Protein Nanopatterns and Biosensors Using Gold Binding Polypeptide (GBP) as a Fusion Partner

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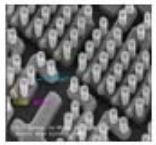
ril 18, 2008

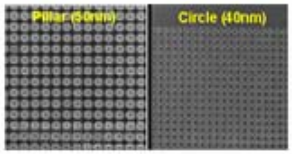
National NanoFab Center (NNFC)

Centralized public facility for nanofabrication service to promote nanotechnology R&D for academia, research inst., and industry in Korea

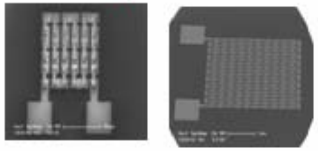
- ✓ **Supporting fundamental research and manufacturing prototype sample**
- ✓ **Training nanotechnologists with hands-on experience**
- ✓ **Contributing to the commercialization and advancement of nanotechnology**



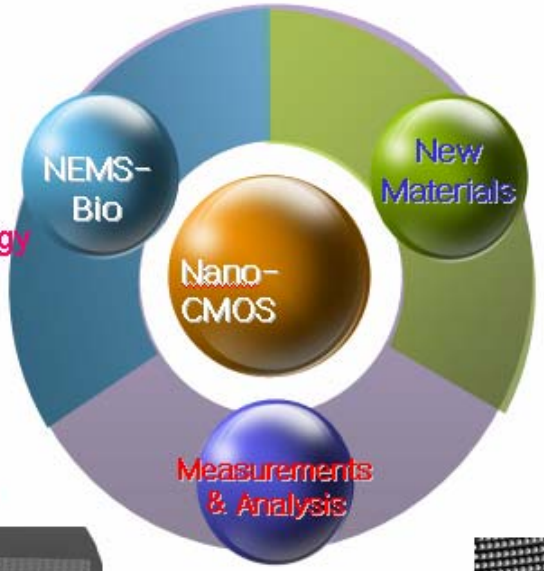
180 nm CMOS Technology

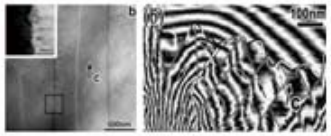


Nano Pattern Template

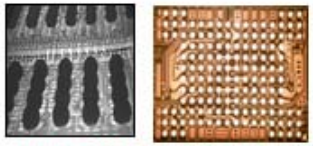


Micro thermoelectric cooler

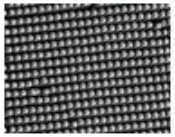




Microscopy analysis



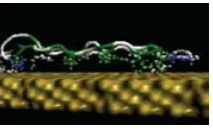
Reverse Engineering



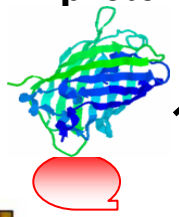
Dry adhesive structure

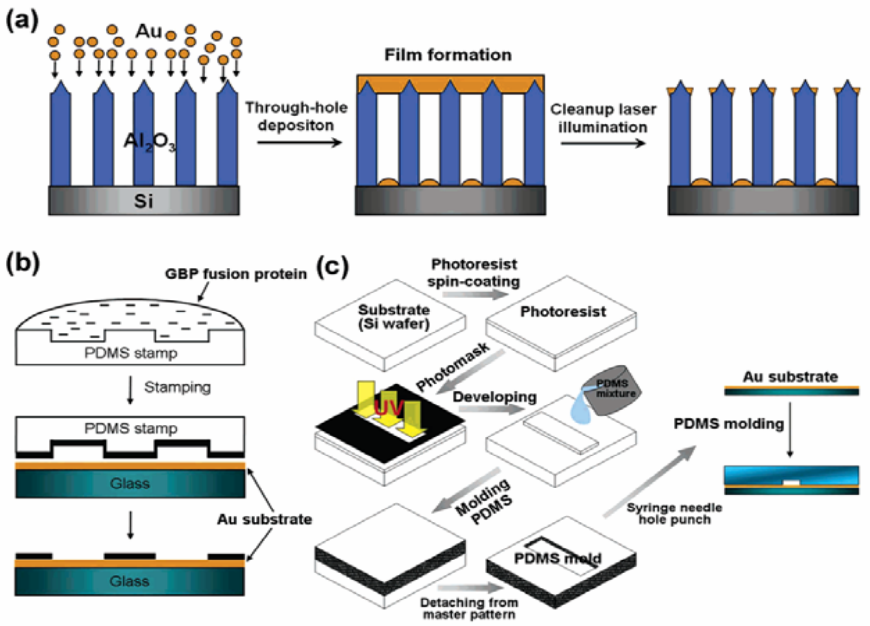
GBP application : Overall scheme of this study

