Lab 10: Urinary System Anatomy and Physiology, Reproductive System Anatomy

**KIDNEY**
Locate the following structures on the sheep kidney and human kidney models:

<table>
<thead>
<tr>
<th>Sheep Kidney</th>
<th>Kidney Models</th>
<th>Nephron Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>renal capsule</td>
<td>renal artery and vein</td>
<td>nephron</td>
</tr>
<tr>
<td>cortex</td>
<td>adipose capsule</td>
<td>glomerular capsule</td>
</tr>
<tr>
<td>medulla</td>
<td>cortex</td>
<td>(Bowman's capsule)</td>
</tr>
<tr>
<td>pelvis</td>
<td>medulla</td>
<td>convoluted tubules</td>
</tr>
<tr>
<td>ureter</td>
<td>hilum</td>
<td>PCT</td>
</tr>
<tr>
<td>pyramids</td>
<td>pyramids</td>
<td>DCT</td>
</tr>
<tr>
<td></td>
<td>minor calyces</td>
<td>loop of Henle</td>
</tr>
<tr>
<td></td>
<td>major calyces</td>
<td>collecting ducts</td>
</tr>
<tr>
<td></td>
<td>pelvis</td>
<td></td>
</tr>
</tbody>
</table>

**UROGENITAL SYSTEM**
Locate the following structures on the cat and on models and charts of the human:

<table>
<thead>
<tr>
<th>Kidneys (right &amp; left)</th>
<th>Ureters</th>
<th>Urinary bladder</th>
<th>Urethra</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adrenal glands</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renal arteries</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Renal veins</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Female</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ovaries</td>
<td>Scrotum</td>
</tr>
<tr>
<td>Uterine tube</td>
<td>Testes</td>
</tr>
<tr>
<td>Uterus</td>
<td>Epididymis</td>
</tr>
<tr>
<td>*Uterine horns</td>
<td>Vas deferens</td>
</tr>
<tr>
<td>Uterine body</td>
<td>Spermatic cord</td>
</tr>
<tr>
<td>Cervix</td>
<td>Inguinal canal</td>
</tr>
<tr>
<td>Vagina</td>
<td>Urethra</td>
</tr>
<tr>
<td>Broad Ligament</td>
<td>Prostate gland</td>
</tr>
<tr>
<td>*Urogenital sinus</td>
<td>Penis</td>
</tr>
<tr>
<td>Vulva</td>
<td></td>
</tr>
</tbody>
</table>

*Found in cat only, not in the human.*
Urinalysis

I. Terminology

- Urochrome
- Hematuria
- Glucosuria
- Crystals
- Ketonuria
- Casts
- Pyuria
- Renal Calculi

II. Analysis of Unknowns ("fake" urine)

A. **Appearance** – check color and transparency
   - Normal color: __________________
     - Urochrome
   - Abnormal colors:
     - Reddish amber – urobilinogen (produced by action of intestinal bacteria on bile pigment)
     - Red to smoky brown: blood and blood pigments
   - Normal transparency: _________________
   - Abnormal transparency:
     - Cloudy – bacterial infection, pus, fat

B. **Specific Gravity** – use urinometer [read at meniscus to 3 decimal places]
   - Normal range: 1.003 to 1.030
   - Abnormal: low – chronic nephritis, diabetes insipidus
               high – diabetes mellitus, acute nephritis

C. **Multistix (urine test strips)** – know what is considered normal for each test and know one abnormal situation for each urine component.

<table>
<thead>
<tr>
<th></th>
<th>Normal</th>
<th>Abnormal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glucose:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ketones:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Specific Gravity:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Blood:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>pH:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Protein:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

D. **Sediments** - examine sediment slide. You are responsible for naming 2 sediments, not for identifying them on the slide.
**Urinalysis Questions:**

1. What is a typical volume of urine that would be excreted in a day?

2. What substance is responsible for the normal “yellow” color of urine?

3. Which has a greater specific gravity: 1 ml of dH₂O or 1 ml of urine?
   Why?

4. Glucosuria is indicative of what clinical situation?

**Urogenital System Questions:**

1. Name the following structures:
   a. Cup-shaped structure that surrounds the glomerulus:
   b. Cone-shaped areas in the medulla of the kidney:
   c. Fibrous outer covering of kidney:
   d. Functional unit of kidney:
   e. Tubes that drain the kidneys:

2. Describe the function:
   a. Vas deferens:
   b. Prostate gland:
   c. Uterine tubes:
   d. Uterine horns:
**Lab 11: Respiratory Anatomy & Physiology**

Locate these structures on the models and chart for the human:
*Locate these structures on the cat.

- Diaphragm
- Pleura
  - Visceral
  - Parietal
- Pleural Cavity
- *Lungs
  - Lobes
- Mediastinum
- *Phrenic Nerves
- *Larynx
- *Vocal Cords
- *Epiglottis
- *Glottis
- Thyroid Cartilage
- Cricoid Cartilage
- *Tracheal Cartilage
- Primary Bronchi
- Secondary Bronchi

**Respiratory Physiology:**
Define these lung volumes and know the number of milliliters for each:

- Tidal Volume
- Inspiratory Reserve Volume
- Expiratory Reserve Volume
- Vital Capacity
- Residual Volume
Bell Jar Model:
Identify the parts of the Bell Jar Model that represent the following:
   A. lungs -
   B. pleural cavity -
   C. diaphragm -
   D. thoracic cavity wall -

Respiratory Slides:
Normal lung
Emphysema
Pneumonia

Respiratory System Questions:
1. How does the number of lung lobes in the human compare to the cat?
   Human: ________      Cat: ________
2. The trachea bifurcates into two primary ________________.
3. The cartilaginous flap that deflects food and liquid into the esophagus and away from the respiratory tree is the ________________.
4. The phrenic nerve innervates the ________________.
5. How many pleural cavities are there? ________________.
6. What pressure change occurs in the Bell Jar when the “diaphragm” is pulled down ________________.
7. What pressure change occurs in the Bell Jar when the “diaphragm” is released ________________.
Lung Volumes:
Label the following lung volumes and capacities:

- TLC
- TV
- IRV
- ERV
- RV
- VC
Identify the following structures on the Respiratory System diagram:

<table>
<thead>
<tr>
<th>Alveoli</th>
<th>Epiglottis</th>
<th>Tertiary bronchi and bronchioles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apex</td>
<td>Esophagus</td>
<td>Visceral pleura</td>
</tr>
<tr>
<td>Base</td>
<td>Trachea</td>
<td>Pleural cavity</td>
</tr>
<tr>
<td>Diaphragm (contracted)</td>
<td>Primary bronchus</td>
<td>Parietal pleura</td>
</tr>
<tr>
<td>Diaphragm (relaxed)</td>
<td>Secondary bronchus</td>
<td>Larynx</td>
</tr>
</tbody>
</table>
Urinary / Reproductive / Respiratory Systems

1. Trace the flow of urine from the minor calyx to the outside of the body.

2. What is another name for “uterine tube”?

3. What is the superior rounded portion of the uterus called?

4. Describe the major differences observed between the female cat and the human regarding the urinary and reproductive systems.

5. Identify the specific location of spermatogenesis.

6. For the human lungs, identify the number of lobes and their names.

7. What happens to the thoracic cavity volume during inspiration?

8. During diaphragm contraction, does the volume of the thoracic cavity increase or decrease?

9. During expiration, what causes air to flow out of the lungs?