Non-contact GMR Sensor with Magnetic Nanoparticles for Biomedical Concentration Measurement

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GMR sensors have been studied and intergrated into a sensitive system for detecting and quantifying biomedical molecule concentration. The targets of the detection and the measurement are prostate cancer antigens (PSAs) to which antibody-magnetic nanoparticles (MNPs) complexes made a specific binding. To employ a GMR sensor for the measurement, a process of linking between anti-PSA (antibody specific for PSAs) with MNPs has been developed. Owning to these bindings, the induced magnetic field from MNPs in a sample well was the primary measure of the biological molecule concentration. In this configuration, the sample well containing MNPs was non-contact and moving relatively to the immobile GMR sensor in a magnetizing field. The sensor system could detect a wide range of PSA antigen concentration, from 4 ng/mL to 1 μg/mL.

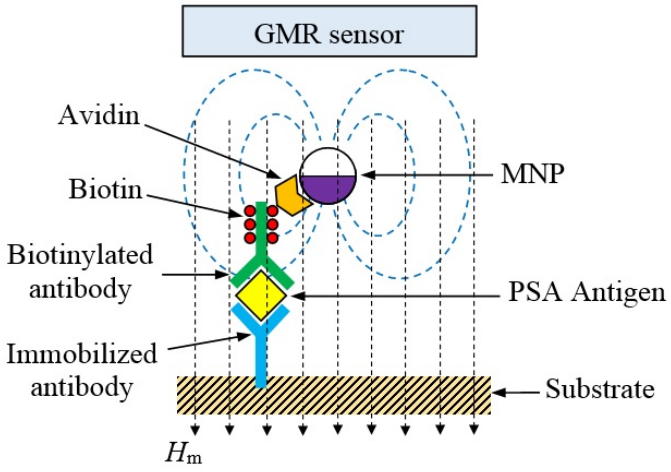

Fig. 1. Non-contact GMR sensor in measurements of magneto-biological sample.