

Diffraction-Based Immunosensor for Dengue NS1 Virus

Authors : Harriet Jane R. Caleja, Joel I. Ballesteros, Florian R. Del Mundo

Abstract : The dengue fever belongs to the world's major cause of death, especially in the tropical areas. In the Philippines, the number of dengue cases during the first half of 2015 amounted to more than 50,000. In 2012, the total number of cases of dengue infection reached 132,046 of which 701 patients died. Dengue Nonstructural 1 virus (Dengue NS1 virus) is a recently discovered biomarker for the early detection of dengue virus. It is present in the serum of the dengue virus infected patients even during the earliest stages prior to the formation of dengue virus antibodies. A biosensor for the dengue detection using NS1 virus was developed for faster and accurate diagnostic tool. Biotinylated anti-dengue virus NS1 was used as the receptor for dengue virus NS1. Using the Diffractive Optics Technology (dotTM) technique, real time binding of the NS1 virus to the biotinylated anti-NS1 antibody is observed. The dot@-Avidin sensor recognizes the biotinylated anti-NS1 and this served as the capture molecule to the analyte, NS1 virus. The increase in the signal of the diffractive intensity signifies the binding of the capture and the analyte. The LOD was found to be 3.87 ng/mL while the LOQ is 12.9 ng/mL. The developed biosensor was also found to be specific for the NS1 virus.

Keywords : avidin-biotin, diffractive optics technology, immunosensor, NS1

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