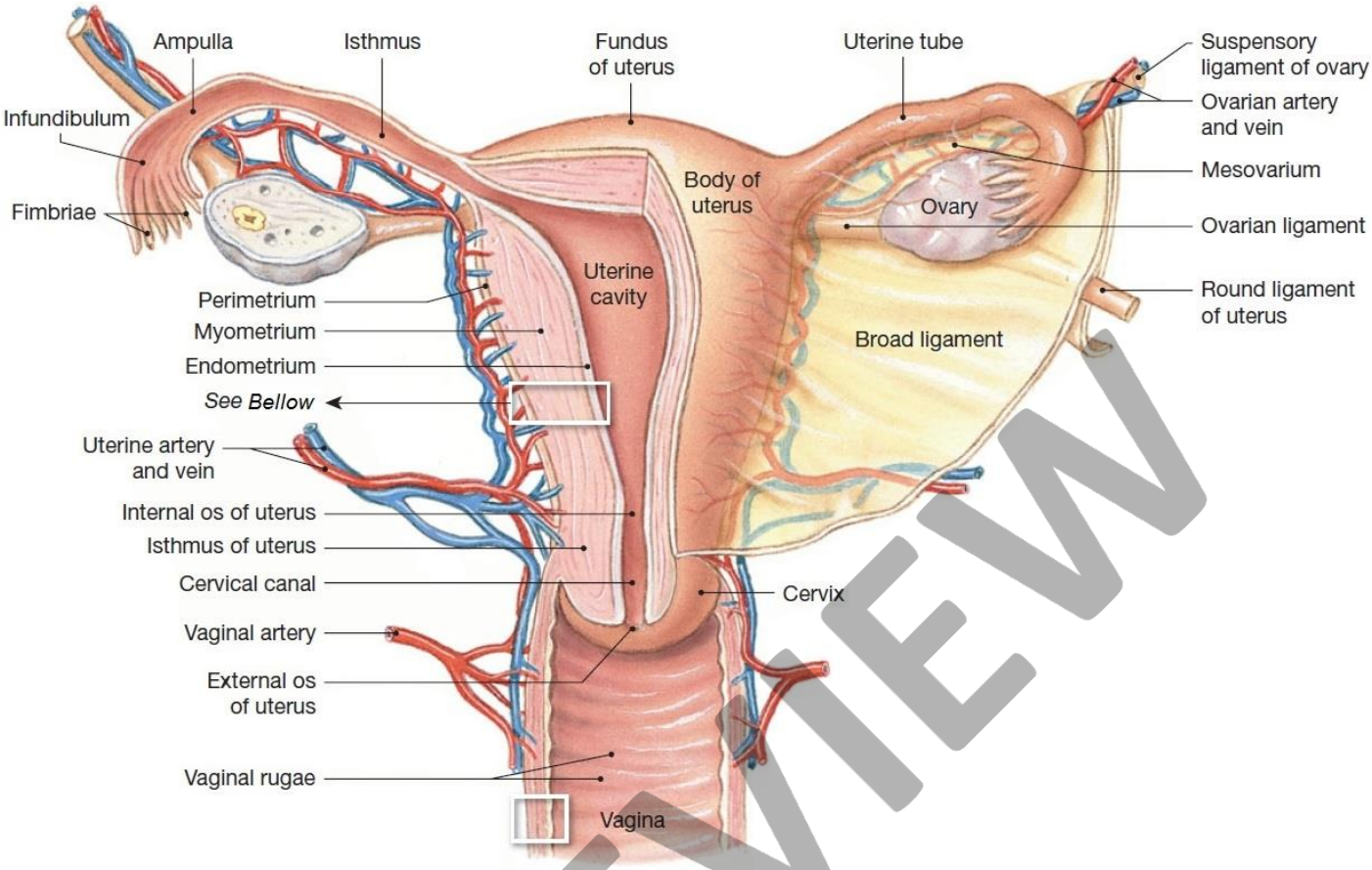
Reproductive System

1. The basic structure and function of the Female Reproductive System

a) Describe the gross anatomy of the female reproductive system including the ovaries, uterine (fallopian) tubes, uterus and vagina.



