



ARYA College of Pharmacy

(Affiliated to RUHS, Jaipur • Approved by PCI, AICTE, New Delhi)

• S.P.- 40, Kukas Industrial Area (RIICO) Jaipur - 302028
• Ph.: 0141-5148801, 5148802, 5148803

• Website : www.aryapharmacyjpr.com
• Fax : 01426-510040

DEPARTMENT OF PHARMACY

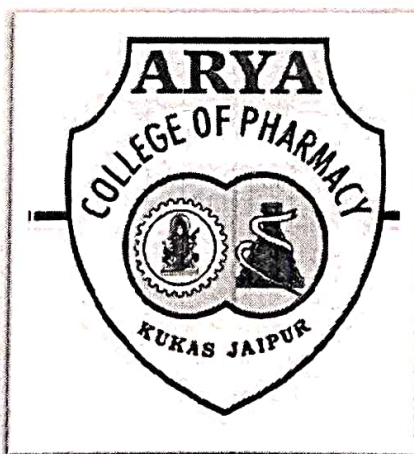
COURSE FILE

**SUBJECT NAME: HUMAN ANATOMY AND
PHYSIOLOGY-I**

SUBJECT CODE: BP101T

BRANCH : PHARMACY

YEAR : I YEAR 1ST SEMESTER



Q. A. J.

PRINCIPAL

Arya College of Pharmacy
Delhi Road, RIICO Industrial Area
Kukas, JAIPUR

**Arya College of Pharmacy
Department of pharmacy
(Rajasthan University of Health Sciences, Jaipur)**



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VISION OF THE DEPARTMENT

To produce graduates with strong fundamentals in the area of pharmacy so as to meet the needs of society and industry in self sustainable manner with ethical values.

MISSION OF THE DEPARTMENT

MISSION NO.	MISSION STATEMENTS
MISSION-1	To impart quality education and build a robust foundation of HAP subject among pharmacy students
MISSION-2	To make students globally competitive by providing value added courses, soft skill and practical training
MISSION-3	To create best teaching learning methodologies with a committed team of faculties and students

Qandary

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PROGRAM OUTCOME		
1.	Pharmacy Knowledge	The graduate student shall exhibit knowledge in the field of pharmacy and allied subjects of life sciences.
2	Planning Ability	The graduate students will exhibit ability of understanding, and offer remedial solutions in pharmaceutical industries, health sectors.
3	Problem Analysis	The graduate students will exhibit the ability to conduct, analyze and understand the scientific data of pharmaceutical industries in area of Manufacturing, Quality control, Quality Assurance, Marketing Management and Clinical Research.
4	Modern Tool Usage	The graduate students will exhibit the ability to learn, select and apply appropriate procedure, resources in the area of Manufacturing, Marketing and Quality control. The graduate students will implement newly implemented software to solve the problems in the above areas.
5	Leadership Skills	The graduate students will exhibit the ability to understand and consider the human reply , leadership and team building as and when the planning changes which is required for accomplishment in the area of Manufacturing, Marketing and Quality control and Assurance, practice , professional and societal responsibilities.
6	Professional Identity	Understand, analyze and communicate the value of their professional roles in society (e.g. health care professionals, promoters of health, educators, managers, employers, employees).
7	Pharmaceutical Ethics	The graduate students shall maintain the high professional identity and render the services in the society as per the ethics and moral value given in Pharmacy oath and pharmaceutical jurisprudence
8	Communication	The graduate students will be able to communicate the policies of the industries, academic and healthcare departments to the society through effective communication through verbal and written.
9	Pharmacist and Society	The graduate students will apply reasoning informed appropriate knowledge to improve the drug safety and action through patient counselling.
10	Environment and Sustainability	The graduate students will understand and communicate the importance of professional pharmacy practice solutions in society and environmental issues.
11	Lifelong learning	The graduate students will exhibit confidence for self education and ability for lifelong learning.

