



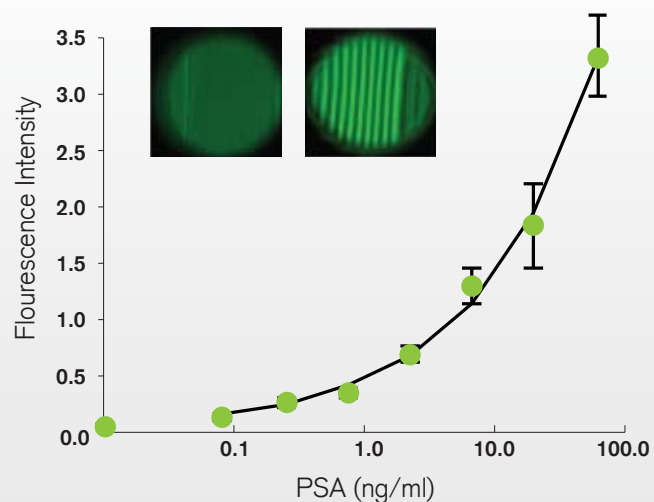
## Technical bulletin

### Microfluidic performance, lateral flow price

Technical Update: Summer 2014

#### Highlights:

- High sensitivity multiplex cytokine measurement
- Rapid assays in whole blood
- pg/ml sensitivity achieved using conventional colorimetric assay chemistry
- Expanded range of low cost colorimetric and fluorescence reader options including scanner, CMOS/CCD camera, smartphone



**Rapid PSA quantitation using simple smartphone fluorescence detection**

Tel: **+44 (0)1403 787 927**

Email: **sales@capfilmtech.com**

Twitter: **@CapFilmTech**

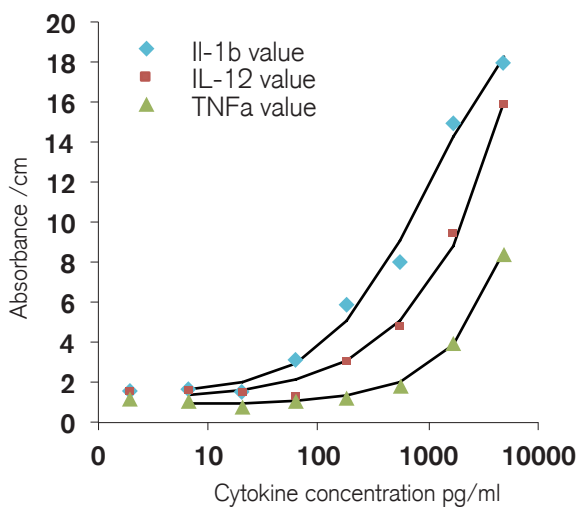
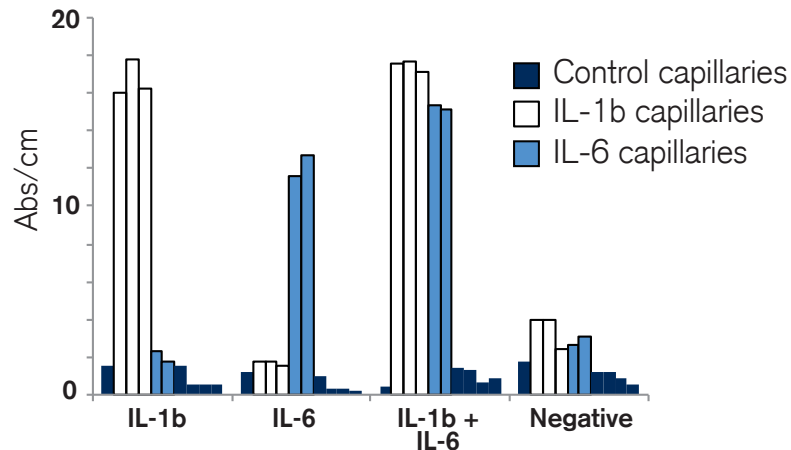
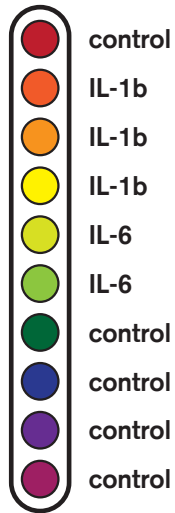


