No pregnancy

- In absence of pregnancy, cells stop synthesising steroids and apoptose
- Reduced progesterone synthesis results in menstruation
- After degeneration of the corpus luteum, oestrogen levels drop, releasing FSH from inhibition
- More follicles stimulated to grow in another cycle
- Remnants of the corpus luteum phagocytosed by macrophages; fibroblasts then invade and produce a scar of connective tissue (corpus albicans)

Pregnancy

- Trophoblast cells of the implanting embryo secrete human chorionic gonadotrophin (hCG), which acts similarly to LH
- HCG targets the corpus luteum; maintains it to maintain progesterone synthesis and thus the uterine mucosa
- Progesterone also stimulates the uterine mucosal glands, for nutrition of the embryo before placenta is in place
- Corpus luteum of pregnancy hypertrophies and is maintained by HCG for 4-5 months
  - Placenta then produces progesterone and oestrogens at sufficient levels
- Corpus luteum degenerates and replaced by a corpus albicans

Uterine tubes

- Muscular tubes with considerable mobility
- Regions
  - Funnel shaped infundibulum with fimbriae
  - Ampulla, long expanded area where fertilisation occurs
  - Isthmus, narrow region near uterus
  - Uterine/intramural part, passes through wall of the uterus
- Wall of oviduct is folded mucosa, thick muscularis (with interwoven longitudinal and circular muscle) and peritoneum with mesothelium

Clinical note

- Salpingitis is inflammation of the uterine tubes
- Salpingectomy is surgical removal of the uterine tubes

- Mucosa has branching, longitudinal folds, particularly in the ampulla, not present in the intramural segment
- Mucosa is simple columnar epithelium on a lamina propria of loose connective tissue
- Two cell types, ciliated cells and secretory peg cells (apical side bulges into lumen)
Cilia beat toward the uterus, moving along a viscous fluid film produced by peg cells, which contains glycoproteins and nutrients. Both cell types hypertrophy and cilia elongate in response to oestrogen during the follicular phase, and atrophy in the luteal phase. At the time of ovulation, the uterine tubule shows active movement. Infundibulum moves closer to ovary and partially covers its surface. Muscle contractions of the fimbriae and ciliary activity move the oocyte along the uterine tubes to the ampulla. The secretions from peg cells has nutrient and protective functions for the oocyte and sperm, including factors promoting capacitation. Oocyte viable for 24 hours. Following fertilisation, the oocyte finishes its second meiotic division to form the ovum. Diploid cell from fertilisation is the zygote. Contraction of the oviduct and ciliary movement transport the zygote to the uterus; ciliary activity not essential.

**Clinical note**

- Proinflammatory scar tissue can block uterine tubes, preventing the embryo from reaching the uterus.
- May implant in the uterine tube wall – ectopic pregnancy.
- The lamina propria may react like the uterine endometrium and form decidual cells.
- Due to small diameter and inability to expand, tubes cannot contain the growing embryo and will rupture – haemorrhage, which can be fatal.

**Uterus**

- Pear shaped, thick muscular walls.
- Uterine tubes enter into the body; curved, superior area is the fundus.
- Uterus narrows in the isthmus to become the cervix; lumen is the internal os, entering into the cervical canal.
- Three major layers:
  - Perimetrium: outer connective tissue layer, continuous with ligaments.
  - Myometrium: thick smooth muscle, highly vascularised.
  - Endometrium: mucosa of simple columnar epithelium.
- Thickness and structure of the endometrium influenced by ovarian hormones.

**Myometrium**

- Bundles of smooth muscle plus connective tissue with blood vessels
- Mixture of longitudinal and circular muscle.
- Connective tissue of the nipple is rich in smooth muscle fibres running parallel to the lactiferous sinuses, responsible for nipple erection.

Taken from Mescher, Junqueira’s Basic Histology: Text and Atlas, Twelfth Edition.

Pregnancy and lactation:
- Several hormones contribute to growth of the mammary glands during pregnancy (oestrogen, progesterone, prolactin, human placental lactogen).
- Alveoli proliferate (composed of cuboidal epithelium, with myoepithelial cells) and ducts proliferate.
- Stroma becomes less prominent; intra-lobular loose connective tissue is infiltrated by lymphocytes and plasma cells (become more numerous toward end of pregnancy for IgA secretion).
- Late in pregnancy the alveoli and ducts dilate due to an accumulation of colostrum (rich in proteins, vit A, and electrolytes) which is produced under influence of prolactin; antibodies added.
- Following parturition, levels of oestrogen and progesterone declines, and glandular alveoli become active in milk production.
- Merocrine secretion of protein, apocrine secretion of lipids, plus other components (sugar, lactose etc.)