



RAPID RECALL

of Medical Science **Part-1**

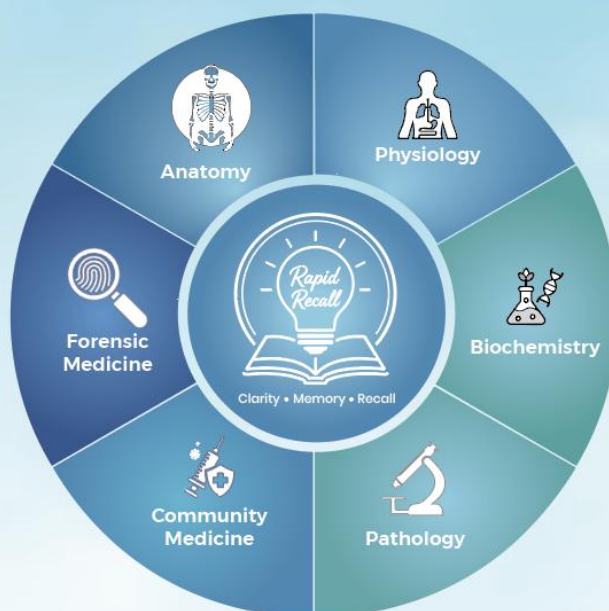


A Comprehensive Resource for Doctors' Job Preparation

Written by

Dr. Md. Rasel

BCS (Health) - 39th Special BCS
Registrar (Medicine), Mymensingh Medical College Hospital



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RAPID RECALL

of Medical Science (Part-2)

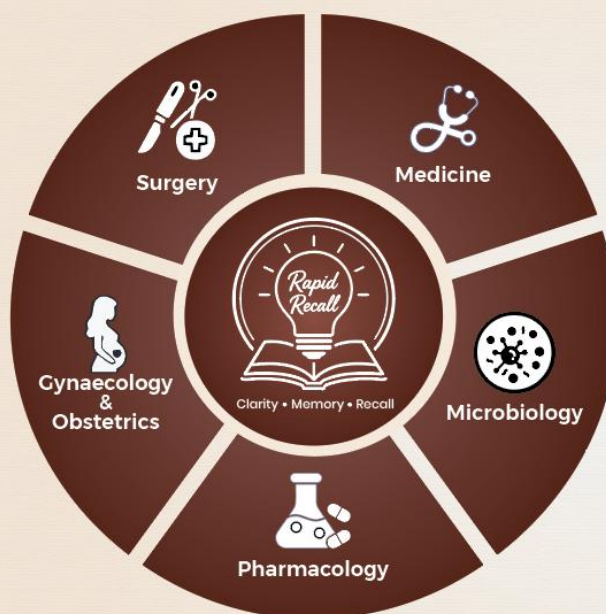


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PREVIOUS QUESTIONS (ANATOMY)**☆ Histology**

- ⌚ 48th Special BCS: Lining of urinary tract is → **Transitional epithelium**
- ⌚ 48th Special BCS: The layer of digestive tract containing nerves and vessels → **Submucosa**
- ⌚ 48th Special BCS: Most actively growing area of a long bone → **Epiphyseal cartilage**
- ⌚ 42nd Special BCS: Avascular structure includes → **Enamel of the teeth**
- ⌚ 42nd Special BCS: Epithelium found in thyroid follicles → **Cuboidal epithelium**
- ⌚ 39th Special BCS: Dermis → **Is formed by connective tissue**
- ⌚ 39th Special BCS: Smooth muscle is found in → **Wall of blood vessel**
- ⌚ 39th Special BCS: Extracellular matrix is more in → **Connective tissue**
- ⌚ 39th Special BCS: Urinary bladder is lined by → **Transitional epithelium**
- ⌚ 39th Special BCS: Elastic cartilage is not found in → **Epiphyseal plate of bone**
- ⌚ 39th Special BCS: Simple squamous epithelium is found in → **Endothelium**
- ⌚ 39th Special BCS: All are functions of epithelial tissue except → **Globulin synthesis**

