# Effect of Target Nucleotide Length on Hybridization for Microfluidic DNA Microarray

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On a microfluidic platform, length of target nucleotide is a deterministic factor in behavior of target:probe nucleotide hybridization. DNA hybridization assays are widely used for biomarker detection for both research as well as clinical applications. In this study, three target DNA oligo-nucleotides having different lengths, 18-mer, 38-mer, and 42-mer, were examined with re-circulating flow on a same 18-mer probe immobilized in polyacrylamide gel pad. Re-circulating flow is adopted to overcome extremely slow diffusion of target DNA in a solution without mixing. Depending on the lengths of oligo-nucleotides, their hybridization and melting profiles with temperature were varied significantly, which reflect that extra-lengthy nucleotides were dynamically influenced by re-circulating flows.
By comparison of three target nucleotides, relationships between flow and hybridization could be obtained. Furthermore, results could give a basic understanding for an optimal level of fragmentation and labeling of target nucleotides with ribosomal RNA. Our technology could have far-reaching fundamental researches in micro-fluidic dynamics or microarray study.