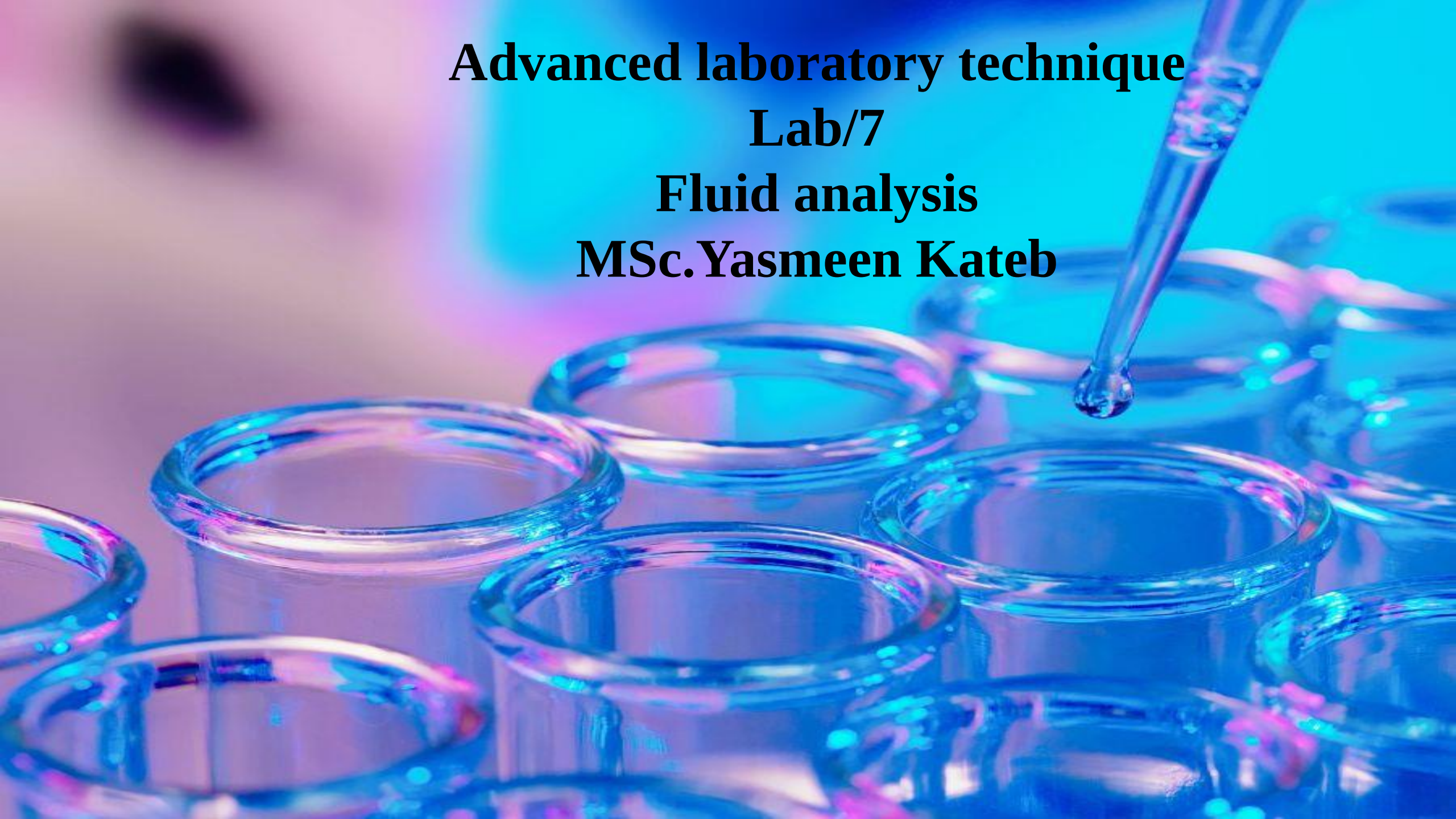


Advanced laboratory technique

Lab/7

Fluid analysis

MSc.Yasmeen Kateb

Introduction

- **What is Fluid Analysis?**
- Fluid analysis is the laboratory examination of body fluids to diagnose diseases, monitor treatment progress, and detect abnormalities.
- It is essential in evaluating conditions related to the **kidneys**, **nervous system**, **joints**, and **reproductive system**.