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PROGRAM EDUCATIONAL OUTCOME

1.	Education	Graduates of the program will be having sound capacity in pharmaceutical sciences and will be equipped with knowledge required in Pharmaceutical industries and/or institutes.
2	Technical Skill Competencies	To provide students with competence of technical skills in various subjects including Pharmaceutics, Pharmaceutical Chemistry, Pharmacology and Pharmacognosy enabling them to fulfill the requirements of Pharmaceutical Industries, Community and Hospital Pharmacy and also to pursue higher studies.
3	Depth of knowledge	To provide relevant and up to date knowledge and training to students about the subjects of Pharmaceutical formulation & development, Pharmaceutical chemistry, Drug regulatory affairs, Pharmacology of drugs, drug analytical methods, drugs of natural origins.
4	Preparedness of students	To prepare students to perform the best of their abilities in postgraduate programmes or to succeed in Pharmaceutical industry/technical professions.
5	Evaluation	Graduates of the program will be able to assess pros and cons, benefits and deficiencies of the subject matters to learned pharmaceutical technologies they studied and philosophies they observed in the field of pharmaceutical sciences.

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PSO - (Programme Specific Outcome)

B. Pharm Programme

B.Pharm student will be able to—

PSO1	Impart detail theoretical and practical knowledge of all core and allied subjects of pharmaceutical sciences, which comprises of dosage form design of various drugs with comprehensive knowledge of chemical structure, routes of administration, mechanism of action, doses of drugs, patient treatment, patient counseling, drug dispensing, hospital administration, drug manufacturing, QA/QC and regulation etc.
PSO2	Highlight the concepts and operative tools of hospital pharmacy, community pharmacy, pharmaceutical care, clinical pharmacy, pharmacovigilance, pharmacoconomics, clinical research, clinical pharmacokinetics and other related areas for the benefit of academicians, hospital/community pharmacists and industry.
PSO3	Acquire knowledge in the field of synthetic biopharmaceutics, drug transport, pharmacokinetics & pharmacodynamics, drug delivery systems, cell and molecular biology, synthetic and macromolecular chemistry, chemical and biomedical engineering, materials science, physiology and pharmacology.
PSO4	Emphasis on Drug Discovery and Design, Drug Delivery Systems, Drug Action and Clinical Sciences, Drug Analysis, Drug Regulatory Affairs etc.

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COURSE OUTCOMES

1. Explain the gross morphology, structure and functions of various organs of the human Body
2. Describe the various homeostatic mechanisms and their imbalances.
3. Identify the various tissues and organs of different systems of human body.
4. Perform the various haematological experiments like CT,BT,CBC,TLC etc.
5. Appreciate coordinated working pattern of different organs of each system

CO	PO											PSO			
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PSO 1	PSO 2	PSO 3	PSO 4
CO 1	3	1	1	-	1	1	-	3	2	2	3	3	1	--	--
CO 2	1	-	1	-	-	1	-	1	-	-	3	3	--	--	--
CO 3	1	-	1	-	-	-	-	1	-	-	3	3	--	--	--
CO 4	3	-	1	-	-	1	-	1	-	-	3	3	--	--	--
CO 5	3	-	1	-	1	-	-	3	-	1	3	3	--	--	--

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B.PHARMACY 1st SEMESTER

HUMAN ANATOMY AND PHYSIOLOGY-I

RECOMMENDED BOOKS

1. Human physiology by Dr.C.C Chatterrje
2. Principles of Anatomy And Physiology by TortoraGrabowski.
3. Anatomy And Physiology in health and illness by Kathleen J Wilson
4. Text Books of Practical Physiology by C.L Ghai
5. Human Anatomy & Physiology S.Chaudhary .
6. Human Anatomy by Elaine N. Marieb; Patricia Brady
Wilhelm; Jon B. Mallatt
7. Principles of Human Anatomy by Gerard J. Tortora; Mark Nielsen
8. Netter's Atlas
9. Guyton and Hall Textbook of Medical Physiology
10. A complete book of anatomy by Dr Bhatia
11. Essentials of Medical Physiology by K.Sembulingam, Ross & Wilson,
Anatomy-Physiology in health and illness.
12. Donald.C Rizzo, Fundamental of Anatomy and Physiology.

