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On-Chip immunoassay of a Cardiac Biomarker in Serum Using a Polyester-Toner Microchip

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ACCEPTED MANUSCRIPT

1	On-Chip immunoassay of a Cardiac Biomarker in Serum Using a Polyester-Toner
2	Microchip
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6	Abstract
7	An on-chip immunoassay to detect C-reactive protein (CRP) was performed using a
8	polyester-toner (PT) microchip. CRP is a highly conserved plasma protein responding to
9	inflammation and is used for clinical purposes to diagnose an inflammatory state. For rapid
10	analysis and specific interactions in immunoassays, extensive studies using microfluidic
11	chips have been carried out. Recently, a simple technique to fabricate a disposable PI
12	microchip by a direct printing process was developed and several applications were
13	introduced. One major drawback of the PT microchip, however, is the poor separation
14	performance due to the quality of the microfluidic structures. This problem for a PT
15	microchip can be overcome using a cleavable tag immunoassay, which requires minima
16	separation performance. After analytes are conjugated onto antibodies which are immobilized
17	on the surface of microbeads placed on the PT microchip, a second group of fluorescently
18	tagged antibodies is added and complexed with the analytes. The tag is then cleaved and the
19	solution containing the cleaved tag is analyzed by electrophoresis. The time needed for the
20	complete analysis to be carried out on a PT microchip was less than 35 min. The dynamic
21	range of the CRP in 10-fold diluted serum was 0.3 to 100 mg/L and the limit of detection was
22	0.3 mg/L, which demonstrated the possibility of a quantitative analysis of CRP in serum in
23	clinical trials.
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cleavable tag immunoassay

Keywords: Polyester-toner microchip, microfluidic immunoassay, C-reactive protein,

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