RANDOX
TOXICOLOGY

Toxicology Solutions

Contents

Introduction

Randox Toxicology aim to minimise laboratory workflow constraints whilst maximising the scope of quality drug detection. We are the primary manufacturer of Biochip Array Technology, ELISAs, and automated systems for forensic, clinical and workplace toxicology.

Biochip Array Technology

Moving away from traditional single analyte assays, Biochip Array Technology (BAT) boasts cutting-edge multiplex testing capabilities providing rapid and accurate drug detection from a single sample. Based on ELISA principles, the Biochip is a solid state device with discrete test regions onto which antibodies, specific to different drug compounds, are immobilised and stabilised. Competitive chemiluminescent immunoassays are then employed, offering a highly sensitive screen.

Designed to work across a wide variety of matrices, this revolutionary multi-analyte testing platform allows toxicologists to achieve a complete immunoassay profile from the initial screening phase. Offering the most advanced screening technology on the market, Randox Toxicology has transformed the landscape of drugs of abuse (DoA) testing. Our unrivalled toxicology test menu is capable of detecting over 600 drugs and drug metabolites.

Benefits

Simultaneous detection

Multiplex testing facilitates simultaneous screening of various drugs and drug metabolites from a single sample.

Accurate testing

Biochip Array Technology has a proven high standard of accurate test results with CVs typically <10%.

Small sample volume

As little as 6µl of sample produces a complete immunoassay profile, leaving more for confirmatory testing.

Extensive test menu

With over 600 drugs and drug metabolites, Randox Toxicology have the world's largest multiplex screening testing menu.

Optimum efficiency

Multiplex testing delivers a more cost effective and efficient solution compared to any existing method.

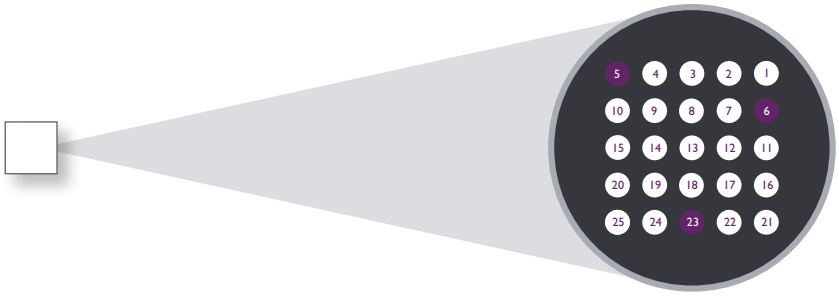
Multiple matrices

Including blood, urine, oral fluid, hair, meconium, vitreous humor and tissue.

Testing Process

Biochip Array Technology (BAT) is an immunoassay testing platform for the simultaneous multi-analyte testing of a panel of related tests. The technology works by combining a panel of up to 44 related tests on a single Biochip with a single set of reagents, controls and calibrators. Competitive chemiluminescent immunoassays are employed for the Biochip Arrays. A light signal generated from each of the test regions on the Biochip is simultaneously detected using digital imaging technology and compared to that from a calibration curve.

Example: DoA ULTRA



Discrete Test Regions (DTR) on each Biochip for individual analytes

1. Oxycodone I
2. Oxycodone II
3. Dextromethorphan
4. Meprobamate
5. Reference spot
6. Correction spot
7. Methamphetamine
8. Barbiturates
9. Benzodiazepines I (Oxazepam)
10. Benzodiazepines II (Lorazepam)
11. Methadone
12. Opiate
13. Phencyclidine (PCP)
14. Benzoylecgonine (Cocaine Metabolite)
15. Zolpidem
16. Tricyclic Antidepressants (TCA)
17. Cannabinoids (THC)
18. Tramadol
19. Amphetamine
20. Fentanyl
21. Blank
22. Buprenorphine
23. Correction Spot
24. Benzodiazepines III (Clonazepam)
25. Generic Opioids

The Evidence Series

The Evidence Series of immunoassay analysers are powered by Biochip Array Technology and combine the latest technological advances for drug residue detection using immunoassay principles. This has resulted in the creation of three systems; our newly released Evidence+, the Evidence Investigator and the Evidence MultiSTAT, which allow for simultaneous semi-quantitative or qualitative analysis of up to 44 tests per sample.