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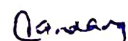
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FACULTY TIME TABLE

B. PHARM I SEM (SESSION-2021-22) (Sec. A+B)

Day/ Time	8:50-09:50 am	09:50-10:50 am	10:50-11:50 am	11:50-12:20 pm	12:20-4:20 pm (Practical)		3:20-4:20 pm
					Batch A	Batch B	
Monday		HAP-I (Sec. B)	HAP-I (Sec. A)	L U N C H		HAP-I (Sec.B)	
Tuesday							
Wednesday							
Thursday		HAP-I (Sec.A)	HAP-I (Sec.B)			HAP-I (Sec.A)	
Friday	Tutorial HAP-I	Tutorial HAP-I (Sec.B)			HAP-I (Sec.A)		
Saturday	HAP-I (Sec.A)		HAP-I (Sec.B)		HAP-I (Sec.B)		

* Practical Time 12:20-3:20 pm


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Assignment No.1:

1. Discuss homeostasis with suitable example?
2. Define and draw human cell. Discuss functions of each cell organelle?
3. Discuss various types of transport across cell membrane?
4. What are general principles of cell communication? Discuss in detail methods of intercellular cell signaling?
5. Classify human tissue. Discuss characteristics features, location and functions of epithelial and connective tissues?

Assignment No.2:

1. Draw neat and labeled diagram of human skin. Discuss various functions of skin?
2. Classify bones. Discuss salient feature and functions of bones of appendicular skeleton.
3. Classify joints. Describe structure and functions of synovial joint?
4. Write characteristic features of skeletal muscle. Discuss physiology of muscle contractions?
5. Discuss joint movements and joint disorders.

Assignment No.3:

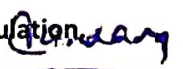
1. Define blood. Write composition and functions of blood.
2. Enlist blood disorders. Discuss in detail Anaemia, haemophilia and thalacimia?
3. Define blood coagulation. Discuss in detail blood coagulation mechanism?
4. Define blood groups. Discuss significance of Rh factor in blood grouping?
5. Enlist lymphoid organs. Discuss structure and functions of lymph node and spleen?

Assignment No.4:

1. Classify nervous system. Discuss structure and functions of sympathetic nervous system?
2. Classify nervous system. Discuss structure and functions of parasympathetic nervous system?
3. Enlist eye disorders. Discuss in detail mechanism of vision with suitable diagram?
4. Enlist ear disorders. Discuss in detail mechanism of hearing with suitable diagram?
5. Enlist taste buds. Discuss in detail mechanism of taste with suitable diagram?
6. Enlist Cranial nerves. Write functions of each cranial nerve?

Assignment No.5:

1. Draw internal structure of heart. Discuss various events in Cardiac cycle?
2. Differentiate blood vessels with suitable diagram?
3. Define and classify blood pressure. Discuss in detail RAAS mechanism of BP regulation.
4. Discuss in detail characteristic features of ECG. Give account on heart disorders.
5. Write a short notes on: (A) Cardiac output (B) Stroke volume (C) Heart rate


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Branch: B.Pharm. Lecture Notes Sem: Istym Subject: HAP.

Topic: SCOPE OF HAP. Unit: I. Lecture No.

INTRODUCTION

- Basic Knowledge of Structure, Size, Shape, location, functioning of various organs of the Human body is provided by two Imp. Subjects →
1. Human Anatomy.
 2. Human Physiology.

HUMAN ANATOMY: → Branch of biomedical Science, dealing with Normal Structure, Size, Shape and location of various parts of the body.

Often done by dissection of Cadavers.

Different levels of Anatomy are →

1. GROSS ANATOMY: Structure observed via unaided eyes.
2. MICROSCOPIC ANATOMY: Via aided eyes →
 - A. Histology: Study of tissue
 - B. Cytology: Study of Cells.

Other ways to study Anatomy, includes →

1. PALPATION: Feeling with hands, i.e. Swollen liver, pulses.

2. AUSCULTATION: Listening to Natural sounds of the body.
(i.e) Heart and lungs.

3. PERCUSSION: Tapping for Echo-Sounds, Reveals abnormal pockets of air/fluid.

PHYSIOLOGY: → Derived from Greek word "Physiologia" meaning "Natural knowledge".

- This term was first used by "Jean Fernel", a France physician.
- Branch of biomedical Science, dealing w Normal functioning of various organs of/in the body.
- It describes, what happens in various organs and organ system.
- Comparative physiology employs other species, to enable us to learn about
 - Human Physiology
 - Evolution
 - Functional Relationship.