Types of Body Fluids Analyzed

- **Commonly Analyzed Fluids:**
- **Urine**: To evaluate kidney function, infections.
- **Cerebrospinal Fluid (CSF)**: To assess conditions affecting the central nervous system (CNS).
- **Synovial Fluid**: To diagnose joint diseases like arthritis, gout.
- **Seminal Fluid**: To evaluate male fertility, sperm count, and semen quality.

Urine Analysis

- **What is Urine Analysis?**
- Urine analysis is a routine laboratory test to evaluate kidney function and detect conditions like infections, diabetes, and metabolic disorders.
- **Collection Method**: Collected in a sterile container, usually the first-morning urine sample is recommended for accuracy.

Components Tested in Urine

1-Physical Appearance

•Color and Transparency: Dark or cloudy urine can indicate blood, infection.

2-Chemical Composition

•pH Level: Can indicate kidney problems or metabolic imbalances.

•Glucose: Elevated levels suggest diabetes.

•Protein: Presence of protein indicates kidney disease.

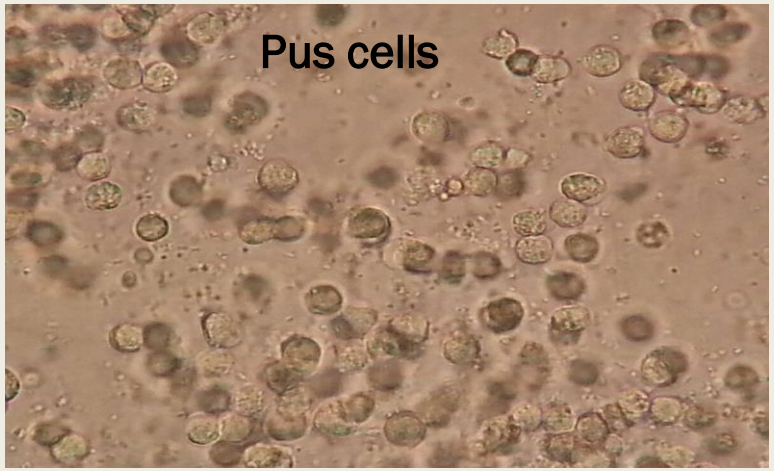
•Ketones: High levels may suggest diabetic ketoacidosis.

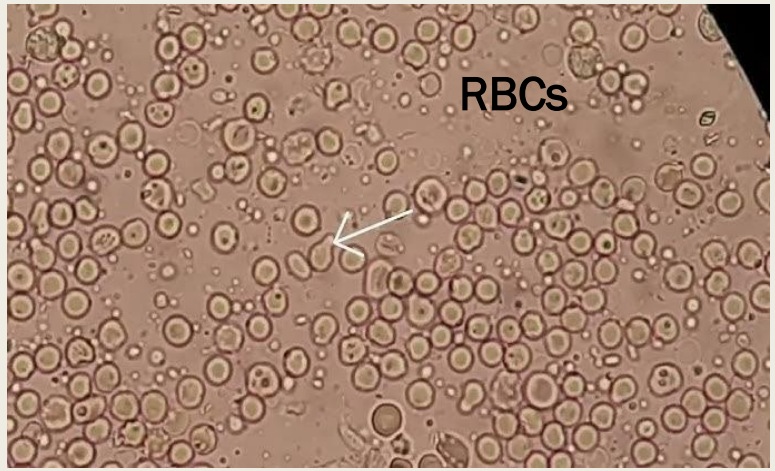
3-Microscopic Examination

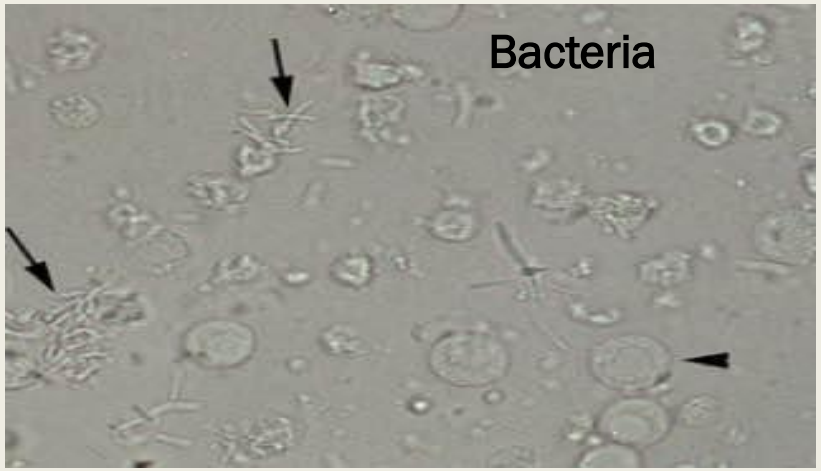
•Red Blood Cells (RBCs): Presence may indicate UTIs, kidney stones, bladder conditions.

