

Phage Display Based Biosensing and Bioanalysis

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Abstract:

Specific probes against targets play significant role in biosensing and bioanalysis. The landscape phage library f8/8 displaying random octapeptides on the pVIII coat protein of the phage fd-tet, and demonstrating many excellent features including multivalency, stability, and high structural homogeneity. In this talk, we present our recent advance in selecting specific phage clones binding with different targets such as free prostate-specific antigen (fPSA), cellulase, ubiquitous pathogens from the landscape phage library. Then we developed a series approaches such as sandwich enzyme linked immunosorbent assay (ELISA) array of “phage/fPSA/anti-PSA mAb” combining with anti-PSA mAb for detecting fPSA, phage microarray for the detection of cellulose, as well as rapid, selective and sensitive colorimetric biosensing of *Staphylococcus aureus*. Finally their applications in biomedical application is highlighted. Taken together, the landscape phage is an attractive biomolecular probe and should become efficient and cost-effective in bioanalysis and biosensing.

Key words: phage display, fusion protein, biosensing, bioanalysis, diagnostics

References

- [1] G. P. Smith, *Science* 228,1315-1317(1985), doi:10.1126/science.4001944
- [2] H. Qi, H. Lu, H.-J. Qiu, V. Petrenko, A. Liu, *Journal of Molecular Biology* 417,129-143(2012), doi: 10.1016/j.jmb.2012.01.038
- [3] Q. Lang, F. Wang, L. Yin, M. Liu, V. Petrenko, A. Liu, *Analytical Chemistry* 86, 2767-2774(2014), doi:10.1021/ac404189k
- [4] H. Qi, F. Wang, V. Petrenko, A. Liu, *Analytical Chemistry* 86, 5844-5850(2014), doi: 10.1021/ac501265y
- [5] A. Liu, G. Abbineni, C. Mao, *Advanced Materials* 21,1001-1005(2009), doi: 10.1002/adma.200800777
- [6] P. Liu, L. Han, V. Petrenko, A. Liu, *Biosensors & Bioelectronics* 82,195-203(2016), doi: 10.1016/j.bios.2016.03.075
- [7] L. Han, P. Liu, H.-J. Zhang, F. Li, A. Liu, *Chemical Communications* 53, 5216-5219(2017), doi: 10.1039/c7cc02049j