Evidence+

Fully automated batch immunoanalyser

Receive up to 3,780 test results in under 90 minutes*

Ideal for high throughput laboratories

Evidence Investigator

Semi-automated, bench top analyser

Receive up to 1,890 test results in 70 minutes*

Ideal for small to medium sized laboratories

Evidence MultiSTAT

Fully automated, bench top analyser

Receive up to 58 test results in under 30 minutes**

Ideal for workplace, custodial or laboratory drug testing

*Based on DOA Blockbuster Array

**Based on ToxPlex Array

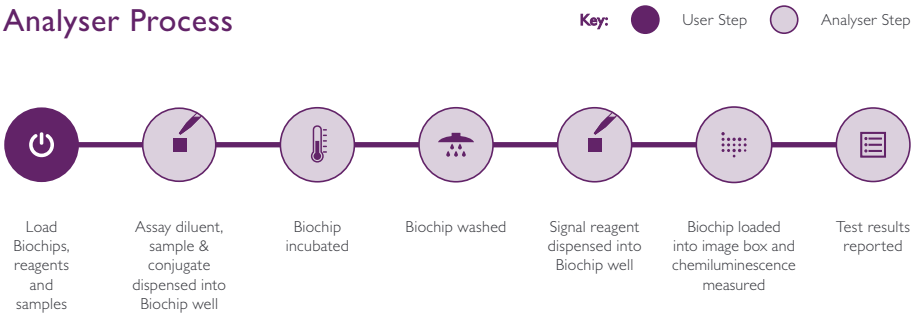
Evidence+

Faster Testing, Accurate Results

The fully automated Evidence+ analyser is set to truly revolutionise laboratories worldwide. Continuing to provide high standards of quality, efficiency and reliability, the fully automated batch immunoanalyser simultaneously detects multiple drugs and drug metabolites from a single sample.

The Evidence+ analyser enables both efficient and cost-effective testing whilst providing accurate and reliable results to larger high throughput laboratories.

Analyser Process



Large Sample Throughput

With the potential of up to 3,780 test results in under 90 minutes, based on a throughput of 1 carousel containing 90 samples using our DOA Blockbuster Array, the Evidence+ analyser is uniquely designed for fast and accurate batch analysis.

Precise Testing

Biochip Array has a proven high standard of precise testing with CVs typically <10%. Multiplex capabilities will minimise analytic variation between tests, representing greater value for money.

Worklist Loading

Allows the operator to save frequently used worklists, reload them onto the system and apply them to different arrays with a few simple clicks, ensuring time to first result is firmly fixed at <45 minutes (array dependent).

Quality Control Extension

Extended quality control viewing allows results to be displayed on the system for up to 180 days, facilitating the operator with trend analysis for recalibration and control performance.

Technical Snapshot

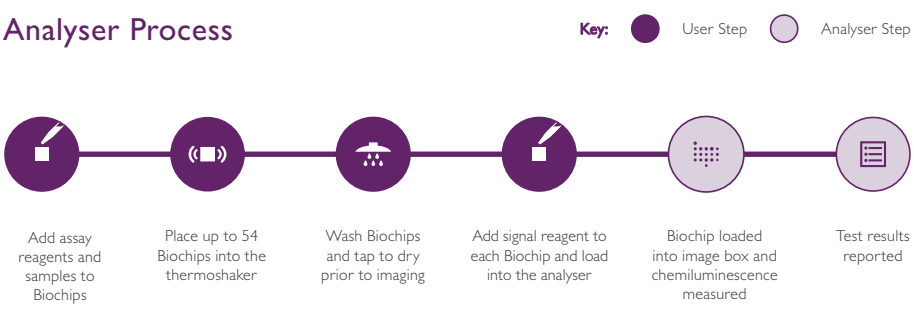
Dimensions	1750 (H) x 1000 (D) x 2000 (W) mm
Weight	650 kg, 1433 lbs
Biochip Format	10 Biochip carriers (each holds 9 individual Biochips)
Maximum Throughput	Up to 90 samples in under 90 minutes (array specific)
Operational Modes	Windows® based
Sample Capacity	180 Samples
Sample Volume	6 - 150µl per Biochip (Array specific)
Time to First Result	< 45 minutes (Array specific)
Accreditation	CE marked (Europe) & SFDA MDMA (Saudi Arabia) authorised
Analyser Type	Fully automated analyser (Class 2 Laser Product)

Evidence Investigator

Versatile, Efficient and Comprehensive Testing

The Evidence Investigator is a compact, semi-automated benchtop platform which avails of the world's most comprehensive toxicology test menu. Utilising revolutionary Biochip Array Technology, this analyser facilitates simultaneous detection of multiple drugs and drug metabolites from a single sample. With the ability to consolidate a number of immunoassay tests, the Evidence Investigator is an efficient and cost effective solution for drugs of abuse testing, providing laboratories with a highly sensitive immunoassay screen.