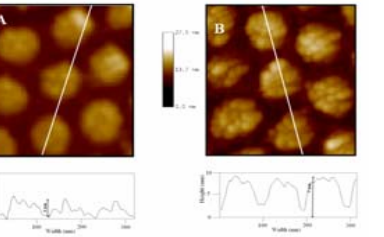
***In vitro* expression in *E. coli* and purification**

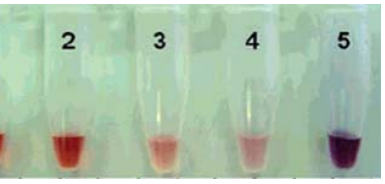


GBP-EGFP6H fusion protein

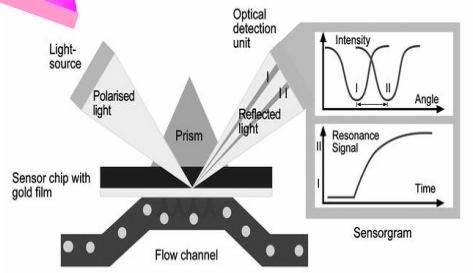




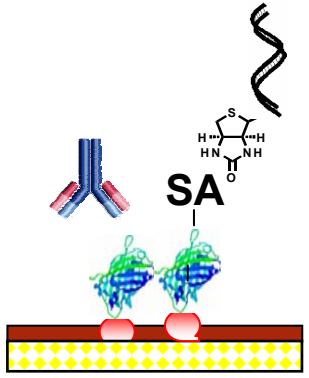




Colorimetric assay



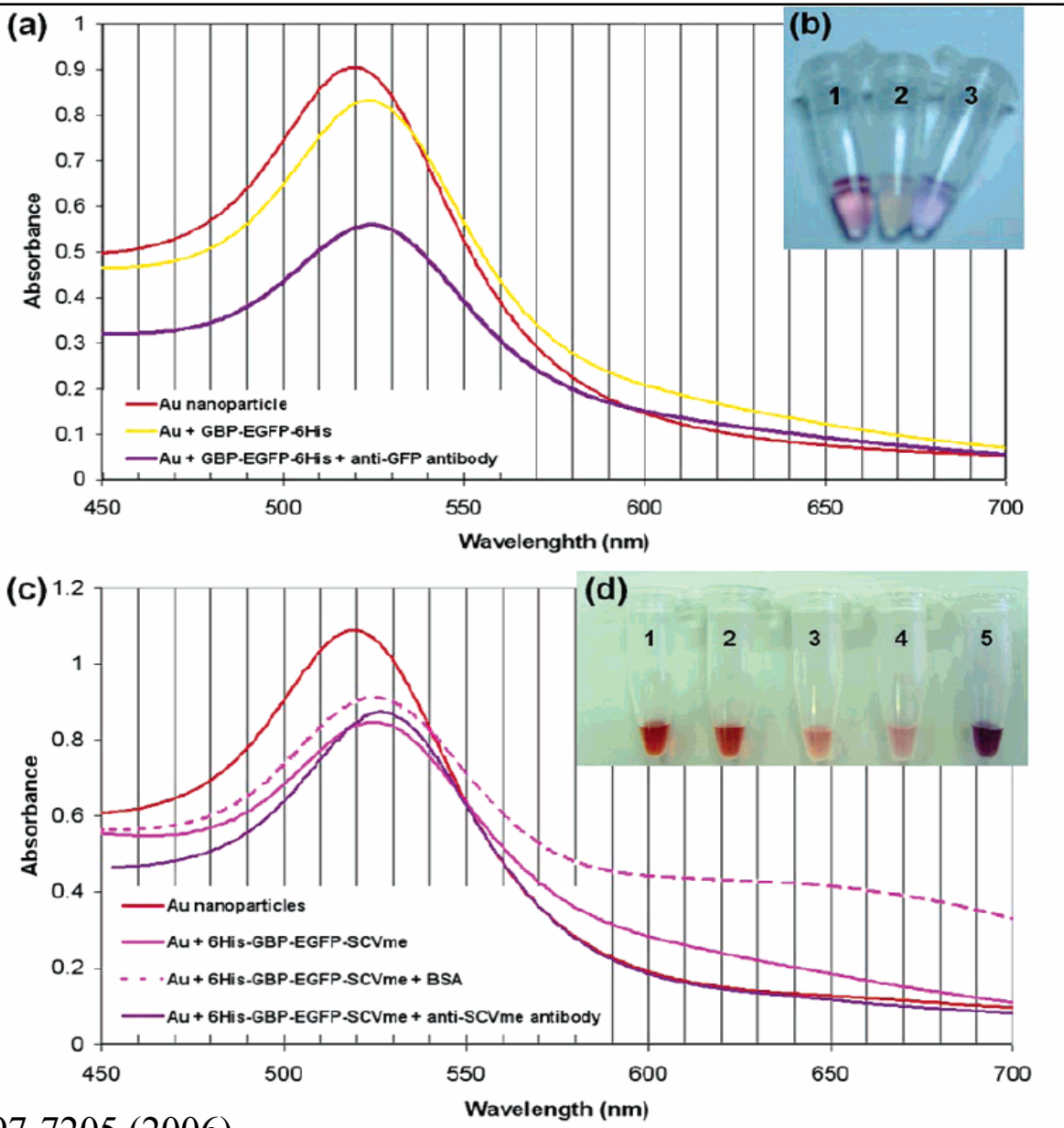
SPR



DNA & Protein interactions assay

nal. Chem., **78**:7197-7205 (2006)

Colorimetric assay



Anal. Chem., **78**:7197-7205 (2006)