LEVELS OF BODY ORGANISATION:

ATOM : Hydrogen, lithium



MOLECULE : Water molecule, Glucose molecule



MACROMOLECULE : Protein, DNA



ORGANELLE : Mitochondria, Golgi Apparatus, Nucleus



CELL : Muscle cell, Nerve cell



TISSUE : Simple Squamous, Epithelium, loose Connective tissue



ORGAN : Skin, Heart, Kidney



ORGAN SYSTEM : Integumentary System, Skeletal, Digestive Syst, Circulatory



ORGANISM : Human

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Lecture Notes

Branch : B.Pharm Sem.: Subject : HAP

Topic : SCOPE OF HAP Unit I Lecture No.

SCOPE OF ANATOMY AND PHYSIOLOGY :

- 1/ To know the structure and function of Human Body.
- 2/ To know parameters of Normal Health.
- 3/ To understand pathology of disease and pathological changes thus aid in diagnosis of disease / रोगों का निदान और
- 4/ To Inquire into fascinating complexity of Human body.
- 5/ Determination of techniques of Surgeries / शल्य चिकित्सा
- 6/ To know factors affecting various physiological processes and its effects.
- 7/ To know overall effective maintainance of individual and Community Health.
- 8/ To meet the existing requirements of Introductory Anamatomy and Physiology Courses.
- 9/ Gives, Value, Simplicity, direction and sort of power to the lecturers.
- 10/ As a foundation, to advanced Scientific Studies.
- 11/ It is a Formidable body of Knowledge to present in an introductory Courses and mastering Subjects.
- 12/ Highlights the practical Application of Anatomical and Physiological Concepts to Students.
- 13/ It is needed to understand, How Individual Structures are related to the Composition of entire body. Therefore, Anatomical Nomenclature such as "Regional Names", "Directional Terms", and "Planes to Section" that enables the learners, to precisely describe, the Relationships of one's body structure to another.
- 14/ By Studying Concepts of Physiology, We know, How the various feedback mechanisms, work to maintain, physiological processes within a Narrow Range, that is Compatible to life.

- 15 To know, How homeostasis is maintained.
- 16 As a gateway to Careers in Health Related fields, mass therapy and Athletics Training.
- 17 Provide Scientific approach to extract drugs from plant and Animal Sources.
- 18 Anatomy and Physiology Knowledge Provides help in preparation and use of drugs to Correct the body's excess, Deficiencies and deviations of functions, so as to Normalize or Vitalize the body.

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Branch : B.Pharm Sem : Lecture Notes 1st yr Subject : HAP
Topic : Unit I Assignment Unit I Lecture No.

Q.1. Draw a Well labelled diagram of Cell and Enlist the functions of atleast Three Inter Cellular Organs.

Ans. "The Smallest structural and Functional Unit of living body is Called 'Cell'".

⇒ Cells Vary in Size and Shape but most of them, have similar Intracellular Components.

⇒ Mammalian Cell on an Average is of 10^{-5} m in diameter.

