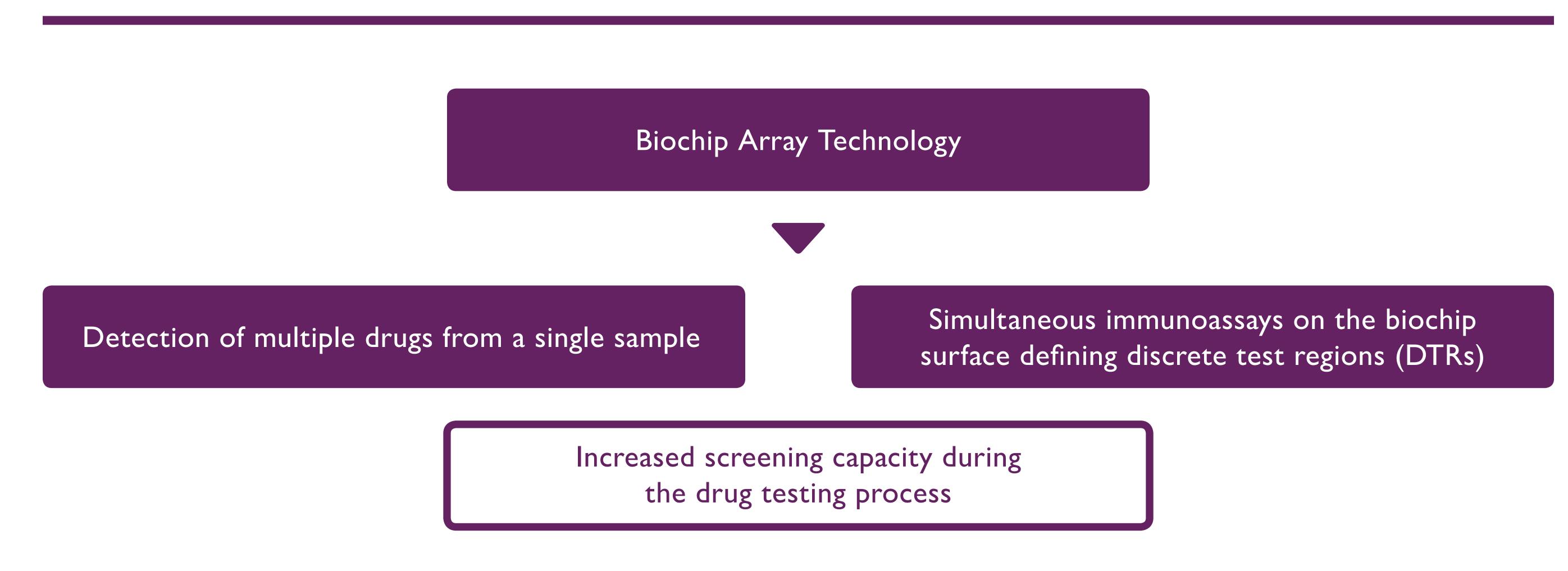
DEVELOPMENT OF A NOVEL HIGH-DENSITY BIOCHIP ARRAY FOR INCREASED COMPREHENSIVE MULTI-DRUG SCREENING (44 SIMULTANEOUS ASSAYS) FROM A SINGLE SAMPLE