Ovaries

- Produce immature female gametes → oocytes, eggs
- Secretion of female sex hormones → estrogen, progestin
- Secrets 'inhibin; involved in feedback control of pituitary hormone

→ Mesovarium:
→ Ovarian Ligament
→ Suspensory ligament

Uterine Tube (Fallopian Tubes or Oviduct)

- Transport oocyte from ovary to uterus

→ Infundibulum: contains fimbriae

- Creates current to pull eggs in to uterine tube

→ Ampulla: thickness of smooth muscle layers gradually increases as the tube approaches the uterus
→ Isthmus: where sperm fertilise the egg

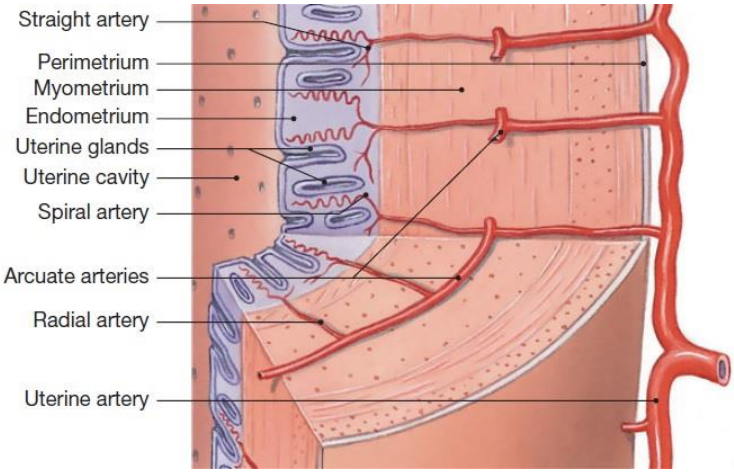
Uterus: where foetus forms

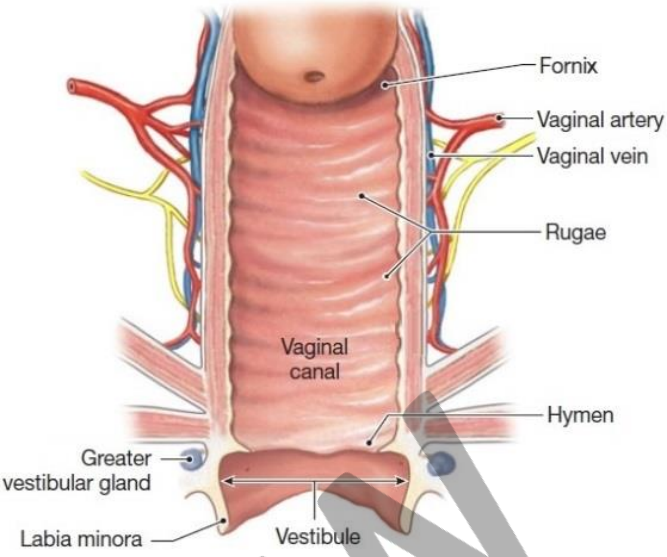
- Hollow muscular organ
- Located between bladder & rectum

→ Body

- Perimetrium: outer muscle layer
- Myometrium
- Endometrium

→ Cervix





Vagina

- Rugae: allows vagina to expand
  - Covered in mucous membrane
- Hymen: elastic epithelial fold that partially blocks the entrance
- Vestibule: masses of erectile tissue that covers the entrance

b) Describe the gross anatomy of the breasts.

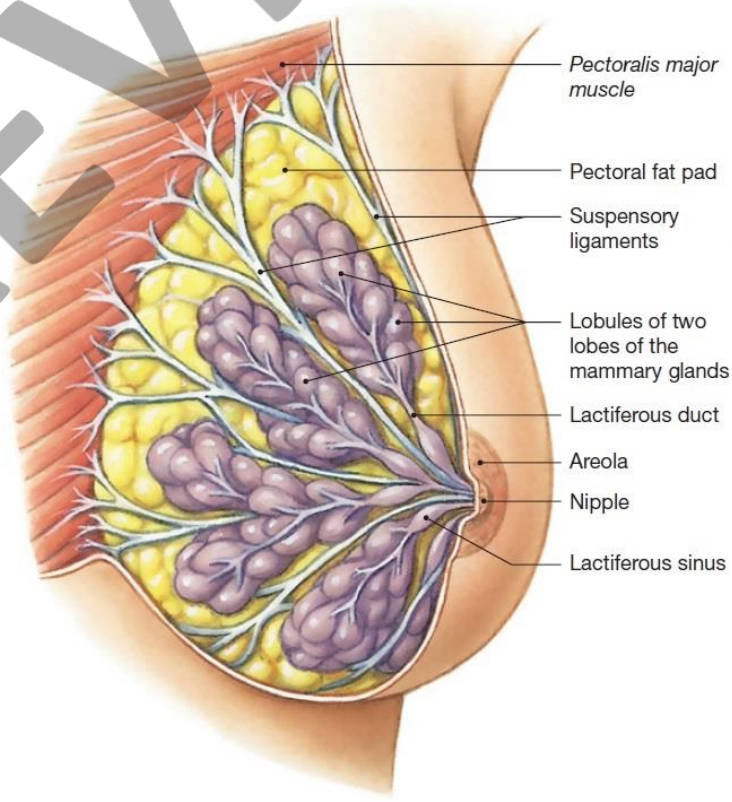
→ **Nipple:** where the ducts of underlying mammary gland open onto the body surface
  - **Areola:** reddish-brown skin around each nipple