☆ Thorax

- ⌚ 48th Special BCS: The base of heart is formed mainly by → **Left atrium**
- ⌚ 48th Special BCS: Structural and functional unit of lung → **Alveoli**
- ⌚ 42nd Special BCS: Muscle involved in forceful respiration → **Scalene**
- ⌚ 42nd Special BCS: Continuous capillaries for gaseous exchange occur in → **Lungs**
- ⌚ 42nd Special BCS: The diaphragm is pierced by → **Left phrenic nerve**
- ⌚ 39th Special BCS: False statement about lung → **The left lung is divided into three lobes**
- ⌚ 39th Special BCS: Structure passing through the aortic opening of the diaphragm → **Thoracic duct**

☆ Head and Neck

- ⌚ 48th Special BCS: Nerve responsible for sensation of smell → **Olfactory nerve**
- ⌚ 48th Special BCS: Part of the parasympathetic nervous system → **Ciliary ganglion**
- ⌚ 42nd Special BCS: Complete lesion of the oculomotor nerve causes → **Ptosis**
- ⌚ 42nd Special BCS: Deep cervical fascia encloses → **Thyroid gland**
- ⌚ 39th Special BCS: Region where deep fascia is absent → **Face**

☆ Pelvis and Perineum

- ⌚ 48th Special BCS: Reproductive organ → **Uterus**
- ⌚ 42nd Special BCS: Content of the broad ligament → **Ovarian artery**
- ⌚ 39th Special BCS: Structure crossing the ureter in the female near the ureterovesical junction → **Uterine artery**
- ⌚ 39th Special BCS: Male external genital organ → **Penis**
- ⌚ 39th Special BCS: The rectum is related anteriorly to → **Cervix**
- ⌚ 39th Special BCS: Detrusor muscle is a muscle of → **Urinary bladder**

CLASSIFICATION OF RODS

I. Gram Positive rods *****A. Aerobic****1. Spore forming**

- i. Bacillus
 - Bacillus anthracis – Anthrax
 - Bacillus cereus – Food poisoning after taking **reheated rice**

2. Non-spore forming

- i. Corynebacterium – Diphtheria
- ii. Listeria – Neonatal sepsis, Meningitis in **neonates & elderly**

B. Anaerobic**1. Spore forming**

- i. Clostridium
 - Clostridium tetani – Tetanus
 - Clostridium botulinum – Botulism
 - Clostridium perfringens – **Gas gangrene**
 - Clostridium difficile – **Antibiotic associated** pseudomembranous colitis

2. Non-spore forming

- i. Actinomyces
- ii. Nocardia

II. Gram Negative Rods

- **Respiratory organisms** → *Haemophilus, Bordetella, Legionella*.
- **Zoonotic organisms** → *Brucella, Francisella, Pasteurella, Yersinia*.
- **Enteric and related organisms** → *Escherichia, Klebsiella, Enterobacter, Serratia, Salmonella, Shigella, Proteus*.
- **Curved rods** → *Campylobacter, Helicobacter, Vibrio*.
- **Aerobic rod** → *Pseudomonas*.
- **Anaerobic rod** → *Bacteroides*.

IMPORTANT BACILLUS SPECIES

Organism	Major disease	Transmission / predisposing factor	Toxin action
<i>Bacillus anthracis</i>	Anthrax	Soil spores enter wounds or are inhaled	Protective antigen mediates entry; edema factor increases cAMP ; lethal factor causes cell death and necrosis
<i>Bacillus cereus</i>	Food poisoning	Spores germinate in reheated rice and produce enterotoxins	One enterotoxin increases cAMP ; another resembles staphylococcal enterotoxin

