UNDERGRADUATE ACADEMIC RECORD / LOGBOOK

Pathology

The TN Dr. M.G.R Medical University
Chennai

The Tamil Nadu Dr. M.G.R. Medical University Chennai

Under Graduate Academic Record / Logbook Department of Pathology

"I thank all the illustrious faculty of Pathology in the Affiliated Medical Institutions of this University for their conscientious effort"

Dr. K. Narayanasamy, M.D., D.M.(Gastro.)

PREFACE

The goal of the Graduate Medical Education Regulation (GMER) is to sculpt every medical student into a responsible Indian Medical Graduate who can cater to the needs of the society. The thrust in the new regulations is to make medical education more learner-centric, patient-centric, gender-sensitive, outcome-oriented and environment appropriate.

Communication and interpersonal skills are imperative in providing quality medical care. Our curriculum achieves this by providing dedicated curriculum time in the form of a longitudinal program based on Attitude, Ethics and Communication (AETCOM) competencies. Foundation Course is to orient medical learners to MBBS programme, and provide them with requisite knowledge, communication (including electronic), technical and language skills.

Electives allow students to get exposed to diverse environment, get a glimpse of future career, to revisit basic sciences of their own interest and indulge in research activities. The Family adoption program aims to provide experimental learning opportunity to Indian Medical Graduates in community-based health care.

Skill laboratories have been incorporated into the curriculum for the learners to get an opportunity to observe and learn clinical and communication skills while eliminating the fear of harming patients. The Learner-doctor method of clinical training (Clinical Clerkship) is to provide learners with experience in Longitudinal patient care, by being part of the health care team providing hands-on care for patients.

This academic record / log book has been prepared based on new NMC guidelines – Competency Based Medical Education Curriculum (CBME) Guidelines – dated 1st August 2023. It should be maintained as a document to record day-to-day academic activities, assessments, grading of assessments and its feedback. Periodic recording of all academic activities should be done by the student and has to be submitted to the faculty in-charge during feedback sessions. This document will incorporate in it all components that are being assessed for the final internal assessment and should be submitted to the concerned department and the examiners. Internal assessment marks will be given after evaluating this document. For subjects spanning across different phases this academic record has to be maintained for that particular subject and has to be evaluated at the end of posting in each phase.

CERTIFICATE

This is to certify that the candidate Mr./Ms.……

Reg No. ……, admitted in the year ……. in the …… Medical College, ……. has satisfactorily completed / has not completed all assignments / requirements mentioned in this logbook for second year MBBS course in the subject of Pathology during the period from …… to ……. She / He is eligible / not eligible to appear for the summative (University) assessment as on the date given below.

Signature of Faculty

Name and Designation

Countersigned by Head of the Department

Place:

Date:

INDEX

CURRICULUM VITAE

Name of Student											
Date of commencement of phase											
Name of Parent/Guardian											
Date of Birth & Age											
Permanent Address											
Address for Postal Communication											
Mobile Phone (Parent/Guardian)											
Mobile Phone (Parent/Guardian)											
Mobile Phone (Student)											
Email ID (Parent/Guardian)											
Email ID (Student)											

Paste recent passport size photo

Signature of student

DISTRIBUTION OF SUBJECTWISE TEACHING HOURS FOR 2ND MBBS

SUBJECTS	*LECTURES*	*SGL*	*CLINICAL POSTINGS*	*SDL*	*TOTAL*
PATHOLOGY	*80*	*165*	*-*	*10*	*255*
PHARMACOLOGY	*80*	*165*	*-*	*10*	*255*
MICROBIOLOGY	*70*	*135*	*-*	*10*	*215*
COMMUNITY MEDICINE	*15*	*0*	*0*	*10*	*25*
FAP	*0*	*0*	*30*		*30*
FORENSIC MEDICINE AND TOXICOLOGY	*12*	*22*	*-*	*08*	*42*
CLINICAL SUBJECTS	*59*	*-*	*540*	*-*	*599*
AETCOM	*-*	*29*	*-*	*8*	*37*
SPORTS,YOGA AND EXTRACURRICULAR ACTIVITIES	*-*		*-*	*20*	*35*
PANDEMIC MODULE	*-*			*28*	*28*
FINAL TOTAL	*316*	*516*	*585*	*104*	*1521*

CONSOLIDATED INTERNAL ASSESSMENT MARKS THEORY AND PRACTICAL

Name of the Student:

DEPARTMENT OF PATHOLOGY									
Faculty: MBBS			**Year/Phase-II**					**Date:**	
I. Formative Assessment Theory			**II. Continuous Internal Assessment Theory**						**Total**
1st PCT* Theory	**2nd PCT Theory**	**Prelims Theory (Paper I & II)**	**Home Assignment**	**Continuous Class test (LMS**)**	**Seminar**	**Museum study**	**Library assignments**	**Attendance Theory**	
					II-C(i)	**II-C(ii)**	**II-C(iii)**		
					Self-Directed Learning				
I-A	**I-B**	**I-C**	**II-A**	**II-B**	**II-C**			**II-D**	
100	**100**	**200**	**15**	**30**	**15**	**15**	**15**	**10**	**500**

III. Formative Assessment			IV. Continuous Internal Assessment (Practical)						Total
1st PCT* Practical/ First Ward Leaving Examination	**2nd PCT Practical/ Second Ward Leaving Examination**	**Prelims Practical**	**IV–A Log Book (150)**				**IV–B Journal (Record book/ Portfolio)**	**IV-C Attendance (Practical)**	
			Certifiable skill-based competencies (Through OSPE/OSCE/Spots / Exercise/Other)	**AETCOM competencies**	**SVL*** Lab activity**	**Research**			
III-A	**III-B**	**III-C**	**IV-A1**	**IV-A2**	**IV-A3**	**IV-A4**			
100	**100**	**100**	**60**	**30**	**40**	**20**	**40**	**10**	**500**

**PCT – Part Completion test; **LMS – Learning Management System; ***Simulation-based Virtual Lab activity*

**UGMEB No.U.14021/08/2023 dtd 01/08/2023 Pg.no. 69*

Professor & Head
Department of Pathology

I. FORMATIVE ASSESSMENT - THEORY

Date	Assessment	Topic	Marks obtained
	PCT– I (Part Completion)		_____/100
	PCT – II		_____/100
	Prelims	Paper I	_____/100
		Paper II	_____/100
		Total	_____/200

Signature of Facilitator

Formative Feedback Session	Marks:
Topic:	**Date:**
Feed Back received from Student	
Feed Back and Remedial Action suggested by the facilitator/ Remedial assessment marks	
Signature of student	
Signature of facilitator after completion of remedial action	

Formative Feedback Session	Marks:
Topic:	**Date:**
Feed Back received from Student	
Feed Back and Remedial Action suggested by the facilitator/ Remedial assessment marks	
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Topic:	**Date:**
Feed Back received from Student	
Feed Back and Remedial Action suggested by the facilitator/ Remedial assessment marks	
Signature of student	
Signature of facilitator after completion of remedial action	

II A. HOME ASSIGNMENT

Note:

- This section includes academic mile stones attained through assignments / "out of class" academic work.
- The learner shall be given an assignment based on the core or non-core topics of the curriculum and any other such topics as deemed necessary.
- The structure for the assignment should include an introduction, main body of the assignment and a conclusion if it is an essay work. Illustrations, flow charts, tables and graphs should be part of the submission where ever necessary.
- Plagiarism should be discouraged.
- The completion of such activity shall be recorded in this section by the learner and signed by the facilitator.

Date	Topic

Signature of Facilitator

Home Assignment: 1	**Date:**

`Topic

Summary of Assignment

Feedback by facilitator

Signature of facilitator

Home Assignment: 2 **Date:**

Topic

Summary of Assignment

Feedback by facilitator

Signature of facilitator

Home Assignment: 3	**Date:**
Topic	
Summary of Assignment	
Feedback by facilitator Signature of facilitator	

II B. CONTINUOUS CLASS TEST

No.	Topic	Date of completion
1	Cell Injury, Cell death and adaptations, Inflammation and Repair	
2	Hemodynamic disorders, Thromboembolic diseases and Shock, Genetic Disorders and Diseases of Immune system	
3	Neoplasia	
4	Infectious diseases, Environmental and nutritional diseases, Diseases of Infancy and Childhood	
5	Hematology	
6	Heart, Blood vessels and Lung	
7	Gastro intestinal tract, Liver Gallbladder and the pancreas	
8	The Kidney, Lower urinary tract and Male genital system	
9	Female genital tract, Breast and the Endocrine system	
10	Skin, Bone. Joints and soft tissue tumors, CNS,Peripheral nerves and Skeletal muscles and eye.	

The Assessment Methods may include End of Lecture Class/Module Assessment: 5-15 MCQ's solved over 5-8 minutes / very short answer etc.,

Consolidation of marks for each topic may be done based on number of classes in each topic

Total average marks -30

Signature of Facilitator

I C. SELF-DIRECTED LEARNING

Note:

1. This section includes academic mile stones attained through self-directed learning. The learner shall be assigned a specific learning objective for each session.
2. The learner shall be given an assignment based on core and non-core topics of the curriculum and any other such topics as deemed necessary.
3. They shall record a detailed synopsis of the learning in this section. The student shall also record a list of the books/journals referred in Vancouver format.
4. The completion of such activity shall be recorded in this section by the learner and signed by the facilitator.

Date	SDL	Topic
	II-C (i). SEMINAR	
	II-C (ii). MUSEUM STUDY	
	II-C (iii). LIBRARY ASSIGNMENTS	

Signature of Facilitator

SDL session: Seminar	**Date:**
Topic:	
Synopsis	
Bibliography	
Feedback given by the Facilitator with signature	

SDL session: Museum study 1 **Date:**

Topic:

Signature of facilitator

Synopsis

SDL session: Museum study 2 **Date:**

Topic:

Signature of facilitator

Synopsis

SDL session: Library Assignment 1	**Date:**
Topic:	
Synopsis	
Bibliography	
Feedback given by the Facilitator with signature	

SDL session: Library Assignment 2	**Date:**
Topic:	
Synopsis	
Bibliography	
Feedback given by the Facilitator with signature	

SDL session: Library Assignment 3	**Date:**
Topic:	
Synopsis	
Bibliography	
Feedback given by the Facilitator with signature	

III FORMATIVE ASSESSMENT - PRACTICAL

Date	Assessment	Topic	Marks obtained
	PCT– I		**_____/100**
	PCT – II		**_____/100**
	Prelims		**_____/200**

Signature of Facilitator

IV. CONTINUOUS INTERNAL ASSESSMENT
IV A. LOG BOOK

IV A1. CERTIFIABLE SKILL BASED COMPETENCIES

(THROUGH OSPE/OSCE/SPOTS/EXERCISE/OTHER)

Note:

1. This section captures the skills and competencies obtained by the learner during the course work in the department.
2. The facilitator shall assess the learner for the specific certifiable competency and those certifiable competencies which the learner has acquired shall be entered in this section. A record of these is also maintained in the assessment record.

Competency and name of the activity	**Peripheral smear interpretation**		
Date			
Attempt at activity First or Only (F) Repeat (R) Remedial (Re)			
Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations Or Numerical Score			
Decision of faculty Completed (C) Repeat (R) Remedial (Re)			
Initial of faculty and date			
Feedback received Initial of learner			

Competency and name of the activity	**Haemoglobin estimation**		
Date			
Attempt at activity First or Only (F) Repeat (R) Remedial (Re)			
Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations Or Numerical Score			
Decision of faculty Completed (C) Repeat (R) Remedial (Re)			
Initial of faculty and date			
Feedback received Initial of learner			

Competency and name of the activity	**Blood grouping and Rh typing**		
Date			
Attempt at activity First or Only (F) Repeat (R) Remedial (Re)			
Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations Or Numerical Score			
Decision of faculty Completed (C) Repeat (R) Remedial (Re)			
Initial of faculty and date			
Feedback received Initial of learner			

Competency and name of the activity	**Urine examination Physical**		
Date			
Attempt at activity First or Only (F) Repeat (R) Remedial (Re)			
Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations Or Numerical Score			
Decision of faculty Completed (C) Repeat (R) Remedial (Re)			
Initial of faculty and date			
Feedback received Initial of learner			

Competency and name of the activity	**Urine examination chemical**		
Date			
Attempt at activity First or Only (F) Repeat (R) Remedial (Re)			
Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations Or Numerical Score			
Decision of faculty Completed (C) Repeat (R) Remedial (Re)			
Initial of faculty and date			
Feedback received Initial of learner			

Competency and name of the activity	**OSPE Charts**		
Date			
Attempt at activity First or Only (F) Repeat (R) Remedial (Re)			
Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations Or Numerical Score			
Decision of faculty Completed (C) Repeat (R) Remedial (Re)			
Initial of faculty and date			
Feedback received Initial of learner			

Competency and name of the activity	**Spotters**			
Date				
Attempt at activity First or Only (F) Repeat (R) Remedial (Re)				
Rating Below (B) expectations Meets (M) expectations Exceeds (E) expectations Or Numerical Score				
Decision of faculty Completed (C) Repeat (R) Remedial (Re)				
Initial of faculty and date				
Feedback received Initial of learner				

IV A1. CERTIFIABLE SKILL BASED COMPETENCIES

(THROUGH OSPE/OSCE/SPOTS/EXERCISE/OTHER)

CLINICAL PATHOLOGY

Competency Milestones in Hematology and Clinical Pathology Lab Work:

1. Record progress through lab work milestones in the record book.
2. Facilitators will periodically verify and sign records at the end of each session/module.
3. Each session ends with an assessment (e.g., OSPE). Document outcomes and feedback.
4. Perform basic blood and urine tests, interpret results, and record observations.

No	Page No.	Test / Procedure / Experiment	Date of Demonstration	Initials of Facilitator
1		Peripheral smear interpretation and differential count		
2		Hemoglobin estimation		
3		Blood grouping and Rh typing		
4		Urine examination – Physical		
5		Urine examination - Chemical		

Smear Preparation

- Labeling: Label a clean glass slide with the patient's ID and date.

- Drop Placement: Place a small drop of blood (about 2-3 mm in diameter) near one end of the slide.

- Slide Spreading:
  Hold another slide (spreader slide) at a 30-45° angle.
  Place the spreader slide in front of the drop of blood.
  Push the spreader slide forward smoothly and rapidly, spreading the blood evenly across the slide.

- Drying:
  Allow the smear to air dry completely. Do not blow on the slide or use any heat source.

- Staining:

  Place the dried smear horizontally on a staining rack.
  Flood the smear with ready-to-use Leishman stain and let it stand for 2 minutes to fix the cells.

- Buffer Addition:

  Add an equal volume of buffer solution to the stain on the slide.
  Mix gently by rocking the slide and let it stand for 5-7 minutes. The stain should appear metallic green at the end of the staining process.

- Rinsing:
  Rinse the slide gently with distilled water to remove excess stain.
  Tilt the slide to drain off the water and allow the smear to air dry in a vertical position.

- Examination

- Microscopy:
  Place a drop of immersion oil on the stained smear.
  Examine under a microscope using 10x, 40x, and 100x objectives.
  Perform a differential count, assessing the morphology of red blood cells (RBCs), white blood cells (WBCs), and platelets.

- Recording:
  Record findings such as Differential cell counts, morphology, and any abnormalities observed.

- Steps for Performing a Differential Count
  Apply a drop of immersion oil on the cover glass over the smear area.

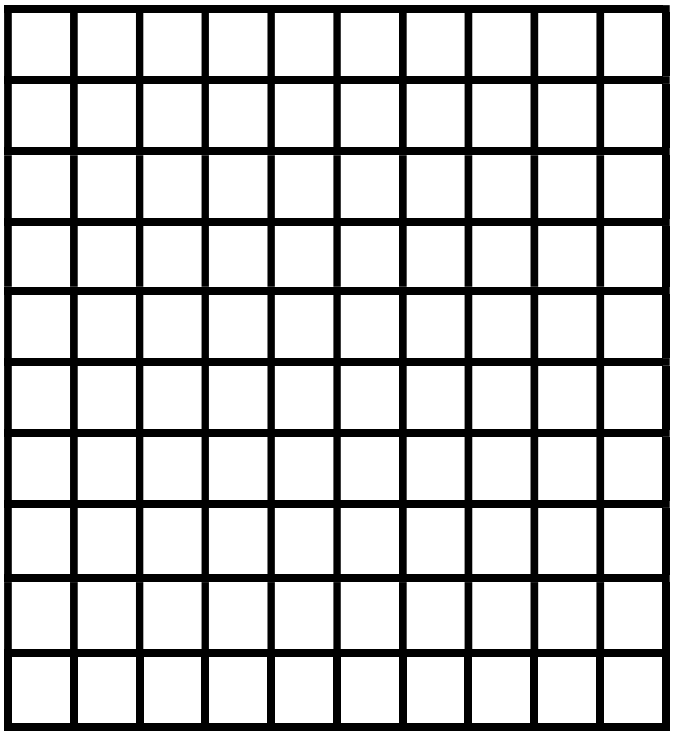
- Microscope Setup:

  Place the slide on the microscope stage.
  Adjust the microscope to use the 10x objective to locate the optimal area for counting, which is the monolayer region (also known as the feathered edge).

- Finding the Counting Area:

  The counting area is located just inside the feathered edge where RBCs are evenly spaced without significant overlap.
  Move the slide to this region and switch to the 40x objective to confirm the area.

- White Blood Cell Identification:
  Switch to the 100x oil immersion objective for detailed examination.
  Focus on the cells and begin scanning the slide in a systematic manner (e.g., serpentine or zig-zag pattern) to avoid recounting cells.
- Counting WBCs:

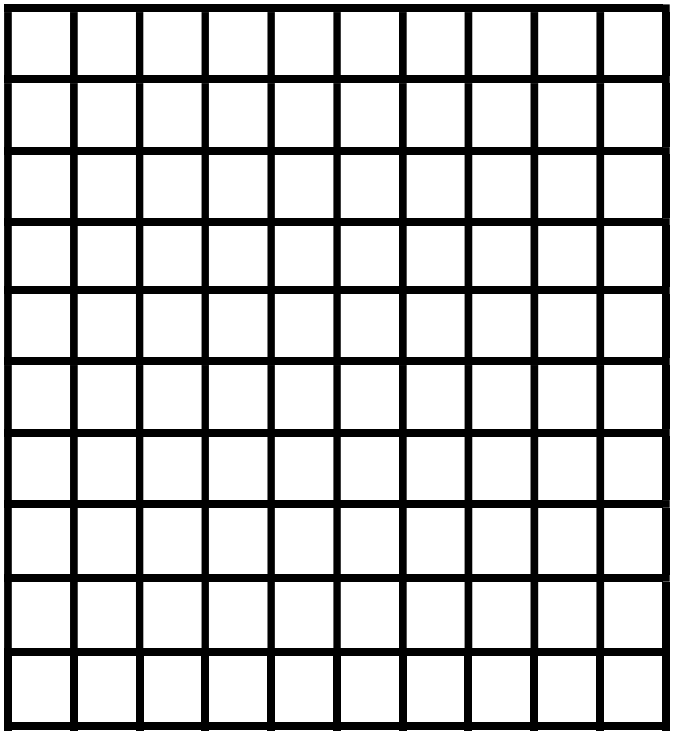


Identify and categorize each WBC type as you encounter them:
Normal range
Neutrophils 55-70%
Lymphocytes 20-40%
Monocytes 2-8%
Eosinophils1-6%
Basophils<1%

Recording the Count:
Record the number of each type of WBC in the lab notebook.

