

The application of antibody microarray chip for the detection of prostate specific antigen

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Abstract

Prostate specific antigen is a serine protease secreted by prostate epithelial cells, which is currently used as a marker of prostate cancer because high levels of PSA (>4.0ng/ml) indicate the possibility of prostate cancer¹⁾. However, elevated serum total PSA levels have also been attributed to benign prostatic hyperplasia and prostatitis, leading to a high rate of false positive screening results²⁾. Therefore, several studies have suggested that the measurement of free PSA/total PSA(free PSA plus PSA combined with α 1-antichymotrypsin) ratio can be used to improve the specificity of prostate cancer screening in selected men with elevated serum total PSA levels³⁾. In this study, we evaluated the possibility of the application of antibody microarray chip to measure free PSA and total PSA levels, quantitatively. Antibody microarrays were constructed with monoclonal antibodies specific for free PSA and PSA combined with ACT. Serially diluted antibodies were spotted on the slide to test specificity, sensitivity, and accuracy of antibody microarray chips. The spot intensity values were well correlated with the PSA concentrations. The graph of PSA concentration versus intensity has the linearity ($R^2>0.98$) when PSA concentration is higher than 0.2ng/ml. The result of antibody microarray chip was compared to that ELISA assay, and we found that the antibody microarray chip is more effective and useful tool for simultaneous detection of free PSA/total PSA ratio than ELISA method. Our result shows a strong merit in immediate free/total PSA ratio calculation and more precise prostate cancer screening. In conclusion, antibody microarray chip can be used as a novel PSA detection tool.

References

1. Catalona W. J, Smith D. S, Ratliff T. L, Basler J. W. (1993), Detection of organconfined prostate cancer is increased through prostatic-specific antigen-based

- screening, *JAMA*. **270**, 948-954.
2. Stamey T. A, Yang N. Hay A. R, McNeal J. E, Freiha, F. S, Redwine E. (1987), Prostate-specific antigen as a serum marker for adenocarcinoma of the prostate, *N. Engl. J. Med.* **317**, 909-916.
 3. Junker R, Brandt B, Zechel C, and Assmann G. (1997), Comparison of Prostate specific antigen measured by four combinations of free PSA and total PSA assays, *Clinical Chemistry* **43**, 1588-1594.