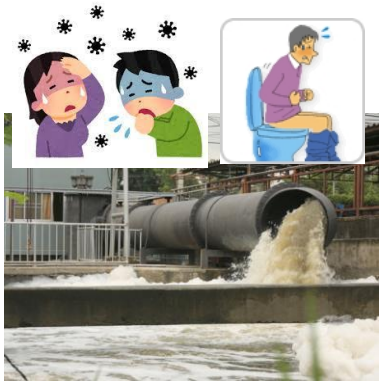
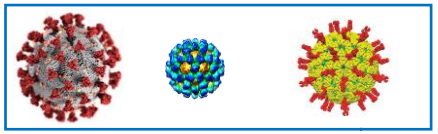
Tohoku Univ. Technology

Early Detection of Infectious Disease Outbreas

Construction of Electrochemical Sensor and System for Detecting Biomarkers in Sewage Associated with Infectious Diseases





Viral Genes: Conventional Targets for Wastewater Epidemiology

Infectious disease-associated biomarkers: New targets

Overview

In recent years, for viral infectious diseases that cause significant damage to society, wastewater-based epidemiological methods that use epidemiological information contained in municipal wastewater to detect the occurrence of infectious disease patients and infectious epidemics at an early stage have attracted attention. Currently, wastewater-based epidemiological studies on infectious diseases are mainly performed by detecting viral genes using PCR. However, some problems remain, such as the time required to detect and quantify viral genes from collected wastewater samples, the necessity of sample concentration due to the low virus concentration, and the high cost and labor for analysis.

In this study, we aimed to construct a sensor that can detect infectious disease-related biomarkers in wastewater quickly and simply. Biomarkers are emitted from patients with infectious diseases at higher concentrations than the virus itself. In this study, we used antiviral human immunoglobulin (Ig) A as a test substance. We attempted to construct a measurement system in which IgA in a sample is captured by antigen-antibody reaction with proteins immobilized on the electrode surface, and changes in the electrode surface state associated with the reaction are detected by electrochemical measurement.

Product Application

- Realization of an infectious disease-adaptive society through early detection of infectious disease outbreaks
- Early detection also contributes to rapid drug and vaccine development

IP Data

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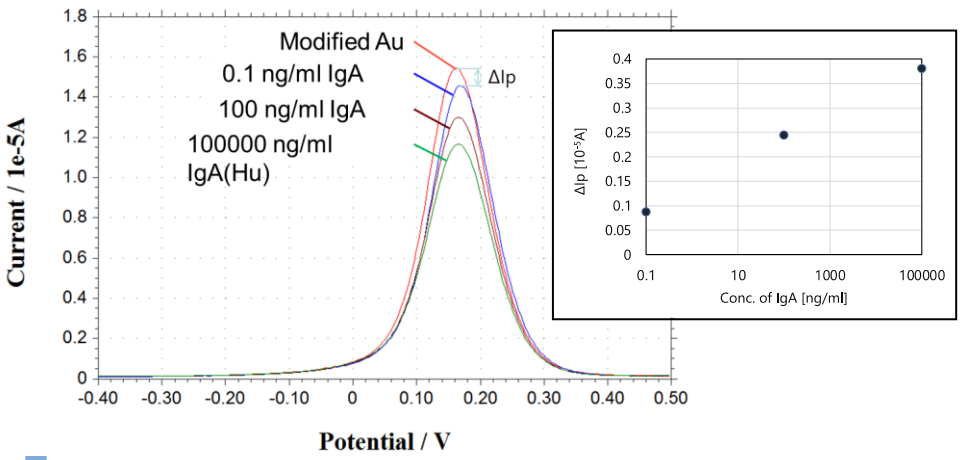
The developed sensor can measure human antibodies in real time

Square wave voltammetry



Related Works

[1] The Ministry of Land, Infrastructure, Transport and Tourism. FY 2021. “Building a Real-Time Sewage Monitoring System to Construct a Society Adapted to Infectious Diseases.” Research Themes Conducted in Sewerage Application Research.

Contact

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