Assessment of Sensitivity and Dynamic Range of New Generation Microarray Technology using the MAQC Samples

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Abstract

Microarray technologies provide expression measurements that more accurately reflect the range of gene activities in biological samples, while feature density and content remain constant. This new platform provides expression measurements that more accurately reflect the range of gene activities in biological samples, while feature density and content remain constant. The reduction in area allows for a more concentrated target sample without increasing RNA concentration. The reduction in area allows for a more concentrated target sample without increasing RNA concentration. The reduction in area allows for a more concentrated target sample without increasing RNA concentration.

Introduction

Recently the MicroArray Quality Control (MAQC) consortium published the most comprehensive study to date assessing the performance and platform comparability of microarray technology. The microarrays are commercially available isolates and the techniques used in the study allow for the relatively straightforward assessment of microarray performance.

Sensitivity and Dynamic Range

The response of biological probes is also improved using the new 4 pack format. The graphs shown in Figure 2 demonstrate the detected signals for the same sample hybridized on the two formats. As can be seen in the figure, overall signal correction between the formats, with higher probe intensities for the 4 pack array. In addition, 9000 probes that were either below the detection limit (three times the measured background noise) or saturated on the 44K array are now detected on the 4 pack array. The graphs represent the exact same data as those with spots in data shown in Figure 2 and the 4 pack array is from the red shaded areas shown in Figure 1.

Comparison To TaqMan®

The relative accuracy of microarray platforms can be assessed by comparison to gene expression measurements collected by alternative platforms. Figure 6 presents scatter plots of the 4 pack and 44K log2(B/A) concentration response. The 4 pack arrays (shown in red) have a lower CV (84%) compared to the 44K (88%).

Conclusions

We have used the MAQC samples to evaluate performance of a new generation microarray technology, the Agilent 4 pack microarray, and compared performance to that of the previous generation.

Both formats demonstrate good reproducibility with readouts within standard errors less than 18%. The 4 pack microarrays show generally improved reproducibility as compared to the 44K microarrays, due in part to the increased concentration of hybridizations.