Analyser Process



Simultaneous Analyte Detection

The multiplex testing capabilities of Biochip Array Technology facilitates accurate simultaneous screening of various drug metabolites across our toxicology arrays, with CVs typically <10%.

Optimum Efficiency

Multi-analyte controls and calibrators with multiplex testing capabilities, facilitate laboratory efficiency and deliver a cost consolidating solution for the toxicology laboratory.

Multiple Matrices

Testing available across multiple matrices including; blood, urine, oral fluid, hair, vitreous humor, meconium and tissue to accommodate any laboratory.

Fast Turnaround Time

With a throughput of 45 samples in 70 minutes, the Evidence Investigator is uniquely designed for fast and accurate batch analysis and delivers up to 1,890 test results.

Technical Snapshot

Dimensions	750 (H) x 480 (D) x 420 (W) mm
Weight	24 kg, 52.9 lbs
Biochip Format	1x Biochip carrier (min 3 & max 9 individual Biochips)
Maximum Throughput	45 samples in 70 minutes
Accreditation	CE marked (Europe), Health Canada, NMPS (China), CDSCO (India) and MFDS (Korea) approved, SFDA MDMA (Saudi Arabia), ANVISA (Brazil), MDA (Malaysia) and TGA (Australia) authorised
Measurement Principal	Competitive chemiluminescent reaction
Analyser Description	Semi-automated Biochip Array analyser
Calibration Method	9 point calibration

Evidence MultiSTAT

Fully Automated Drug Testing

Using our revolutionary Biochip Array Technology, the Evidence MultiSTAT is an automated analyser that enables on-site simultaneous detection of up to 29 classical, prescription and synthetic drugs from a single sample. Designed to work across a variety of matrices, our patented multi-analyte testing platform provides a complete immunoassay profile within minutes, changing the landscape of drug detection forever.

Analyser Process

Key: User Step Analyser Step

Prepare sample and add to cartridge

Load reagent and tip cartridge to MultiSTAT

Press play

No Laboratory Required

The Evidence MultiSTAT is a versatile analyser that provides automated drug screening in a range of settings, such as workplaces, custodial environments and hospitals.

Simple Process

With prefilled reagent cartridges and a simple interface, non-laboratory trained staff can operate the analyser in any environment and achieve accurate, qualitative or semi-quantitative results in minutes.

Rapid Screening

As minimal sample preparation is required, up to 58 results can be provided in under 30 minutes, offering an efficient and accurate toxicology screen.

Extensive Test Menu

The Evidence MultiSTAT facilitates on-site simultaneous screening of multiple drug classes, including classical, prescription and synthetic drugs of abuse.

Technical Snapshot

Dimensions	585 (H) x 535 (D) x 570 (W) mm
Weight	48 kg, 106lbs
Analyser Description	Fully automated Biochip Array analyser
Biochip Format	Cartridge based system – assay reagents sealed in a pre-filled cartridge
Maximum Throughput	Up to 58 results in under 30 minutes (array specific)
Data Back-up Methods	Data export functionality
Measurement Principal	Competitive techniques with chemiluminescent reaction
Accreditation	CE marked (Europe), Health Canada approved, TGA (Australia) and SFDA MDMA (Saudi Arabia) authorised
Sample Loading	Single cartridge loading bay

Matrices

Randox Toxicology Biochip analysers and Drugs of Abuse Arrays are suitable for testing a variety of sample types. The nature of the prefabricated Biochip surface, secured inside a Biochip carrier, forms ideal conditions for the reaction process to take place. As the drugs of abuse testing market evolves, drugs studies have highlighted the benefits of screening in a number of matrices in order to gain a comprehensive understanding of a patient sample profile. Consolidation of multiple matrices onto one system, offers an efficient and flexible testing solution.

