

Understanding the Principles of ELISA in Immunoassay

Lindbladh Bulow*

Department of Pure and Applied Biochemistry, University of Lund, Lund, Sweden

ABOUT THE STUDY

Enzyme Immunoassay (EIA), also known as Enzyme-Linked Immunosorbent Assay (ELISA), is a common laboratory technique used to detect and quantify the presence of antigens or antibodies in a biological sample. This method is widely used in medical research, clinical diagnostics, and drug development.

The basic principle of EIA involves the use of an enzyme-conjugated antibody or antigen, which is capable of binding specifically to the target molecule. When the target molecule is present in a sample, it binds to the antibody or antigen, forming an antigen-antibody complex.

The enzyme-conjugated molecule attached to this complex can then be detected using a substrate that the enzyme converts into a detectable signal, such as a color change or fluorescence.

There are different types of EIA, which can be categorized based on the type of molecule being detected, the type of assay format, and the type of substrate used to detect the enzyme signal.

Most common types of EIA:

Direct ELISA: This type of EIA detects the presence of an antigen in a sample by using an enzyme-conjugated antibody that directly binds to the antigen. The enzyme-linked antibody-antigen complex can then be detected using a substrate that produces a detectable signal.

Indirect ELISA: This type of EIA detects the presence of an antibody in a sample by using an antigen-coated surface to capture the antibody. A secondary enzyme-conjugated antibody that binds to the captured antibody is then used to generate the signal.

Sandwich ELISA: This type of EIA is used to detect antigens that are present in low concentrations in a sample. The antigen is captured by an immobilized antibody, and a second enzyme-conjugated antibody is used to detect the antigen-antibody complex.

Competitive ELISA: This type of EIA is used to measure the concentration of a small molecule, such as a drug or hormone, in a sample. A known amount of the molecule is added to the sample, and an enzyme-conjugated version of the same molecule competes with the sample molecule for binding to a limited amount of immobilized antibody. The amount of enzyme signal generated is inversely proportional to the concentration of the molecule in the sample.

EIA is a highly sensitive and specific method for detecting and quantifying antigens or antibodies in a biological sample. It is widely used in clinical diagnostics to detect infectious diseases, autoimmune disorders, and cancer biomarkers. EIA is also used in drug development to measure the concentration of drugs in blood or tissue samples.

One of the advantages of EIA is that it is a relatively simple and inexpensive technique, requiring only a few reagents and basic laboratory equipment. However, it does require careful optimization of assay conditions, such as the concentration of reagents and the incubation time, to ensure accurate and reproducible results.

Enzyme immunoassay is a powerful laboratory technique that has revolutionized medical research and clinical diagnostics. It provides a fast, sensitive, and specific method for detecting and quantifying antigens or antibodies in a variety of biological samples. Its versatility and broad range of applications make it an invaluable tool in the field of biomedical sciences.

Correspondence to: Lindbladh Bulow, Department of Pure and Applied Biochemistry, University of Lund, Lund, Sweden, E-mail: blindbladh0505@gmail.com

Received: 09-May-2023, Manuscript No. IDIT-23-24378; **Editor assigned:** 12-May-2023, PreQC No: IDIT-23-24378 (PQ); **Reviewed:** 29-May-2023, QC No. IDIT-23-24378; **Revised:** 05-Jun-2023, Manuscript No: IDIT-23-24378 (R); **Published:** 12-Jun-2023; 10.35248/2593-8509.23.8.144

Citation: Bulow L (2023) Understanding the Principles of ELISA in Immunoassay. Immunol Disord Immunother. 8:144.

Copyright: © 2023 Bulow L. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.