SPR Analysis

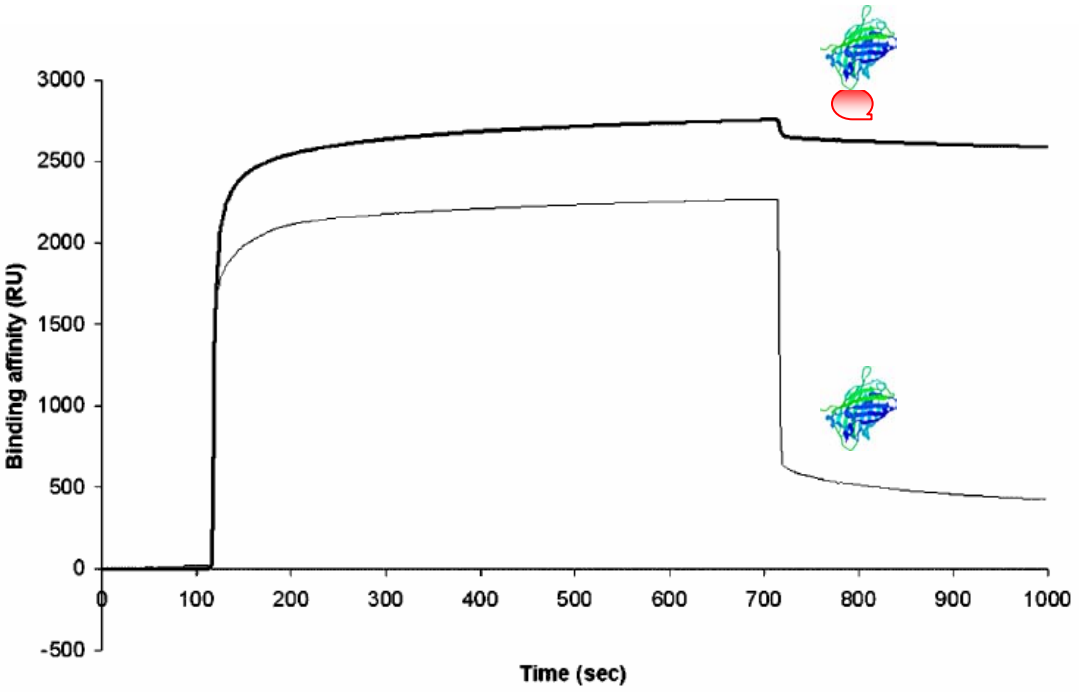
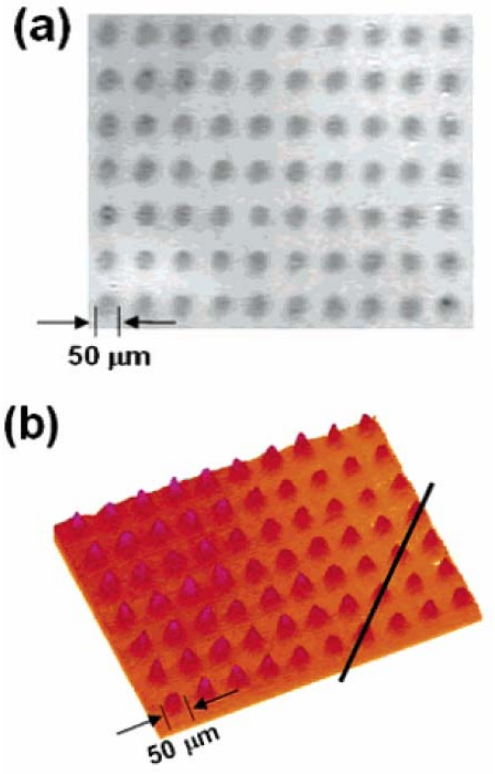
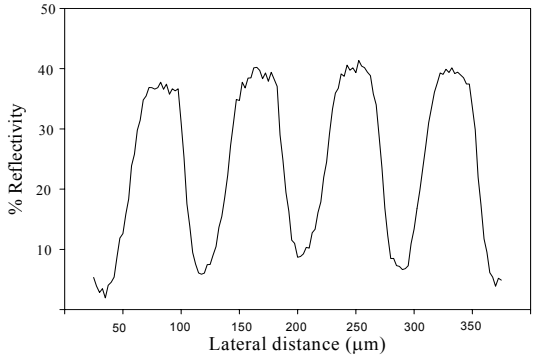


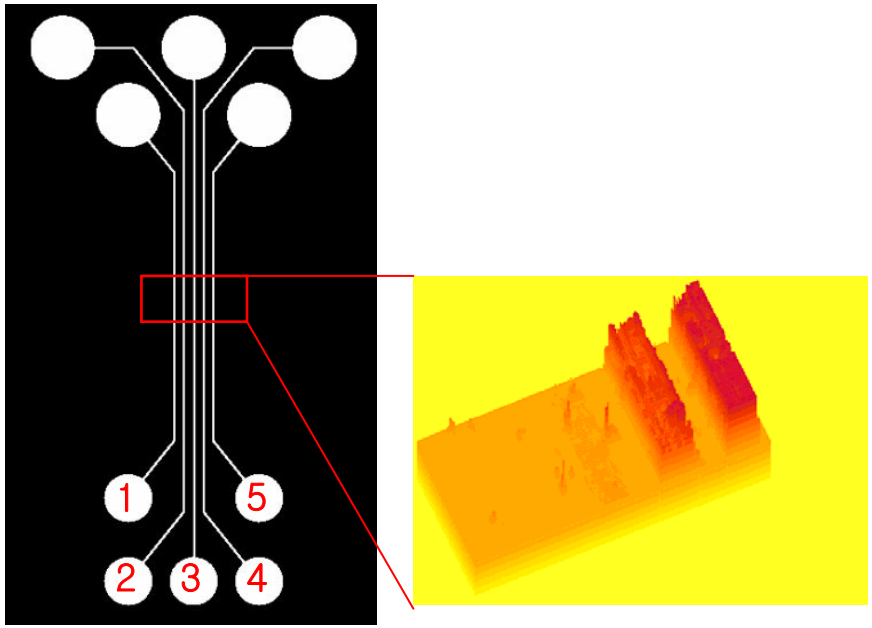
Figure 5. SPR sensorgrams showing the specific immobilization of GBP-EGFP-6His fusion proteins onto the gold sensor chip. The GBP-EGFP-6His fusion protein (boldface line) and EGFP (light line) were introduced at the flow rate of 5 μL/min. After protein binding, the surface of gold chip was washed with PBS solution.