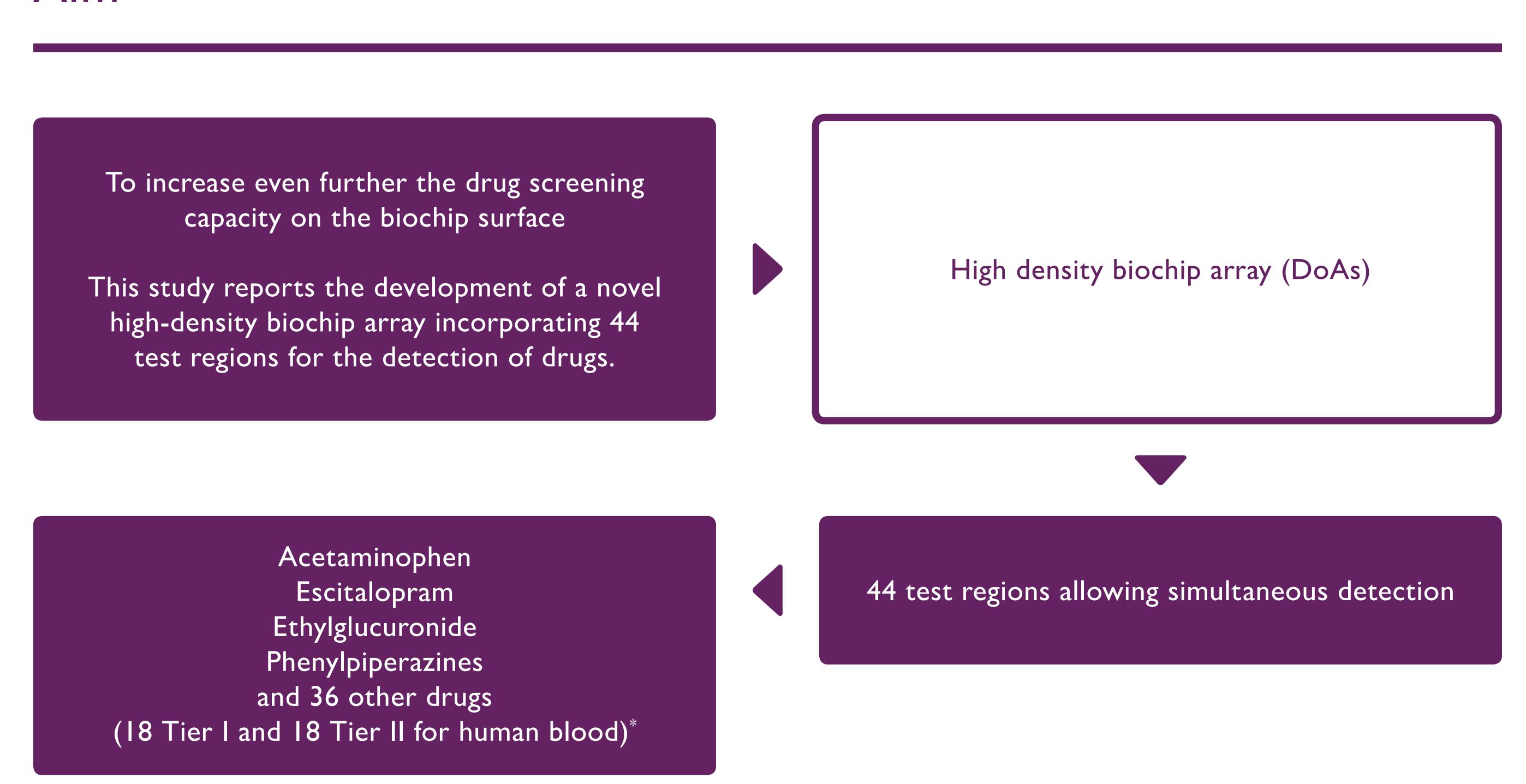
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Introduction



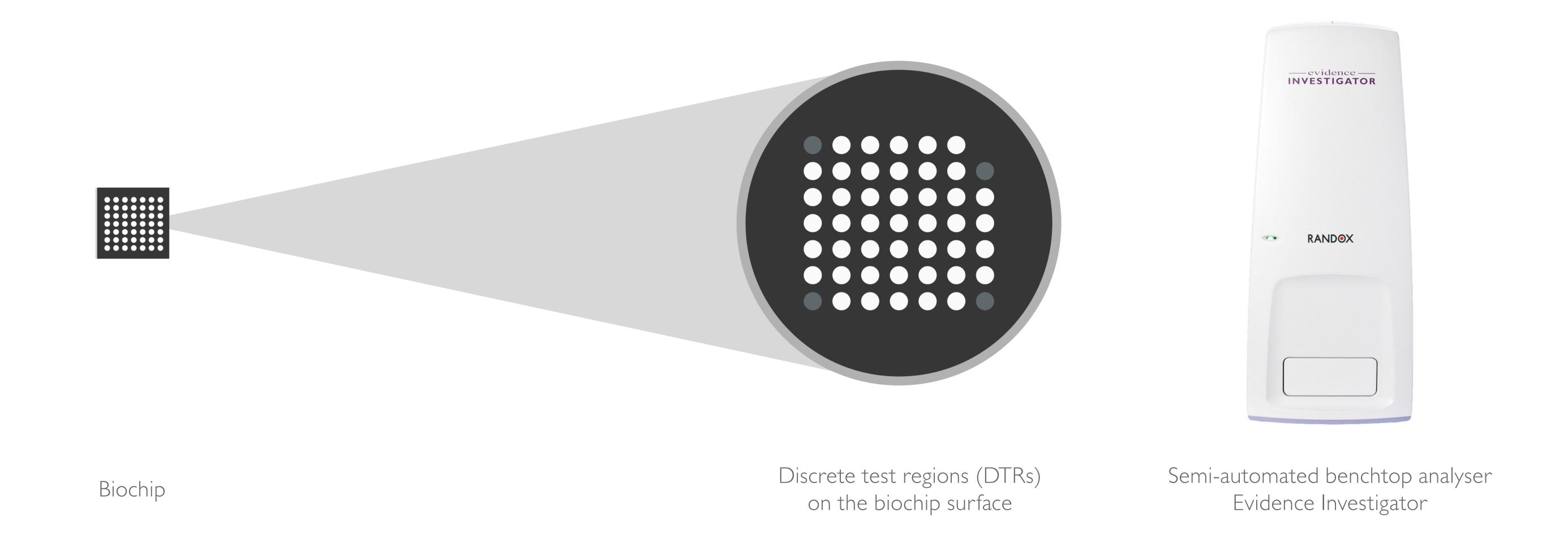
With the introduction of new legislation and an increase in drug abuse, the ability to screen as many analytes from a single sample as possible is more important than ever, saving time and resources.