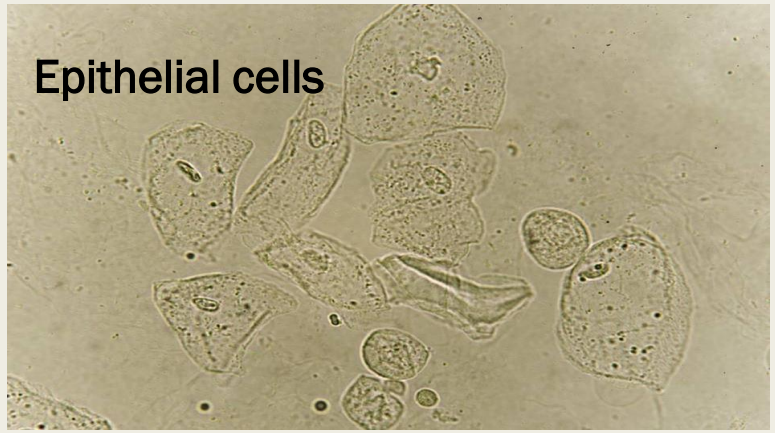
•White Blood Cells (WBCs): Can indicate infection or inflammation.

•Crystals: May indicate kidney stones or metabolic disorders.

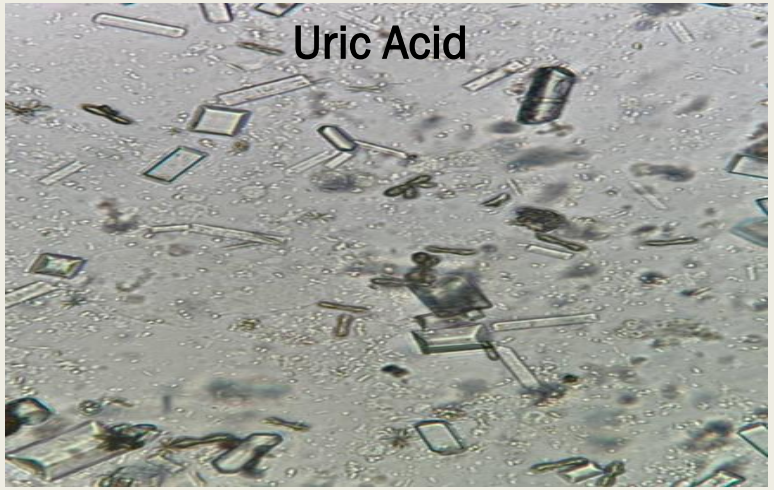

Pus cells


RBCs


Bacteria


Epithelial cells


Amorphous Urate


Uric Acid


Ca. Oxalate

CSF (Cerebrospinal Fluid) Analysis

- **What is CSF?**
- CSF is a clear fluid surrounding the brain and spinal cord. It acts as a cushion for the brain and helps with the removal of waste from the CNS.
- **Collection Method**: Collected through a **lumbar puncture** ,where a needle is inserted into the lower back usually between the third and fourth lumbar vertebrae to extract fluid.

Components Tested in CSF

- **Protein**:
  - Elevated protein levels can indicate meningitis ,CNS infections.
- **Glucose**:
  - Low glucose levels are suggestive of bacterial meningitis or cancer.
- **White Blood Cells (WBCs)**:
  - Increased WBCs suggest infections like meningitis or encephalitis.
- **Bacteria**:
  - The presence of bacteria indicates bacterial meningitis.

Synovial Fluid Analysis

- **What is Synovial Fluid?**
- Synovial fluid is the thick, lubricating fluid found in joints, providing cushioning and reducing friction during movement.
- **Collection Method**: Collected through **arthrocentesis** (joint aspiration), where a needle is inserted into the joint to withdraw the fluid.