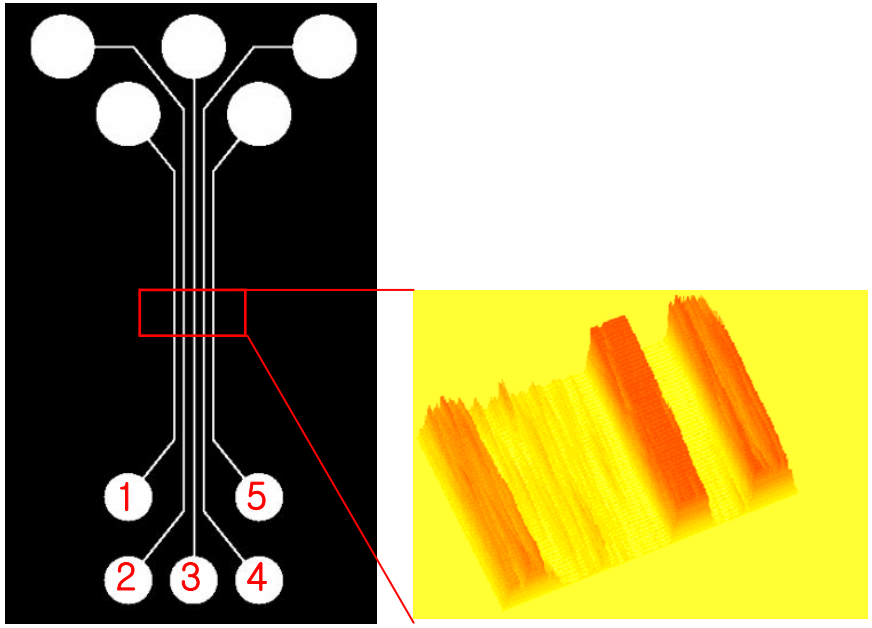




nal. Chem., **78**:7197-7205 (2006)

SPR*i* using microfluidic chip





: Bare gold surface
: Binding buffer
: 1% BSA in Binding buffer
anti-EGFP in Binding buffer, subsequently
: GBP-EGFP in Binding buffer
: GBP-EGFP
anti-EGFP in Binding buffer, subsequently

1 : GBP-EGFP-SA
2 : 1% BSA +probe DNA (biotinylated)
3 : GBP-EGFP-SA + probe DNA (biotinylated) subsequently

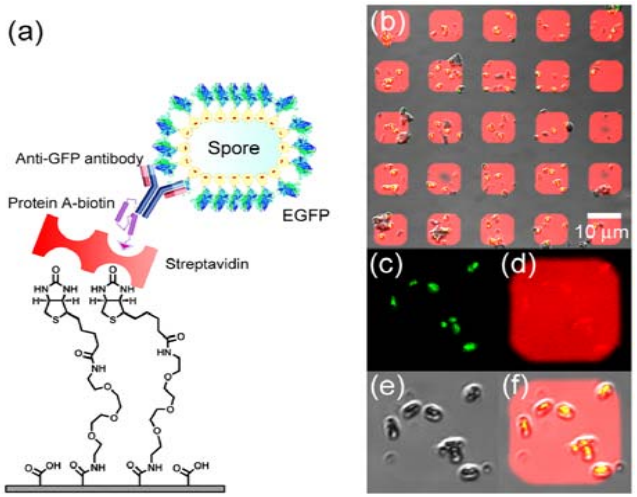
4 : GBP-EGFP-SA + probe DNA (biotinylated) subsequently

