

Customizable DNA Microarrays

Dr. Amit Kumar
CEO and President
Combimatrix Corporation
Seattle, WA

Subsequent to the sequencing of the human genome, we are met with the task of understanding and mining such information for developing molecular diagnostics and new drugs. Such an endeavor has been and will continue to be facilitated through DNA microarrays. However, most approaches for fabricating microarrays do not provide the level of customization that is necessary for flexible and novel methods of genetic interrogation. Combimatrix has developed a new technology that uses semiconductor micro and nanotechnologies to enable the rapid, flexible, and inexpensive fabrication of fully customized DNA microarrays for R&D and molecular diagnostics applications. This technology, known as the “virtual flask” technology, allows thousands of individually controlled chemical reactions to be executed on a chip that is roughly one centimeter in surface area. The virtual flask technique is based on a proprietary semiconductor device that can fabricate in parallel multiple sequences of DNA through base-by-base assembly. The virtual flask technology arises from a combination of nanotechnology, biotechnology, and information technology in a unique approach to address a specific medical need. Virtual flasks have additional applications in biosensing, siRNA-based drug discovery, and others. This presentation will discuss the fundamental technology as well as specific applications in genomics and drug discovery.