RBC and WBC morphology:

DIFFERENTIAL COUNT



Neutrophils:

Lymphocytes:

Monocytes:

Eosinophils:

Basophils:

Peripheral smear reporting format

Red blood cells :

White blood cells :

Platelets :

Immature cells :

Hemoparasites :

Impression :

Hemoglobin Estimation

Hemoglobin Estimation by Sahli's Hemoglobinometer

- ❖ Principle
  The Sahli's method, or acid hematin method, is based on the principle of converting hemoglobin into acid hematin by adding hydrochloric acid (HCl). The brownish color of acid hematin formed is then compared with a standard color scale in the hemoglobinometer to estimate the concentration of hemoglobin in grams per deciliter (g/dL).

- ❖ Materials Required:
  Sahli's Hemoglobinometer
  Hemoglobin tube (Graduated, calibrated in g/dL)
  Comparator block with color standards
  Stirrer (Glass rod with rubber tip)

- ❖ Reagents:
  0.1N Hydrochloric Acid (HCl)
  Equipment
  Sahli's pipette (0.02 ml or 20 µl pipette)
  Distilled water
  Dropper or Pasteur pipette

- ❖ Personal Protective Equipment (PPE):
  Gloves
  Lab coat

- ❖ Procedure

- ❖ Preparation

1. Preparation of Reagent:

- Ensure the availability of 0.1N HCl. Prepare fresh if necessary.

- ❖ Step-by-Step Procedure

1. Add Hydrochloric Acid:
- Fill the Sahli's hemoglobin tube with 0.1N HCl up to the *mark '2'* on the tube using a dropper.

2. Blood Sample Collection:
- Collect fresh blood using a Sahli's pipette. Ensure proper mixing if using blood from an EDTA tube.

3. Transfer Blood Sample:
- Draw 0.02 ml (20 µl) of blood using the Sahli's pipette. Ensure that the pipette is filled to

the mark without air bubbles.
- Wipe any blood from the outside of the pipette with clean gauze to avoid contamination or overestimation.

4. Mix Blood with Acid:
- Add the blood to the Sahli's hemoglobin tube containing HCl.
- Use the glass stirrer to mix gently. Allow the reaction to take place, forming acid hematin.

5. Color Development:
- Let the mixture sit for 5-10 minutes to ensure complete conversion of hemoglobin to acid hematin, resulting in a brown color.

6. Titration with Distilled Water:
- Gradually add distilled water to the tube using a dropper while continuously stirring until the color matches the standard color of the comparator block.

7. Reading the Hemoglobin Level:
- Once the color matches, read the hemoglobin concentration directly from the graduated scale on the Sahli's hemoglobin tube. The reading is given in grams per deciliter (g/dL).

Interpretation of Results:

- Normal hemoglobin levels vary by age, gender, and altitude but typically fall within the following ranges:
  - Adult Males: 13.8 to 17.2 g/dL
  - Adult Females: 12.1 to 15.1 g/dL
  - Children: 11 to 16 g/dL (varies by age)

Hemoglobin Estimation

Blood grouping and Rh typing

Blood Grouping and Rh typing: Tile Method

- ❖ Purpose
  To determine the ABO and Rh blood group of an individual using the tile method.

- ❖ Principle
  The tile method is based on the agglutination reaction between red blood cells and specific antibodies. When an antigen-antibody reaction occurs, visible clumping (agglutination) is observed. This reaction helps identify the blood group by using anti-A, anti-B, and anti-D antibodies to detect the presence of corresponding antigens on the surface of red blood cells.

- ❖ Materials Required

- *Reagents:*
  - *Anti-A serum* (Blue color)
  - *Anti-B serum* (Yellow color)
  - *Anti-D serum* (Clear or Green color, for Rh factor)

- *Equipment:*
  - Clean white tile or porcelain plate with marked areas (A, B, D)
  - Blood grouping pipettes or droppers
  - Mixing sticks or applicator sticks

- *Personal Protective Equipment (PPE):*
  - Gloves
  - Lab coat

Procedure

Preparation

1. *Label the Tile:*
   - Divide the tile into sections labeled *A, **B, **D* (Rh) and control to indicate where each reagent will be placed.

2. *Reagent Preparation:*
   - Ensure that the anti-sera (anti-A, anti-B, anti-D) are at room temperature and well-mixed before use.

Step-by-Step Procedure

1. *Placing Reagents:*
   - *Anti-A: Place a drop of anti-A serum in the section labeled **A*.
   - *Anti-B: Place a drop of anti-B serum in the section labeled **B*.
   - *Anti-D: Place a drop of anti-D serum in the section labeled **D*.

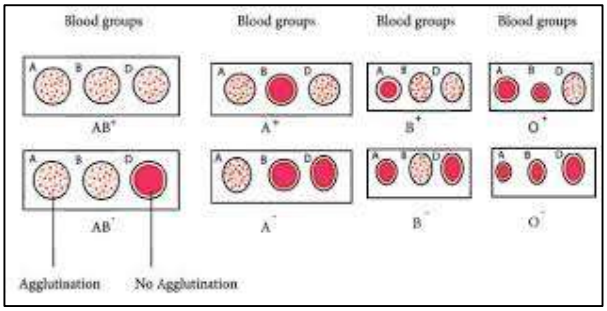
2. *Adding Blood Samples:*
   - Use separate pipettes or droppers to place one drop of blood in each section of the tile.

3. *Mixing:*
   - Use clean applicator sticks to mix each blood drop with its corresponding antiserum thoroughly.
   - Use separate sticks for each section to avoid cross-contamination.

4. *Observation:*
   - Gently rock the tile back and forth for *1-2 minutes*.
   - Observe each section for agglutination (clumping) with the naked eye under adequate lighting.

5. Interpretation of results :

Antisera Reaction	Blood Group
Agglutination with Anti-A only	A negative
Agglutination with Anti-B only	B negative
Agglutination with Anti-D only	O positive
Agglutination with Anti-A and Anti-B only	AB negative
Agglutination with Anti-A and Anti-D only	A positive
Agglutination with Anti-B and Anti-D only	B positive
Agglutination with Anti-A, Anti-B, and Anti-D	AB positive
No Agglutination in any section	O negative



Blood grouping and Rh typing

URINE EXAMINATION –PHYSICAL AND CHEMICAL

Objectives:

- To observe and record the physical characteristics of a urine sample.
- To identify any abnormalities that may indicate pathological conditions.

Materials Required:

- **Fresh urine sample** (preferably midstream, first-morning sample)
- **Urine sample container** (clean and dry)
- **Graduated measuring cylinder**
- **Glass rod or pipette** (for mixing)
- **White background** (for observing color and clarity)
- **pH paper or dipstick** (for pH measurement)
- **Thermometer** (optional, for temperature measurement)

Procedure:

1. **Collection of Urine Sample:**
    - Collect a fresh urine sample in a clean, dry container.
    - Ensure it is a midstream sample for accurate results.
    - Use the first-morning sample if possible, as it is more concentrated.
2. **Volume:**
    - Measure the volume of the urine sample using a graduated measuring cylinder.
    - Record the volume in milliliters (mL).
3. **Color:**
    - Observe the color of the urine sample against a white background.
    - Record the color using standard descriptors (e.g., pale yellow, amber, dark brown).
    - **Normal Color:** Pale yellow or straw-colored due to the presence of the pigment urochrome.
    - **Abnormal Colors:**
        - Dark yellow or amber: Possible dehydration or presence of bilirubin.
        - Red or pink: Hematuria, beets, or medications.
        - Brown: Liver disease or myoglobinuria.
        - Green or blue: Bacterial infection, certain medications, or dyes.
4. **Clarity (Turbidity):**
    - Gently swirl the urine sample in the container.
    - Observe and record the clarity of the urine.
    - **Normal Clarity:** Clear or slightly hazy.
    - **Abnormal Clarity:**
        - Cloudy or turbid: Possible presence of bacteria, pus, red blood cells, or crystals.
        - Milky: Presence of chyle or lipids.
5. **Odour:**
    - Smell the urine sample by wafting the odour towards your nose with your hand.

- Record the odour.
- **Normal Odour:** Slightly aromatic.
- **Abnormal Odours:**
  - Ammonia-like: Possible bacterial infection or standing urine.
  - Fruity or sweet: Diabetes mellitus (presence of ketones).
  - Foul or putrid: Urinary tract infection.

6. **Specific Gravity:**
   - Use a urinometer or refractometer to measure specific gravity.
   - Calibrate the instrument according to manufacturer instructions if necessary.
   - Record the specific gravity value.
   - **Normal Range:** 1.005 to 1.030.
   - **Abnormal Values:**
     - Low specific gravity (<1.005): Possible overhydration, diabetes insipidus, or renal impairment.
     - High specific gravity (>1.030): Possible dehydration, glycosuria, or proteinuria.
7. **pH:**
   - Use pH paper or a urine dipstick to measure the pH of the urine sample.
   - Record the pH value.
   - **Normal pH Range:** 4.5 to 8.0.
   - **Abnormal pH:**
     - Acidic (<4.5): Possible metabolic acidosis, diabetic ketoacidosis, or diarrhea.
     - Alkaline (>8.0): Possible urinary tract infection, renal tubular acidosis, or vomiting.

Urine chemical examination

1. Protein: Heat Coagulation Test

Objective:

To detect the presence of proteins in urine using heat coagulation.

Materials Required:

- Fresh urine sample
- Test tube
- Bunsen burner or spirit lamp
- Glass rod
- 1% acetic acid
- Test tube holder
- Thermometer (optional)

Procedure:

1. **Collection of Sample:**
   - Obtain a fresh urine sample in a clean test tube.
2. **Initial Observation:**
   - Observe the urine sample for any visible turbidity before heating.
3. **Heating:**
   - Hold the test tube at an angle and gently heat the upper part of the urine sample over a Bunsen burner or spirit lamp.
   - Use a test tube holder to avoid direct contact.
   - **Note:** Do not boil the urine; just heat until it is warm (around 60°C - 70°C).
4. **Observation:**
   - Look for any turbidity or coagulation in the heated portion of the urine.
   - If no turbidity is observed, proceed to the next step.
5. **Addition of Acetic Acid:**
   - Add a few drops of 1% acetic acid to the urine sample using a glass rod.
   - This step ensures that any turbidity is due to protein and not due to phosphates or carbonates.
6. **Final Observation:**
   - Observe the urine sample for any persistent turbidity or coagulation.

Interpretation:

- **Positive Result:**
  - Turbidity or coagulation remains after adding acetic acid, indicating the presence of proteins.
  - This is usually due to albumin or other proteins, suggesting possible renal issues like glomerulonephritis or nephrotic syndrome.
- **Negative Result:**
  - No turbidity or coagulation observed after adding acetic acid, indicating the absence of significant proteinuria.

Precautions:

- Ensure gentle heating to avoid boiling, which can lead to false positives.
- Use fresh urine samples for accurate results.

2. Sugar: Benedict's Test

Objective:

To detect the presence of reducing sugars in urine using Benedict's reagent.

Materials Required:

- Fresh urine sample
- Benedict's reagent
- Test tube
- Bunsen burner or water bath
- Test tube holder
- Graduated pipette

Procedure:

1. **Preparation:**
   - Take 5 ml of Benedict's reagent in a test tube.
2. **Addition of Urine:**
   - Add 0.5 ml (about 8 drops) of the urine sample to the test tube using a graduated pipette.
3. **Mixing:**
   - Gently shake the test tube to mix the contents thoroughly.
4. **Heating:**
   - Heat the mixture in a boiling water bath or over a Bunsen burner for about 2-3 minutes.
   - Ensure even heating by continuously swirling the test tube using a holder.
5. **Observation:**
   - Observe the color change in the solution.

Interpretation:

- **Positive Result:**
  - **Green Precipitate:** Trace amount of reducing sugar (0.1 - 0.5 g%).
  - **Yellow Precipitate:** Moderate amount of reducing sugar (0.5 - 1.0 g%).
  - **Orange Precipitate:** High amount of reducing sugar (1.0 - 1.5 g%).
  - **Brick Red Precipitate:** Large amount of reducing sugar (>1.5 g%).
  - Presence of reducing sugars, like glucose, may indicate diabetes mellitus or renal glycosuria.
- **Negative Result:**
  - Blue solution (no color change), indicating the absence of reducing sugars.

Precautions:

- Use freshly prepared Benedict's reagent for accurate results.
- Avoid overheating to prevent splashing.

Rothera's Test for Ketone Bodies in Urine

Objective:

To detect the presence of ketone bodies (acetoacetic acid and acetone) in urine using Rothera's reagent.

Materials Required:

- **Fresh urine sample**
- **Rothera's reagent powder** (a mixture of sodium nitroprusside and ammonium sulfate)
- **Concentrated ammonium hydroxide solution (NH_4OH)**
- **Test tube**
- **Glass rod**
- **Graduated pipette**

Preparation of Rothera's Reagent:

- **Rothera's Reagent Powder:**
  - Mix **sodium nitroprusside** (1 part) with **ammonium sulfate** (100 parts) thoroughly to form the reagent powder.

Procedure:

1. **Collection of Urine Sample:**
   - Collect a fresh midstream urine sample in a clean test tube.
2. **Addition of Rothera's Reagent:**
   - Add **0.5 grams** of Rothera's reagent powder (sodium nitroprusside and ammonium sulfate mixture) to the urine sample.
3. **Mixing:**
   - Shake the test tube gently to mix the powder uniformly with the urine.
4. **Addition of Ammonium Hydroxide:**
   - Carefully add **2 ml** of concentrated ammonium hydroxide solution (NH_4OH) to the mixture by allowing it to flow gently down the side of the test tube. This creates a distinct layer above the urine.
   - Do not mix after adding the ammonium hydroxide; the solution should form a distinct layer above the urine.
5. **Observation:**
   - Observe the junction of the two layers for any color change within **1-2 minutes**.
   - A **purple or violet ring** forming at the interface indicates a positive reaction.

Interpretation:

- **Positive Result:**
  - A distinct **purple or violet ring** at the interface of the two layers indicates the presence of ketone bodies (acetoacetic acid and acetone).
  - This result suggests ketosis or ketoacidosis, common in conditions like uncontrolled diabetes mellitus, prolonged fasting, or a ketogenic diet.
- **Negative Result:**
  - No color change or ring formation at the interface, indicating the absence of significant ketone bodies in the urine.

3. Blood: Benzidine Test

Objective:

To detect the presence of blood (hemoglobin) in urine using benzidine reagent.

Materials Required:

- Fresh urine sample
- Benzidine reagent
- Hydrogen peroxide solution (3%)
- Test tube
- Graduated pipette
- Test tube holder

Procedure:

1. **Preparation:**
   - Add 2 ml of urine to a clean test tube.
2. **Addition of Benzidine Reagent:**
   - Add 1 ml of benzidine reagent to the urine sample.
3. **Addition of Hydrogen Peroxide:**
   - Add a few drops of 3% hydrogen peroxide to the mixture.
   - Swirl the test tube gently to mix.
4. **Observation:**
   - Observe for any color change within 1-2 minutes.

Interpretation:

- **Positive Result:**
  - Immediate blue or green color development indicates the presence of hemoglobin or myoglobin, suggesting hematuria, hemoglobinuria, or myoglobinuria.
- **Negative Result:**
  - No color change observed, indicating the absence of blood in the urine.

Precautions:

- Handle benzidine reagent with care, as it is a known carcinogen.

- Use appropriate protective equipment, such as gloves and goggles.

4. Bile Salts: Hay's Test

Objective:

To detect the presence of bile salts in urine using Hay's sulfur powder test.

Materials Required:

- Fresh urine sample
- Sulfur powder
- Test tube
- Glass rod

Procedure:

1. **Preparation:**
   - Take 10 ml of urine in a clean test tube.
2. **Addition of Sulfur Powder:**
   - Sprinkle a small amount of sulfur powder on the surface of the urine.
3. **Observation:**
   - Observe the behavior of sulfur powder on the urine surface.

Interpretation:

- **Positive Result:**
  - Sulfur powder sinks to the bottom, indicating the presence of bile salts, which reduce surface tension.
  - This suggests conditions such as obstructive jaundice or liver disease.
- **Negative Result:**
  - Sulfur powder remains floating on the surface, indicating the absence of bile salts.

Precautions:

- Ensure that the urine sample is fresh, as decomposition can alter test results.
- Handle sulfur powder with care to avoid inhalation.

5. Bile Pigments: Fouchet’s Test

Objective:

To detect the presence of bile pigments in urine using Fouchet’s reagent.

Materials Required:

- Fresh urine sample
- Fouchet’s reagent (containing ferric chloride and trichloroacetic acid)
- Barium chloride solution (10%)
- Test tube
- Pipette

- Filter paper

Procedure:

1. **Preparation:**
   - Add 10 ml of urine to a test tube.
2. **Addition of Barium Chloride:**
   - Add 2 ml of 10% barium chloride solution to the urine.
   - Mix well and let it stand for a few minutes to form a precipitate.
3. **Filtration:**
   - Filter the mixture to collect the precipitate on filter paper.
4. **Addition of Fouchet's Reagent:**
   - Place the filter paper with the precipitate on a clean surface.
   - Add a few drops of Fouchet's reagent to the precipitate.
5. **Observation:**
   - Observe any color change on the filter paper.

Interpretation:

- **Positive Result:**
  - Greenish-blue color development indicates the presence of bile pigments like bilirubin.
  - This suggests liver dysfunction, obstructive jaundice, or hemolytic anemia.
- **Negative Result:**
  - No color change, indicating the absence of significant bile pigments.

Precautions:

- Handle Fouchet's reagent with care, as it is corrosive.
- Ensure proper disposal of reagents and samples according to safety guidelines.

Urine physical examination

Urine chemical examination

Cytology

Note

1. This section includes academic mile stones attained through microscopic observation of cytology slides.
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s.no	Page no	Cytology Slides	Date of Demonstration	Initials of Facilitator
1		Fibroadenoma		
2		Carcinoma Breast		
3		Tuberculous lymph node		
4		Secondary carcinomatous deposit lymph node		
5		Pleomorphic adenoma		
6		Ascitic fluid for malignancy		
7		Pap smear – superficial cells		
8		Pap smear- intermediate cells		
9		Hashimoto's thyroiditis		
10		Colloid goitre/multinodular goitre		

4.CYTOLOGY

Cytology is the study of cell morphology which are obtained from various organs / masses by needle aspiration (FNAC) or obtained from body cavities (body fuild cytology) or from mucosal surfaces. It consists of

1. Aspiration cytology.
2. Exfoliative cytology.

FNAC: Fine needle aspiration cytology

In FNAC, a thin bore needle (22G / 23G) is introduced into the mass / organ & a small amount of tissue / cells is aspirated. The aspirated material is spread on slides, fixed, stained with Romanowsky stains / H&E / Pap stain, mounted and studied under microscope.

Exfoliative Cytology

Cells lining the pleural, peritoneal & other cavities & surface epithelia are shed off more so in malignancy due to loss of cohesion of cells.

Sites where exfoliated cells obtained are from :

a. Body fluids - pleural, peritoneal, pericardial & synovial fluids.
b. Surface epithelia-cervix, vagina, oral cavity, respiratory tract, urinary tract, GIT.
C. Buccal smear - sex chromatin (Barr Body).

PAP SMEAR

It is an exfoliative vaginal cytology & exfoliation of cells occur due to the process of continuous renewal of the body tissues. The desquamated shed cells collect in natural cavities & recesses & at the orifices of cavities that communicate with the exterior by vagina, urethra, anus, oral cavity, nose.

