Multiplex protein assays based on real-time magnetic nanotag sensing

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Abstract: Magnetic nanotags (MNTs) are a promising alternative to fluorescent labels in biomolecular detection assays, because minute quantities of MNTs can be detected with inexpensive giant magnetoresistive (GMR) sensors, such as spin valve (SV) sensors. However, translating this promise into easy to use and multilplexed protein assays, which are highly sought after in molecular diagnostics such as cancer diagnosis and treatment monitoring, has been challenging. Here, we demonstrate multiplex protein detection of potential cancer markers at subpicomolar concentration levels and with a dynamic range of more than four decades. With the addition of nanotag amplification, the analytic sensitivity extends into the low fM concentration range. The multianalyte ability, sensitivity, scalability, and ease of use of the MNT-based protein assay technology make it a strong contender for versatile and portable molecular diagnostics in both research and clinical settings.

Author Keywords: Biochip; Giant magnetoresistive sensors; GMR; Magnetic nanotags; Multiplex protein detection

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