⇒ Every Cell Comprises of →

1. Cell Membrane
2. Cytoplasm
3. Nucleus.

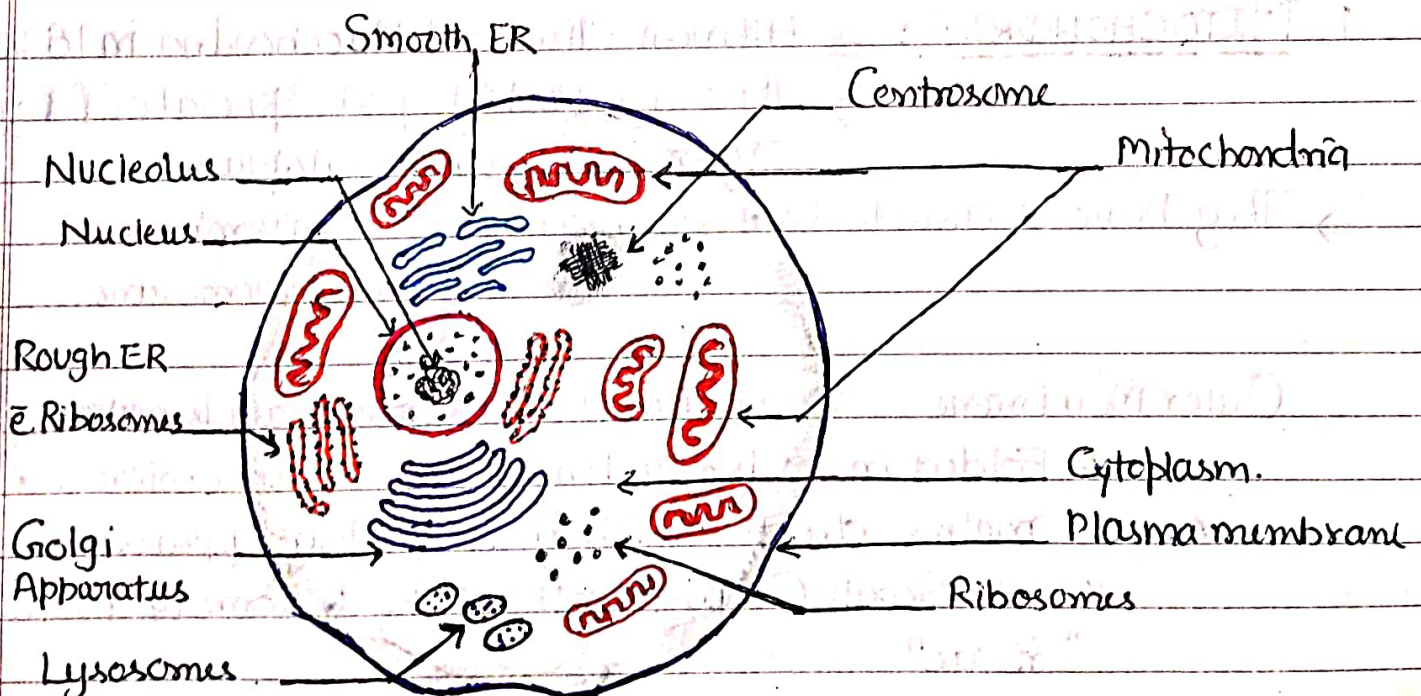


FIG: HUMAN CELL

⇒ The Human Cell has the Following Cell-Organalles →

1. Nucleus.
2. Mitochondria.
3. Ribosomes
4. Endoplasmic Reticulum: ER.
5. Golgi Apparatus.
6. Lysosomes.
7. Cytoskeletons
8. Centrosomes.

DESCRIPTION OF ATLEAST THREE INTERCELLULAR ORGAN

1. MITOCHONDRIA: ⇒ Altman discussed Mitochondria in 1890.
⇒ These are Rod Shaped, Spherical or filamentary
organellus found in Cytoplasm.

⇒ They have a double Unit membrane → Outer Membrane
Inner Membrane.

⇒ Outer Membrane is Smooth but the inner membrane is ~~smooth~~ →
* Folded inwards into finger like processes (microvilli) in
matrix, due to which mitochondria appears to be divid
* into Small Compartments or take the form of Partitions
"Cristae"

⇒ Many Tennis Racket like Small particles, are Situated on the wall of
~~mitochondria~~ Cristae.

⇒ Each Particle is divided into three Parts, Base, Stem and Head,
are Called F_1 -Particles. (Oxysomes).

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Lecture Notes

Branch : B. Pharm Sem.: 1st yr Subject : HAP 20

Topic : Unit: 1 Assignment Unit I Lecture No.

9. ENDOPLASMIC RETICULUM: → It is a Network of much branched membranes, distributed in the Cytoplasm.
- Branches of the Network, are double layered forming many Tubular Structures.
 - ER is more developed in young Cells and Concentrated around the Nucleus extending upto plasmalemma.
 - On the basis of Morphology, ER is made up of →
 - **Cisternae**: Long, flat, Unbranched Sacs, Running parallel.
 - **Vesicles**: Ovate Structure.
 - **Tubules**: Form Net-like Structure.
 - ER is either →
 1. **SMOOTH / AGRANULAR**: Without Ribosomes on the wall.
 2. **ROUGH / GRANULAR**: With Ribosomes.