Blood

- Matrix dedicated kit for blood ensures optimum performance
- Simple sample centrifugation and dilution
- Small sample volume requirements
- No SPE columns or solvents needed

Urine

- Minimal sample preparation
- Proven reduction in false results

Oral Fluid

- Matrix dedicated kit for oral fluid ensures optimal assay performance
- Compatible for use with multiple oral fluid collection devices
- Applications for point of collection testing

Hair

- Can be used to determine drug abuse history over a period of months
- Monitoring abstinence is possible over a length of time
- Sample collection is relatively easy and non-invasive

Meconium*

- Considered the best method for detecting drug exposure in pregnancy
- Separation of drugs with same parent type ensures fewer false results
- Multiplex testing facilitates simultaneous screening of various drugs and drug metabolites from a single meconium sample

Tissue*

- Biochips offer accuracy and precision in a wide range of tissue homogenates
- Invaluable for drug screening programs
- Separation of drugs with same parent type ensures fewer false results

Vitreous Humor*

- Multiplex is advantageous due to limited sample volume
- Increased stability of certain drugs with this matrix
- Facilitates testing when other matrices are unavailable

*Test menu validated only for blood, urine, oral fluid and hair but all other matrices are applicable.

Test Menu

For Forensic Use Only (Unless Specified)

DoA 1+

Amphetamine
Barbiturates
Benzodiazepines I (Oxazepam)
Benzodiazepines II (Lorazepam)
Buprenorphine
Benzoylecgonine (Cocaine Metabolite)
Cannabinoids (THC)
Creatinine (Urine only)
Methadone
Methamphetamine
MDMA
Opiate
Phencyclidine (PCP)
Tricyclic Antidepressants (TCA)

DoA ULTRA

Amphetamine
Barbiturates
Benzodiazepines I (Oxazepam)
Benzodiazepines II (Lorazepam)
Benzodiazepines III (Clonazepam)
Benzoylecgonine (Cocaine Metabolite)
Buprenorphine
Cannabinoids (THC)
Dextromethorphan
Fentanyl
Generic Opioids
Meprobamate
Methadone
Methamphetamine
Opiates
Oxycodone I
Oxycodone II
Phencyclidine (PCP)
Tramadol
Tricyclic Antidepressants (TCA)
Zolpidem

NPS I

AB-CHMINACA (Synthetic Cannabinoids)
AB-PINACA (Synthetic Cannabinoids)
Bath Salts I (Mephedrone / Methcathinone)
Bath Salts II (α-PVP / MDPV)
Benzylpiperazines
JWH-018 (Synthetic Cannabinoids)
Mescaline
Phenylpiperazines I
Phenylpiperazines II
Salvinorin
UR-144/XLR-11 (Synthetic Cannabinoids)

NPS II

Acetylfentanyl
AH-7921
Buprenorphine
Carfentanil/Remifentanil
Clonazepam
Etizolam
Furanylfentanyl
Mitragynine
MT-45
Naloxone
Ocfentanyl
Sufentanil
U-47700
W-19

MultiSTAT Panels

	Whole Blood*	Urine I**	Urine II	Oral Fluid
α-PVP (Flakka)	×	×	×	×
AB-CHMINACA (Synthetic Cannabinoids)	×		×	
AB-PINACA (Synthetic Cannabinoids)	×	×	×	
Amphetamine	×	×	×	×
Barbiturates	×	×	×	×
Benzodiazepines	×		×	
Benzodiazepines I (Oxazepam)		×		×
Benzodiazepines II (Lorazepam)		×		×
Benzoylecgonine (Cocaine Metabolite)	×	×	×	×
Buprenorphine	×	×		×
Cannabinoids (THC)	×	×	×	×
Creatinine		×	×	
Ethyl Glucuronide (EtG)	×	×	×	
Fentanyl	×	×	×	×
JWH-018 (Synthetic Cannabinoids)		×		×
Ketamine				×
Lysergic acid diethylamide (LSD)				×
Methadone	×	×	×	×
Methamphetamine	×	×	×	×
Opiate	×	×	×	×
Oxycodone	×	×		×
Phencyclidine (PCP)	×		×	×
Pregabalin	×		×	
Propoxyphene				
Tramadol	×	×	×	×
Tricyclic Antidepressants (TCA)	×	×	×	
UR-144/XLR-11 (Synthetic Cannabinoids)		×	×	×
6-MAM	×	×	×	×

