder → urethra.

Three processes occur in the nephron; *filtration*, *secretion* and *reabsorption*. Where do these processes take place in the nephron? What types of substances are filtered, reabsorbed, secreted?

**REPRODUCTIVE SYSTEM:**

You should have examined the male and female rats' reproductive systems during your dissection. There are also illustrations and descriptions of these systems in your lab manual. The human reproductive systems are described and illustrated in your lab manual and textbook. Try to trace the flow of gametes through these systems. If you can do this, and name the different structures as you trace these paths, you should have little problem with any questions about the reproductive system that are on your practical. You should also compare and contrast the rat and human systems.

The list below includes the structures you should be familiar with.

## Male Reproductive System

Rat

**scrotum**  
**testis (-es)**  
**epididymis**  
**vas deferens**  
**seminal vesicles**  
**prostate gland**  
**urethra**  
**penis**

Human

**scrotum**  
**testis (-es)**  
**epididymis**  
**vas deferens**  
**seminal vesicles**  
**prostate gland**  
**urethra**  
**penis**  
**bulbourethral gland**

## Female Reproductive System

Rat

**ovary**  
**oviduct**  
**uterine horns (duplex uterus)**  
**vagina**

Human

**ovary**  
**fallopian tube (uterine tube)**  
**uterus (simplex uterus)**  
**vagina**  
**cervix**

**Circulatory System:**

This is the most difficult section of these three systems in there being many terms to memorize. Hopefully you spent a fair amount of time during your dissection trying to identify the parts of this system that your lab manual directed you through in your dissection. A more general focus concerns the 3 circuits that were discussed in lab and in your manual. The pulmonary circuit serves to bring blood to and from the lungs. The right side of the heart services this circuit. The systemic circuit, serviced by the left side of the heart, delivers blood to the body. The hepatic portal system brings blood from numerous organs of the digestive system to the liver. Portal systems are a system of veins the carry blood from one capillary bed to another.

You should also be familiar with the heart, both its parts and how blood flows through it. You also should know the differences between veins and arteries, in their function and their form.

Again, one of the best ways to study for this is to try to trace the flow of blood through the entire system, trying to name the parts as you go from one structure to another. There are good diagrams and descriptions of this in you lab and textbook.

Listed below are the terms you need to be familiar with:

**Pulmonary Circuit:**

Cranial vena cava (R & L)  
 Caudal vena cava  
 Right atrium  
 Tricuspid valve  
 Right ventricle  
 pulmonary semilunar valve  
 pulmonary trunk  
 R & L Pulmonary arteries  
 pulmonary veins  
 Left Atrium  
 Bicuspid (mitral) valve  
 left ventricle

**Systemic Circuit:**

left ventricle  
 aortic semilunar valve  
 aorta - ascending aorta  
 aortic arch  
 descending aorta  
 thoracic aorta  
 abdominal aorta  
 coronary arteries

**Arteries:** Brachiocephalic  
 R. subclavian  
 R. common carotid  
 L. common carotid  
 L. subclavian  
 ( Celiac )  
 (superior mesenteric)  
 Renal (R & L)  
 Iliolumbar (R & L)  
 Iliac (R & L)

**Veins:** Cranial vena cavae (R & L)  
 Internal jugular  
 External jugular  
 Caudal vena cava  
 Hepatic  
 Renal (R & L)  
 Iliac (R & L)