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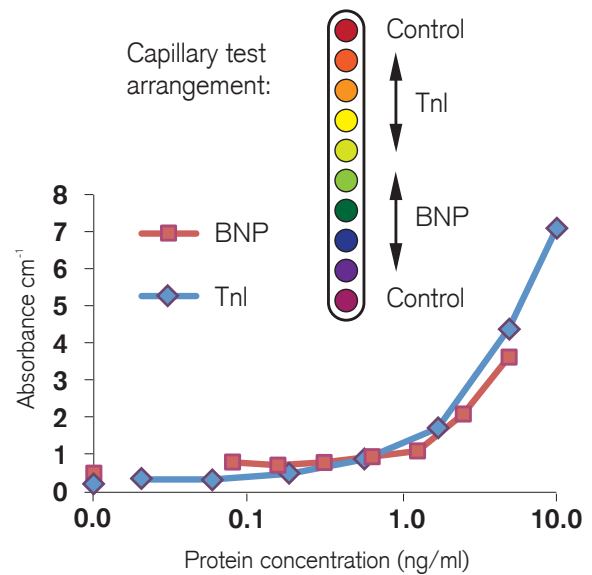


## Multiplex assays measuring multiple markers in a single sample

Capillary test arrangement:



**Quantitative Multiplex Cytokine Measurement**



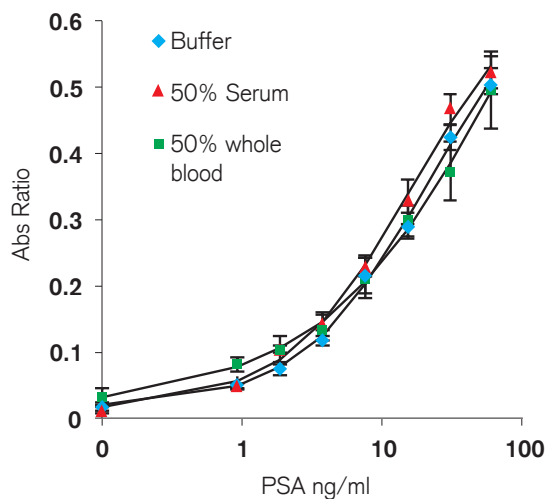
**Quantitative Dual Cardiac Biomarker Measurement**

## Rapid Assays in Whole Blood

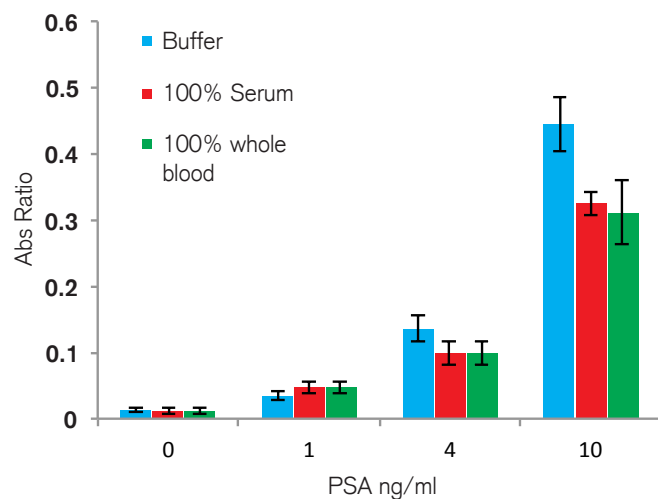
Assay Step	Time (min)	
	Conventional Microtitre plate	FluorEx™ Microcapillary Film
Sample Incubation	120	2
DetAb Incubation	120	5
Enzyme Incubation	20	5
Enzymatic Substrate Incubation	20-30	1.5-3
Total wash steps	3x-6 washes	1
Total	280	13.5-15