CELLULAR ADAPTATION AND CELL INJURY

❖ Cellular response to injury ***

1. Cellular adaptation

- Atrophy
- Hypertrophy
- Hyperplasia
- Metaplasia

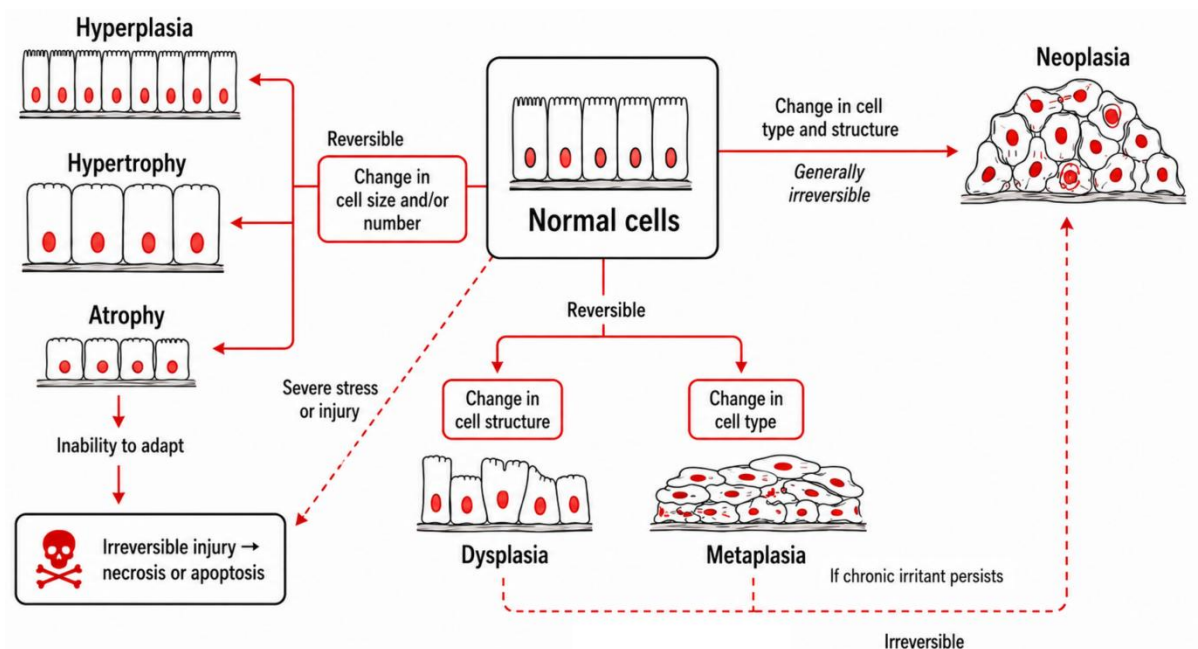
2. Cell injury

- **Reversible cell injury**
 - Cellular swelling
 - Fatty change
- **Irreversible cell injury**
 - Apoptosis
 - Necrosis

3. Intracellular accumulation

4. Pathological calcification

5. Cellular aging



❖ **EPI Plus**

- **EPI Plus means special programmes/services provided in addition to routine vaccination through the EPI platform.**

Target group	EPI Plus services
Child	▪ Vitamin A capsule for under-5 children
	▪ Deworming programme
Couple / Mother	▪ Sex education
	▪ Advice on breastfeeding
	▪ Family planning advice

❖ **Cold Chain ****

- **Polio and measles** vaccines must be stored in the freezer compartment.
- Rest of the vaccines must be stored **in the cold part but never allowed to freeze.**
- The maximum temperature for storage of any vaccine is **8°C.**

❖ **Contraindications of Live Attenuated Vaccines ****

- **Pregnancy** → avoid **live vaccines**
- **Malignancy** → Leukaemia, lymphoma, generalized cancer
- **Severe immunodeficiency** → HIV/AIDS, congenital immunodeficiency
- **Immunosuppressive therapy** → steroid, chemotherapy, radiotherapy
- **Severe acute febrile illness** → **postpone** vaccination
- **Recent immunoglobulin/blood products** → delay measles/MMR/varicella-type vaccines
- **Anaphylaxis to previous dose/component** → do not repeat