Fixative:

80% isopropyl alcohol

Aerosol spray/cyto fix/carbowax-polyethylene glycol spray fixative

Stains used:

Papanicolaou stain

Hematoxylin & eosin

Shorr's stain

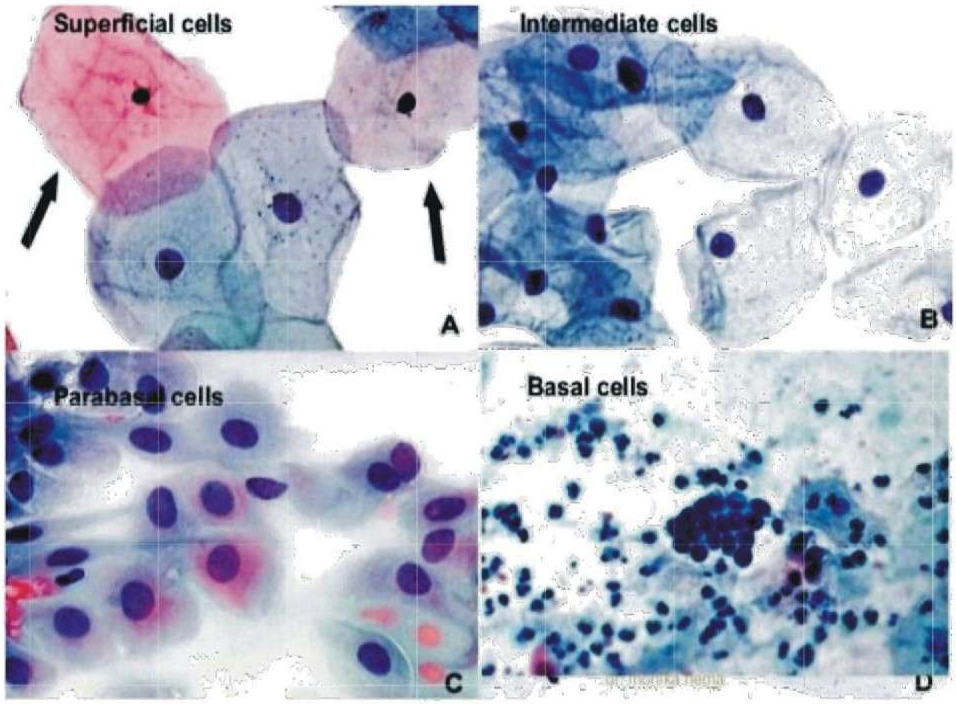
Wright Giemsa stain

Normal cytology of the female genital tract :

EPITHELIAL CELLS : Superficial cells, intermediate cells, parabasal cells & basal cells.

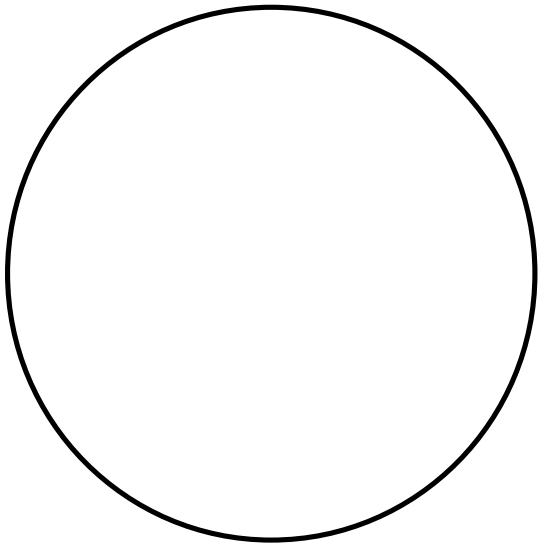
NON EPITHELIAL CELLS : RBC, leucocytes, plasma cells, histiocytes, lymphocytes & spermatozoa.

Morphology of the cells



Type of cell	Features	Hormonal influence
Superficial cell	Mature squamous cells, polygenal cells with pyknotic nuclei	Estrogen
lntermediate cell	Larger nucleus with finely granular texture, folded/wafer like cytoplasm	Progesterone
Parabasal cell	Round to oval cells with nucleus larger than intermediate cells	Not influenced by hormones. Seen in atrophic smear
Basal cell	Small cells with scant cytoplasm	Not influenced by hormones Seen in atrophic smear

Cytology 1:
Date:



Cytology 1: Fibroadenoma

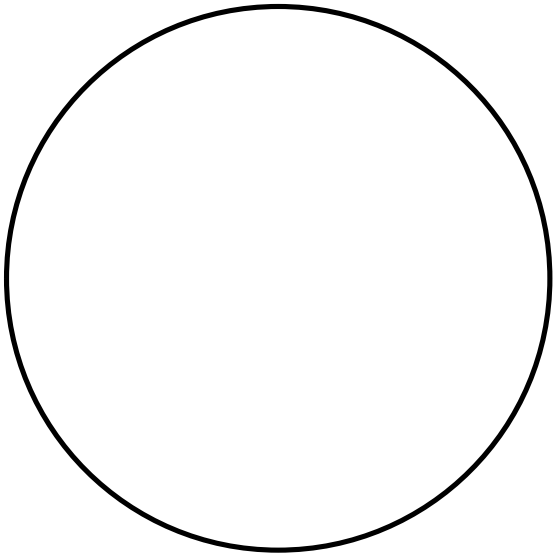
Microscopy:

a) Cellular smears showing cohesive clusters of benign duct epithelial cells forming stag horn pattern.

b) Myoepithelial cells & stromal fragments are seen in the background.

Cytology 2
Date:

:

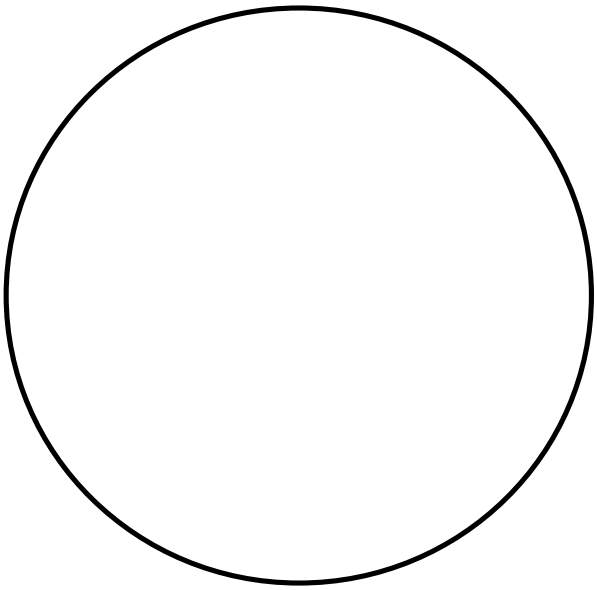


Carcinoma breast

a) Smear shows discohesive clusters and singly scattered malignant duct epithelial cells.

b) Malignant cells exhibit pleomorphic, hyper chromatic nuclei with absent bare nuclei.

Cytology: 3
Date:



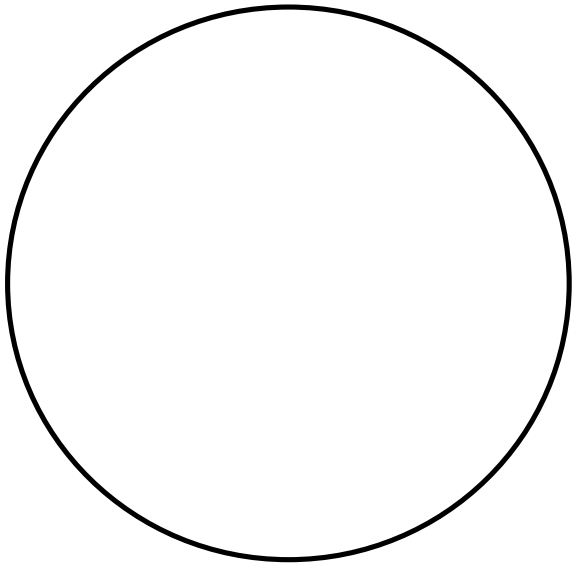
Tuberculous lymphnode

Microscopy:

a) Smear shows epithelioid granuloma composed of epithelioid cells, Langhans type of giant cells, lymphocytes & histiocytes in a necrotic background.

b) Caseous necrosis-seen as pink amorphous foci.

Cytology: 4
Date:

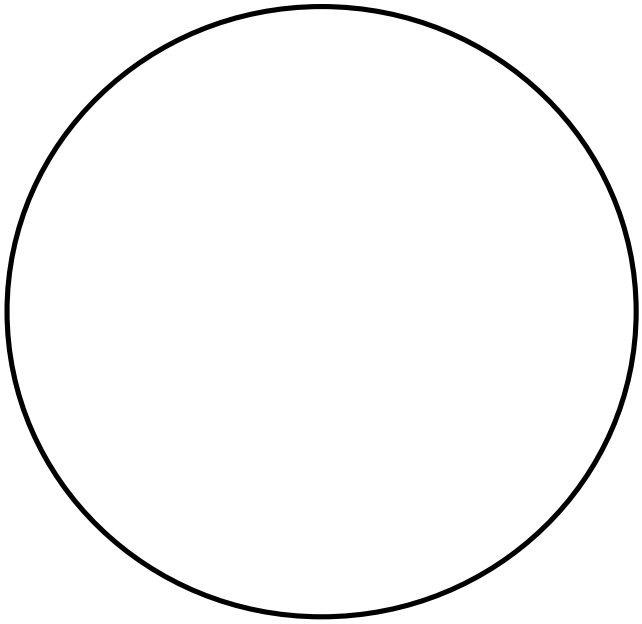


Lymph node metastatic deposit of squamous cell carcinoma

Microscopy:

a) Moderately cellular smear showing malignant squamous epithelial cells arranged in groups & singly scattered cells.
b) Background shows lymphocytes and keratinous material.

Cytology: 5
Date :

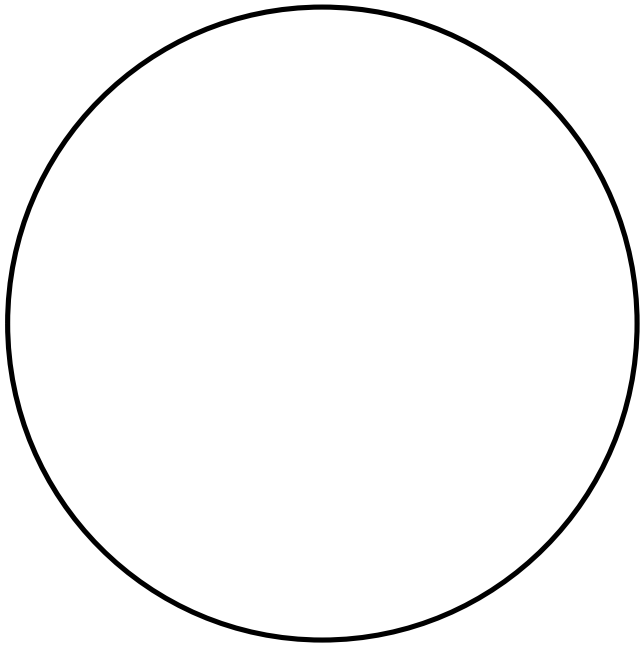


Ascitic fluid cytology- Smear Positive for maligancy

Microscopy:

a) Cellular smears show three dimensional clusters of neoplastic cells arranged in solid &acinar pattern.
b) The neoplastic malignant epithelial cells are round to oval with hyperchromatic& pleomorphic nuclei.

Cytology : 6
Date :

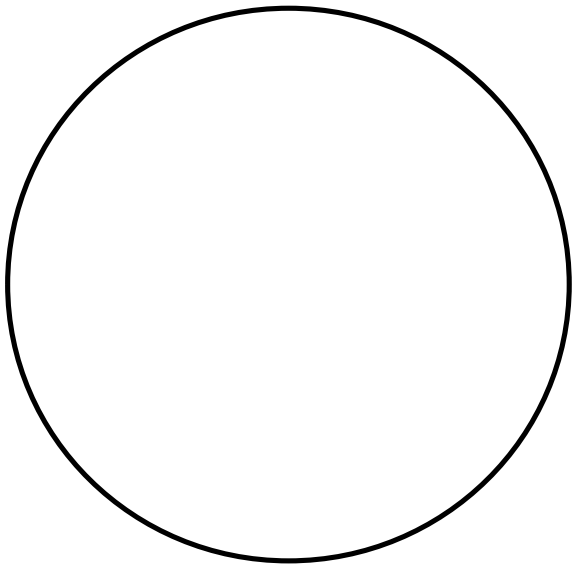


Superficial cells

Microscopy :

a) Superficial cells are large, flat, polygonal epithelial cells with abundant eosinophilic cytoplasm and small, pyknotic nuclei, often staining orange-pink.
b) They indicate estrogenic activity and are typically found during the proliferative phase

Cytology : 7
Date :

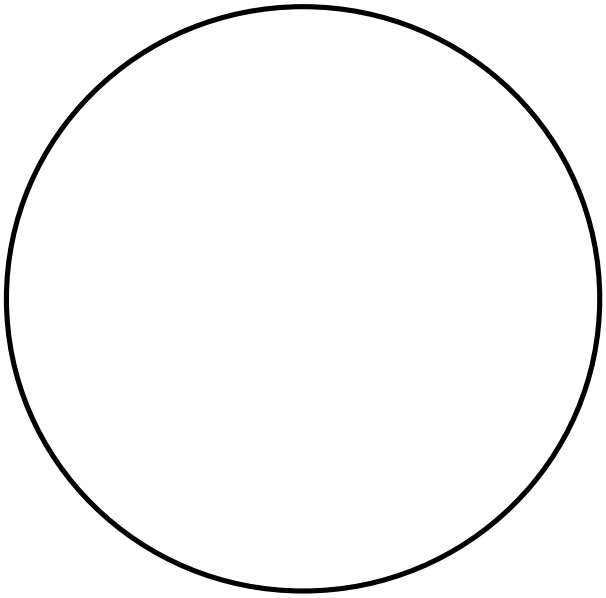


Intermediate cells

Microscopy :

a) The polygonal-shaped intermediate squamous cell size ranges 1,256-1,618 µm. The cytoplasm is thin, transparent, and typically stains basophilic. The centrally placed vesicular nucleus with fine evenly dispersed granular chromatin.
b) Intermediate cells are seen in abundance when progesterone is at high levels during the secretory phase.

Cytology : 8
Date :



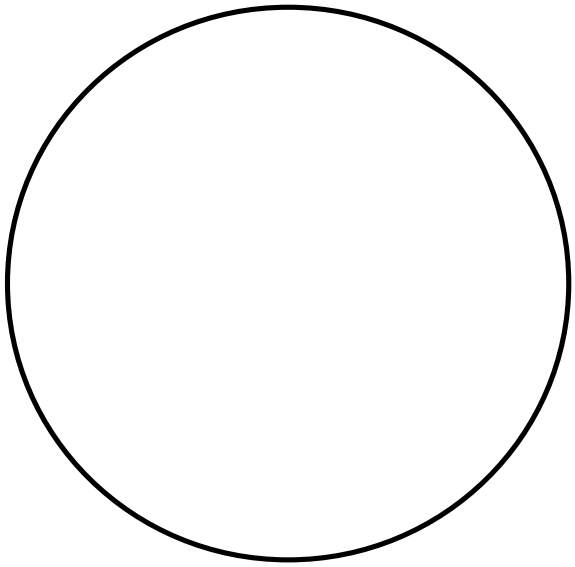
Pleomorphic adenoma

Microscopy :

a) Sheets and singly scattered ductal cells and myoepithelial cells

b) Chondromyxoid stromal background

Cytology : 9
Date :



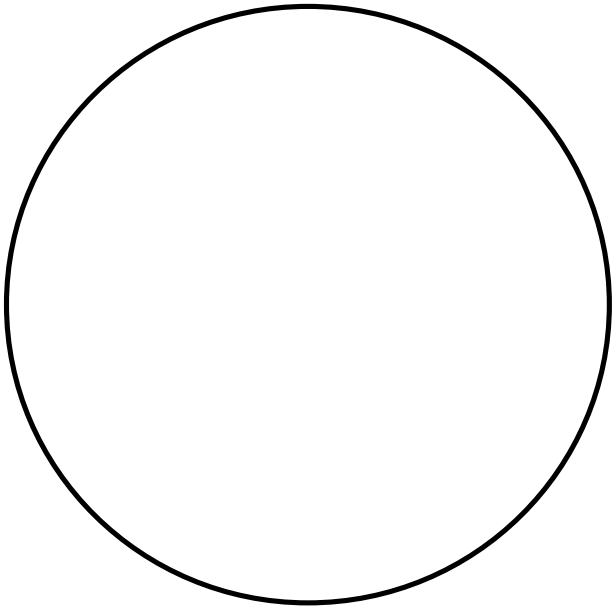
Hashimoto's thyroiditis

Microscopy :

a) Moderately cellular smear and aggregates of oncocytic cells admixed with variable number of lymphocytes

b) Background of scant colloid.

