

APPLICATION OF BIOCHIP ARRAY TECHNOLOGY TO THE EVIDENCE MULTISTAT ANALYSER FOR THE RAPID MULTI-ANALYTICAL SCREENING OF DRUGS

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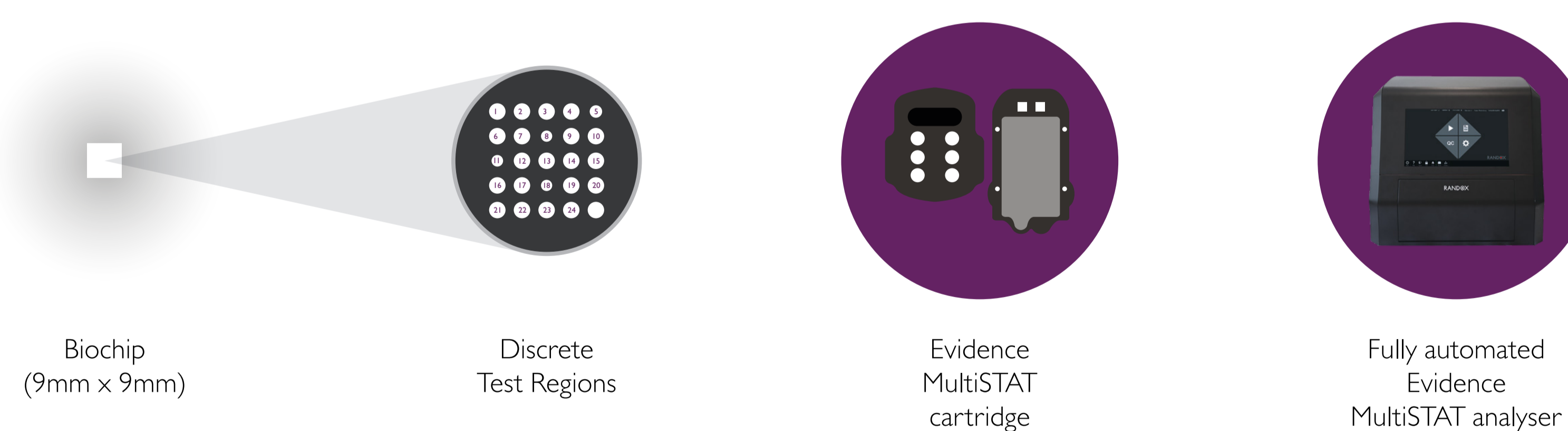
INTRODUCTION

Biochip array technology, by using discrete miniaturised immunoassays on the biochip surface, enables the screening of multiple drugs from a single sample thus increasing the screening capacity and the result output. Rapid drug screening is beneficial in the screening step of the drug testing process. The application of this technology to the fully automated Evidence MultiSTAT analyser leads to the rapid and simple multi-analytical screening of specimens.

This study reports analytical evaluation of two biochip arrays, one developed for the rapid simultaneous detection of drugs in urine (creatinine assay also included as marker of dilution) and the other developed for the rapid simultaneous detection of drugs in blood.

METHODOLOGY

Simultaneous competitive chemiluminescent immunoassays on a biochip surface applied to the Evidence MultiSTAT analyzer were employed. This fully automated system processes a self-contained cartridge containing all the components required for the immunoassay reactions and has the capacity to screen in under 20 minutes (urine) and within 23 minutes (blood). Sampling against a cut-off sample, the results obtained are qualitative.



CONCLUSION

Data indicate that multiple drug classes can be rapidly screened from a single sample of urine or blood by applying simultaneous biochip-based immunoassays to the biochip analyser Evidence MultiSTAT. This application facilitates the drug testing process as it represents a rapid and easy to use multi-analytical screening tool.

RESULTS

Urine screening (within 20 minutes)

Test menu and cut-offs			
	Cut-off (ng/mL)		Cut-off (ng/mL)
AB-PINACA	2.5	6-MAM	10
α-PVP	5	Methadone	300
Amphetamine	200	Methamphetamine	200
Barbiturates	200	Opiate	200
Benzodiazepines 1	150	Oxycodone	50
Benzodiazepines 2	150	THC	20
Benzoyllecgonine/cocaine	150	Tramadol	5
Buprenorphine	1	Tricyclic antidepressants (TCAs)	100
ETG	750	UR-144	10
Fentanyl	2		
JWH-018	20	Creatinine	20mg/dL

Repeatability (replicates +50% and -50% cut-off)	Accuracy (50 negative and 50 spiked samples, spanning the cut-off)
>90% for all the assays	>90% for all the assays

Blood screening (within 23 minutes)

Test menu and cut-offs			
	Cut-off (ng/mL)		Cut-off (ng/mL)
AB-CHMINACA	5	6-MAM	10
AB-PINACA	2	Methadone	10
α-PVP	5	Methamphetamine	50
Amphetamine	50	Opiate	80
Barbiturates	50	Oxycodone	10
Benzodiazepines 1	20	Pregabalin	1,000
Benzodiazepines 2	20	Propoxyphene	10
Benzoyllecgonine/cocaine	25	THC	10
Buprenorphine	2	Tramadol	5
ETG	500	Tricyclic antidepressants (TCAs)	60
Fentanyl	1		

Repeatability (replicates +50% and -50% cut-off)	Accuracy (50 negative and 50 spiked samples, spanning the cut-off)
>90% for all the assays	>80% for all the assays