Components Tested in Synovial Fluid

- **White Blood Cells (WBCs)**:
  - Elevated WBC count may indicate infection (e.g., septic arthritis) or inflammatory arthritis (e.g., rheumatoid arthritis).
- **Crystals**:
  - Uric acid crystals suggest gout, while calcium pyrophosphate crystals point to pseudogout.
- **Bacteria**:
  - Presence of bacteria indicates joint infection (septic arthritis).
- **Viscosity**:
  - Low viscosity can indicate rheumatoid arthritis or infection.

Seminal Fluid Analysis

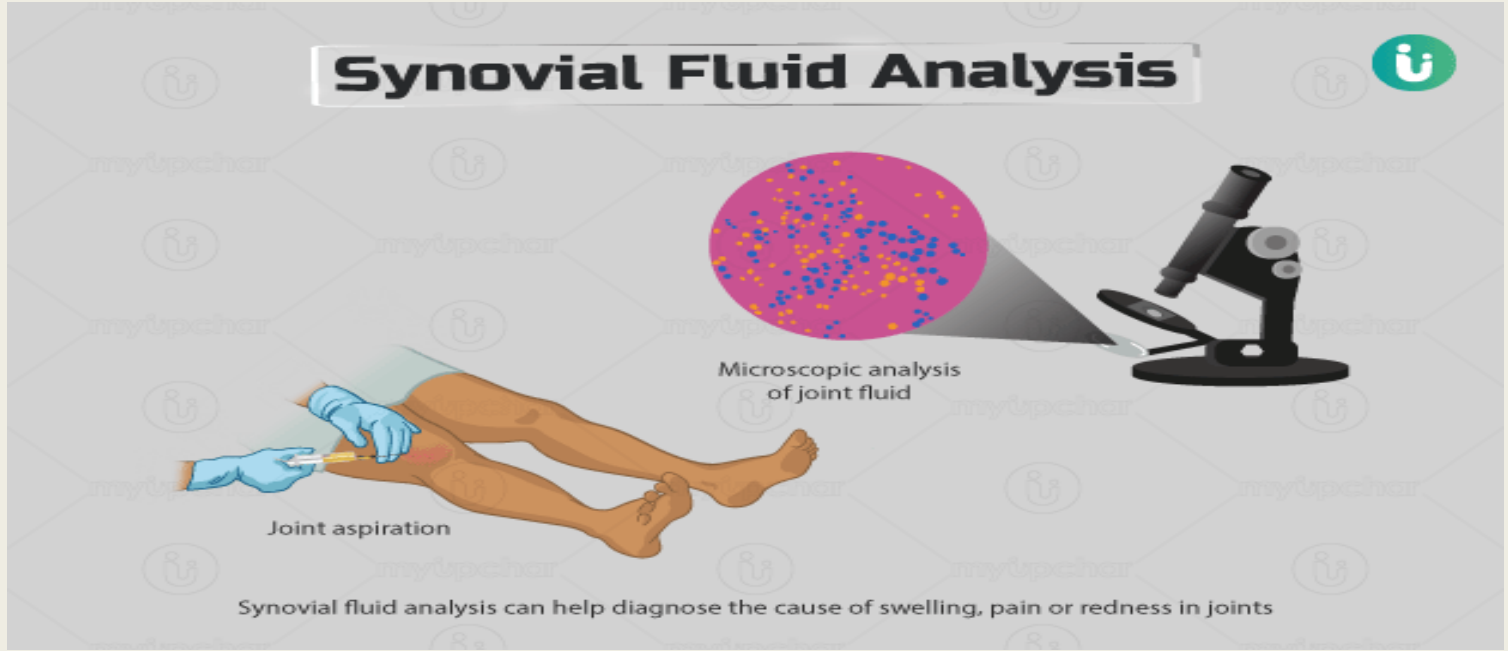
- **What is Seminal Fluid (Semen) Analysis?**
- Seminal fluid analysis is a test that examines the quality and quantity of semen and sperm, used to assess male fertility.
- **Collection Method**: Semen is collected via **masturbation** into a sterile container, ideally after **2-7 days of abstinence**.