Cytology : 10
Date :



Colloid goitre

Microscopy:

Smears show clusters and follicles of thyroid follicular cells.background shows colloid

Hematology

Note

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s.no	Page no	Hematology Slides	Date of Demonstration	Initials of Facilitator
1		Neutrophilia		
2		Eosinophilia		
3		Malarial parasite		
4		Microcytic hypochromic anemia		
5		Macrocytic anemia		
6		Acute myeloid leukemia		
7		Acute lymphoid leukemia		
8		Chronic myeloid leukemia		
9		Chronic lymphoid leukemia		
10				
11				
12				

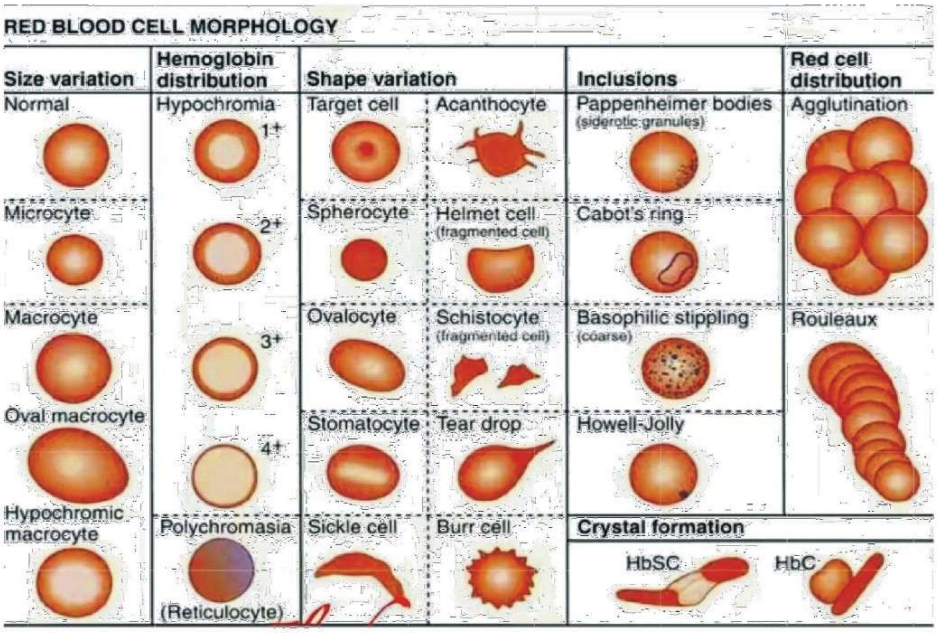
INTERPRETATION OF PERIPHERAL SMEAR

RBC : Size, shape, Chromasia, inclusions, Immature cells, excess rouleux formation/agglutination, hemoparasites

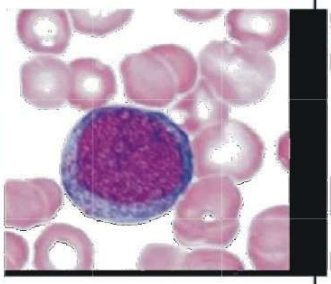
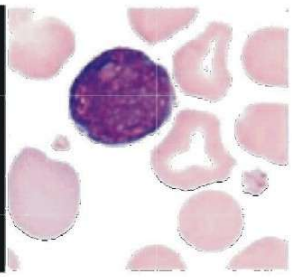
WBC : Count, morphology-nucleus, granules, cytoplasmic inclusions, immature cells

Platelets : Count, size, morphology

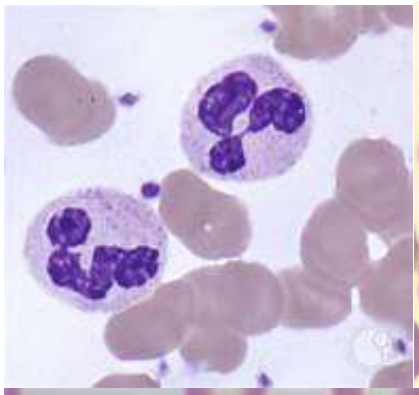
RBC disorder



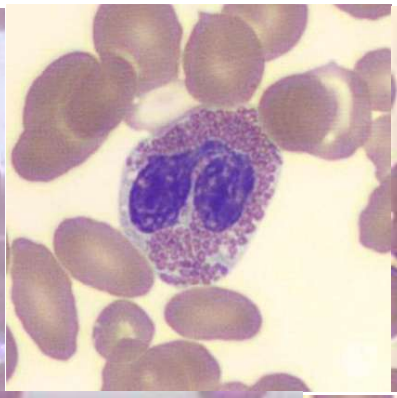
WBC-Features of immature blast

CHARACTERISTICS	MYELOBLAST	LYMPHOBLAST
		
Size	15-20 microns	10-20 microns
Nucleus	Round to oval	Round to oval
Nucleoli	2-5	1-2
Chromatin	Fine	Fine,evenly stained
Cytoplasm	Moderate basophilia	Scant, slightly to moderately basophilic
Granules	Absent or upto 20	None
N/c ratio	4:1	7:1 to 4:1

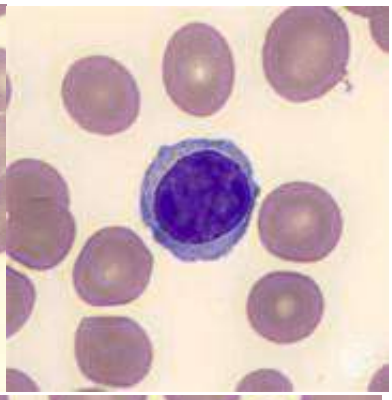
Neutrophil

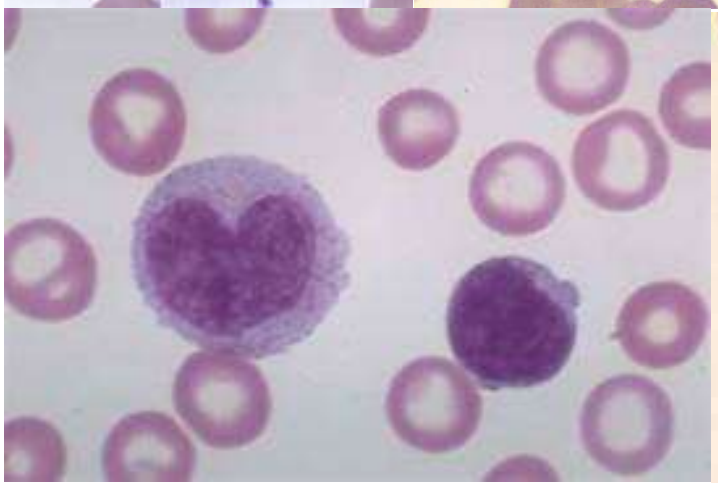


eosinophil

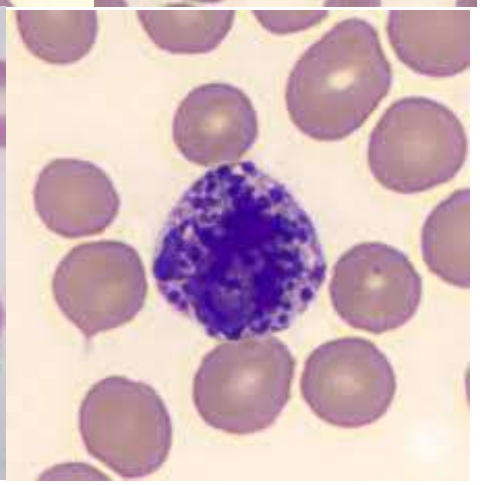


lymphocyte



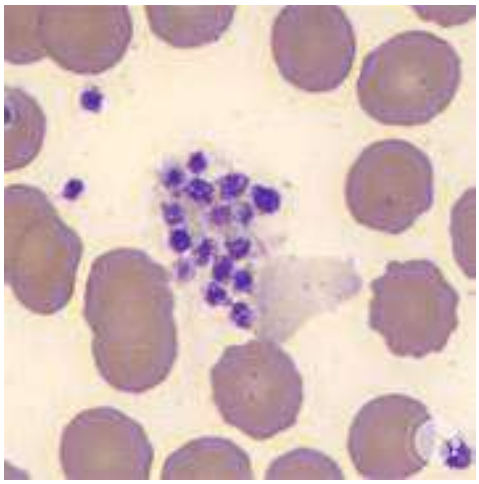


Monocyte

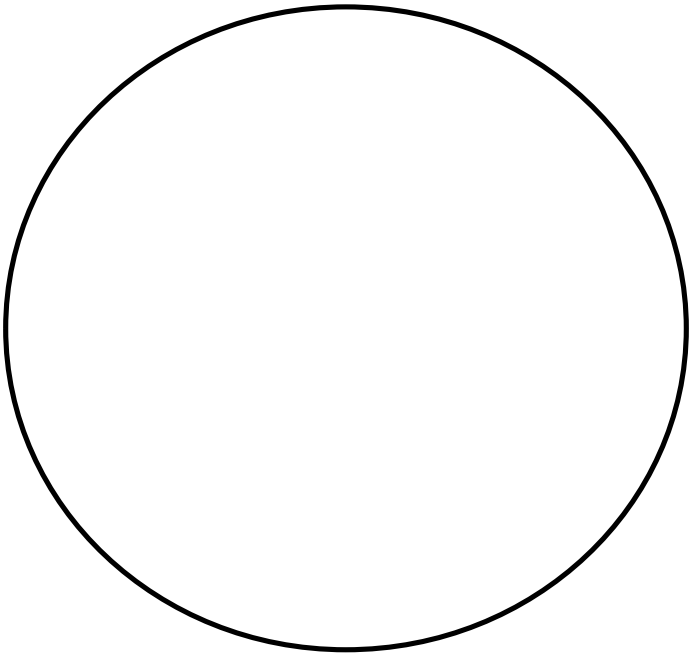


Basophil

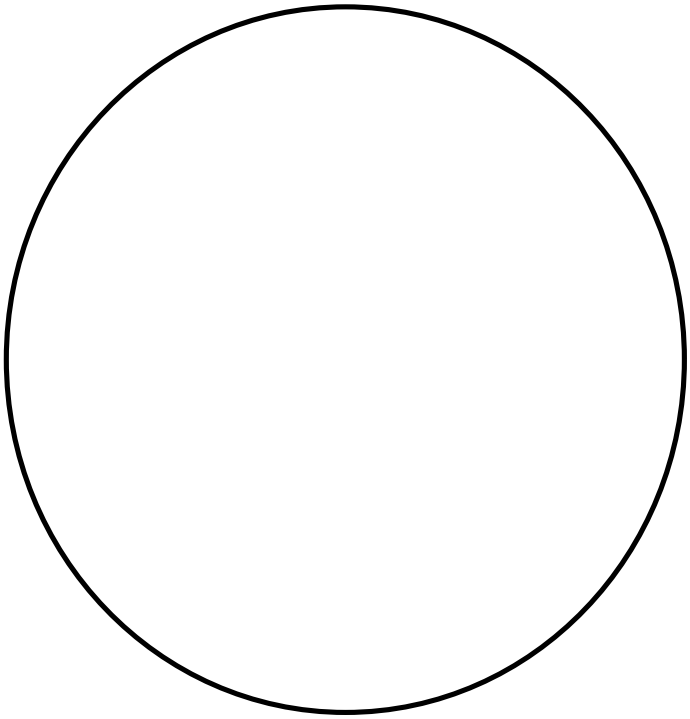
Platelets



Haematology : 1
Date :



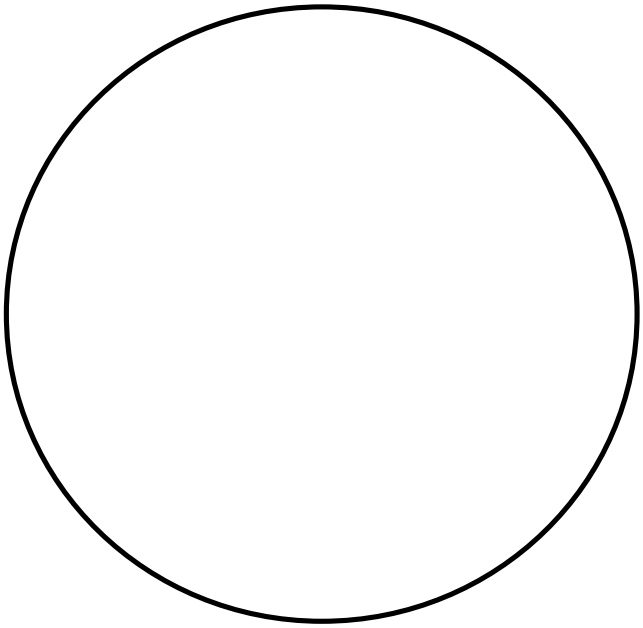
Haematology : 2
Date



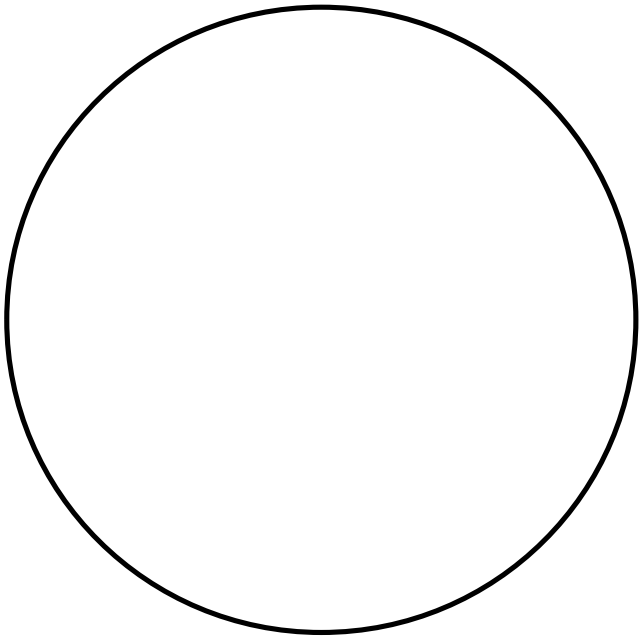
Microscopy : 1

Microscopy :2

Haematology : 3
Date :



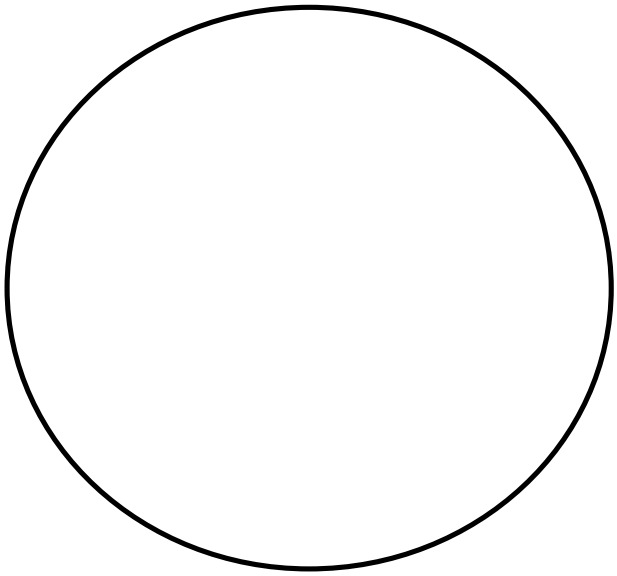
Haematology : 4
Date :



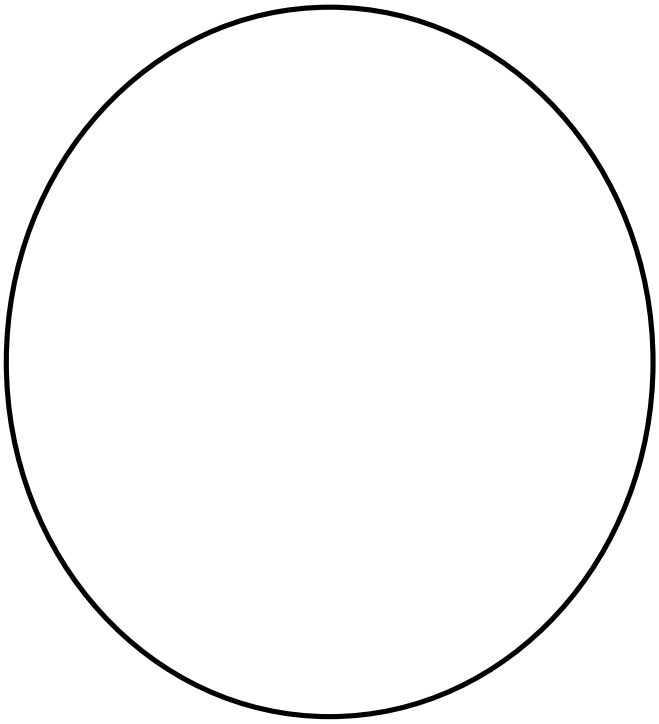
Microscopy : 3

Microscopy : 4

Haematology : 5
Date :



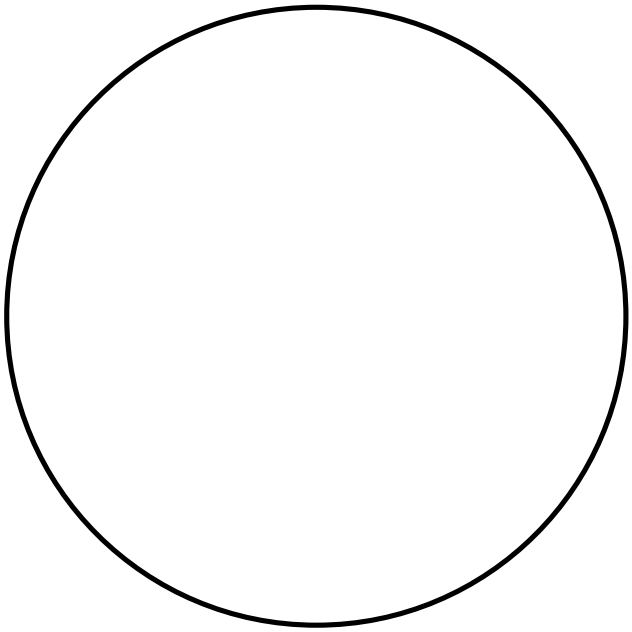
Haematology : 6
Date :



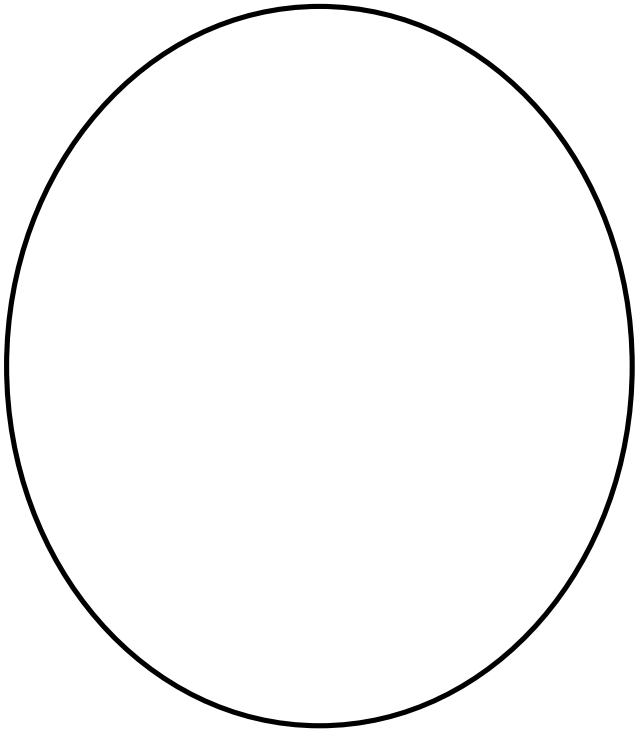
Microscopy : 5

Microscopy : 6

Haematology : 7
Date :



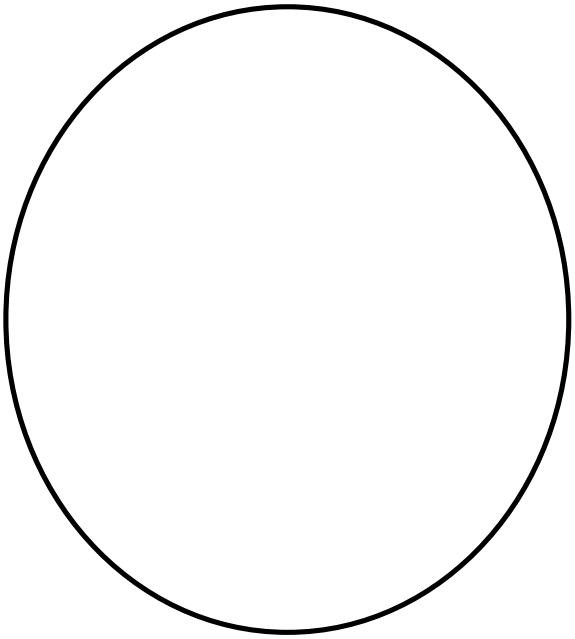
Haematology : 8
Date :



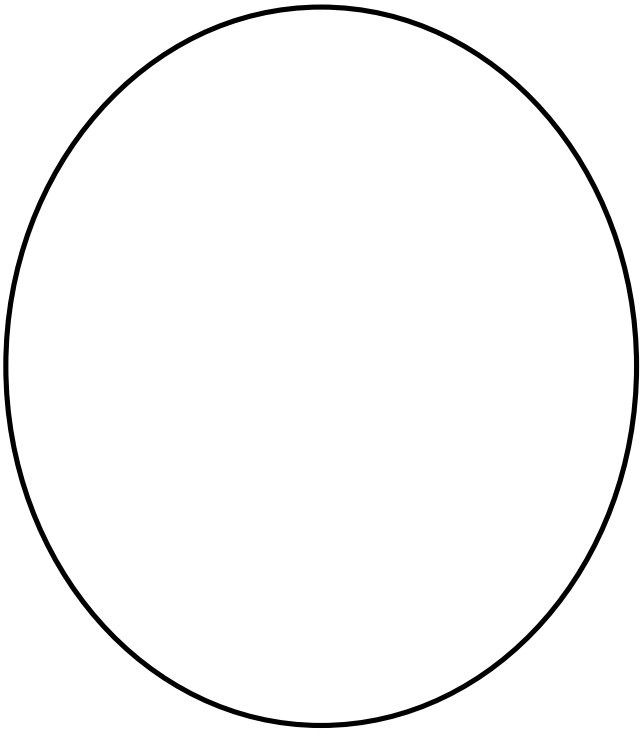
Microscopy : 7

Microscopy : 8

Haematology : 9
Date :



Haematology : 10
Date:



Microscopy : 9

Microscopy : 10

HISTOPATHOLOGY

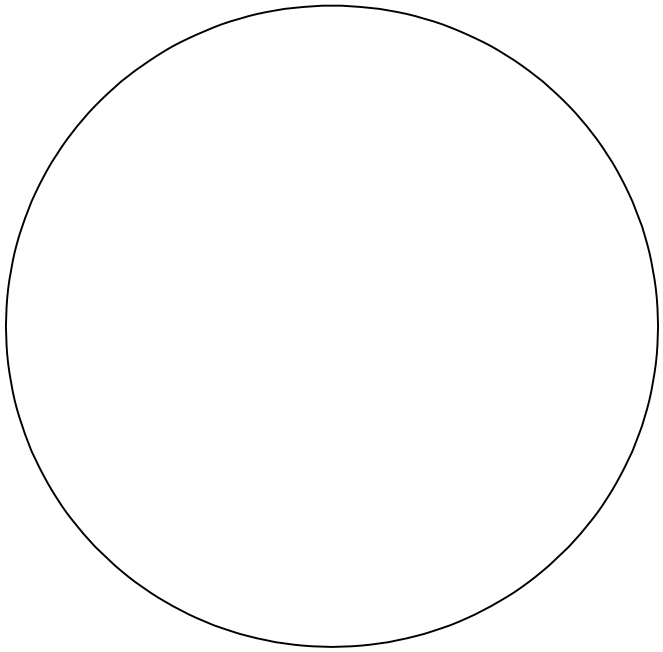
Note

1. This section includes academic mile stones attained through microscopic observation of histopathology slides.
2. The learner shall make observation entries as mandated in the record book.
3. The record note books shall be verified by the faculty facilitator at the end of Each session or module.
4. The completion of each such activity shall be recorded in this section by the learner and signed by the facilitator.
5. The end of each session shall be appended by an end of training formative assessment in the topic / session / module. eg: OSPE, DOPS etc. Such sessional outcomes and feed for such outcomes may be suitably entered in the concerned documents.

