

Protein microarray developers have also worked with other materials as solid substrates for creating protein microarrays. These include aluminum or gold (expensive), hydrophilic polymers, and polyacrylamide gels. The different solid phase materials require different chemistries and are adaptable to different kinds of proteins. The most important characteristic of these chemistries is that they do not denature the protein in any manner.

One technique that has been developed for protein immobilization that results in a mechanically stable array but which still allows the individual molecules to move around in the immobilized membrane. This lateral fluidity is a property of biological membrane, where many therapeutically relevant proteins are located. The process uses modified glass surfaces with γ -aminopropyl silane. Because the membrane proteins are housed in the membrane, they are also immobilized. The membrane proteins have also been shown to remain functional, at least in the sense that they bind ligands in the expected manner.

Different families of G-protein-coupled-receptors (GCPRs) — the adrenergic, neurotensin, and dopamine receptors — have been used to create arrays using this technology. The arrays were incubated with fluorescently labeled ligands to screen compounds across different receptor families and within a single family of receptors. The affinity of compounds for a particular GPCR found using these arrays was the same as determined by other methods, suggesting that the GCPR activity is preserved in the Corning microspot.

Scientists also use photolithography (as with DNA microarrays) to etch miniature wells on the surface of silicon chips. The immobilized proteins or antibodies are located in the flow chambers on the chip, so they are always kept in aqueous solution and do not risk denaturation by drying. The proteins are then detected by fluorescent labeling, using a rapid-scanning reader developed by the company. Using the photolithography technique, the company can manufacture high-density arrays capable of detecting up to 10,000 proteins in parallel.

During the period from 2007 to 20012, the market for DNA/gene microarray products is expected to XXXX from \$XX xxxx to \$XX xxxx at an average annual XXXX rate of XX%. This growth rate is expected to XXXX significantly, XXXX at an average annual rate of XX% during the period 2012 to 2017, and reaching a total United States market potential of \$XX xxxx.

Table 8-2

Historic and Projected United States Market Potential for DNA/Gene Microarrays: 2007-2017

(US\$ Millions)

2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017

Source: Kalorama Information LLC

In fact, the market potential for DNA chips is expected to XXXX slightly between 2008 and 2009. This is believed to be the result of a complex combination of factors including political issues involving:

- Political issues affecting research funding;
- Economic issues affecting research and development in the pharmaceutical industry;
- Changes in the applications of DNA/RNA chips, particularly in genomics and microbiology; and
- A shift to tissue arrays for many former DNA-chip arrays.

This market potential, however, will adjust rapidly and significant XXXX in the market potential for this segment will resume by 2010.

For the period 2007 to 2017, the United States DNA/gene microarray products market potential is expected to XXXX at an average annual rate of XX%, causing the total market to grow XX-fold, from about \$XX xxxx to \$XX xxxx.