NIT Calicut develops nano-sensor to detect deadly infections in minutes

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To help in early diagnosis of sepsis at the bedside of the patient

A team of scientists at the National Institute of Technology (NIT) Calicut has developed a new highly sensitive, low-cost, point-of-care device with an electrochemical biosensor that could help early diagnosis of sepsis at the bedside of the patient.

Sepsis is a serious medical condition caused by an infection that can lead to multiple organ failure, shock and even death. Endotoxin, a toxic component of the outer membrane of Gram-negative bacteria, acts as a key biomarker, signalling the presence of an infection that could lead to sepsis.

The scientists have developed eight distinct sensor architectures and a sensitive device for detecting endotoxins rapidly.

In a paper published in the journal *Langmuir*, the team has demonstrated a highly sensitive electrochemical sensor chip designed for the selective detection of Lipopolysaccharide (LPS), which is compatible with a portable analyser for on-site detection. The sensor is fabricated using functionalised CNT (fCNT) and copper(I) oxide nanoparticles (Cu_2O).

The specific binding of endotoxin to LPS-binding Aptamers or polymyxin B was used to improve selectivity. All the sensors have exhibited high selectivity and detected endotoxin in the presence of other interfering compounds. This device detects endotoxin in blood serum using a standard addition method, providing results within 10 minutes.