S.No	Pageno.	Histopathology Slides	Date of Demonstration	Initials of Facilitator
1		Fatty Liver		
2		Acute appendicitis		
3		Granulation tissue		
4		CVC - Lung		
5		CVC – Liver		
6		CVC – Spleen		
7		Atheroma		
8		Thrombus		
9		Actinomycosis		
10		Rhinosporidiosis		
11		Capillary hemangioma		
12		Cavernous hemangioma		
13		Pneumonia		
14		Tuberculosis - Lung		
15		Lipoma		
16		Schwannoma		
17		Gastric ulcer		
18		Adenocarcinoma stomach		
19		Adenocarcinoma colon		
20		Caseating granulomatous lymphadenitis		
21		Secondary carcinomatous deposits-LN		
22		Cirrhosis		
23		Chronic pyelonephritis		
24		Renal cell carcinoma		
25		Wilms tumour		
26		Products of conception		
27		Leiomyoma		
28		Teratoma		
30		Fibroadenoma		
31		Carcinoma breast		
32		Colloid goitre		
33		Hashimoto’s thyroiditis		
34		Papillary carcinoma of thyroid		
35		Hodgkin lymphoma		

36		Osteoclastoma		
37		Osteochondroma		
38		Osteosarcoma		
39		Squamous cell carcinoma		
40		Basal cell carcinoma		
41		Malignant melanoma		
42		Proliferative phase		
40		Secretory phase		

1.Fatty Liver

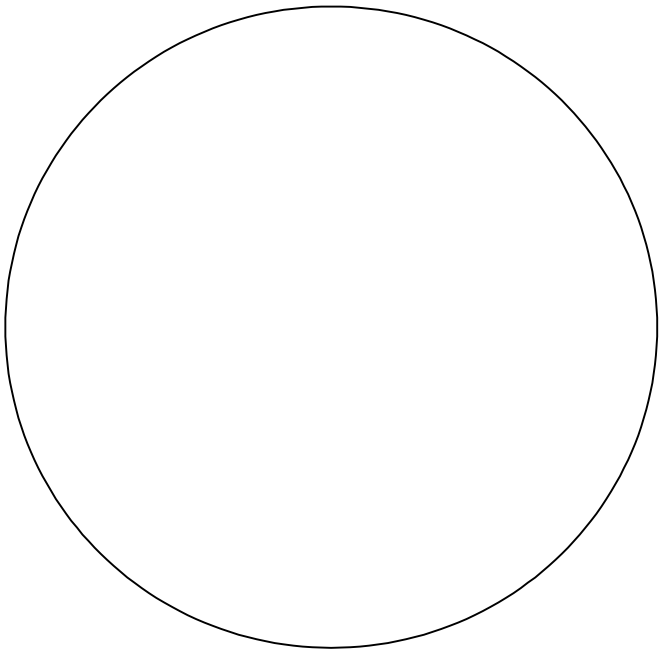


1.Fatty Liver

Microscopy:

Hepatocytes show intracytoplasmic macro and micro vesicles imparting vacuolated appearance with nucleus pushed to the periphery

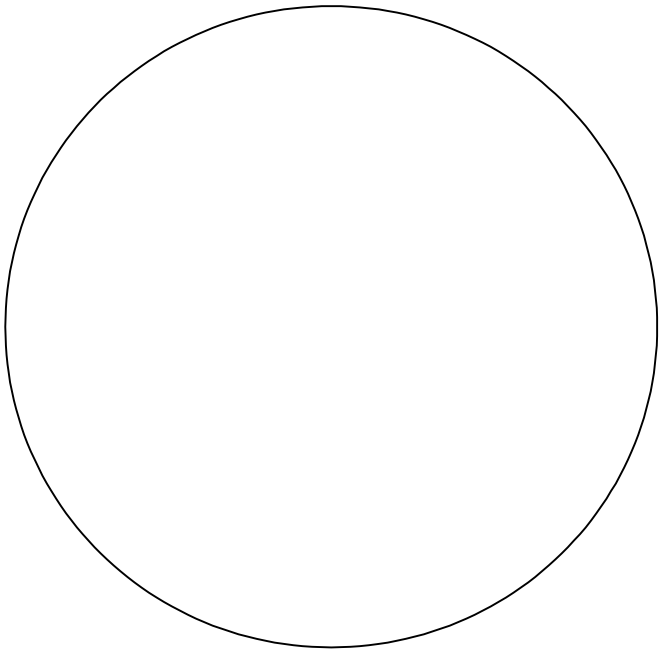
2. Acute appendicitis



Microscopy:

Necrotic debri in the lumen.
Transmural acute inflammatory infiltrate.
Neutrophilic infiltration in the submucosa & muscularis.

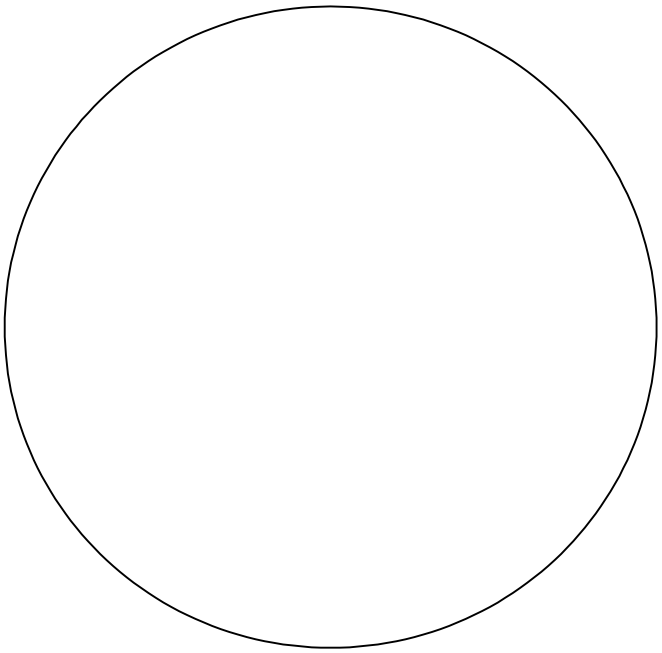
3. Granulation tissue



Microscopy:

Numerous proliferating capillaries.
Proliferating spindle shaped fibroblasts.
Scattered inflammatory cells in edematous stroma.

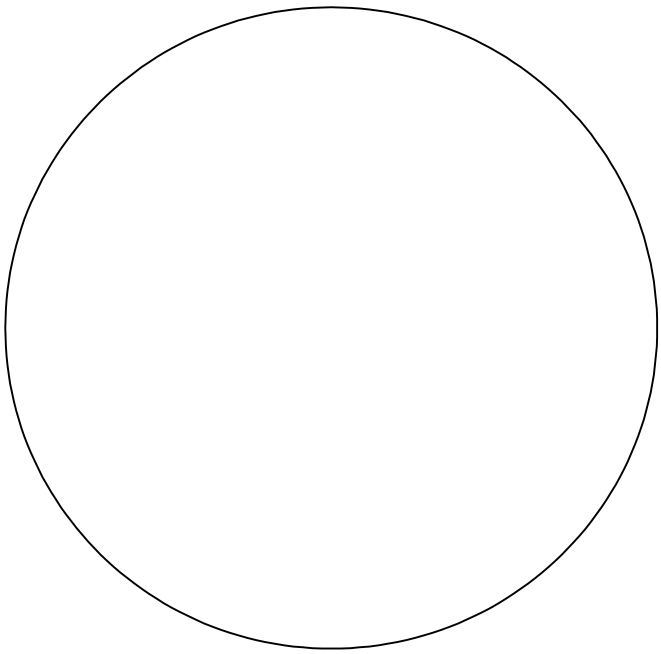
4.Chronic venous congestion - Lung



Microscopy:

Alveolar septa shows edema,congested (dilated) capillaries.
Alveolar spaces show proteinaceous fluid & hemosiderin laden macrophages (heart failure cells), focal fibrosis can be seen.

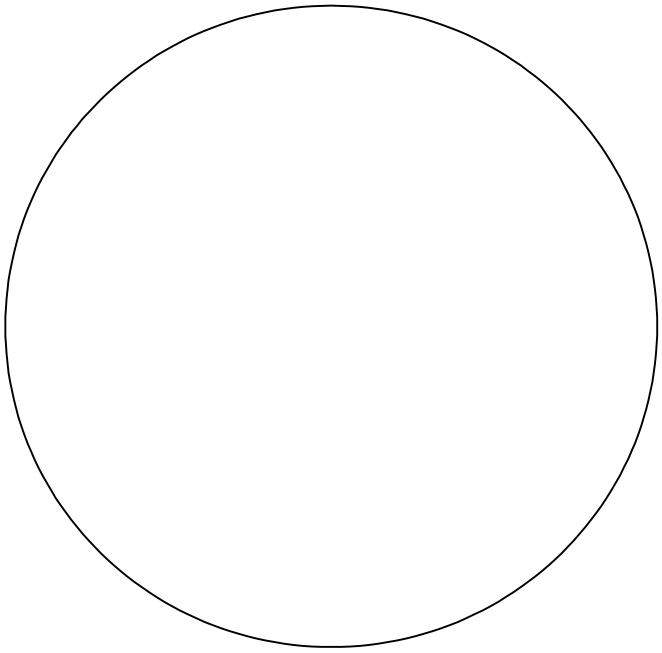
5. Chronic venous congestion - Liver



Microscopy:

Dilated & congested central veins.
Ischemic necrosis (dark small hepatocytes) around central vein.
Sinusoidal congestion

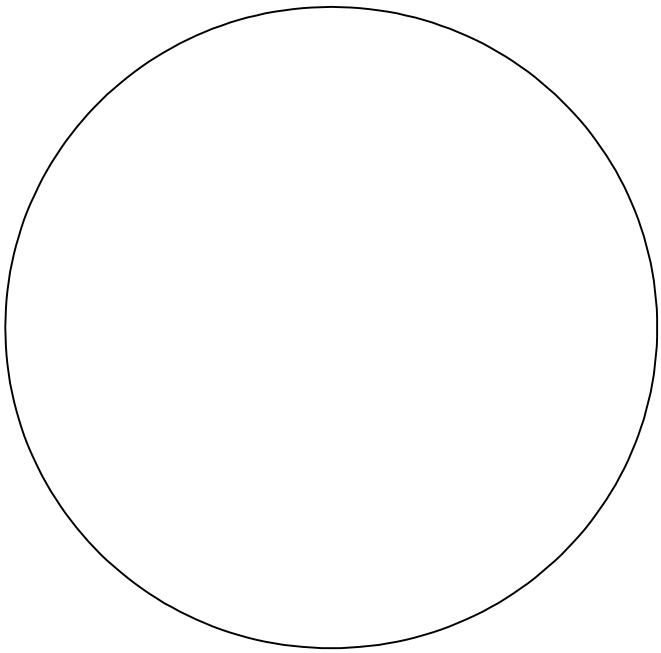
6. Chronic venous congestion - Spleen



Microscopy:

Dilated sinusoid of red pulp with fibrosis and hemosiderin laden macrophages.
Iron and calcium containing fibrotic nodules (Gamna – Gandy bodies).

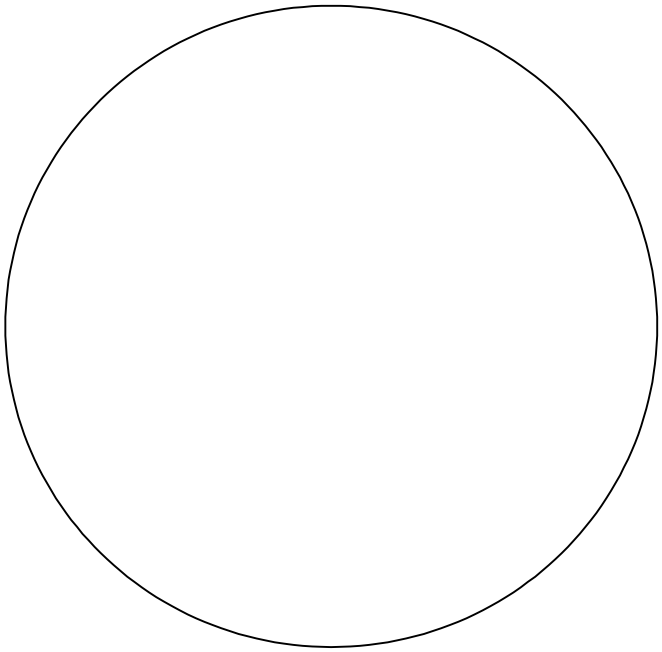
7.Atheroma



Microscopy:

Subintimal lesion.
Intimal thickening will be present.
Atheroma is characterized by smooth muscle cells, foamy histiocytes, cholesterol clefts in the center & covered by fibrous cap.

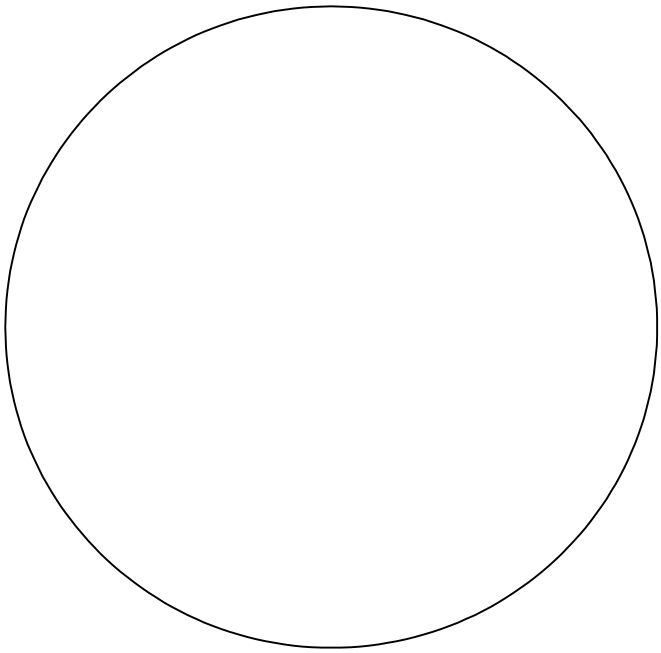
8.Thrombus



Microscopy:

Blood vessel Lumen occluded by eosinophilic fibrin material admixed with scattered RBC. In late stages,organization of thrombus characterized by fibroblast & capillary proliferation.

9. Actinomycosis

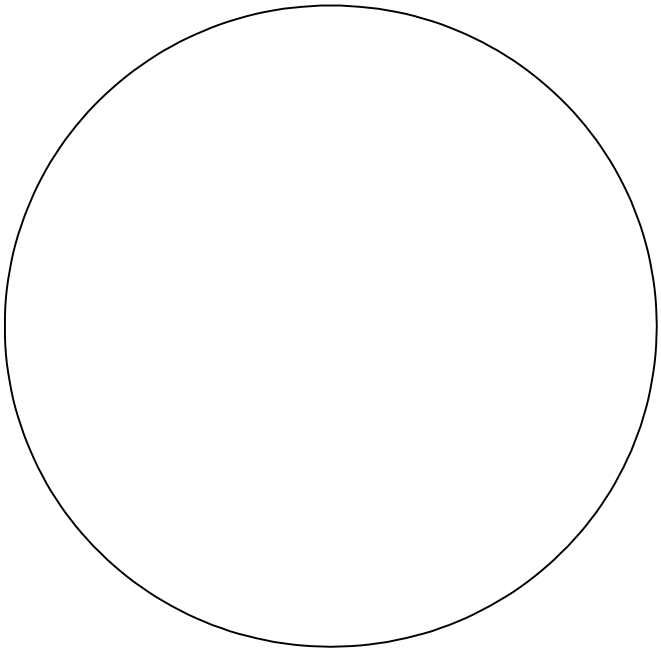


Microscopy:

Bacterial colonies characterized by amorphous,granular basophilic filaments surrounded by eosinophilic material (Splendore-Hoeppli phenomenon).

Bacterial colony is surrounded by inflammatory cells predominated by neutrophils.

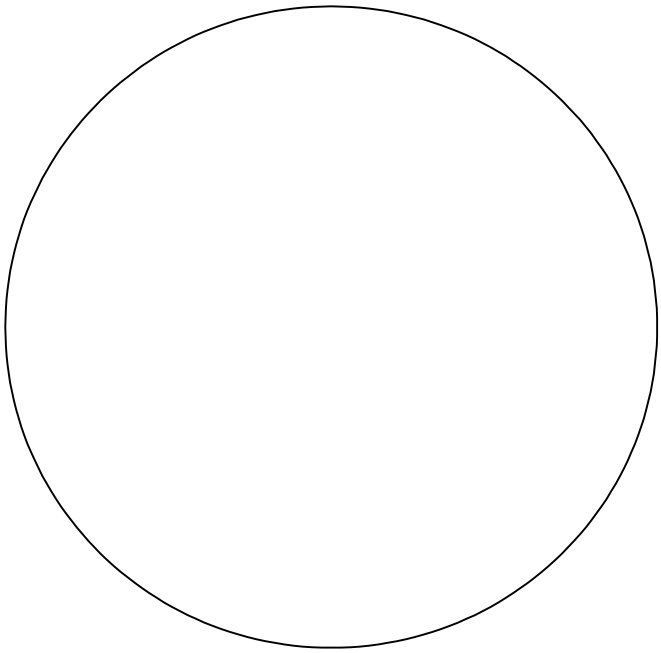
10. Rhinosporodiosis



Microscopy:

The surface of the polyp is lined by respiratory epithelium & stroma contains large sporangia with thick chitinous wall and contain numerous spores.