Aim



Methodology

Simultaneous competitive chemiluminescent immunoassays (n=44) defining DTRs on the biochip surface were employed and applied to the biochip analyser Evidence Investigator. The light signal generated from each of the test regions on the biochip was simultaneously detected using digital imaging technology. The signal output is inversely proportional to the concentration of drug in the sample. The system has dedicated software to process, report and archive the data produced.



Results

Initial analytical evaluation is presented.

The immunoassays on the high-density biochip array and the half maximal inhibitory concentration (IC_{50}) achieved are shown in the table to the right.

Conclusion

The high-density biochip array developed for the increased comprehensive multi-drug detection (44 simultaneous immunoassays) has the potential of greatly assist the screening step in the drug testing process by increasing even further the test result output from a single sample.

Reference

I. Logan B.K., et al. Recommendations for Toxicological Investigation of Drug-Impaired Driving and Motor Vehicle Fatalities-2017 Update. J Anal Toxicol. 2018, 42(2): 63-68

	Immunoassay	IC ₅₀ (ng/mL)	Tier	Drug Type
1.	6-MAM	0.2		Narcotic Analgesics
2.	AB-CHMINACA	0.7		Synthetic Cannabinoid
3.	AB-PINACA	0.6		Synthetic Cannabinoid
4.	Acetyl fentanyl	0.3		Narcotic Analgesics
5.	AH7921	0.1		Narcotic Analgesics
6.	Alpha PVP	0.2		CNS Stimulant
7.	Amphetamine	6.3		CNS Stimulant
8.	Barbiturate	5.8		CNS Depressant
9.	Mephedrone (Bath Salts I)	0.4	II	CNS Stimulant
10.	Oxazepam (Benzodiazepine I)	2.4		CNS Depressant
11.	Lorazepam (Benzodiazepine II)	1.6		CNS Depressant
12.	Buprenorphine	0.2		Narcotic Analgesics
13.	Benzoylecgonine/cocaine	1.4		CNS Stimulant
14.	Carfentanil	0.1		Narcotic Analgesics
15.	Clonazepam	0.1		CNS Depressant
16.	Dextromethorphan	0.24		Dissociative Drugs
17.	Escitalopram	0.67	_	SSRI CNS Depressant
18.	Ethylglucuronide	86.2	_	CNS Depressant
19.	Etizolam	0.1		CNS Depressant
20.	Fentanyl	0.07		Narcotic Analgesics
21.	Fluoxetine	1.9	_	CNS Depressant
22.	Gabapentin	2764		CNS Depressant
23.	Ketamine	4.8		Dissociative Drugs
24.	LSD	0.1		Hallucinogen
25.	Meperidine	0.96	_	Narcotic Analgesics
26.	Meprobamate	10.5		CNS Depressant
27.	Methadone	0.4		Narcotic Analgesics
28.	Methamphetamine	3.7		CNS Stimulant
29.	Mitragynine	0.16		CNS Stimulant
30.	Naloxone	0.2	_	Narcotic Analgesics
31.	Opiate	1.9		Narcotic Analgesics
32.	Oxycodone I	0.7		Narcotic Analgesics
33.	Oxycodone II	0.03		Narcotic Analgesics
34.	PCP	0.5		Dissociative Drugs
35.	Phenylpiperazines	1.9	_	SARI
36.	Pregabalin	24		CNS Depressant
37.	TCA	6.5		CNS Depressant
38.	THC	0.9		Cannabis
39.	Tramadol	0.2		Narcotic Analgesics
40.	Trazodone	0.5	_	CNS Depressant
41.	U47700	0.8		Narcotic Analgesics
42.	Generic opioids	1.9		Narcotic Analgesics
43.	Acetaminophen	3279.1	<u>-</u>	Analgesic
44.	Zolpidem	0.3		CNS Depressant
	2017130111			Ci to Depiessant

*According to the updated (2017) recommendations for the toxicological investigation of suspected alcohol and drug-impaired driving cases and motor vehicle fatalities.

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