Commentary
Volume 8:1, 2022

Immunochemistry & Immunopathology

ISSN: 2469-9756 Open Access

Immunoassays: An Overview

Marina Cetkovic-Cvrlje*

Department of Biological Sciences and Immunology Laboratory, St Cloud State University, St Cloud, MN, USA

Description

Immunoassays are bioanalytical procedures for detecting and quantifying target molecules in biological samples that rely on the specificity of an antigen-antibody response. Immunoassays are widely employed in drug discovery and pharmaceutical industries for a variety of purposes, including illness diagnostics, therapeutic drug monitoring, clinical pharmacokinetic and bioequivalence research, and clinical pharmacokinetic and bioequivalence investigations. The inherent specificity, high throughput, and high sensitivity of immunoassay methods for the analysis of a wide range of analytes in biological samples account for their importance and extensive use in pharmaceutical analysis. In the realm of immunoassay development for pharmaceutical analysis, significant advancements have recently been made. Preparation of unique immunoanalytical reagents, analysis of new categories of chemicals, methodology, and instruments were all part of the developments. The fundamental methodologies as well as recent developments.

Immunoassays are available in a variety of formats and variations. Immunoassays can be performed in numerous phases, with reagents being added, rinsed away, or separated at various points along the procedure. Separation immunoassays and heterogeneous immunoassays are terms used to describe multi-step assays. Some immunoassays can be performed simply by mixing the reagents and sample and measuring the results. Homogeneous immunoassays, or non-separation immunoassays, are examples of such assays.

Aside from the binding of an antibody to its antigen, all immunoassays must have a way to generate a quantifiable signal in response to the binding. Immunoassays entail chemically connecting antibodies or antigens with some type of detectable label in the majority of cases, but not all. Modern immunoassays contain a huge number of labels that can be detected in a variety of ways. Many labels can be detected because they emit radiation, change the colour of a solution, glow under light, or can be made to emit light.

Types of immunoassays

RIA (radioimmunoassay): To quantify hormones, medicines, and viral antigens, radioimmunoassays use a radioisotope as a label. A fixed concentration of antibody specific for that antigen is incubated with a known concentration of radiolabeled antigen. After that, the radiolabeled antigen-antibody combination is combined with a biological sample containing an unknown amount of the same antigen.

CIA (Counting Immunoassay): Particle counting technology is used in counting immunoassays. Antibodies specific for an antigen of interest are coated on polystyrene beads (Latex particles). When these beads are treated with a biological sample containing the target antigen, immune complexes create observable clumps (agglutination).

Enzyme Immunoassays (EIA) or Enzyme-linked Immunosorbent Assays (ELISA): In an ELISA, an enzyme is linked to an antibody that has been produced specifically against a target antigen. Because of its great specificity and sensitivity, ELISA is commonly employed for high-throughput antibody or drug screening.

Fluoroimmnoassay (FIA): Fluorescent probes are used to mark antibodies in the fluoroimmnoassay (FIA). A fluorescent-labeled antibody is treated with biological samples containing an antigen of interest. To quantify the target antigen, the fluorescence intensity of the resulting antigen-antibody combination is evaluated.

Chemiluminescence: In chemiluminescence immunoassays, luminophore markers like acridinium esters can be employed directly, while enzymatic markers like alkaline phosphatase and horse radish peroxidase can be used indirectly with adamantyl 1, 2-dioxetane aryl phosphate (AMPPD) and luminol substrates, respectively [1-5].

References

1. Findlay, John WA, W. C. Smith, J. W. Lee, and G. D. Nordblom, et al. "Validation of immunoassays for bioanalysis: a pharmaceutical industry perspective." *J Pharm Biomed Anal* 21(2000): 1249–1273.
2. Chuanlai, Xu, Peng Cifang, Hao Kai, and Jin Zhengyu, et al. "Chemiluminescence enzyme immunoassay (CLEIA) for the determination of chloramphenicol residues in aquatic tissues." *Luminescence* 21(2006):126–128.
3. Samsonova, Zh V., O. S. Shchelokova, N. L. Ivanova, and M. Iu Rubtsova, et al. "Enzyme immunoassay of ampicillin in milk." *Prikl Biokhim Mikrobiol* 41 (2005): 668–675.
4. Lachenmeier, Katrin, Frank Musshoff, and Burkhard Madea. "Determination of opiates and cocaine in hair using automated enzyme immunoassay screening methodologies followed by gas chromatographic–mass spectrometric (GC–MS) confirmation." *Forensic Sci Intl* 159 (2006):189–199.
5. Benito-Peña, Elena, María C. Moreno-Bondi, Guillermo Orellana, and Ángel Maquieira, et al. "Development of a novel and automated fluorescent immunoassay for the analysis of β-lactam antibiotics." *J Agric Food Chem* 53 (2005): 6635–6642.

Conflict of Interest

None.

***Address for Correspondence:** Marina Cetkovic-Cvrlje, Department of Biological Sciences and Immunology Laboratory, St Cloud State University, St Cloud, MN, USA, E-mail: cetkoviccm@outlook.com*

Received 02 February, 2022, Manuscript No. icoa-22-52972; **Editor assigned:** 8 February, 2022, PreQC No. P-52972; QC No. Q-52972; **Reviewed:** 15 February, 2022, **Revised:** 21 February, 2022, Manuscript No. R-52972; **Published:** 28 February, 2022, DOI: 10.37421/2329-9517.22.8.135

How to cite this article: Cetkovic-Cvrlje, Marina. "Immunoassays: An Overview." Immunochem Immunopathol 8 (2022): 135.