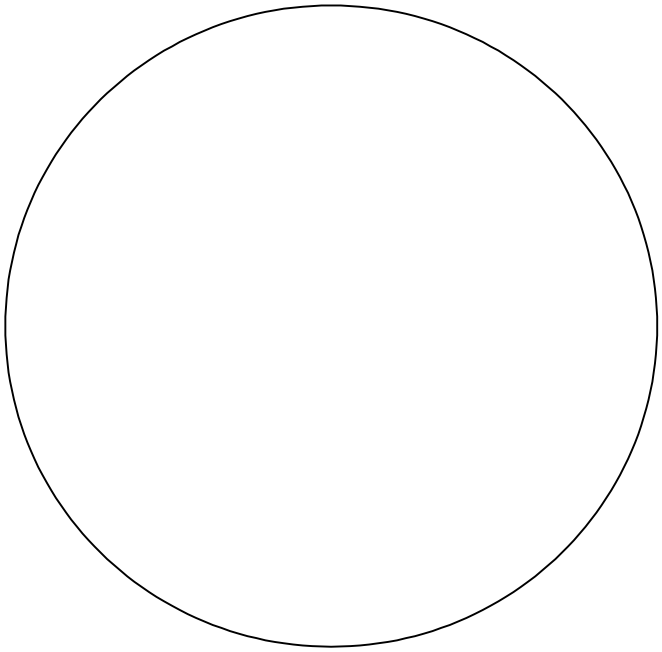
11. Capillary hemangioma



Microscopy:

Lobular architecture formed by small vascular channels lined by flattened endothelial cells . Lobules are separated by scant connective tissue stroma.

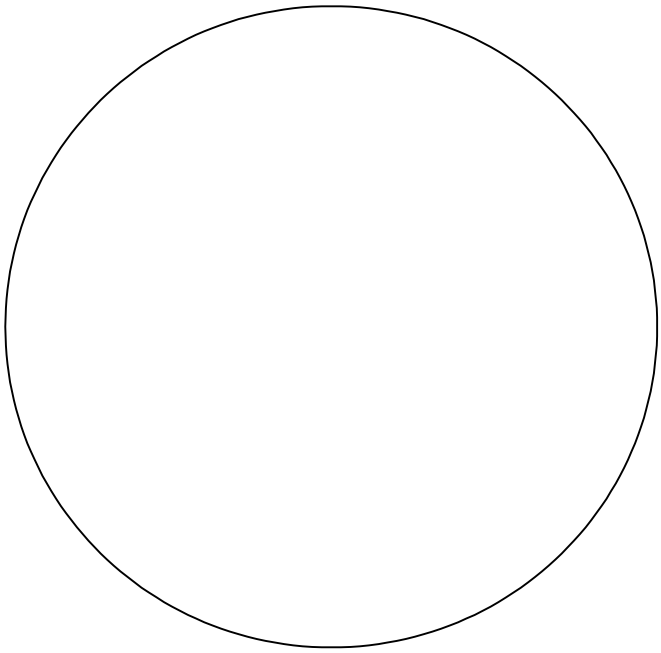
12.Cavernous Hemangioma



Microscopy:

Large thin walled cavernous type of blood vessels lined by single layer of flattened endothelium.

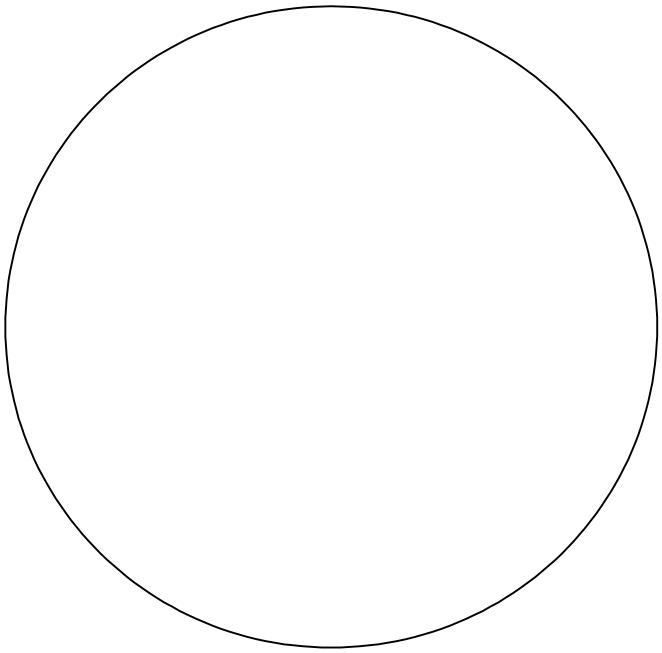
13. Pneumonia



Microscopy:

Stage of congestion- Congested septa, septal edema, proteinaceous fluid in alveoli.
Stage of red hepatization- Dilated vascular spaces filled with edematous fluid ,RBC& few neutrophils.
Stage of grey hepatization- Central alveoli show alveolar spaces filled with neutrophils, macrophages & fibrinous material communicating through pores of Kohn, retraction of fluid.

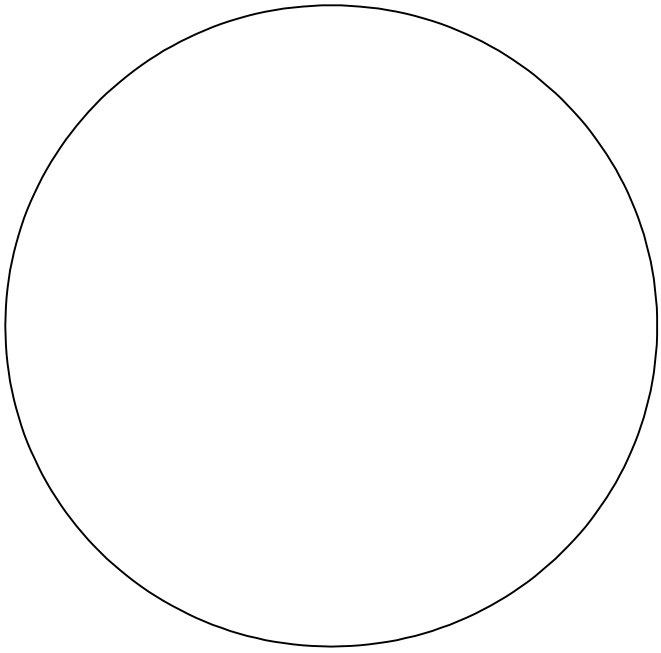
14. Tuberculosis - Lung



Microscopy:

Lung parenchyma with foci showing scattered granulomas.
Granuloma show central caseous necrosis, Langhans giant cells, surrounded by epithelioid histocytes lymphocytes & fibroblasts.

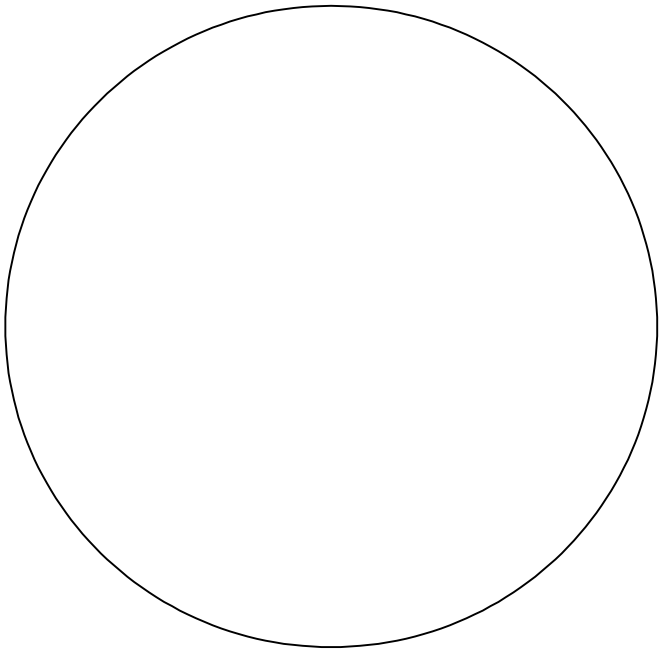
15.Lipoma



Microscopy:

Lobules of mature adipocytes which have abundant vacuolated cytoplasm & eccentrically placed nuclei separated by fibrous septa.

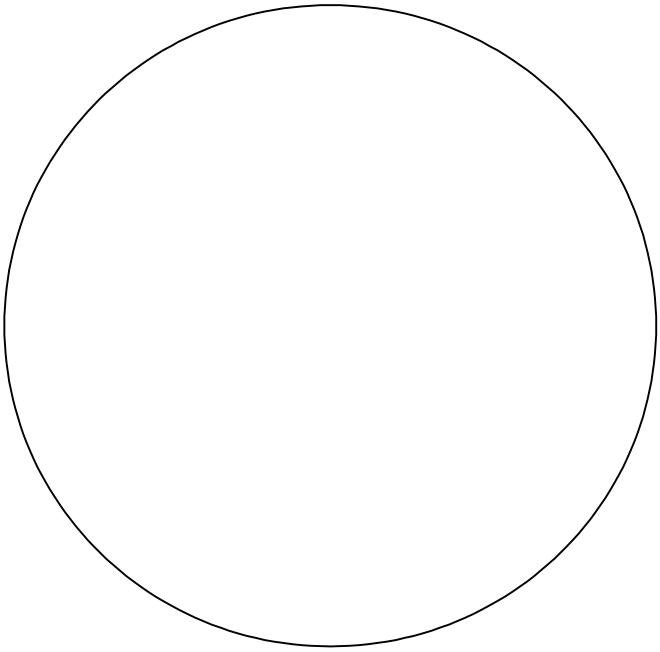
16.Schwannoma



Microscopy:

The tumor is composed of hypocellular and hypercellular areas with elongated spindle shaped cells with bland wavy nucleus forming Verrocay bodies.

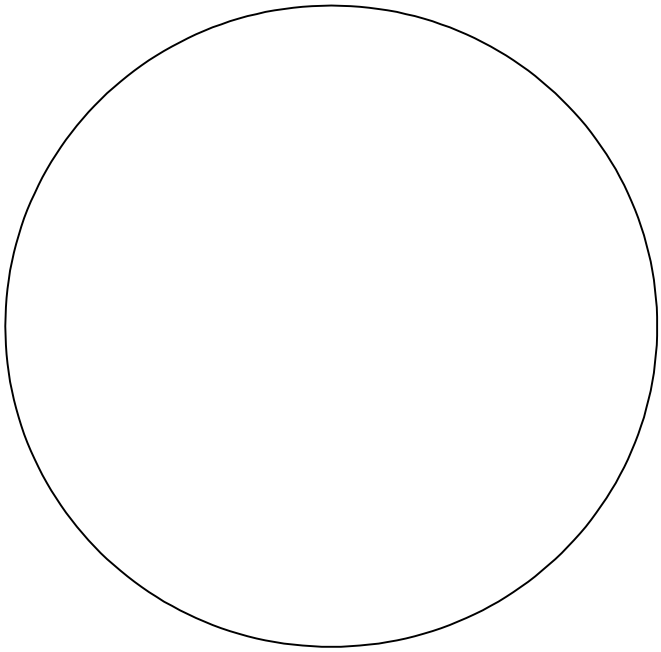
17. **Gastric ulcer**



Microscopy:

Ulcerated gastric mucosa ..
Lamina propria shows edema, inflammatory infiltrate and pyloric glands lined by columnar cells

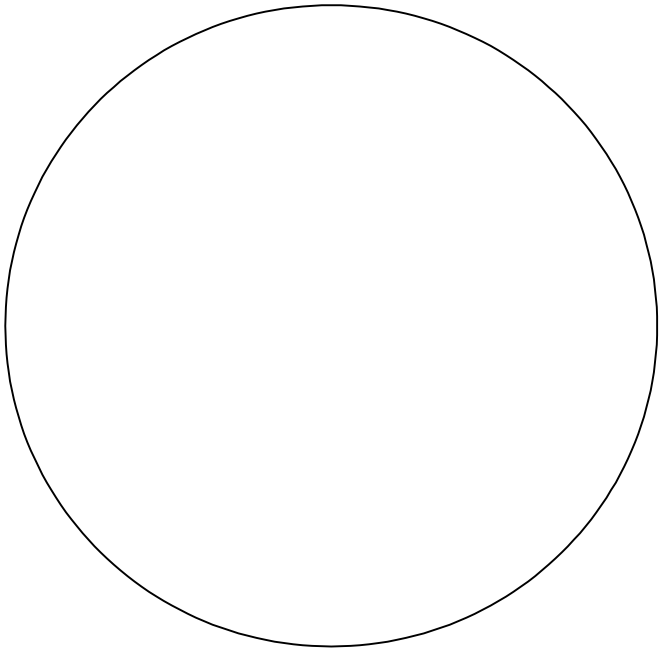
18.Adenocarcinoma stomach



Microscopy:

Ulcerated gastric mucosa with malignant transformation.
Closely packed malignant glands lined by columnar cells with hyperchromatic nuclei.

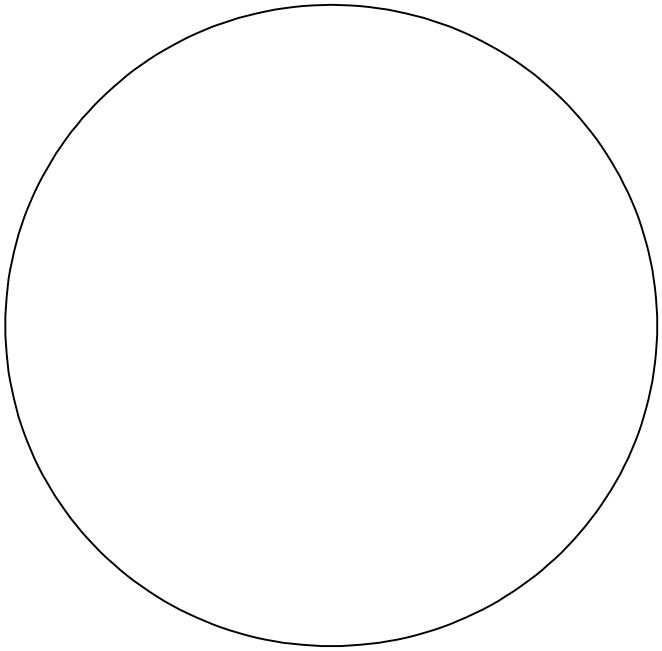
19.Adenocarcinoma colon



Microscopy:

Ulcerated colonic mucosa with malignant transformation.
Closely packed malignant glands lined by columnar cells with hyperchromatic nuclei.

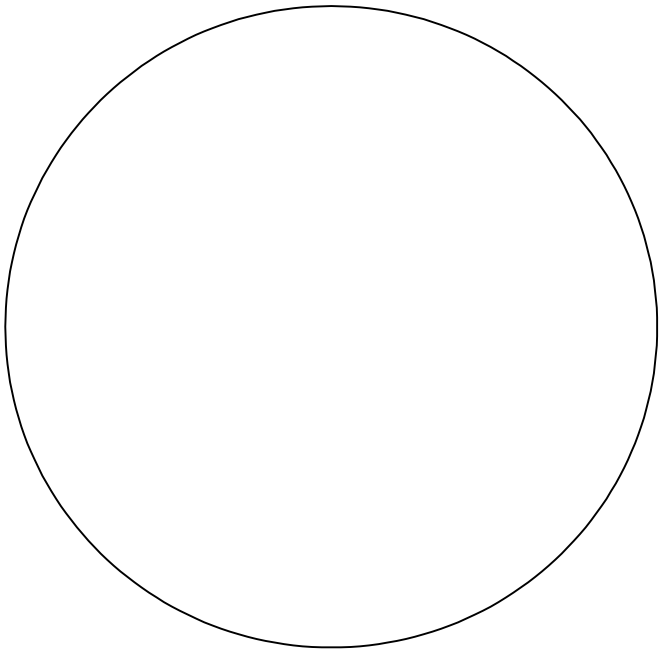
20. Caseating granulomatous lymphadenitis



Microscopy:

Preserved lymphnode architecture with collection of epithelioid granulomata composed of central caseous necrosis surrounded by epithelioid cells, Langhans type of giant cells & a peripheral rim of lymphocytes & fibroblasts.

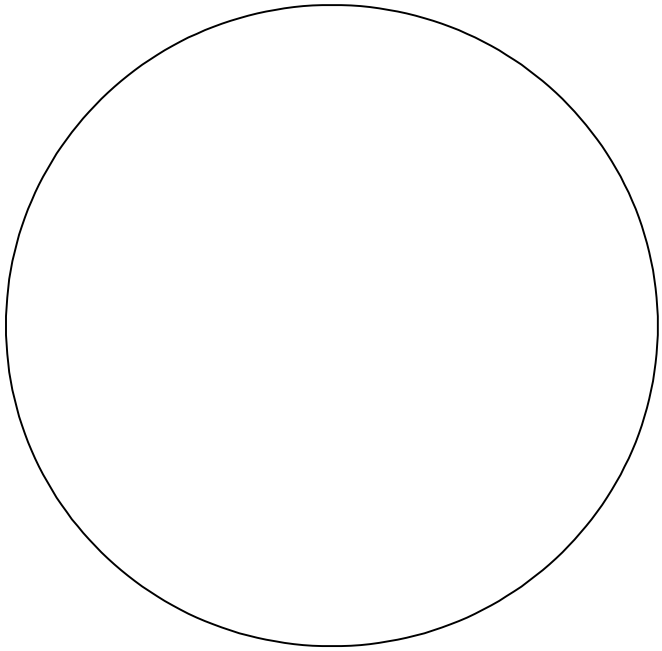
21. Secondary carcinomatous deposits



Microscopy:

Partial or complete effacement of architecture.
The malignant cells can be seen singly scattered or in clusters with moderate eosinophilic cytoplasm hyperchromatic nuclei and high nuclear cytoplasmic ratio.

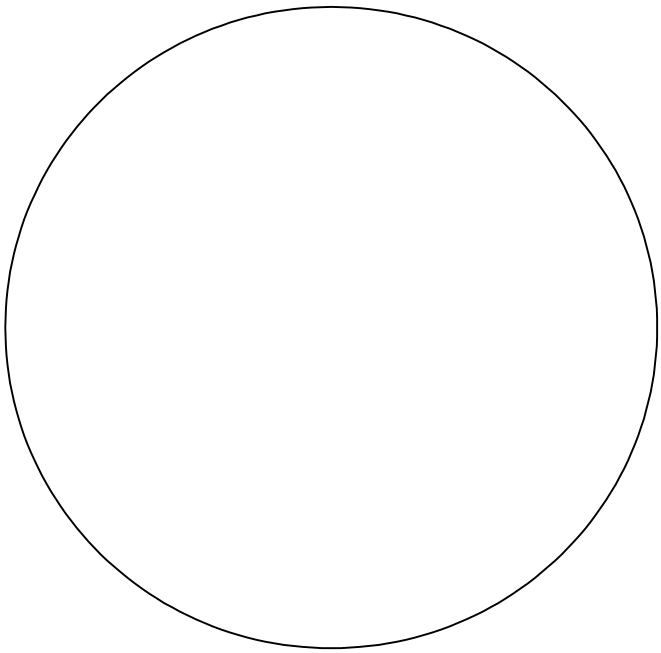
22. Cirrhosis



Microscopy:

Altered liver architecture with loss of normal relationship between central vein & portal tract.
Hepatocytes form nodules separated with thick fibrous septa.
Periportal areas show fibrosis and focal lymphocytic infiltration.