→ **Glandular Lobes:** consists of separate lobes
  - Bundle of lobes

→ **Lactiferous ducts:** convergence of ducts leaving lobules

→ **Lactiferous sinus:** expanded chamber near the surface

→ **Subcutaneous layer**
  - → **Adipose (fat) tissue:** outer layer
  - → **Suspensory (Cooper's) ligaments**: deep layer



Lactating Breast

- Glandular tissue are larger
  - ↳ Less dense compared to non-lactating breast
- Larger nipple pore, ducts & sinuses

Neoplasia

1. Terminology and Classification

a) Define the terms neoplasia, neoplasm and tumour.

Neoplasia: uncontrolled growth of abnormal cells

Neoplasm: mass formation of neoplastic cells

Tumour: abnormal growth of cells

b) Distinguish between neoplasia and hyperplasia, dysplasia and metaplasia

Hyperplasia: increase in number of cells in organ or tissue in response to a stimulus

- ↳ Ceases when the stimulus is removed

Dysplasia: pre-invasive change in cells that is characterise by disordered growth and morphological changes in the cell nucleus

- ↳ Reversible
- ↳ Considered pre-cancerous condition

Metaplasia: reversible replacement of one type of different cell by another in response to a stimulus

- ↳ Not considered to be pre-cancerous

c) Describe the different branches of oncology;

i. Experimental

Experimental oncology: Work in the laboratory and study the ethology (behaviour), pathogenesis (develop of disease) and cellular and molecular biology of Neoplasm

ii. Clinical

Clinical oncology: studies neoplasticism disease in a clinical setting

- ↳ Diagnostic and therapeutic

iii. Cancer epidemiology

Cancer epidemiology: studies the causes of neoplasia in human population and identify and develop improved treatments

- ↳ Study environmental causes of tumours

d) Detail the different factors that classify a neoplasm (tumour) as either benign or malignant. Include macroscopic and microscopic characteristics and growth behaviour

	Benign	Malignant
Macroscopic Features	• Encapsulated with a smooth external surface • Little tissue destruction • Does not grow blood vessels	• Irregular surface • Merges into surrounding tissue ↳ No capsules • Angiogenesis: formation of new blood vessels
Microscopic Feature	• Cells resembles normal tissue of origin ↳ Nuclei of normal size & shape ↳ uniformed • Cells are well differentiated • Same number of chromosomes (23 pairs) • Slow growth ↳ Less mitosis	• Cells does not resemble normal tissue of origin ↳ Pleomorphic: nuclei of varying shape and sizes • Varying numbers of chromosomes • Rapid growth ↳ Fast mitosis

e) Explain the term differentiation and the difference between a well-differentiated and poorly differentiated tumour cell.

Cell differentiation: process which cells becomes more specialised

- Well-differentiated cell: look more like normal cells
  - ↳ Complete the process of specialisation
  - Grows more slowly
  - Spread more slowly
- Poorly differentiated cells: appears more different than normal cells
  - ↳ Incomplete specialisation
  - Rapid growth
  - Leads to metastasis

f) Define the term, metastasis. Describe how this process occurs, the steps involved and how it affects the spread of cancer.

Metastasis: process in which cells move from one site to a distant site in the body

Stage 1: Growth, Expansion, proliferation
- Primary tumour cell develops

Stage 2: Invasion
- Tumour cell invades lymphatic and blood vessels (veins)

Stage 3: Transport
- Tumour cells spreads when lymph or blood circulates

Stage 4: Embolisation
- Cells clumps

Stage 5: Invasion
- Secondary tumour forms at a site distant from primary tumour

Mechanisms
- Pressure generated by expanding mass, moves tumour cells towards surrounding tissue
- Less differentiated cells re more mobile
- Cells form 'pseudopods'
  - ↳ able to move in between and into surrounding normal cells
- release of lytic enzymes degrades extracellular tissue
- loss of cell-to-cell contact inhibition

Primary Tumour Site	Secondary Tumour Site
GIT, breast, bones, melanoma	Liver
Beast, bones, melanoma	Lung
Breast, prostate	Bones
Lungs, breast, melanoma	Brain
Breast, lung	Adrenals