Microfluidic dimensions deliver rapid assay incubation times

Abs Ratio vs PSA- 50% serum/blood



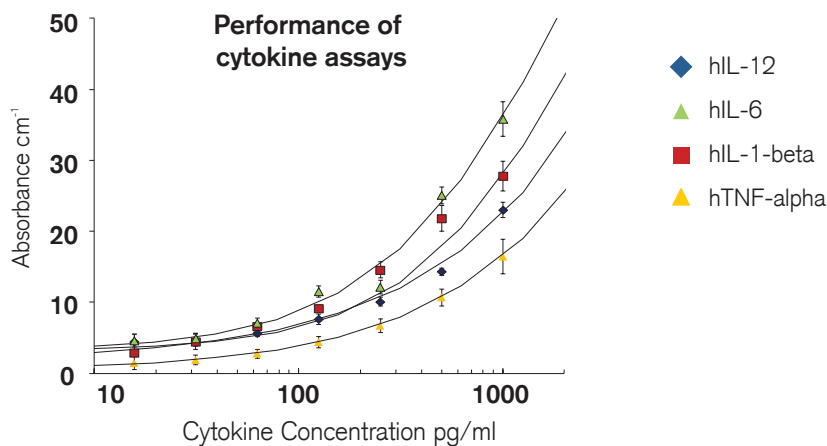
Abs Ratio vs PSA- 100% serum/blood



Assay Parameter	Buffer	50% Serum	50% Whole Blood	100% Serum
Assay Range	0.9–60.0 ng/ml ( $R^2 = 0.9988$ )	0.9–60.0 ng/ml ( $R^2 = 0.9981$ )	0.9–60.0 ng/ml ( $R^2 = 0.9983$ )	0.9–60.0 ng/ml ( $R^2 = 0.9988$ )
Sensitivity (LoD)	<0.9 ng/ml	<0.9 ng/ml	<0.9 ng/ml	<0.9 ng/ml
Precision	5% at 3.8 ng/ml	9% at 3.8 ng/ml	7% at 3.8 ng/ml	7% at 3.8 ng/ml

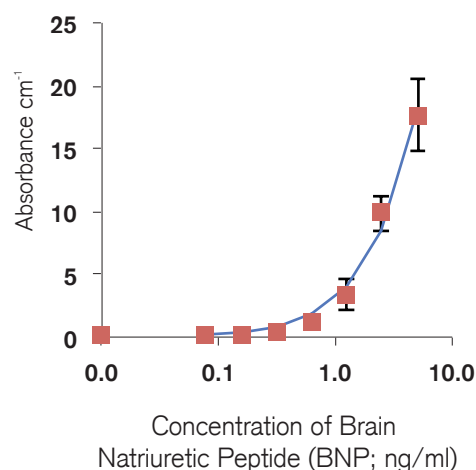
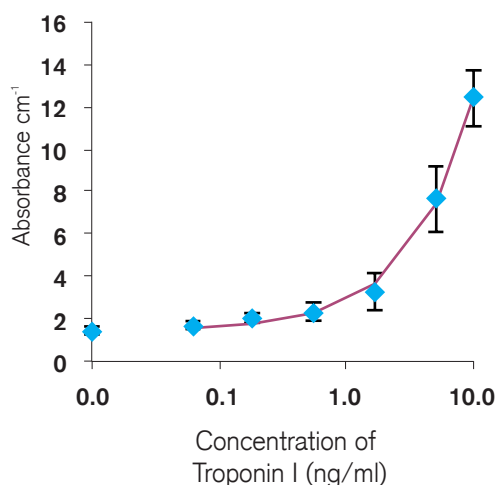
Assays can be performed directly in whole blood or serum with no loss in performance.  
See Barbosa et al Lab Chip 2014 for more details (DOI: 10.1039/C4LC00464G).

## High Assay Sensitivity using Conventional Colorimetric ELISA Chemistry



Cytokine	LoD (pg/ml)	LoQ (pg/ml)	Precision (%CV)	Dynamic range
hIL-1beta	7	53	7.5% at 60 pg/ml	1.5-2.0 log
hIL-6	15	20	9.0% at 48 pg/ml	
hIL-12	2	104	6.9% at 62 pg/ml	
TNF-alpha	6	20	12% at 62 pg/ml	

### High sensitivity measurement of human cytokines



### High sensitivity measurement of cardiovascular disease biomarkers

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