*EV4347 CE Marked
**EV4346 CE Marked & Health Canada Approved

DoA Hair

- Amphetamine
- Benzodiazepine
- Cannabinoids (THC)
- Benzoylecgonine (Cocaine Metabolite)
- Hydrocodone
- Ketamine
- Methamphetamine
- Opiate
- Oxymorphone
- Phencyclidine (PCP)

DoA Blockbuster

- Acetaminophen
- Amphetamine
- Barbiturates
- Benzodiazepines I (Oxazepam)
- Benzodiazepines II (Lorazepam)
- Benzodiazepines III (Clonazepam)
- Benzodiazepines IV (Etizolam)
- Benzoylecgonine (Cocaine Metabolite)
- Buprenorphine
- Cannabinoids (THC)
- Dextromethorphan
- Escitalopram
- Ethyl Glucuronide (EtG)
- Fentanyl
- Fluoxetine
- Haloperidol
- Ibuprofen
- Ketamine
- Lamotrigine
- Lysergic Acid Diethylamide (LSD)
- 6-MAM
- MDMA
- Methadone
- Methamphetamine
- Meperidine
- Meprobamate
- Methylphenidate
- Mitragynine
- Opiates
- Oxycodone I (Oxycodone)
- Oxycodone II (Oxymorphone)
- Oxycodone III (Hydrocodone)
- Phencyclidine (PCP)
- Pregabalin
- Salicylates
- Sertraline
- Tricyclic Antidepressants (TCA)
- Tramadol
- Trazodone
- Venlafaxine
- Zolpidem
- Zopiclone

ToxPlex

Acetaminophen
Amphetamine
Barbiturates
Benzodiazepines 1 (Oxazepam)
Benzodiazepines 2 (Clonazepam)
Benzoylecgonine (BZG)
Buprenorphine
Cannabinoids (THC)
Creatinine (Urine Only)
Dextromethorphan
Ethyl Glucuronide (EtG)
Fentanyl
Haloperidol
Ketamine
MDMA
Meprobamate
Methadone
Methamphetamine
Methaqualone
Opiate
Oxycodone
Phencyclidine (PCP)
Pregabalin
Propoxyphene
Salicylate
Tramadol
Tricyclic Antidepressants (TCA)
Zolpidem
6-MAM

BENEFITS OF TOXPLEX

Introducing the new 29 analyte Biochip Array offering flexibility, customisation and semi-quantitative results.

Fast Analysis

With the ToxPlex Array, you can receive up to 58 results in under 30 minutes.

User-Defined Cut Offs

With a range of cut offs, you can select the cut off that is suitable for your market.

Semi-Quantitative

Semi-quantitative results on our new Evidence MultiSTAT software update.

Dual Sample Input

Our first Evidence MultiSTAT panel that can run two samples simultaneously side by side.

Catalogue Numbers

For Forensic Use Only (Unless Specified)

Evidence Investigator

Product	Result Reporting Format	Matrix	Full Kit Cat. No.*
DoA Array I +	Semi-quantitative	Urine	EV3746
DoA Array I +	Semi-quantitative	Blood	EV3751
DoA Blockbuster	Semi-quantitative	Blood	EV4388
DoA ULTRA	Semi-quantitative	Urine	EV4103
DoA ULTRA	Semi-quantitative	Blood	EV4056
DoA Hair	Semi-quantitative	Hair	EV4338
NPS I	Semi-quantitative	Urine	EV4266
NPS II	Semi-quantitative	Urine	EV4271

*Kit includes 54 tests

Evidence MultiSTAT

Product	Result Reporting Format	Matrix	Full Kit Cat. No.*
DoA MultiSTAT Oral Fluid**	Qualitative	Oral Fluid	EV4279
DoA MultiSTAT Urine I	Qualitative	Urine	EV4193
DoA MultiSTAT Urine II	Qualitative	Urine	EV4292
DoA MultiSTAT Whole Blood	Qualitative	Blood	EV4195
DoA ToxPlex	Semi-Quantitative	Urine	EV4455

