

A Novel, High-Performance Random Array Platform for Quantitative Gene Expression Profiling

Gary Nunn

Illumina, Inc., U.S.A.

Illumina has developed a new microarray technology for quantitative gene-expression profiling on the basis of randomly assembled arrays of beads. Each bead carries a gene-specific probe sequence. There are multiple copies of each sequence-specific bead in an array, which contributes to measurement precision and reliability. We optimized the system for specific and sensitive analysis of mammalian RNA, and using RNA controls of defined concentration, obtained the following estimates of system performance: specificity of 1:250,000 in mammalian poly(A⁺) mRNA; limit of detection 0.13 pM; dynamic range 3.2 logs; and sufficient precision to detect 1.3-fold differences with 95% confidence within the dynamic range. Measurements of expression differences between human brain and liver were validated by concordance with quantitative real-time PCR ($r^2=0.98$ for log-transformed ratios, and slope of the best-fit line=1.04, for 20 genes).

Utilizing this new technology the available new products will be discussed which are designed to assay whole genome gene expression in human and mouse.