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1. Natural, inborn and non-specific immunity → **Innate immunity**
2. Immunity acquired after infection or vaccination → **Acquired immunity**
3. Immunity produced by antigen exposure → **Active immunity**
4. Ready-made antibody mediated immunity → **Passive immunity**
5. Natural active immunity is acquired by → **Infection**
6. Artificial active immunity is acquired by → **Vaccination**
7. Natural passive immunity is acquired by → **Maternal antibody**
8. Artificial passive immunity is acquired by → **Immunoglobulin or antiserum**
9. Community resistance against a disease is called → **Herd immunity**
10. Immunity of major importance in the prevention of epidemics — **Herd immunity.**
11. EPI was launched globally by WHO in → **1974**
12. EPI started in Bangladesh in → **7 April 1979**
13. EPI summary → **6 vaccines, 6 visits, 10 diseases**
14. Vaccines requiring storage in freezer compartment → **OPV and Measles/MR vaccines**
15. Maximum storage temperature for vaccines → **8°C**
16. Live vaccines are contraindicated in → **Pregnancy, Severe immunodeficiency**

❖ Important Autopsy Findings ***

Finding	Medicolegal association
Hyoid bone fracture	Hanging
Ligature mark	Strangulation / throttling
Pugilistic attitude	Burn
Defensive wounds	Homicide
Cyanosis	Asphyxia

❖ Differences Between Hanging and Strangulation **

Feature	Hanging	Strangulation
Manner of death	Usually, suicidal	Usually, homicidal
Ligature mark (48 th BCS)	Oblique, non-continuous, above thyroid cartilage	Horizontal, continuous, at/below thyroid cartilage
Face	Pale	Congested and cyanosed
Salivary dribbling	Present (characteristic)	Absent
Hyoid bone	Fracture may occur	Fracture is uncommon
Thyroid cartilage	Fracture is less common	More common

❖ Specimens and Preservation ***

- Viscera commonly preserved
 - Stomach with contents
 - Upper part of small intestine (15-30cm)
 - Liver: minimum 200-300g.
 - Kidney: longitudinal half of Both kidneys.
- Additionally preserved in selective cases
 - Heavy metals → bone, hair, nails
 - Alcohol → blood, urine, CSF, vitreous humour
 - Criminal abortion → uterus & appendages
 - Pesticides/insecticides → fatty tissue
 - Strychnine → brain/spinal cord/heart
- Materials for chemical analysis
 - Vomitus.
 - Stomach washout.
 - Blood (30 ml; minimum 10 ml) and urine (30ml).
- Preservatives ***
 - Saturated solution of common salt - **most common**.
 - Absolute alcohol.
 - Rectified spirit.
 - 10% formol saline (usually 6-10 times than volume of tissue to be preserved) - not formaldehyde; used for **histopathological examination**
 - Sodium or potassium fluoride with anticoagulant potassium oxalate for **blood**
 - Phenyl mercuric nitrate for urine; thymol fluoride should be added if alcohol, cyanide or cocaine suspected.

VITAMINS

❖ **Classification**

Fat-soluble	Water-soluble
Vitamin A	Vitamin B-complex
Vitamin D	Vitamin C
Vitamin E	
Vitamin K	

VITAMIN A (RETINOL)

❖ **Functions**

- Vision
- Growth
- **Epithelial integrity**
- Immunity
- Reproduction

❖ **Deficiency *****

- **Night blindness (earliest symptom)** [☒ *PSC Non-Cadre*]
- Xerophthalmia
- **Bitot spots**
- Keratomalacia (**Irreversible**) [☒ 10th BCS]
- Increased susceptibility to infection
- Growth retardation
- **Toad skin (Follicular hyperkeratosis)**

❖ **Hypervitaminosis A ****

- Dry, itchy skin
- Hepatomegaly
- Cirrhosis
- **Raised intracranial pressure**
- Osteoporosis
- **Teratogenicity**

VITAMIN D

❖ **Functions**

- Increases calcium absorption
- Increases phosphate absorption
- Bone remodeling
- Bone mineralization

❖ **Deficiency *****

- **Rickets** (Children)
- **Osteomalacia** (Adults)

❖ **Frameshift Mutation**

- Deletion/insertion of **not multiple of 3**
- Examples:
 - Cystic fibrosis
 - Duchenne muscular dystrophy

❖ **In-frame Mutation**

- Deletion/insertion of **3 or multiple of 3 bases**
 - Becker Muscular Dystrophy (BMD)