*Kit includes 12 cartridges

**To be used in conjunction with Neosal™ collection device

Evidence+

Product	Result Reporting Format	Matrix	Full Kit Cat. No.*	Half Kit Cat. No.*
DoA Blockbuster	Semi-quantitative	Blood	-	EV4387
DoA ULTRA	Semi-quantitative	Urine	EV4101	EV4102
DoA ULTRA	Semi-quantitative	Blood	EV4054	EV4055
NPS I	Semi-quantitative	Urine	-	EV4265
NPS II	Semi-quantitative	Urine	EV4269	EV4270

*Full kit includes 360 tests, half kit includes 180 tests

Analysers

Product	Automation	Type	Cat. No.
Evidence Investigator	Semi-automated	Benchtop	EV3602
Evidence MultiSTAT	Fully automated	Benchtop	EV4115
Evidence+	Fully automated	Floor standing	EV4400

ELISA

Randox Toxicology's ELISA kits provide a highly sensitive solution for the rapid detection of drugs in various biological specimens. Our expanding test menu includes a range of new psychoactive substances, common drugs of abuse, analgesics and sedatives. We recommend two compact and robust ELISA readers, offering optimal performance with every test.

DS2 Plate Reader

DS2 is a compact, easy to use and innovative microplate reader designed with full walkaway capability. DS2 quickly and easily processes two 96-well microplates and up to 12 different assays simultaneously.

- Compact system
- Fully automated
- Fully integrated washing
- Instrument diagnostics
- Automated barcode reading
- Extensive on-board software

800TS Plate Reader

The 800TS is a robust microplate reader ideally suited for routine drug detection in the laboratory. Complete with touchscreen and USB capabilities, the high-quality microplate reader requires limited space for outstanding performance, with Gen5™ software available for advanced data handling and analysis.

- Compact system
- Speed reading
- Optimal performance
- High accuracy
- Multiple plate formats
- Gen5™ software

Test Menu

For Forensic Use Only

New Psychoactive Substances

Product	Cat. No.
Mitragynine (Kratom)	MT3489

Analgesics

Product	Cat. No.
Buprenorphine	BUP3508
Fentanyl	FE3505
Oxycodone	OXY10114

Sedative Hypnotics

Product	Cat. No.
Meprobamate	MPB10020
Zolpidem	ZD3485

Other

Product	Cat. No.
Ethyl Glucuronide (EtG)	ETG10593

Cross Reactivity (Examples)

DoA ULTRA / DUID

CR% values represent both Whole Blood and Urine unless specified

Amphetamine

Compound	CR%
S(+)-Amphetamine	100
(±)-MDA	323.3
PMA HCl	292.8
BDB	120.6
(±)-Amphetamine	49.6
Phentermine	25.4
R(-)-Amphetamine	16.6
MDEA	4
S(+)-Methamphetamine	0.01
MDMA	0.4

Benzo Fury Compounds	CR%
5-IT	1003
5-APB HCl	491.7
6-APB HCl	418.6
5-APDB HCl	393.5
5-MAPB HCl	0.6
5-MAPDB HCl	0.4

Barbiturates

Compound	CR%
Phenobarbital	100
Secobarbital	371
Butabarbital	166
Pentobarbital	151
Alphenal	117
Cyclopentobarbital	70.1
p-OH-phenobarbital	64
Butalbital	51.1
Amobarbital	44
Barbital	33.3
(±)-Thiopental	1.1

Benzodiazepines I (Oxazepam)

Compound	CR%
Oxazepam	100
Lorazepam	18.4
Clonazepam	6.9
Temazepam	382
Flubromazolam	326
Nordiazepam	317
Alpha-OH-Aprazolam	310
Nimetazepam	266
Alprazolam	258
Diazepam	256
Estazolam	253
Clobazam	204
Nitrazepam	194
Brotizolam	191
2-OH-Ethylflurazepam	188
Flubromazepam	175
Prazepam	172
Diclazepam	157
Midazolam	116
Desalkylflurazepam	115
Pyrazolam	115
Flunitrazepam	114
Flurazepam	93.4
Delorazepam	77.0
Phenazepam	61.2
Lormetazepam	50.2
Chlordiazepoxide	46.8
Meclonazepam	40.7
Triazolam	29.6
Etizolam	28.4
N-Desmethylflunitrazepam	23.6
Bromazepam	21.6
Alpha-OH-Etizolam	19.0
Temazepam Glucuronide	6.8
N-desmethyl clotiazepam	4.5
7-Aminoflunitrazepam	2.4
Oxazepam Glucuronide	2
8-Aminoclonazolam*	0.4
7-Aminonitrazepam	0.4

