

Biosensor for Determination of Immunoglobulin A, E, G and M

Authors : Umut Kokbas, Mustafa Nisari

Abstract : Immunoglobulins, also known as antibodies, are glycoprotein molecules produced by activated B cells that transform into plasma cells and result in them. Antibodies are critical molecules of the immune response to fight, which help the immune system specifically recognize and destroy antigens such as bacteria, viruses, and toxins. Immunoglobulin classes differ in their biological properties, structures, targets, functions, and distributions. Five major classes of antibodies have been identified in mammals: IgA, IgD, IgE, IgG, and IgM. Evaluation of the immunoglobulin isotype can provide a useful insight into the complex humoral immune response. Evaluation and knowledge of immunoglobulin structure and classes are also important for the selection and preparation of antibodies for immunoassays and other detection applications. The immunoglobulin test measures the level of certain immunoglobulins in the blood. IgA, IgG, and IgM are usually measured together. In this way, they can provide doctors with important information, especially regarding immune deficiency diseases. Hypogammaglobulinemia (HGG) is one of the main groups of primary immunodeficiency disorders. HGG is caused by various defects in B cell lineage or function that result in low levels of immunoglobulins in the bloodstream. This affects the body's immune response, causing a wide range of clinical features, from asymptomatic diseases to severe and recurrent infections, chronic inflammation and autoimmunity. Transient infant hypogammaglobulinemia (THGI), IgM deficiency (IgMD), Bruton agammaglobulinemia, IgA deficiency (SIgAD) HGG samples are a few. Most patients can continue their normal lives by taking prophylactic antibiotics. However, patients with severe infections require intravenous immune serum globulin (IVIG) therapy. The IgE level may rise to fight off parasitic infections, as well as a sign that the body is overreacting to allergens. Also, since the immune response can vary with different antigens, measuring specific antibody levels also aids in the interpretation of the immune response after immunization or vaccination. Immune deficiencies usually occur in childhood. In Immunology and Allergy clinics, apart from the classical methods, it will be more useful in terms of diagnosis and follow-up of diseases, if it is fast, reliable and especially in childhood hypogammaglobulinemia, sampling from children with a method that is more convenient and uncomplicated. The antibodies were attached to the electrode surface via the poly hydroxyethyl methacrylamide cysteine nanopolymer. It was used to evaluate the anodic peak results obtained in the electrochemical study. According to the data obtained, immunoglobulin determination can be made with a biosensor. However, in further studies, it will be useful to develop a medical diagnostic kit with biomedical engineering and to increase its sensitivity.

Keywords : biosensor, immunosensor, immunoglobulin, infection

Conference Title : ICMCB 2023 : International Conference on Molecular Chemistry and Biochemistry

Conference Location : New York, United States

Conference Dates : September 11-12, 2023