❖ **Basic Genetics**

- **Genome** → Total genetic material of a cell
- **Genotype** → Genetic constitution
- **Phenotype** → Observable characteristics
- **Barr body** → **Inactivated** X chromosome

❖ **Blotting Techniques *****

- **Southern blot** → DNA
- **Northern blot** → RNA
- **Western blot** → Protein

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1. **DNA polymerase** → Replication
2. **RNA polymerase** → Transcription
3. **DNA** → **RNA** → **Protein** → Central dogma
4. **S phase** → DNA synthesis
5. **M phase** → Mitosis
6. **46, XX** → Normal female
7. **46, XY** → Normal male
8. **45, X** → Turner syndrome
9. **47, +21** → Down syndrome
10. **Stop codons** → **UAA, UAG, UGA**

Previous BCS Written Question

- ✧ Mitochondrial structure and functions — 44th, 41st, 35th BCS
- ✧ Metabolic acidosis and acid-base balance — 45th, 37th BCS
- ✧ Physiological buffer systems — 35th BCS
- ✧ Normal serum-electrolyte values — 44th, 40th, 37th, 35th BCS
- ✧ Calcium metabolism and normal serum calcium — 38th, 35th BCS
- ✧ Vitamin D — 38th BCS
- ✧ Fat-soluble vitamins — 36th, 35th BCS
- ✧ Vitamin A deficiency — 35th BCS
- ✧ Vitamin B12 and folate — 36th, 35th BCS
- ✧ Difference between hormone and enzyme — 44th BCS

- **Principles of Hernia Repair**
 - Reduce hernial contents
 - Excise **non-viable tissue**
 - Repair bowel (if required)
 - Close or excise the sac
 - Repair the abdominal wall defect
 - Reinforce with **mesh**(when appropriate)
- **Types of Hernia Repair**
 - **Open suture repair:**Bassini, Shouldice, Darn, Moloney darn
 - **Open mesh repair: Lichtenstein (most common)**
 - **Open preperitoneal repair:**Transinguinal, Stoppa
 - **Laparoscopic/Robotic repair:TEP, TAPP**
- **Complications of Inguinal Hernia Surgery**

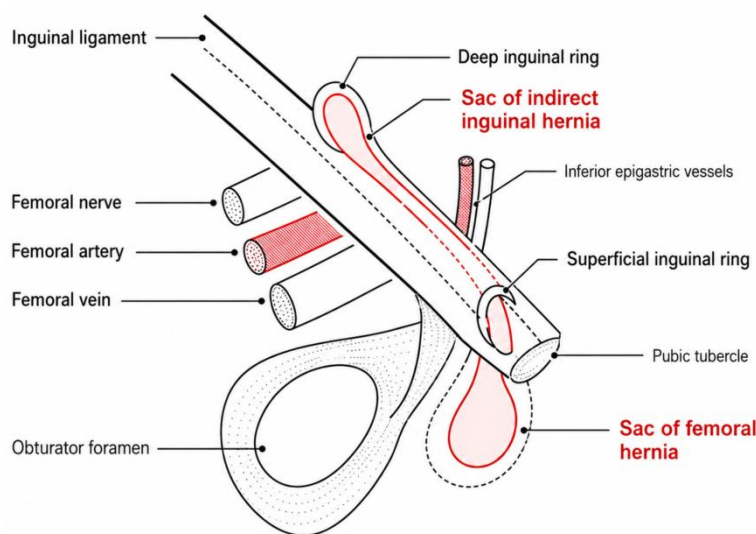
Early	Intermediate	Late
Pain	Seroma	Chronic pain
Bleeding / Haematoma	Wound infection	Testicular atrophy

❖ **Femoral Hernia**

- **Less common** than inguinal hernia
- **More common in women**
- Often **missed clinically**
- **≈50%** present as an **emergency**
- **High risk of strangulation** → Always repair

❖ **Inguinal Hernia & Femoral Hernia**

Feature	Inguinal Hernia	Femoral Hernia
Sex	More common in males	More common in females
Site	Inguinal canal	Femoral canal
Relation to pubic tubercle	Above & medial	Below & lateral



