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Multifunctional nanoparticles combined with magnetic immunoassay for biomarker detection**C Bor Fuh**

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Biomarkers are widely used in clinical research and practice as references for medical diagnoses and treatments of cancers. The levels of biomarkers are generally very low in healthy persons. A detection method with high sensitivity and selectivity is essential to biomarker applications. An enzyme-linked immune-sorbent assay (ELISA) has been a widely used method for biomarker detections. However, it is a time consuming and laborious method even with its high sensitivity and selectivity. Thus, it is desirable to improve it with alternative method. Magnetic immunoassay can provide an alternative method of ELISA with advantages of rapidity, sensitivity and selectivity for biomarker detections. The major advantages come from simple and fast response of magnetic force with high selectivity of antibody. Magnetic immunoassay using multifunctional nanoparticles has great potential in biochemical analysis. This presentation would show several biochemical analyses using bio-functional nanoparticles with emphasis on magnetic immunoassay in thin channels and micro-plates. Several model biomarkers would be used to demonstrate the applications of this technique. This detection limit is substantially lower and the linear range is considerably wider than those of ELISA and other immunoassay methods. The differences between this method and an ELISA in biomarker measurements of serum samples were less than 12%. The proposed method demonstrates favorable detection of biomarkers with advantages of speed, sensitivity, selectivity and throughput.

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