LABORATORY 28 FEMALE REPRODUCTIVE SYSTEM - (second of three laboratories)
UTERINE TUBE AND UTERUS

OBJECTIVES: LIGHT MICROSCOPY: Recognize the different regions of the oviduct, the mucosa including epithelium and extent of muscle layer.
Recognize the three layers of the uterus and characteristics of endometrium at each phase of the menstrual cycle including glands and stroma and the changes that occur in the cells of these structures. Contrast appearance of cervix with body of uterus. Recognize the mucosa, muscularis and adventitia of the vagina.

ASSIGNMENT FOR TODAY'S LABORATORY

GLASS SLIDES

SL 133	Oviduct, fimbria and upper ampulla
SL 134	Ampulla and broad ligament
SL 135	Ampulla and broad ligament, five months pregnancy
SL 139	Uterus and late proliferative
SL 138	Uterus, early proliferative
SL 140	Uterus, early secretory
SL 141	Uterus, fully secretory
SL 58	Uterus, menstrual
SL 142	Uterine cervix, adult
SL 144	Vagina
SL 120	Vagina and urethra
SL 71	Vagina and bladder

HISTOLOGY IMAGE REVIEW - available on computers in HSL
Chapter 17, Female Reproductive System, Uterus
Frames: 1144-1175

SUPPLEMENTARY ELECTRON MICROGRAPHS
Rhodin, J. A.G., An Atlas of Histology
Female reproductive system - oviduct, uterus and vagina pp.409 - 414
(Copies of this text are on reserve in the HSL.)

UTERINE TUBE (OVIDUCT)

The uterine tube is a three-layered structure, consisting of mucosa, muscularis and an outer layer that is for the most part serosa or peritoneum. The oviduct can be divided into the infundibulum from which the fimbria extends toward the ovary, the ampulla is the longest part of the tube and leads to the isthmus that is narrow and lies adjacent to the uterus. From the isthmus a short intramural region extends through the wall of the uterus. In the sections that we will study, the mucosa has elaborate thin folds that in the ampulla extend into the lumen.

A. FIMBRIA AND UPPER AMPULLA, adult. SL 133 (scan) (J. 22-17, 22-18; W. 19.14)

1. Ampulla (upper portion). Identify the different layers of the oviduct, the mucosa, muscularis and serosa then examine the epithelium and identify the ciliated and secretory (peg) cells that are present. Also, determine whether diffuse lymphoid tissue is located in the lamina propria (med, high) (Two cell types are indicated by red and blue arrows).
   What structural and/or functional changes do these undergo with varying hormone influences?

2. Fimbria (red arrows) – The epithelium of the fimbria is similar to that of the ampulla. Observe the composition of the stroma and condition of the vasculature.

B. AMPULLA AND BROAD LIGAMENT. SL 134 (scan)

1. Compare the different layers of oviduct in this slide with those observed in the previous slide.

2. Broad Ligament.
   (a) Connective tissue, blood vessels, lymphatics, scattered smooth muscle and serosa.
   (b) Are any vestigial tubules (blue arrow) present? What do they represent?

C. AMPULLA AND BROAD LIGAMENT, SL 135 (scan). 5 months pregnancy

1. Compare epithelium to SL 133 above.

UTERUS

The body of the uterus has three major layers: endometrium (mucosa), myometrium (muscularis), and perimetrium (serosa). The endometrium shows the most apparent changes during the menstrual cycle. Therefore, study of the uterus involves an understanding the changes in the endometrium that characterize each stage of the cycle.

A. UTERUS. Study a representative slide of the body of the uterus (SL 139) and observe the general characteristics of all layers.

1. Myometrium: It is evident that the myometrium is very thick; it is the thickest of the three layers. Careful inspection of the myometrium reveals that it is vaguely divided into several layers. Arteries and veins with thick muscular walls course through the muscularis and give rise to branches that enter other layers.

2. Endometrium: As you observe the endometrium define the type of epithelium that forms the uterine lining and determine the type of glands present. Be sure to look for different cell types that invade this region, especially in the late secretory phase of the cycle. Find arterioles and venules. Distinguish between the functional and basal zones (functional, red arrow; basal, blue arrow) of the endometrium and observe which region shows the most significant changes during the cycle.

