Abstract

Dengue fever is an acute infectious disease chiefly spread in tropical and semitropical regions. It is caused by dengue virus transmitted by mosquitoes of the genus Aedes. In recent year the epidemic situation of dengue becomes more and more serious in Taiwan. Therefore, it's an important assignment to establish a convenient and precise method for detecting dengue fever.

In this project we aimed for establishing a multi-array immuno-biosensor of dengue fever. The piezoelectric quartz crystal microbalance（QCM）system is a well established sensitive system for detecting mass variation. It is expected to constitute the multi-array immuno-biosensor of dengue fever when four types of anti-dengue virus monoclonal bodies are cooperated as the bio-recognizable materials. The piezoelectric QCM system is advantageous in high sensitivity, rapidly detection, low cost and easy operation. It is very potential to construct a detection system for fast and correct diagnosis of four types of dengue virus.

In the past year various kinds of piezoelectric quartz crystal electrodes were obtained and the surface of their metallic electrodes were successfully modified. Besides probing and discussing the stability of piezoelectric quartz crystal electrodes we have established the applicable steps of cleaning the surface of the electrodes according to their characteristics. In addition, the imported four types of anti-dengue virus monoclonal antibodies have been provided to our lab. All of the four types of anti-dengue virus monoclonal antibodies are IgG. Three different immobilizing methods including the physical adsorption process, the cystamine-glutaraldehyde procedure and the 3-glycidoxypropyl trimethoxysilane procedure were adapted to immobilize those antibodies. The qualitative-chromogenic assay was used to confirm that antibodies are well immobilized on electrode of piezoelectric quartz crystal. According to the results obtained, three of the above-mentioned immobilization methods can immobilize antibodies effectively, especially cystamine-glutaraldehyde procedure. The antibody molecules immobilized by the cystamine-glutaraldehyde procedure was found to have higher binded amount and better response. It is considered as a very potential process for conducing antibody immobilization in this study.

Keyword: biosensor；dengue fever；dengue hemorrhagic fever；monoclonal antibody；piezoelectric quartz crystal.