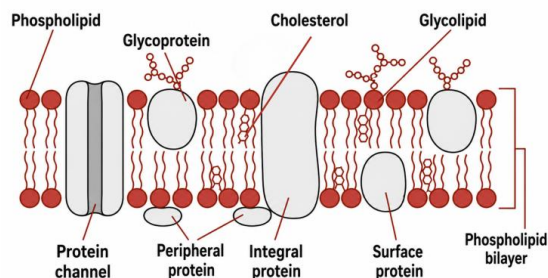
Inguinal vs Femoral Hernia

PLASMA MEMBRANE❖ **Thickness**

- 7.5–10 nm

❖ **Composition**

Component	%
Protein	55
Lipids	42
• Phospholipids	25
• Cholesterol	13
• Other lipids	4
Oligosaccharides	3

❖ **Functions**

- Physical barrier
- Selective permeability
- Maintains electrochemical gradient
- Protection
- Cell shape & adhesion
- Cell polarity
- Receptors
- Transport
- Sensory surface (especially nerve & muscle cells)

❖ **Functions of Membrane Proteins**

Integral (Intrinsic) Proteins	Peripheral (Extrinsic) Proteins
▪ Adhesion molecules ▪ Pumps ▪ Carriers ▪ Ion channels ▪ Receptors ▪ Enzymes ▪ Glycoproteins	▪ Enzymes ▪ Intracellular regulators

ROUGH ENDOPLASMIC RETICULUM (RER)❖ **Features**

- Ribosomes (polyribosomes) present on surface
- Continuous with the outer nuclear membrane
- Well developed in protein-secreting cells

❖ **Cells Rich in RER**

Cell	Major Secretion
Pancreatic acinar cells	Digestive enzymes
Fibroblasts	Collagen
Plasma cells	Immunoglobulins
Serous salivary gland cells	Protein-rich saliva

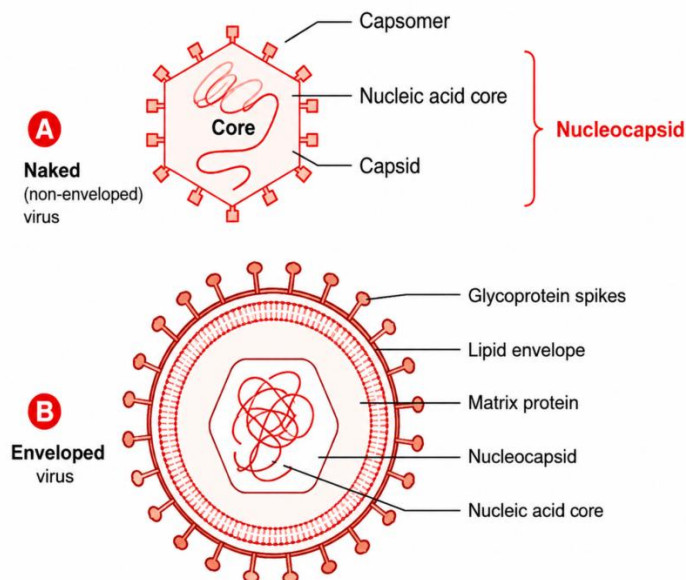
VIROLOGY

❖ Basic Characters of Viruses

- Viruses are obligate intracellular infectious agents.
- They contain either DNA or RNA, never both.
- They require living host cells for replication and have no ribosome, mitochondria or independent metabolic system.

STRUCTURE OF VIRUS

- **Viral genome** → Contains either DNA or RNA, but never both.
- **Capsid** → **Protein** coat surrounding the viral genome.
- **Capsomeres** → Repeating protein subunits that form the capsid.
- **Nucleocapsid** → Viral genome plus capsid.
- **Envelope** → Optional outer lipoprotein membrane derived mainly from the host cell membrane.
- **Glycoprotein spikes** → Bind to specific receptors on host cells.
- **Matrix protein** → Connects the nucleocapsid with the envelope.



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