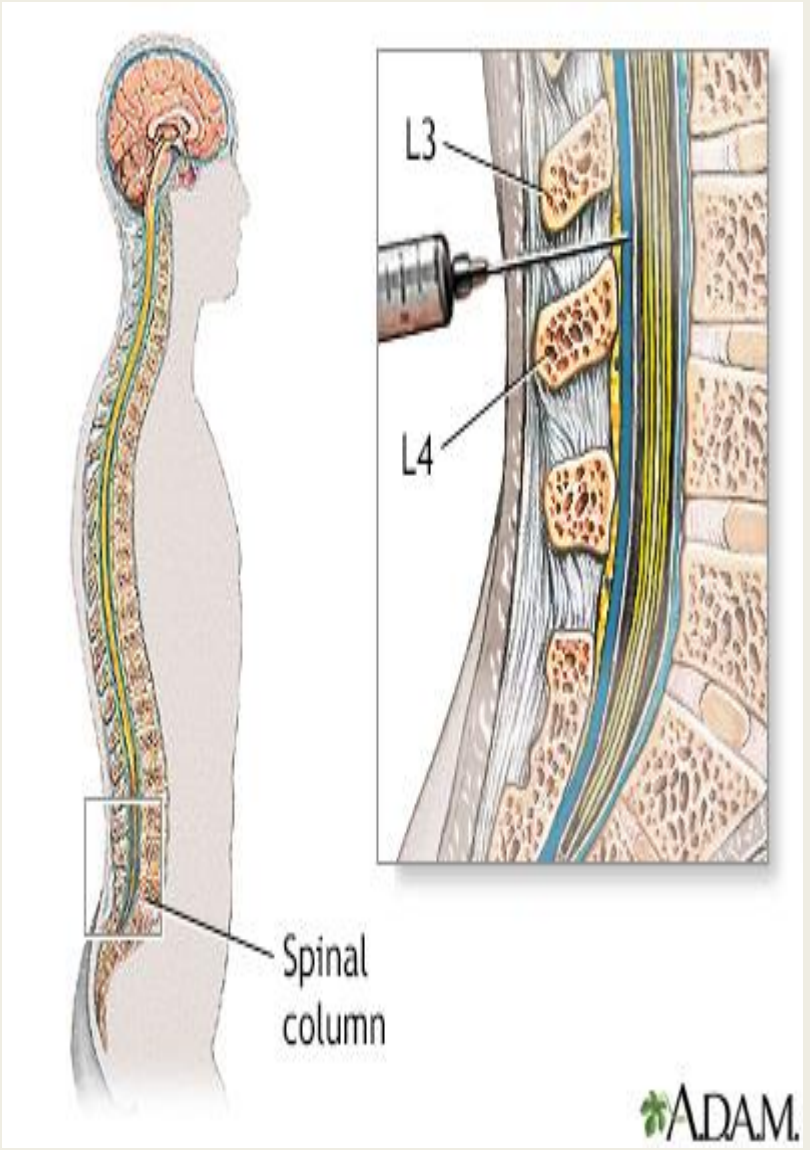
Components Tested in Seminal Fluid

- **Sperm Count**:
  - A low sperm count (oligospermia) can indicate **infertility**.
- **Sperm Motility**:
  - Sperm motility is assessed to determine if sperm can swim properly towards an egg. Poor motility (asthenospermia) affects fertility.
- **Sperm Morphology**:
  - Abnormal sperm shape (teratospermia) may reduce the chance of fertilization.
- **Volume**:
  - Semen volume is also assessed, as low volume may indicate **prostate** or **seminal vesicle** issues.
- **pH**:
  - Normal pH is around 7.2-8.0. Abnormal pH can indicate infections or issues with the **prostate** or **seminal vesicles**.
- **Fructose Levels**:
  - Low fructose levels can suggest a blockage or defect in the seminal vesicles.

Importance of Fluid Analysis in Diagnosis

- **Urine Analysis**: Crucial for diagnosing **kidney diseases**, **diabetes**, **urinary tract infections**, and **metabolic disorders**.
- **CSF Analysis**: Essential for diagnosing **meningitis**, **CNS infections**, and **neurological diseases**.
- **Synovial Fluid Analysis**: Helps diagnose **joint infections**, **arthritis**, **gout**, and **rheumatoid arthritis**.
- **Seminal Fluid Analysis**: Vital for evaluating **male fertility** and detecting abnormalities in sperm count, motility, and morphology.


Synovial Fluid Analysis
Microscopic analysis of joint fluid
Joint aspiration
Synovial fluid analysis can help diagnose the cause of swelling, pain or redness in joints


L3
L4
Spinal column
A.D.A.M.

Thank you