* ER is absent in the Bacteria

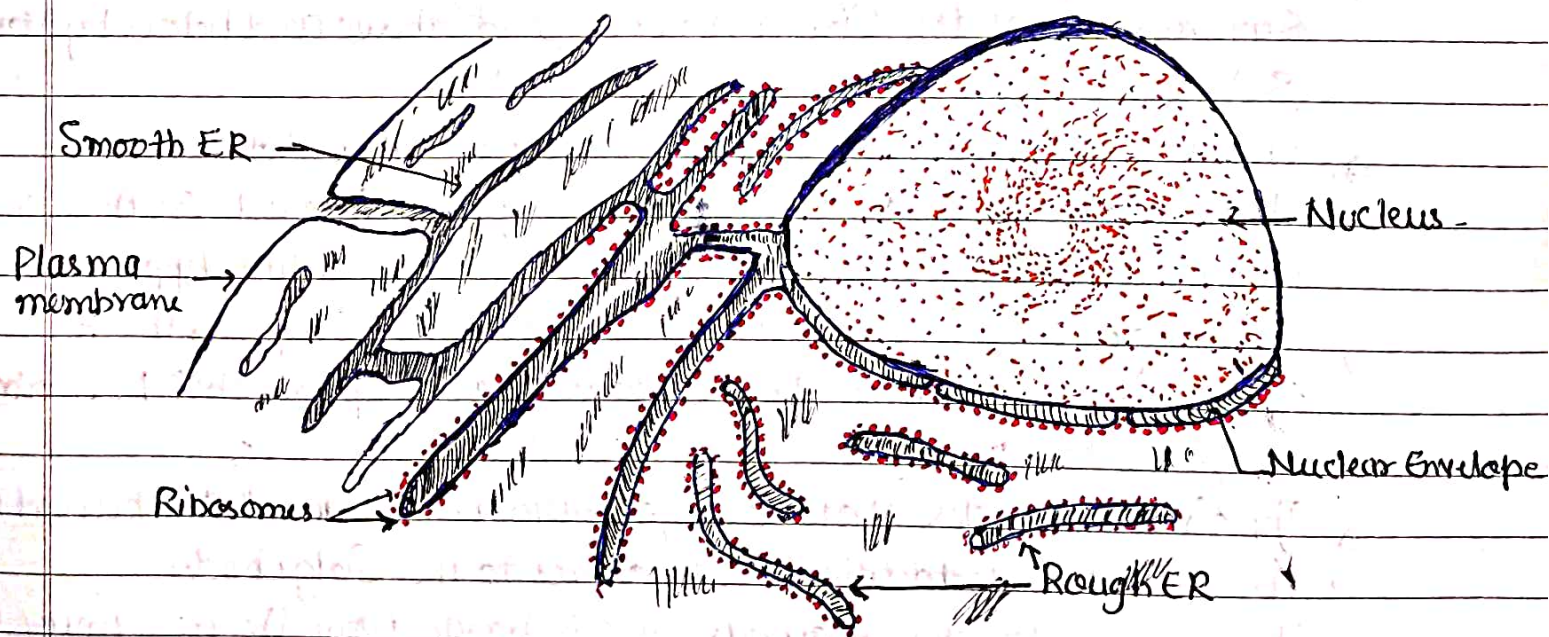


FIG: Rough & Smooth ER

Name of Lecturer : Shailendra Tripathi

- FUNCTIONS:**
1. Provides internal Support to the Colloidal Matrix
 2. Exchange of Materials b/w Nucleoplasm and Cytoplasm (Intercellular Transport of Substance) etc.
 3. Synthesis of Enzymes
 4. The Coupling of fatty acids and Glycerol to form fats, seems to occur in Smooth ER.
 5. Glycogen Storage takes place in Smooth ER.
 6. Nuclear Envelope formation.

* Ribosomes are attached to Rough ER by "Riboforins-I and II"

* It is the 60S Ribosomes, which is attached to ER.

3. GIOLGI BODIES: → First discovered by "Camillo Golgi" in Animal Cells.

- Made up of a Stack of Flat, Sac like structure Called "Cisternae" surrounded at the Circumference and above and below by Vesicles & tubular Structures.
- In most Golgi bodies, the No. of Cisternae is from 4 to 10.
- The margins of Each Cisternae are gently Covered, so that the entire Golgi body takes on a "Cup like or Bowl like Appearance."
- Cisternae, at the Convex end of dictyosome Comprises the "Forming or Cis face" while at the Concave end Comprises the "Maturing or Trans face"
- The Small Vesicles, that are adjacent to the "Cis face" are believed to contribute additional Structures to the Golgi body.
- The Small Vesicles, may also be discharge from the margins of Cisternae b/w Cis and Trans faces.
- The Vesicles, Near the Trans face, are larger, and are believed to be formed from the Uppermost Cisternae.

