History

The history of applied immunochemistry is intertwined with the quest to unravel the mysteries of the immune system and harness its remarkable specificity for various practical applications. While the concept of immunity dates back centuries, the formal understanding of immunological reactions and their application in chemistry began to take shape in the 20th century.

One of the earliest milestones in immunochemistry was the discovery of antibodies by Emil von Behring and Shibasaburo Kitasato in the late 19th century. This pivotal discovery earned von Behring the first Nobel Prize in Physiology or Medicine in 1901 for his work on serum therapy, which utilized antibodies to treat diphtheria.

In the mid-20th century, the development of immunoassays marked a turning point in the field. Radioimmunoassay (RIA), introduced by Rosalyn Yalow and Solomon Berson in the 1950s, enabled the quantification of minute amounts of substances by utilizing specific antibodies. This breakthrough laid the foundation for a wide range of immunochemical techniques.

Emil von Behring

Known for his work on serum therapy and the discovery of antibodies.

2.

Elvin A. Kabat

Contributed to the understanding of antibody structure and function.

4.

Hans Köchling

Developed the enzyme-linked immunosorbent assay (ELISA), a versatile immunochemical technique.

Industrial Applications of Applied Immunochemistry

The impact of applied immunochemistry extends across a wide range of industries:

1.

Pharmaceuticals

Monitoring drug levels in patient blood, evaluating drug efficacy, and quality control.

3.

Cancer Diagnostics

Identifying tumor markers and facilitating early cancer detection.

5.

Pregnancy Testing

Detecting pregnancy hormones (hCG) in urine or blood.

7.

Hormone Assays

Measuring hormone levels for endocrine disorder diagnosis and fertility treatments.

9.

Neuroscience

Studying neurotransmitters and neuropeptides for understanding brain function.

11.

Food Safety Testing

Detecting contaminants, allergens, and pathogens in food products.

13.

Environmental Monitoring

Detecting pollutants and contaminants in the environment.

15.

Drug Screening

High-throughput screening for drug discovery and development.

17.

Genetic Testing

Detecting genetic markers and mutations associated with diseases.

19.

Proteomics

Detecting and quantifying specific proteins in complex samples.

Point-of-Care Testing

Rapid, portable immunoassays for on-site diagnostics.

2.

Liquid Biopsies

Detecting disease markers in blood for early cancer detection.

4.

Cancer Immunotherapy

Monitoring immune responses and treatment efficacy.

6.

Microfluidics

Integrating immunoassays with microfluidic platforms for efficient testing.

8.

Artificial Intelligence

AI-driven analysis for data interpretation and pattern recognition.

10.

Antibody Engineering

Developing engineered antibodies for improved specificity and function.

12.

Neurological Disease Biomarkers

Identifying biomarkers for neurodegenerative disorders.

14.

Epigenetics and Immunochemistry

Studying epigenetic modifications in immunological contexts.

16.

Global Health Applications

Deploying immunoassays for resource-limited settings.

18.

Immunoproteomics

Combining proteomics and immunochemistry for protein analysis.

20.