

Nanomagnetic system for rapid diagnosis of acute infection

박기수[†]

건국대학교

(kskonkuk@gmail.com[†])

I will present a magnetic capture and detection (MCD) assay to enable early detection of infectious diseases. In this approach, antibody secreting cells (ASCs), which serves as an early biomarker for infection, are enriched through magnetic capture, and secreted antibodies are magnetically detected by a miniaturized nuclear magnetic resonance (μ NMR) system. This approach is based entirely on magnetics, which supports high contrast against biological background and simplifies assay procedures. The MCD system was advanced by (i) synthesizing magnetic nanoparticles with high magnetic moments for both cell capture and antibody detection, (ii) developing a miniaturized magnetic device for high-yield cell capture, and (iii) optimizing the μ NMR assay for antibody detection. As a proof-of-concept, MCD was applied to detect antibodies produced by HlyE-specific hybridoma cells. The MCD achieved high sensitivity in detecting antibodies secreted from as few as 5 hybridoma cells (50 cells/mL). Importantly, the assay could be performed with whole blood with minimal sample processing.