

Laboratory analysis refers to a set of tests performed in order to **identify pathogens** and to **study deviations and changes in tissues and biological fluids of the human body**. One of the key fields of medical activity for the assessment of general health, laboratory tests provide almost 70% of the diagnostic information doctors need to properly diagnose and treat a patient.

Lab 1. Elimination of Microbes

Microorganisms are found everywhere—in the air, water, soil, and on human skin. In clinical laboratories, uncontrolled microbial contamination can:

-Interfere with test results.

-Spread infectious diseases.

Methods of Eliminating Microorganisms: The two main methods of controlling microbial growth are:

1-Physical methods include **filtration, temperature treatments, and radiation**. These methods will either reduce the microbial load, completely remove microbes, or prevent microbes from reproducing thus resulting in cell death.

2-Chemical methods which include the use of **chemicals to eradicate or decrease the microbial load**.

Physical Methods

1.Heat include:

a- **Moist heat: example Autoclaving (121 °C, 15 psi, 15–20 min).**



b-Dry heat: example Hot air oven (160–180 °C for 1–2 hour).

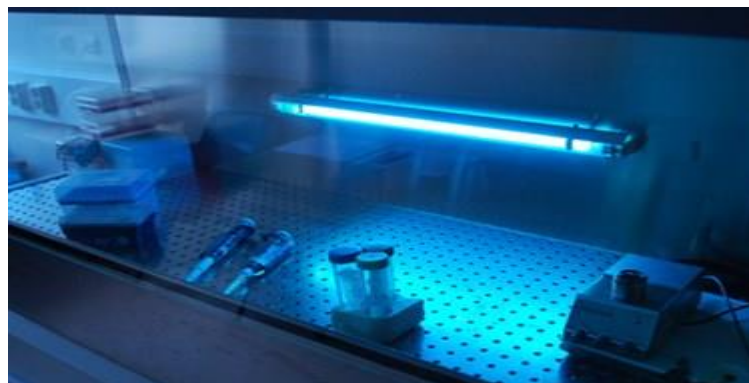


2.Filtration:example Membrane filters (used for heat-sensitive liquids).



3.Radiation: example

* **Ultraviolet (UV) light → surface sterilization.**



* **Ionizing radiation → industrial sterilization.**

Chemical Methods

1. **Alcohols** (70% ethanol, isopropanol) → skin antiseptis.
2. **Phenolic compounds** → disinfectant for surfaces.
3. **Chlorine compounds** (bleach) → strong surface disinfectant.
4. **Aldehydes** (formaldehyde, glutaraldehyde) → sterilization of medical instruments.

Safety Precautions

- 1-Always wear gloves, lab coat, and eye protection.
- 2-Do not open autoclave until pressure returns to normal.
- 3-Handle disinfectants carefully; some are toxic or corrosive.
- 4-Dispose of biohazard waste in designated containers.



Sterilization: The complete destruction or removal of all forms of microorganisms, including spores.

Disinfection: The reduction or elimination of pathogenic microorganisms on inanimate objects, but not necessarily spores.

Antiseptis: Application of chemical agents to living tissues to reduce infection risk.

Aseptic Technique: Practices that prevent contamination by unwanted microorganisms.

The laboratory a wide range of essential tests:

General clinical tests (blood, urine, feces, semen, cerebrospinal fluid, gastric contents).

Molecular genetic tests

Microbiological and biochemical tests

DNA tests (PCR diagnostics)

Immunological tests

Hormonal tests

Tests for **tumor markers**

Diagnosis of infectious diseases (HIV, TORCH infections, hepatitis B and C, syphilis, *H.pylori*, etc.).

Samples Collection

It should follow the correct way for sample collection include:

1-Use of aseptic technique

2-Correct labeling (name, date, time, test required)

3-Appropriate container and preservative

Types of Samples

Blood (venous, arterial, capillary).

Urine (random, midstream, 24-hour, catheter specimen)

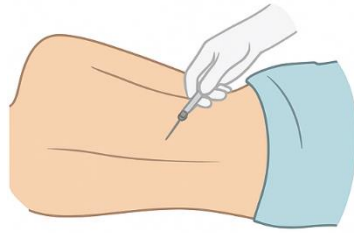
Stool (clean dry container, avoid urine contamination)

Sputum (early morning, deep cough specimen)

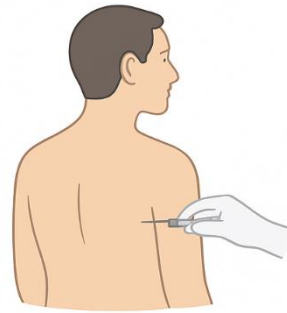
Swabs (throat, wound, nasal, vaginal, urethral) use sterile swabs, avoid contamination with surrounding areas

Body fluids (CSF, pleural, peritoneal, synovial, etc)

LABORATORY ANALYSES



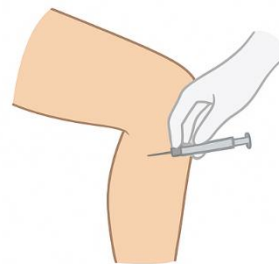
Cerebrospinal Fluid (CSF)



Pleural Fluid

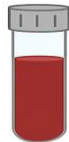


Peritoneal Fluid

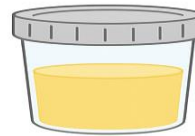


Synovial Fluid

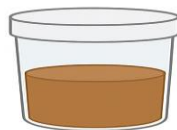
Types of Samples



Blood
(venous, arterial, capillary)



Urine
(random, midstream, 24-hour, catheter specimen)



Stool
(clean dry container, avoid urine contamination)



Sputum
(early morning, deep cough specimen)



Swabs
(throat, wound, nasal, vaginal, urethral)



Body fluids
(CSF, pleural, peritoneal, synovial, etc.)

LABORATORY ANALYSES