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Branch : B.Pharm Sem.: 1styr. Subject : HAP
Topic : Unit-1 Assignment Unit : I Lecture No.

- ⇒ The Forming face is located, next to either the Nucleus or ER.
- ⇒ The Maturing face is usually directed towards the Plasma Membrane.

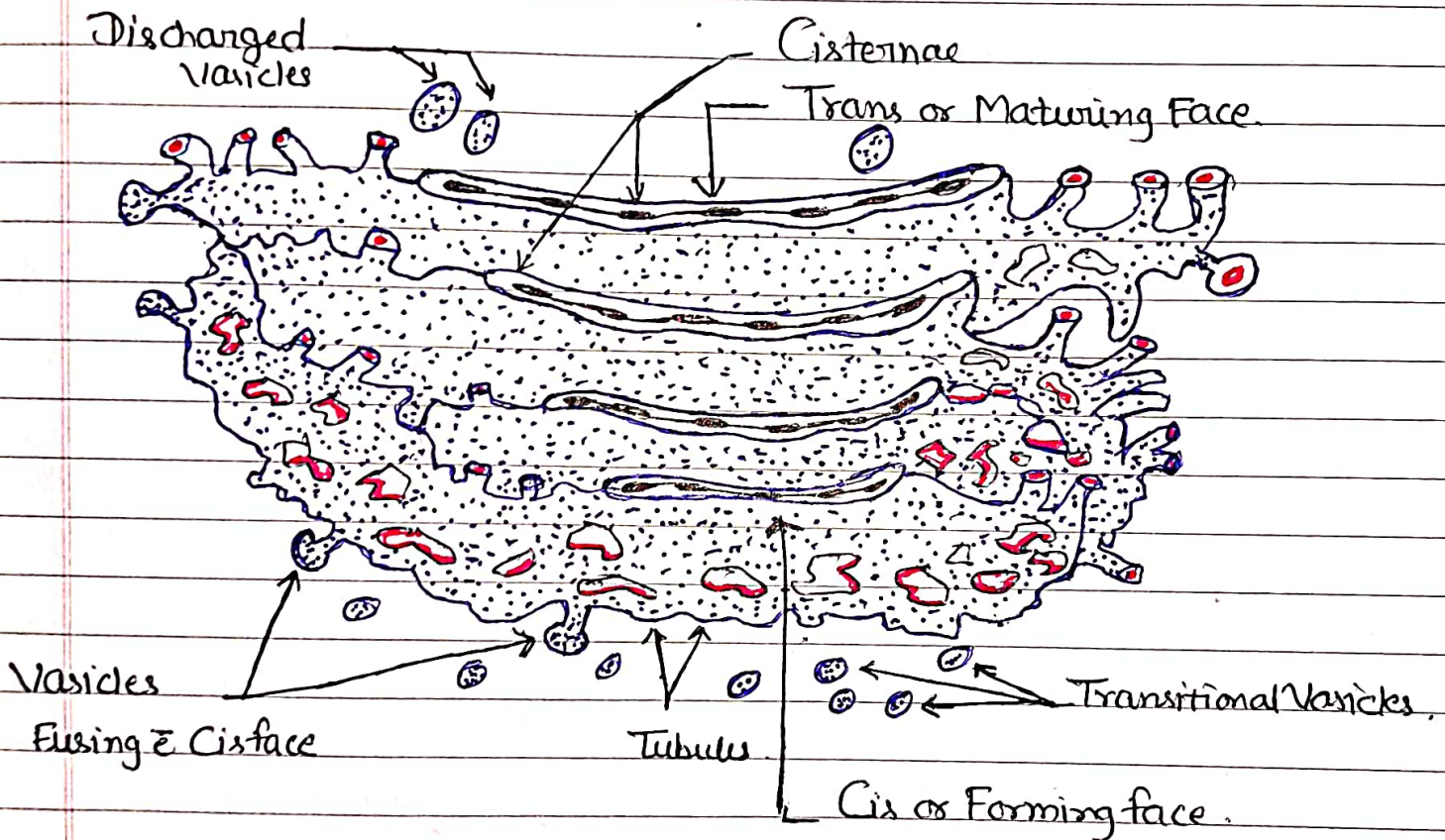


FIG: GOLGI APPARATUS

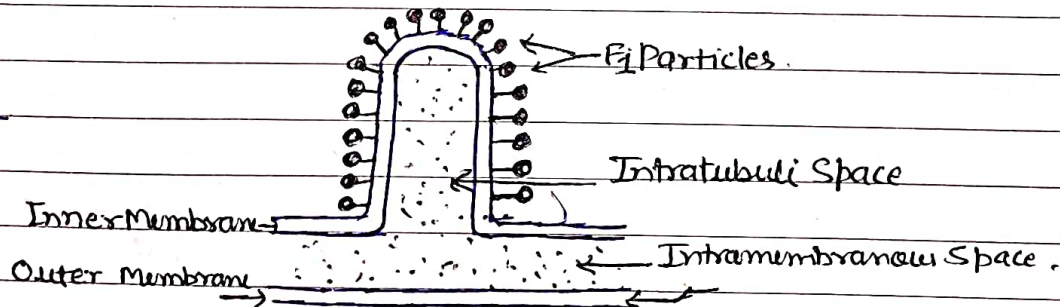
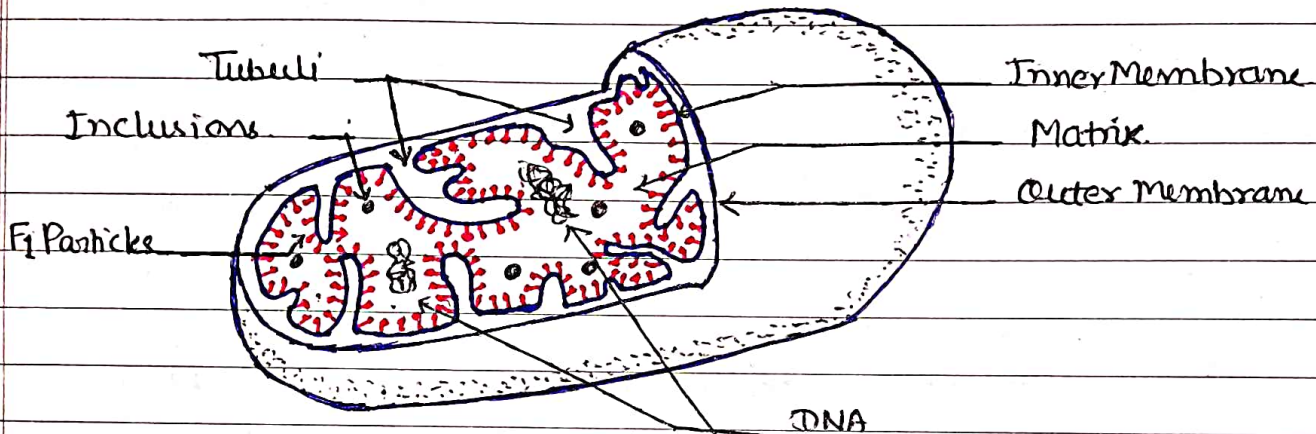
- FUNCTIONS:**
1. Secretion of Many Enzymes, Nucleosides etc.
 2. Cell plate formation.
 3. Cell wall formation
 4. Production of Hormones
 5. Formation of Acrosome during Spermatogenesis

Name of Lecturer : Shailendra Tripathi

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Branch : B. Pharm Sem.: 1st yr Subject : HAP
 Topic : Assignment Unit-I Unit I Lecture No.

- All Enzymes of Respiratory Chain (ETS) and Oxylative phosphorylation are present on Cristae.
- Mitochondrial Matrix have all Enzymes of "Kreb's Cycle, DNA, RNA & Ribosomes"



- FUNCTIONS:**
1. Mitochondria is Called "Power house of the Cell". Major Part of Oxidative Respiration, takes place in Mitochondria
 2. Assistance in Vitellogenesis in Ovaum.
 - 3.

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