

## Protein Printing Kit

### Introduction

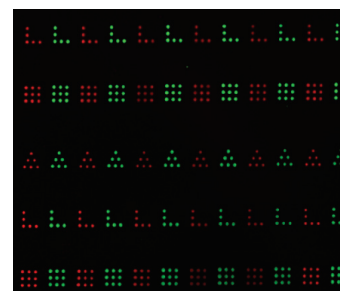
The Protein Printing Kit includes all the reagents and consumables necessary for patterning microscale protein arrays using NanoInk's Dip Pen Nanolithography<sup>®</sup> (DPN<sup>®</sup>) Systems and tools. The kit's proprietary Protein Printing Solution is specially formulated so that users can simply add their desired protein and then print well defined protein arrays, all within a matter of minutes.

### Applications

There is significant interest in being able to create high-quality, multiplexed protein arrays with micron-scale features and nanometer resolution on a functionalized planar surface. Microscale protein arrays have been demonstrated to be useful for protein detection and cell micropatterning studies in applications ranging from diagnostics to tissue engineering to basic research. Using NanoInk's Protein Printing Kit, proteomic researchers will be able to reliably and uniformly transfer proteins to a modified surface for further study.

### Multiplexed Protein Array Patterning

The Protein Printing Kit is compatible with all NanoInk nanofabrication systems and consumable fabrication tools. Using NanoInk's cantilever "multi-pen" tip arrays and reservoir "inkwells" to deposit protein features, up to 12 different proteins can be patterned simultaneously. Figure 1 shows a fluorescent microscope image of a typical multiplexed protein array created by the NLP 2000 System with the Protein Printing Kit.



**Figure 1:** Fluorescent image of a multiplexed pattern of laminin (green) and fibronectin (red). Scale bar is 50  $\mu\text{m}$ .

### Features and Benefits

*Patterning flexibility:* Using NanoInk's tip-based lithography systems and consumables with the Protein Printing Kit, users can easily manipulate the protein printing process to create any number of micropatterns.

*Customizable feature sizes:* Feature sizes of 1 - 8  $\mu\text{m}$  can be created by selecting the appropriate cantilever "pen" tip to deposit features, specifying the cantilever "pen" contact time with the substrate, and adjusting the patterning environmental conditions.

*Highly uniform features:* DPN system-generated protein domains typically exhibit a coefficient of variation (CV) of 10% -15% over the entire pattern.

*High throughput printing:* The Protein Printing Kit is capable of depositing 15 - 25 features per loading.

# Protein Printing Kit

(continued)

*Small sample size:* Compared to conventional protein microarrays, NanoInk's smaller feature sizes have the benefit of drastically reduced sample size requirements.

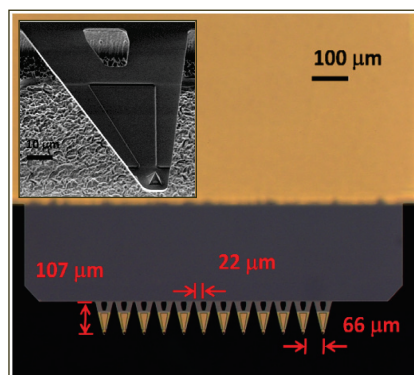
## Kit Components

The Protein Printing Kit (Figure 2) includes all cantilever "pens" (Figure 3), reservoir "inkwells" (Figure 4), solutions and substrates necessary to pattern proteins, as well as a detailed printing protocol:

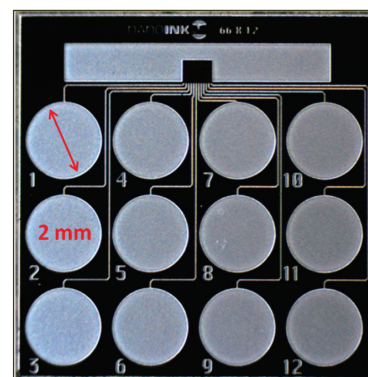
- Multi-Array Type M Pens, Qty. 5
- Inkwell Chips Type M-12MW, Qty. 3
- Epoxy Functionalized Glass Slide, Qty. 2
- Protein Printing Solution, 100  $\mu$ L
- Protein Printing Protocol



Figure 2: Protein Printing Kit



**Figure 3:** Type-M "pens" contain an array of 12 A-frame shaped cantilever "pen" tips spaced 66  $\mu$ m apart. Probes have a spring constant of 2.6 N/m and a specially-designed, recessed channel for improved transport of printing liquid.



**Figure 4:** Type M-12MW "inkwells" contain 12 separate reservoirs that feed printing liquid to the microwells into which "pen" tips are dipped. Channel spacing matches the "pen" tip spacing of Type-M "pens."

## System Compatibility

For use with the NLP 2000 System, DPN 5000 System, and NSCRIPTOR™ System