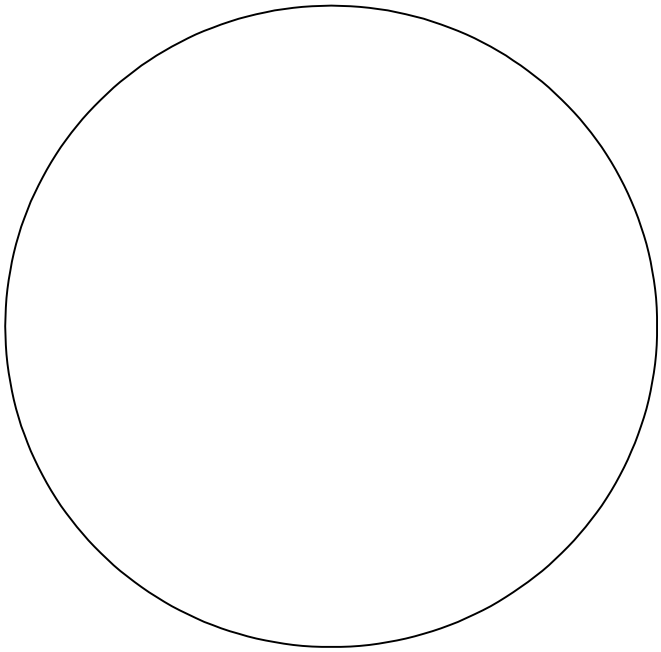
23. Chronic pyelonephritis



Microscopy:

Chronic tubulointerstitial inflammation, tubular atrophy & fibrosis.
Tubules show atrophy & dilatation & filled with eosinophilic material referred to as thyroidization of tubules.
Glomeruli-periglomerular fibrosis &hyalinization

24. Renal cell carcinoma



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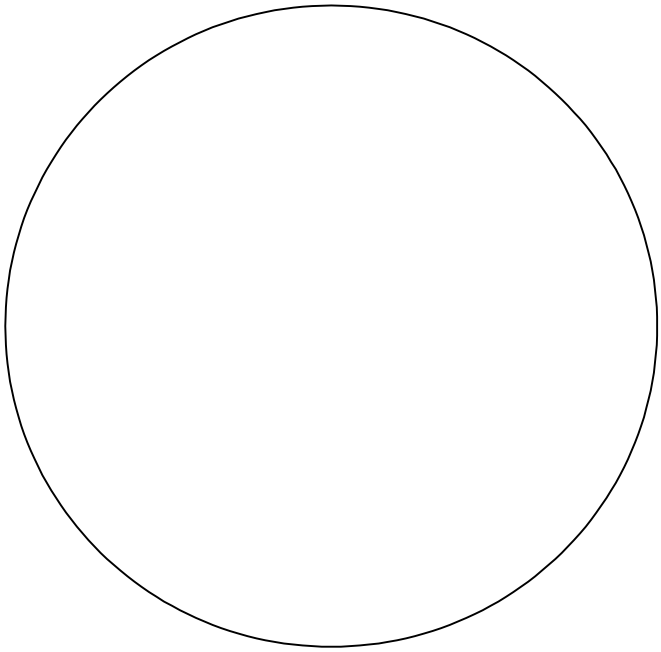
Microscopy:

Renal parenchyma with a malignant neoplasm composed of nests of tumor cells separated by richly vascular, scanty fibrous stroma.
Two types of cells - clear cells & eosinophilic cells.

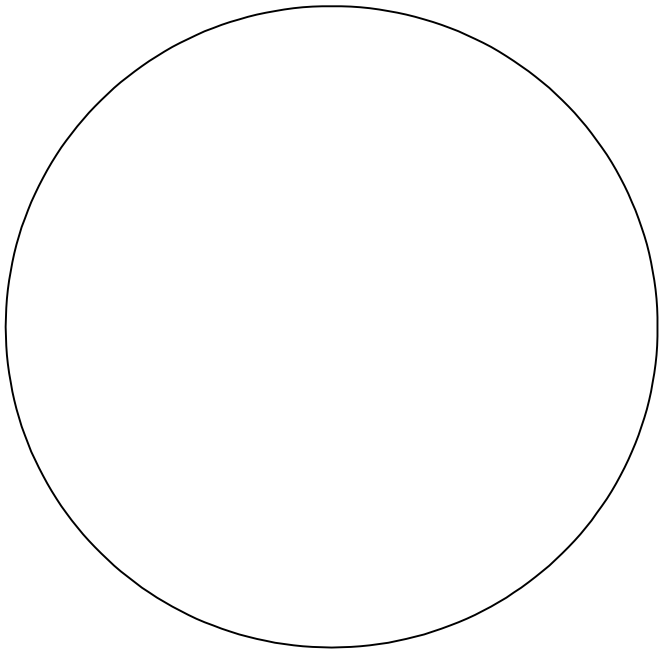
25. Wilms Tumour



Microscopy:

Triphasic combination of blastemal, stromal & epithelial cell types.
Blastemal component characterized by sheets of blue cells with scant cytoplasm & overlapping nuclei with dispersed chromatin.
Epithelial differentiation is usually in the form of abortive tubules or glomeruli. Stromal cells are fibroblastic & myxoid in nature.

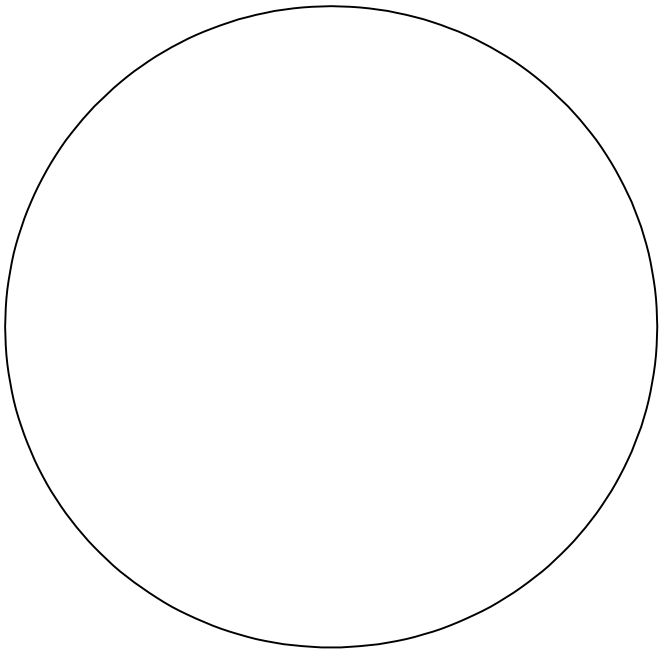
26. Products of Conception



Microscopy:

Presence of chorionic villi composed of delicate mesh of central stroma surrounded by 2 discrete layers of epithelium- the outer syncytiotrophoblast & inner cytotrophoblast. Endometrium shows decidualization (decidual cells have well defined cell borders, eosinophilic cytoplasm & central nucleus).

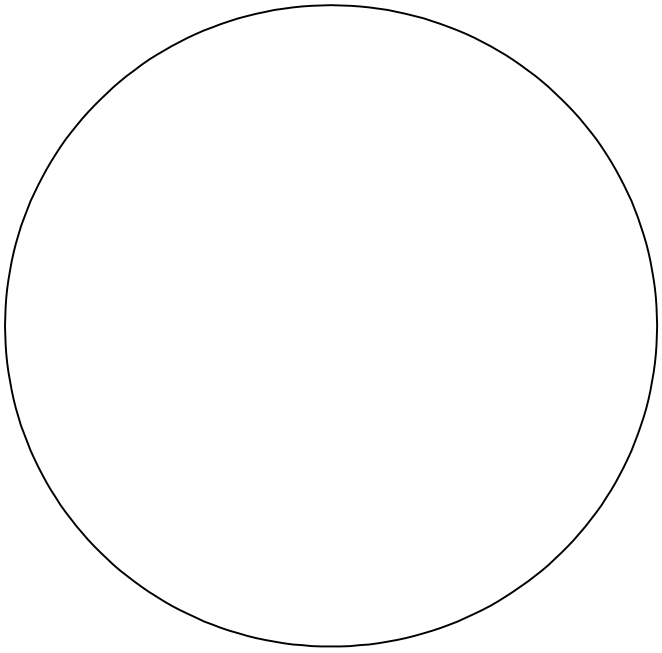
27. Leiomyoma



Microscopy:

Interlacing bundles & whorls of spindle shaped cells with elongated cigar shaped nuclei. No nuclear atypia.

28.Teratoma

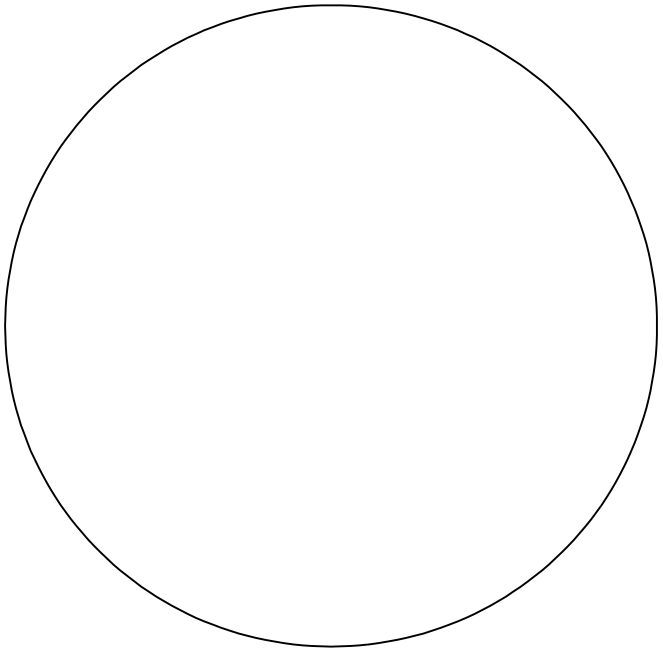


Microscopy:

Cyst lined by squamous epithelium with adnexal elements (ectodermal derivative). Foci of respiratory mucosa with cartilage/foci of gastric or intestinal epithelium (endodermal derivative).

Foci of fat & fibrous tissue (mesodermal derivative).

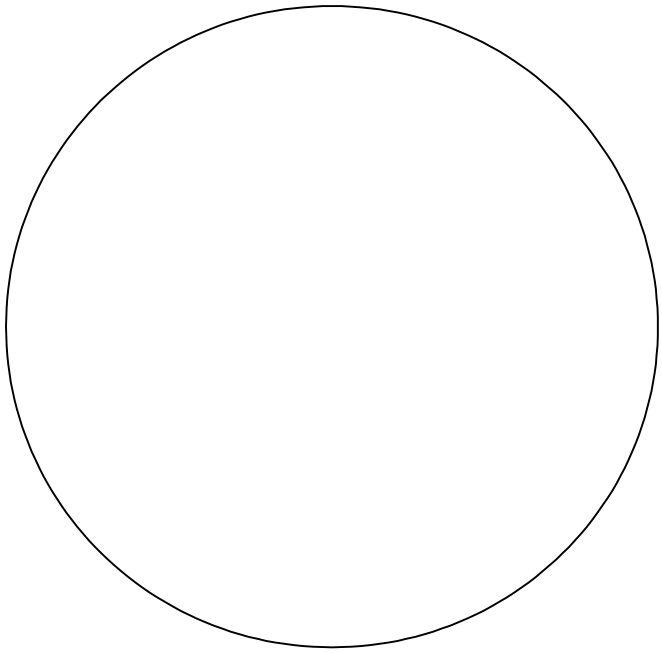
29.Fibroadenoma



Microscopy:

Proliferation of epithelial & stromal elements.
Ducts lined by epithelial & myoepithelial cells.
Stroma showing hyalinization and myxoid change.

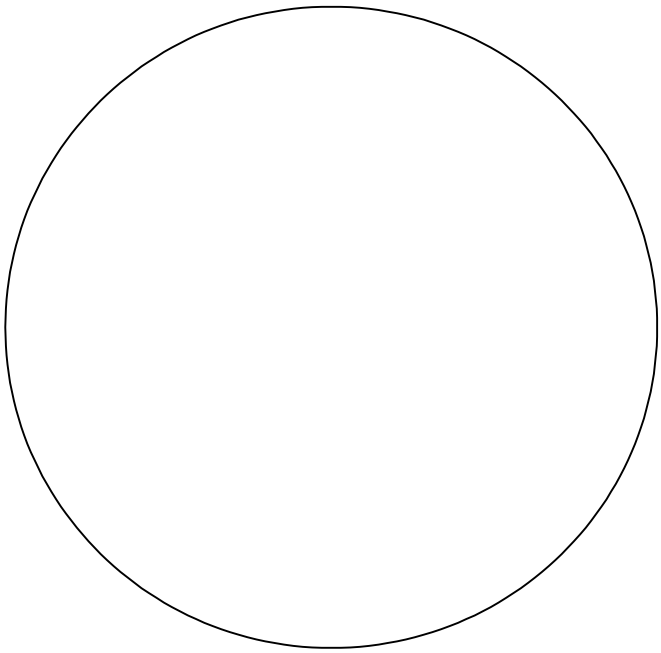
30.Carcinoma Breast



Microscopy:

Malignant neoplasm composed of tumor cells arranged in in tubules , cords & sheets infiltrating into the stroma.
Round to oval malignant epithelial cells with hyperchromatic pleomorphic nuclei.
No myoepithelial cells

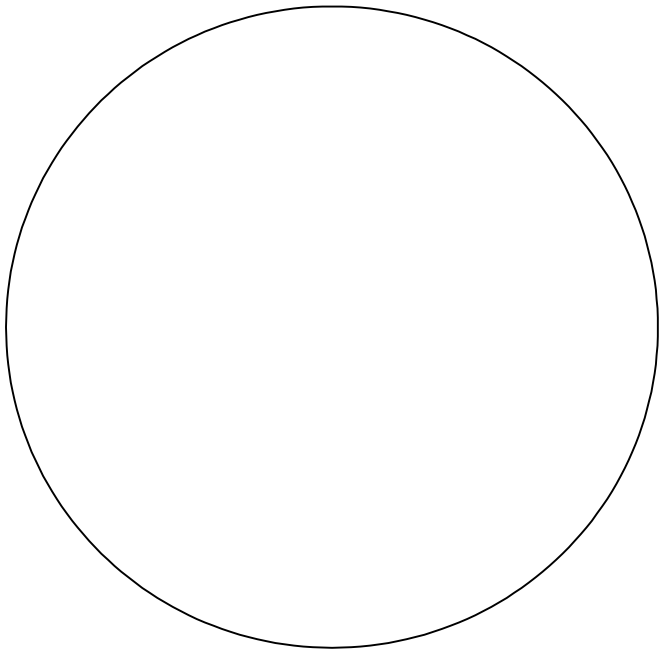
31.Colloid Goitre



Microscopy:

Enlarged thyroid follicles of varying sizes lined by flattened to cuboidal epithelial cells and filled with colloid.
Interstitium shows fibrosis & hemorrhage.

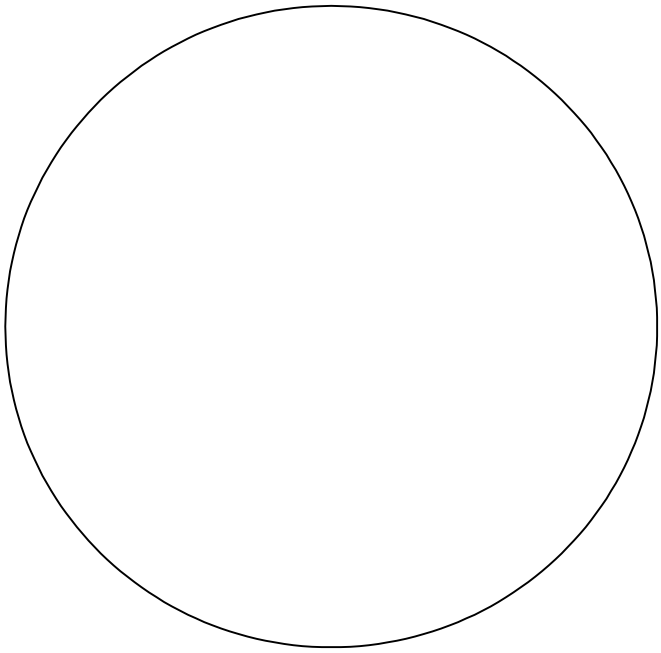
32.Hashimotos thyroiditis



Microscopy:

Thyroid follicles are atrophic lined by oncocytic cells having abundant granular eosinophilic cytoplasm.
Interstitium shows diffuse infiltration of lymphocytes and plasma cells, lymphoid follicles with germinal Centre formation.

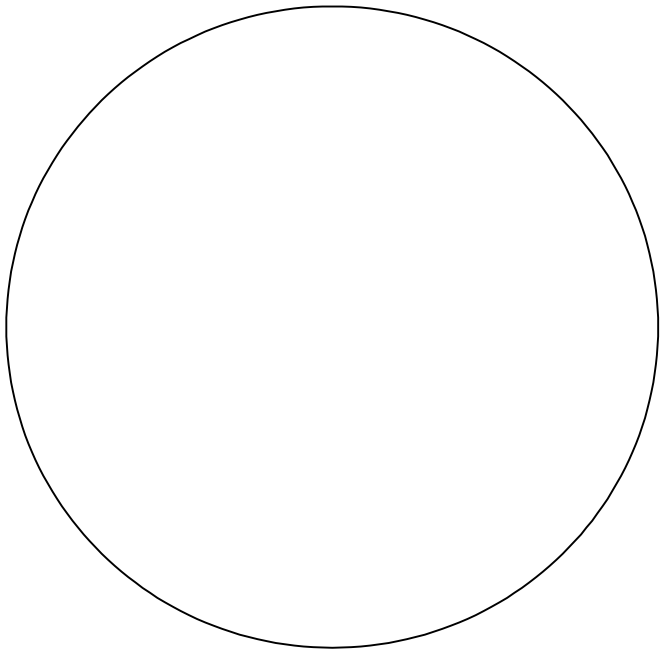
33. Papillary carcinoma Thyroid



Microscopy:

Shows a neoplasm arranged in papillary configuration & lined by columnar cells with nuclei exhibiting nuclear crowding, overlapping, clearing, grooving and inclusions referred to as Orphan Annie eye nuclei.
Psammoma bodies- lamellated, concentric calcified structures.

