

# Label-free Gold Nanoparticle Biosensor for alpha-fetoprotein Detection

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## Abstract

Here we present a new highly sensitive biosensor approach which has the ability to determine 5~100 ng/ml alpha-fetoprotein (AFP) quantitatively using gold nanoparticle arrays slightly embedded in glass substrates which can be quickly prepared by one-step microwave-plasma dewetting process [1]. Without labeling second antibodies and fluorescence dyes for enhancing sensitivity, AFP coupling to anti-AFP immobilized on the substrate can be directly monitored by the change in the local surface plasmon resonance (LSPR) band of gold nanoparticles. The specificity was further tested by detecting AFP in human IgG solution, and the LSPR-Au biosensor also showed a good linear relationship between LSPR band intensity and AFP concentration in the range of 5~100 ng/ml. Having advantages of low-cost and simple optical setup (which is composed of only one light source and one photodiode, and no gratings are needed), this LSPR-Au biosensor system provide a promising application in disposable biochips for point-of-care diagnostics.

## References

[1] Chuen-Yuan Hsu, Jing-Wen Huang and Kuan-Jiuh Lin, Chem. Commun., **47** (2011) 872-874.