

# Development of Sensitive Immunobased Nanosensor for Rapid Detection of Dengue using Urine Samples: A Diagnostic Challenge

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**Abstract**—With the increasing incidence of dengue infection, the early diagnostic confirmation of dengue infection in patients allows for timely clinical intervention, etiological investigation, and disease control. Hence, diagnosis of dengue disease during the acute phase should be a priority and is a public health concern. The World Health Organization (WHO) estimates that more than 2.5 billion people are at risk of dengue infections with 50–100 million cases occurring annually. Currently almost all laboratory diagnostic methods require a blood sample that may be difficult to obtain in children, the population which is most commonly affected by dengue in endemic regions, especially in field conditions or outbreak settings. Saliva and urine samples could be used as surrogates for blood as the collection of these body fluids is non-invasive and better accepted by patients, does not require medically-trained staff and the samples are easier to process as they require only limited laboratory facilities. Recently magnetic nanoparticles have achieved remarkable demand for diagnosis as it can detect and quantify biomolecules at very low concentrations. Keeping this in view, the present study is design to develop immunobased nanosensor for detection of dengue specific antigens in urine samples. The sensor will consist of magnetic immunoassay platform, utilizing magnetic nanoparticles (MNP) in order to concentrate the antigen.

**Keywords:** Dengue, Non-invasive diagnosis, urine, saliva, immunosensor.