*Blood only

Benzodiazepines II (Lorazepam)

Compound	Urine CR%
Lorazepam	100
Delorazepam	79.2
Phenazepam	72.8
Clonazepam	28.2
Desalkylflurazepam	27.1
Flubromazepam	25.9
Oxazepam	13
Meclonazepam	12.8
N-Desmethylflunitrazepam	9.6
N-desmethyl clotiazepam	2.5
Nordiazepam	1.9
Diclazepam	1.1
Nitrazepam	0.8
Bromazepam	0.5
Brotizolam	0.2
Nimetazepam	0.1
Flunitrazepam	0.1
Chlordiazepoxide	0.1
Flurazepam	0.02
Oxazepam Glucuronide	3.5
Lorazepam Glucuronide	24.8
7 Aminoclonazepam	0.3

Benzoylecgonine (Cocaine Metabolite)

Compound	CR%
Benzoylecgonine	100
Cocaine	103.8
m-hydroxybenzoylecoginine	95.6
Cocaethylene	54.4
Ecgonine Methyl Ester	1.29
Norcocaine	0.28

Buprenorphine

Compound	Blood CR%
Buprenorphine	100
Buprenorphine-3β-D-Glucuronide	42.8

Benzodiazepines II (Lorazepam)

Compound	Blood CR%
Lorazepam	100
Delorazepam	79.2
Phenazepam	72.8
Clonazepam	28.2
Desalkylflurazepam	27.1
Flubromazepam	25.9
Lorazepam Glucuronide	24.8
Oxazepam	13
Meclonazepam	12.8
N-Desmethylflunitrazepam	9.6
Oxazepam Glucuronide	3.5
N-Desmethyl Clotiazepam	2.5
Nordiazepam	1.9
Diclazepam	1.1
Nitrazepam	0.8
Bromazepam	0.5
7-Aminoclonazepam	0.3
Brotizolam	0.2
Clonazolam	0.14
Flunitrazepam	0.1
Chlordiazepoxide	0.1
Nimetazepam	0.1
Flurazepam	0.02

Buprenorphine

Compound	Urine CR%
Norbuprenorphine	100
Buprenorphine	16.7
Norbuprenorphine-3β-D-Glucuronide	15.0
Buprenorphine-3β-D-Glucuronide	2.0

Benzodiazepines III (Clonazepam)

Compound	CR%
Clonazepam	100
N-Desmethylflunitrazepam	128
Delorazepam	41.0
7-Aminoclonazepam	40.6
Nitrazepam	38.9
Phenazepam	29.7
N-Desmethyl Clotiazepam	15.3
Desalkylflurazepam	12.1
Flubromazepam	8.9
alpha-OH-Alprazolam	8.0
7-Aminonitrazepam	5.1
Flunitrazepam	3.7
7-Aminoflunitrazepam	2.7
Diclazepam	2.4
Estazolam	2.2
Alpha-OH-Etizolam	1.8
Nordiazepam	1.7
Flubromazolam	1.0
Triazolam	0.8
Medazepam*	0.7
Brotizolam	0.7
Lorazepam	0.5
Etizolam	0.4
Bromazepam	0.3
Nimetazepam	0.2
Alprazolam	0.2
Diazepam	0.1

*Blood Only

Cannabinoids (THC)

Compound	Blood CR%
(-)-11-norΔ⁹-Carboxy-Δ9-THC	100
(±)-11-Hydroxy-Δ⁹-THC	25.6
Δ8-THC	13.3
Δ9-THC	10.9
Cannabidiol	0.02
Cannabinol	0.01

Cannabinoids (THC)

Compound	Urine CR%
11-nor-Δ9-THC-9-carboxylic acid	100
11-OH-Δ9-THC	2.2
11-OH-Δ8-THC	1.1
Cannabinol	0.5