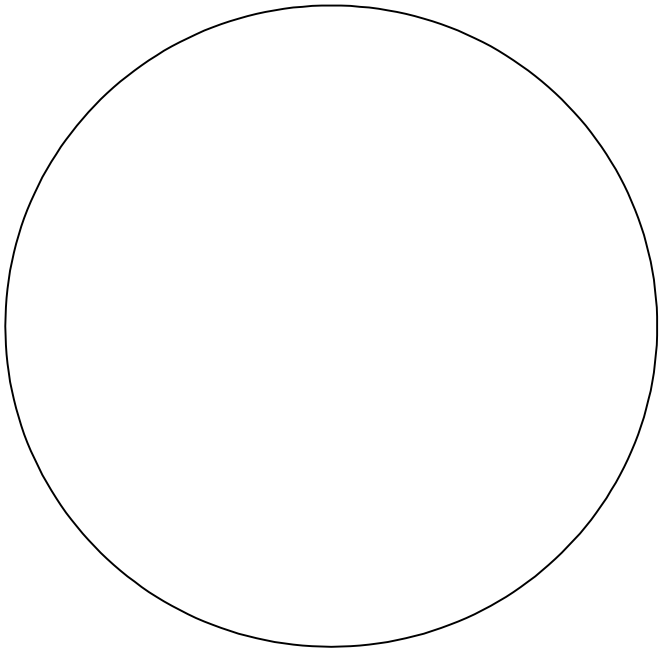
34.Hodgkin Lymphoma



Microscopy:

Effacement of architecture & is diffusely infiltrated by lymphocytes,eosinophils,plasma cells,histiocytes & Reed Sternberg cells of mononuclear, binuclear & multinuclear type. Classical RS cell-large, contains bilobed nuclei presenting a mirror image appearance. Nuclei show prominent eosinophilic nucleoli, perinuclear halo & thick nuclear membrane resembling an owl eye.

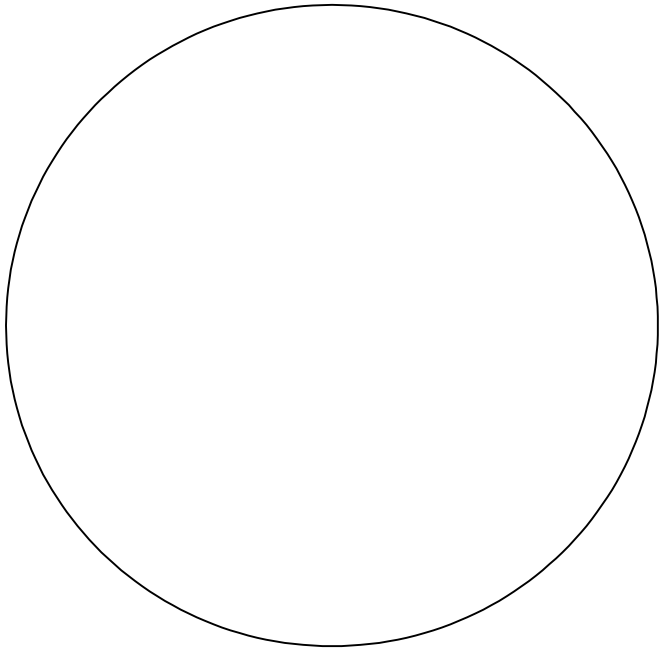
35.Osteoclastoma



Microscopy:

Sheets of osteoclast type multinucleated giant cells in a background of mononuclear tumor stromal cells.
Both multinucleate giant cell & stromal mononuclear cells have round to oval nuclei with smooth chromatin & small nucleoli

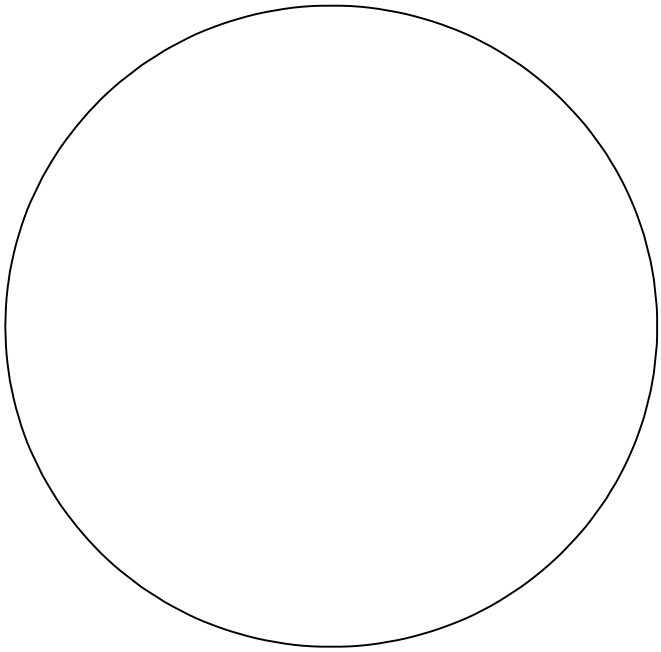
36.Osteochondroma



Microscopy:

Cartilage cap composed of mature hyaline cartilage with overlying fibrous perichondrium. Marrow elements within bony stalk contiguous with native bone.

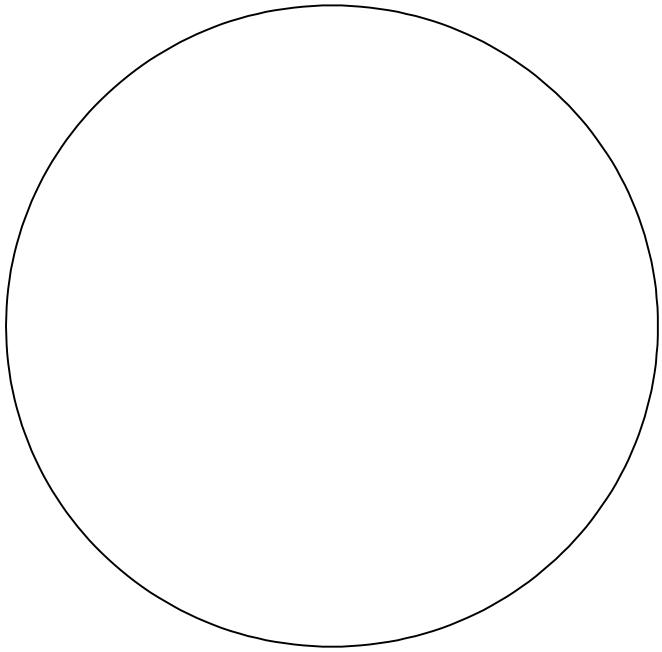
37.Osteosarcoma



Microscopy:

Malignant osteoblasts are pleomorphic,spindle shaped cells.
Lace-like osteoid rimmed by malignant osteoblasts.

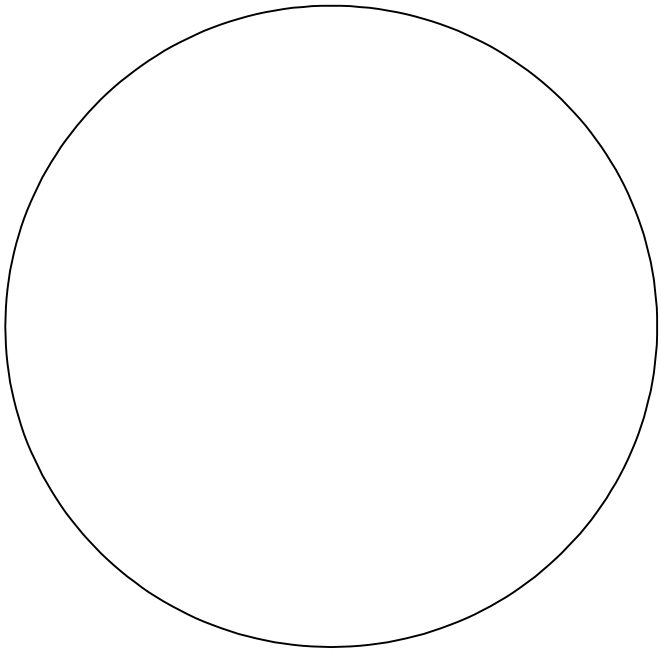
38.Squamous cell carcinoma



Microscopy:

Nests & islands of malignant squamous epithelial cells which are polyhedral with abundant eosinophilic cytoplasm,vesicular nuclei & prominent nucleoli. Keratin pearls –whorls of keratin surrounded by malignant squamous epithelial cells.

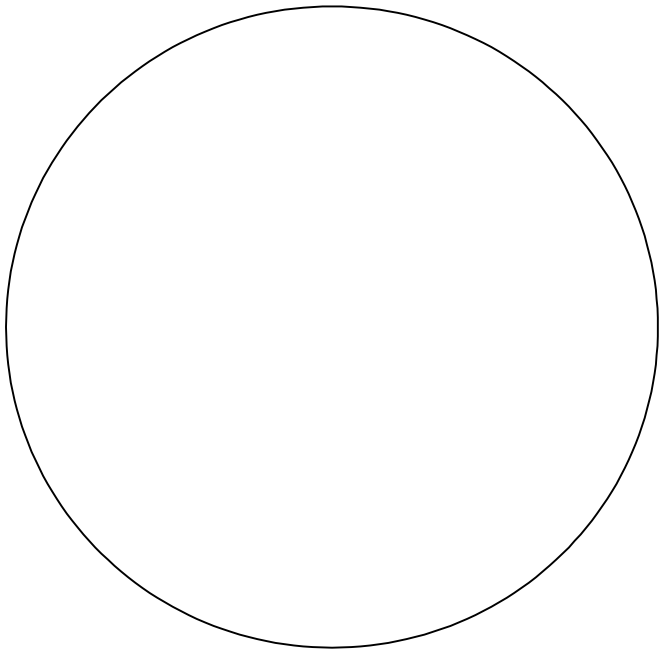
39.Basal cell Carcinoma



Microscopy:

Nests & islands of basaloid cells surrounded by fibro myxoid stroma, separated by cleft like spaces (retraction artefact).
Nests show peripheral palisading of basaloid cells..
Nuclear atypia and mitosis seen.

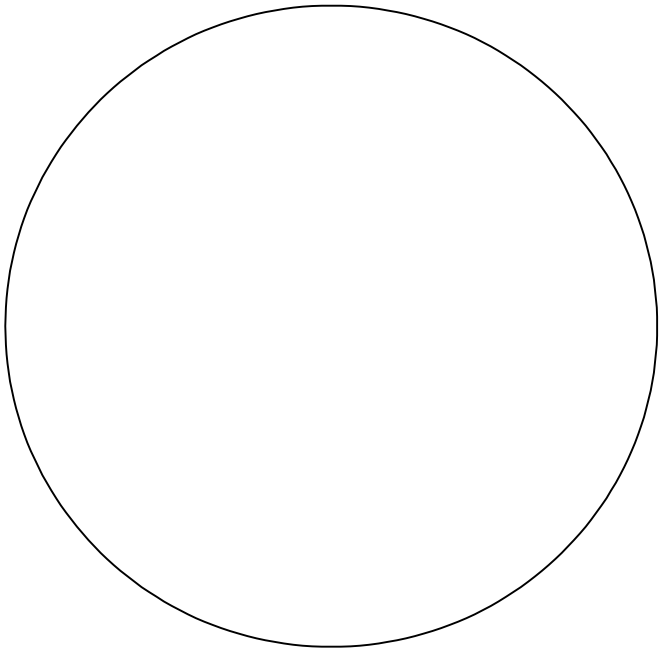
40.Melanoma



Microscopy:

Malignant cells are round to oval shaped with vesicular nuclei & prominent eosinophilic nucleoli. Intracytoplasmic & extracellular melanin pigment will be seen.

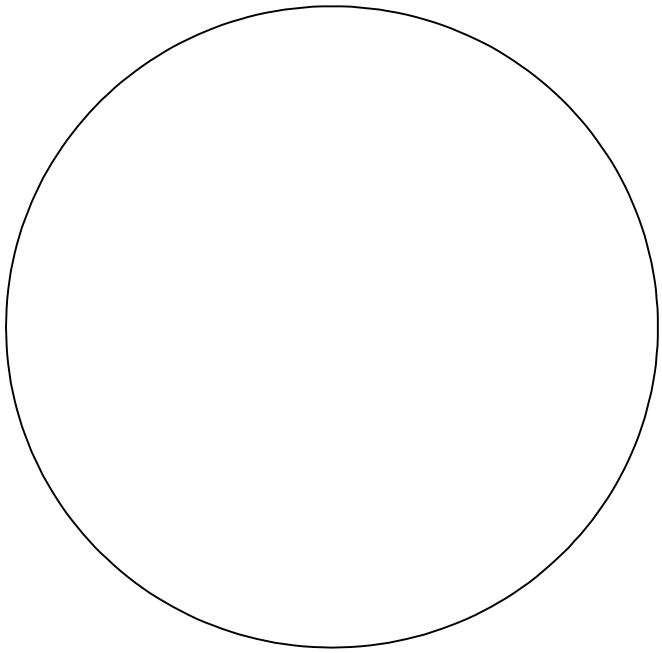
41.Proliferative phase



Microscopy:

Round to tubular endometrial glands with regular spacing between the glands.
The glands are lined by pseudostratified columnar cells.
Stroma appears compact.

42.Secretory phase



Microscopy:

Convoluted, irregularly shaped glands which are lined by single layer of columnar or cuboidal cells with subnuclear or supranuclear vacuoles.
Stroma appears edematous.

GROSS SPECIMENS

Note

1. This section includes academic mile stones attained through microscopic observation of Gross specimens..
2. The learner shall make observation entries as mandated in the record book.
3. The record note books shall be verified by the faculty facilitator at the end of Each session or module.
4. The completion of each such activity shall be recorded in this section by the learner and signed by the facilitator.
5. The end of each session shall be appended by an end of training formative assessment in the topic / session / module. eg: OSPE, DOPS etc. Such sessional outcomes and feed for such outcomes may be suitably entered in the concerned documents.

S.No	Page no.	Gross specimens	Date of Demonstration	Initials of Facilitator
1		Lipoma		
2		Acute appendicitis		
3		Fatty liver		
4		Bronchiectasis		
5		TB Lung		
6		Carcinoma colon/Rectum		
7		Carcinoma stomach		
8		Infarct Spleen		
9		Cirrhosis liver		
10		Gall bladder stones		
11		Multinodular Colloid goitre		
12		Hashimotos thyroiditis		
13		Fibroadenoma breast		
14		Carcinoma breast		
15		Teratoma ovary		
16		Leiomyoma uterus		
17		Carcinoma Endometrium		
18		Chronic pyelonephritis		
19		Ovarian tumor serous/mucinous		
20		Seminoma testis		
21		Renal cell carcinoma		
22		Osteo sarcoma		
23		Osteoclastoma		
24		Malignant melanoma		
25		Squamous cell carcinoma		

IV A2. ATTITUDE ETHICS AND COMMUNICATION

The "Indian Medical Graduate" (IMG) shall possess requisite knowledge, skills, attitudes, values and responsiveness, so that he or she may function appropriately and effectively *as a doctor of first contact of the community* while being globally relevant. In order to fulfill this goal, the IMG must be able to function in the following ROLES appropriately and effectively:

1. Clinician who understands and provides preventive, promotive, curative, palliative and holistic care with compassion.
2. Leader and member of the health care team and system with capabilities to collect, analyze, synthesize and communicate health data appropriately.
3. Communicator with patients, families, colleagues and community.
4. Lifelong learner committed to continuous improvement of skills and knowledge.
5. Professional, who is committed to excellence, is ethical, responsive and accountable to patients, community and profession.

Note:

1. This section includes academic mile stones attained through AETCOM learning. The learner shall be assigned a specific learning objective for each session.
2. The learner shall be given an assignment based on the AETCOM topics of thecurriculum.
3. They shall record a detailed synopsis of the skill learnt in this section. The student shall also record a reflection of the learning and learning process.
4. The completion of such activity shall be recorded in this section by the learner and signed by the facilitator.

Date	No.	Topic

Date	AETCOM Competency

Reflection / Narrative of the session

Feedback by the facilitator

Date	AETCOM Competency

Reflection / Narrative of the session

Feedback by the facilitator

Date	AETCOM Competency

Reflection / Narrative of the session

Feedback by the facilitator

Date	AETCOM Competency

Reflection / Narrative of the session

Feedback by the facilitator

Date	AETCOM Competency

Reflection / Narrative of the session

Feedback by the facilitator

IV A3. SIMULATION-BASED VIRTUAL LAB ACTIVITY

Date	Topic

Date	SVL Activity-smear preparation and staining

Reflection / Narrative of the session

Signature of Facilitator

Date	SVL Activity-CSF analysis
Reflection / Narrative of the session	
Signature of Facilitator	

Date	SVL Activity-viral hepatitis/obstructive jaundice
Reflection / Narrative of the session	
Signature of Facilitator	

IV A4. RESEARCH

- Students can be oriented about research and its importance in medical field. They can be allowed to choose simple studies and may prepare a concept paper.

Date	Topic	Initials of Facilitator

IV B. JOURNAL

Journal	Date of completion
Record Book / Portfolio	

ATTENDANCE

Month	Theory percentage (100%=10 marks)	Practical Percentage (100%=10 marks)

Details	Percentage of attendance / Marks
Foundation Course (minimum 75 %) (Common for all 3 departments)	
Theory (out of 10 marks)	
Practical (out of 10 marks)	
AETCOM	
Case based learning	

INTEGRATED SESSION

1. This section includes academic mile stones attained through horizontal and vertical integrated sessions.
2. The learner shall attend all such integrated sessions, observe, interact and understand the topic.
3. The learner shall submit the end of session assessment (e.g. MCQ session of 15-20 MCQ questions)
4. The completion of such activity shall be recorded in this section by the learner and signed by the facilitator.

No.	Topic	Date of session
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		

CASE BASED LEARNING SESSION

- The objectives of clinical based learning a r e to enable the learner to

1. Recognize the relevance of basic sciences in diagnosis, patient care and treatment.
2. Provide a context that will enhance basic science learning.
3. Relate to experience of patients as a motivation to learn.
4. Recognize attitude, ethics and professionalism as integral to the doctor- patient relationship.
5. Understand the socio-cultural context of diseases through the study of humanities.

The three elements of CBL are

1.Provision of clinical correlation to pathological mechanisms

2.Integration of morphology and clinical features

3.Bridging the gap between laboratory and clinical practice

- **Salient Principles:**

  The key principles underlying clinical based learning are to provide a clinical context and ensure patient centricity. The clinical context can include case scenarios, videos, actual patient or simulated patient etc. The presence of actual patients in every session of CBL, though not essential, is preferred. Therefore, CBL is exposure to the relevant clinical context in earlier years. It must be noted that purpose of CBL is not to prepone the conventional clinical teaching but to provide better understanding of basic sciences through a clinical context.

  Note:

1. This section includes academic mile stones attained through early clinical exposure. The learner shall be assigned a specific learning objective for each session.
2. The learner shall be assigned to such CBL sessions in groups as deemed necessary by the individual institutions. The learner shall observe, interact, understand and perceive the activity. They shall record a detailed synopsis of the learning in this section. The student shall also record a detailed reflection of their experience of what was observed.
3. The completion of such activity shall be recorded in this section by the learner and signed by the facilitator.

CBL Session 1:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 2:

Date	Initials of Facilitator
Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 3:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 4:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 5:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 6:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 7:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 8:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 9:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 10:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 11:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 12:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 13:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 14:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 15:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 16:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 17:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 18:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 19:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

CBL Session 20:

Date	Initials of Facilitator

Objectives	

Synopsis of Learning

Clinical history

Laboratory findings

Gross findings

Microscopic findings

Reflections

PHOTO STORY

1. Students may document the important moments of this journey e.g. prizes won, competitions attended, department activities etc.,
2. These are based on the preferences of individual institutes.
3. The projects are voluntary activity and not included for internal assessment

CO-CURRICULAR ACHIEVEMENTS

1. This section shall include the important co-curricular activities in which the student is involved during the academic year which shall be documented for the student and the department e.g. prizes won, competitions attended, etc.
2. These are based on the preferences of individual institutes.
3. The projects are voluntary activity and not included for internal assessment.

"Complete reporting of pathological information is a shared responsibility of the Physician / Surgeon & Pathologist"

COURTESY:

THE TAMIL NADU DR.MGR MEDICAL UNIVERSITY, CHENNAI 600 032.