3. Is any perimetrium on the section?

B. STAGES OF THE MENSTRUAL CYCLE. Observe and compare the following five slides (SL 138, 139, 140, 141, and 58). During the menstrual cycle, the major changes will be found in the endometrium.

Study the endometrial appearance in each of the following stages of the cycle:

1. EARLY PROLIFERATIVE - SL 138 (scan, low, med, high). (Numerous artifacts from knife scratches appear on this slide.) (J. 22-21, 22-22; W. 19.18a, b, c) Observe the:
   (a) width of the endometrium. Is there any distinction between functional and basal zones?
   (b) appearance of glands. Look for mitotic figures in the epithelium of the glands and in the stroma.
   (c) appearance of arterioles and venules.

2. LATE PROLIFERATIVE - SL 139 (low, med, high) (W. 19.18d, e, f) Note appearance as above. Can a functional and basal zone be distinguished?

3. EARLY SECRETORY (PROGESTATIONAL) SL 140 (scan, low, med, high). (J. 22-23; W. 19.19a, b, c) In this stage, the endometrium is thicker and the functional and basal regions can be easily distinguished. In addition to looking for the same characteristics as in the previous slides observe:
   (a) an accumulation of glycogen, (clear areas indicated by red arrows) appears below the nucleus in of the glandular cells.
   (b) fewer mitoses are found in the glands.
   (c) the endometrial vasculature is more developed.

4. FULLY SECRETORY STAGE - SL 141 (low, med, high) (W. 19.19d, e, f). In this stage you should observe that:
   (a) glandular cells now contain a supra-nuclear secretory product (blue arrows) (type of secretion?).
   (b) the vasculature in the functional zone is more prominent.
   (c) several different cell types appear in the stroma. What are the cell types?

5. MENSTRUAL STAGE - SL 58 (low, med) (W. 19.16) Early menstrual changes. Note on this slide hemorrhage not apparent. What portions of the endometrium are sloughed off during menstruation? What parts remain?

UTERINE CERVIX (NECK) AND VAGINA

A. Uterine cervix, adult - SL 142. (W. 19.23 to 19.26)
   1. Supravaginal (scan, low, med) portion (surrounds the cervical canal). Compare to the body of the uterus in regard to epithelium, glands and stroma of the lamina propria and muscularis. Find the region where the epithelium changes from simple columnar to stratified squamous non-keratinized (blue arrow).
   2. Vaginal portion. Compare the mucosa in this region to the supravaginal region and determine whether glands are present or absent in this location.

B. Vagina. Study the characteristics of the mucosa, muscularis and adventitia. Note the blending of the latter into neighboring organs, where shown.
   1. SL 144 (low, med). (J. 22-26; W. 19.26) - Vagina, longitudinal section.
   2. SL 120 (scan, low, med). Vagina and urethra, cross section.
   3. SL 71 (low). Vagina and bladder (bladder not included in VLM image), cross section. Some patches of transitional epithelium may be found on bladder surface.

OBJECTIVES FOR LABORATORY 28: FEMALE REPRO. SYSTEM – OVIDUCT, UTERUS, VAGINA

1. Using the light microscope or digital slides, identify:

- Oviduct
  - Mucosa
    - Ciliated cells
    - Secretory (peg) cells
  - Muscularis
  - Serosa
  - Be aware of regions (fimbria, ampulla, etc) but do not need to distinguish
- Uterus
  - Body
    - Layers
      - Endometrium
        - Functional zone
        - Basal zone
      - Myometrium
      - Perimetrium
    - Stages
      - Proliferative
      - Early secretory
      - Late secretory
      - Menstrual (note difficult to distinguish from poorly preserved slide)
  - Cervix
    - Supravaginal portion
    - Vaginal portion
- Vagina
  - Mucosa
  - Muscularis
  - adventitia

REVIEW

1. What are the cell types found in the epithelium of the oviduct? Briefly, what changes occur in the epithelium during the menstrual cycle?

2. Briefly describe the histological changes that occur in the functionalis and the basalis regions of endometrial glands during the proliferative phase and the secretory phase of the menstrual cycle.

3. How does the appearance of the stroma change from the proliferative to the secretory phase?