Immunodetection

Immunodetection refers to a group of techniques that use antibodies to detect specific proteins or antigens in biological samples. It is widely used in both basic research and clinical diagnostics.

Main Techniques

Western Blot (WB)

- Detects proteins separated by SDS-PAGE.
- Requires transfer to a membrane (e.g., PVDF or nitrocellulose).
- Uses primary antibody (antigen-specific) and secondary antibody (enzyme-linked).
- Detection via chemiluminescence, fluorescence, or colorimetric substrate.

Immunohistochemistry (IHC)

- Detects antigens in tissue sections.
- Preserves spatial context within the tissue.
- Visualization via light microscopy after chromogenic staining (e.g., DAB).

Immunofluorescence (IF)

- Uses fluorophore-conjugated antibodies.
- Enables localization of proteins in cells or tissues.
- Requires fluorescence microscope or confocal imaging.

ELISA (Enzyme-Linked Immunosorbent Assay)

- Quantitative detection of proteins in liquid samples.
- High sensitivity and specificity.
- Used in diagnostics (e.g., infectious diseases, hormone levels).

Flow Cytometry

- Detects protein expression on or within cells in suspension.
- Useful for immunophenotyping, apoptosis, cell cycle analysis.
- Multicolor analysis with fluorophore-labeled antibodies.

Key Components

- **Primary antibody**: Binds the specific target antigen.
- **Secondary antibody**: Binds the primary antibody and is conjugated to a detectable label (e.g.,

HRP, fluorophore).
- **Detection system**: Colorimetric, chemiluminescent, or fluorescent.

Applications

- Detection of disease biomarkers.
- Analysis of protein expression patterns.
- Neuroscience (e.g., GFAP, NeuN, Merlin).
- Oncology (e.g., Ki-67, p53, HER2).
- Evaluation of therapeutic targets.

Related Pages

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