Detection of cystic fibrosis related DNA targets using AC field focusing of magnetic labels and spin-valve sensors

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Abstract: A spin-valve sensor biochip was used to detect cystic fibrosis related DNA targets for the purpose of developing an affordable diagnostic chip. The strategy used was based on the ac field focusing of magnetically labeled target DNA at sensor sites using U-shaped current lines. U-shaped spin-valve sensors, fabricated within the line structures, detected in real-time the hybridization of DNA targets to complementary DNA probes, previously immobilized onto the chip surface. Hybridization occurred in relatively short times (15-30 min) in comparison with conventional hybridization approaches (3 to 12 h). Statistical data on detection signals for single probe and multiprobe experiments was obtained, showing a significant difference between complementary binding signals and noncomplementary and background ones.

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