**روان ياسر عبدالبديع هاشم طه**

**Western Blot Technique**

**Introduction**:

The Western blot is a widely used analytical technique in molecular biology and biochemistry for detecting specific proteins in a sample. It combines gel electrophoresis with antibody-based detection to identify proteins based on their size and interaction with specific antibodies.

Western blot is a powerful and reliable method for identifying specific proteins in complex samples, and it plays a crucial role in both clinical and research settings.

**Principle**:

Proteins are separated by size using SDS-PAGE, transferred onto a membrane, and then detected using antibodies that bind specifically to the target protein.

**Steps of the Western Blot**:

**1-Protein Extraction**:Cells or tissues are lysed to release proteins.

**2-Gel Electrophoresis (SDS-PAGE):**Proteins are separated based on their molecular weight.

**3-Transfer**:The proteins are transferred from the gel to a membrane (nitrocellulose or PVDF).

**4-Blocking**:The membrane is incubated with a blocking solution to prevent non-specific binding.

**5-Antibody Binding:**The membrane is treated with a primary antibody specific to the target protein.

A secondary antibody, linked to an enzyme, binds to the primary antibody.

**6-Detection**:A substrate is added that reacts with the enzyme, producing a visible signal (chemiluminescent or colorimetric) that indicates the presence of the protein.

**Applications**:

Detection of specific proteins in research and diagnostics.

Study of protein expression levels.

Confirmation of protein identity.