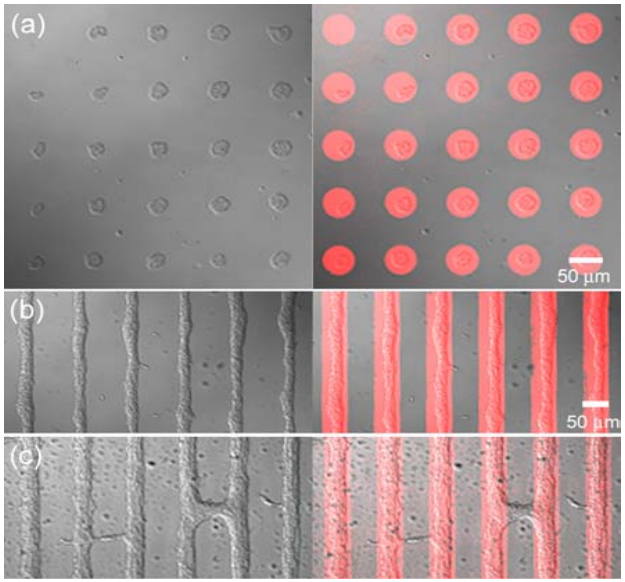
Conclusion & Summaries

1. The methods described in this study could be used as a general method for selective immobilization of GBP-fused proteins and its possible application for studying protein-protein interactions through the SPR & SPRi methods.
2. The binding of GBP-fused proteins to gold surface is very selective, and the fusion protein remains functional.

Other researches

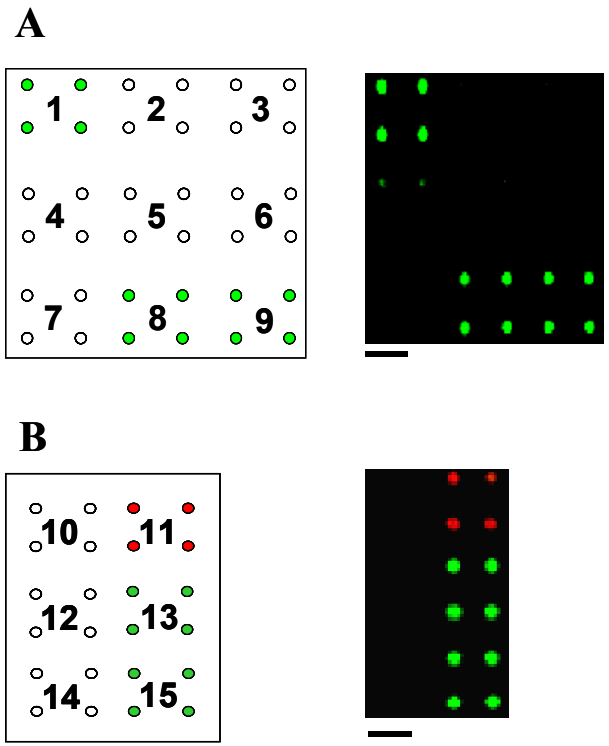
Micropatterns of spores displaying heterologous proteins





J. Am. Chem. Soc., **126**, 10512-10513 (2004)

Peptide microarrays for efficient kinase assay



Anal. Biochem, **330**, 311-316 (2004)

Acknowledgements & Coworkers

Tae Jung Park Ph.D., KAIST
Prof. Sang Yup Lee, KAIST
Jong Pil Park Ph.D., Northwestern Univ.
National NanoFab Center (NNFC)

Thank you all!