PCT Detection for Sepsis

Enhancement Assay

Sepsis is a serious complication caused by an infection of the blood that leads to inflammation throughout the body, resulting in blood clots to cause organ failure. This condition has caused millions of global deaths annually and remains a challenge for the emergency department and intensive care unit. Early and rapid diagnosis of sepsis followed by initiation of antibiotic therapy can significantly improve the outcome of patients. Procalcitonin (PCT) is a 13 kDa protein biomarker that has shown high accuracy for the diagnosis of sepsis. Detection of PCT with the FOPPR™ Enhancement Assay (Fig. 1) can offer accurate femtomolar results within 15 min of analysis time.

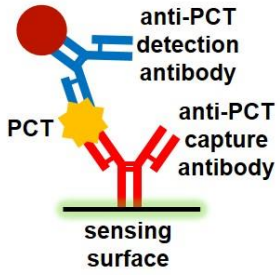

Fig. 1 Detection scheme of PCT with the FOPPR™ Enhancement Assay.

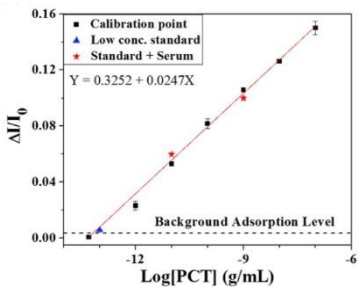

Fig. 2 PCT standard curve.

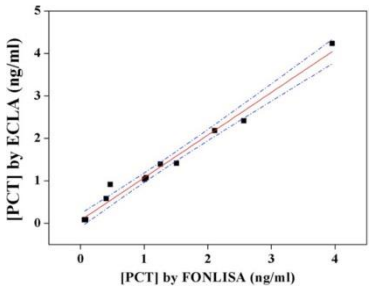

Fig. 3 Correlation between FOPPR™ Enhancement and ECLIA.

The cutoff concentration of PCT for sepsis diagnosis is 0.2 ng/mL. The FOPPR™ Enhancement Assay offers a limit of detection (LOD) of 0.095 pg/mL (7.3 fM), approximately two orders lower than the clinically accepted electrochemiluminescent immunoassay (ECLIA), while offering a linear response range from 1 pg/mL to 100 ng/mL (Fig. 2). Results with FOPPR™ are also highly correlated (R = 0.990) with ECIA (Fig. 3). In comparison with other available detection methods, the FOPPR™ Enhancement Assay offers an ultrasensitive result while maintaining a short analysis time (Table 1).

Table 1 LOD and detection time comparison between FOPPR™ Enhancement and other detection methods. ITA: immunoturbidimetric assay. CLIA: chemiluminescent enzyme immunoassay. MB-ELISA: magnetic beads enzyme-linked immunosorbent assay. SPR: surface plasmon resonance.

Detection Method	LOD (pg/mL)	Time (min)
ITA	260	10
CLIA	20	16
MB-ELISA	20	<90
SPR	4200	<10
ECLIA	20	18
FOPPR Enhancement	0.095	15

References:
[1] Chiang et al. *Biosensors and Bioelectronics* 2020, 151, 111871.
[2] Gluck et al. *Plos One* 2018, 13(10): e0205924.

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