Dextromethorphan

Compound	CR%
Dextromethorphan	100
Dextrorphan tartrate salt	32
(±)-nordextromethorphan	20.4
(+)-3-hydroxymorphinan hydrobromide	0.5
(+)-3-methoxymorphinan HCl	0.4
PCP	0.31
N-desmethyl dextorphan	0.2

Fentanyl

Compound	Blood CR%
Fentanyl	100
α-methylfentanyl	266
p-fluorofentanil	194
Thiofentanyl	177
Furanylethylfentanyl	174
Methoxyacetylfentanyl	61
Ortho-fluorofentanyl	60
Benzylfentanyl	57
Butyrylfentanyl	54
Furanylfentanyl	51
Meta-hydroxy-acrylfentanyl	42
Acrylfentanyl	41
Iso-butyrylfentanyl	35
Theinylfentanyl	29
Norfentanyl	27
Ocfentanyl	19
Valerylfentanyl	16
ω-hydroxyfentanyl	15
Cyclopentylfentanyl	8.4
Cis-mefentanyl	8.4
(+)-trans-3-methylfentanyl	6.5
3-methiofentanyl	4.7
Norfuranylfentanyl	4
3-methylthiofentanyl	3.4
(+)-cis-3-methylfentanyl	3.3
Acetylfentanyl	3.1
Ohmefentanyl	3.1
p-Fluoroisobutyryl fentanyl	1.6
Norocfentanyl	1
ω-hydroxy norfentanyl	0.3
Carfentanil	0.03
Lofentanil	0.01

Fentanyl

Compound	Urine CR%
Fentanyl	100
α-methylfentanyl	266
p-fluorofentanil	194
Benzylfentanyl	57.1
Butyrylfentanyl HCl	54
Norfentanyl	27
ω- Hydroxy fentanyl	15.2
Thienylfentanyl HCl	8.1
3-methio fentanyl	4.7
Norfentanyl Oxalate	4.2
3-methyl thiofentanyl	3.4
Cis-Mefenatanyl HCl salt	3.3
Acetyl fentanyl	3.1
Ohmefentanyl	3.1
ω-Hydroxy norfentanyl	0.3
Carfentanil	0.03
Lofentanil oxalate	0.01

Generic Opioids

Compound	CR%
Oxycodone	100
Hydrocodone	1057
Ethyl Morphine HCl	339
Codeine	287
6-Acetyl-Codeine	166.8
Dihydrocodeine	103.5
Hydromorphone	102.5*
Desomorphine	41.5
Morphine-3βD-Glucuronide	35.1
Heroin	29.5
Morphine	26.3
6-MAM	21.2
Levorphanol	14.9
Thebaine	14.6
Norcodeine	9.2
Oxymorphone	5.8
Morphine-6βD-Glucuronide	0.6
Meperidine	0.4
Dextromethorphan	0.3

*Hydromorphone cross reactivity (CR%) for blood is 102.4

Meprobamate

Compound	CR%
Meprobamate	100
Carisoprodol	88
Mebutamate	8
Meprobamate-N-β-D-glucuronide	3
Hydroxymeprobamate	0.7

Methadone

Compound	CR%
Methadone	100
LAAM	0.7
Dextromethorphan	0.02

Methamphetamine

Compound	CR%
S(+)-Methamphetamine	100
PMMA HCl	291
MDMA	114.4
(±)-Methamphetamine	69.8
MDEA	4.3
(±)-N-Ethylamphetamine	3.0
BDB	0.9

Benzo Fury' Compounds	CR%
5-MAPB HCl	136.1
5-MAPDB HCl	76.6
6-APB HCl	0.9

Opiate

Compound	CR%
Morphine	100
6-MAM	1168
6-Acetyl-Codeine	430.3
Heroin	353.6
Desomorphine	159.9
Codeine	112.2
Morphine-6βD-Glucuronide	68.4
Ethyl Morphine HCl	66.5
Hydromorphone	50.8
Hydrocodone	38.4
Thebaine	19.9
Morphine-3βD-Glucuronide	18
Levorphanol	13.2

Oxycodone I

Compound	CR%
Oxycodone	100
Hydrocodone	132.6
Noroxycodone	29

Oxycodone II

Compound	CR%
Oxycodone	100
Oxymorphone	22.9
6-Acetyl-Codeine	4
Hydrocodone	3.2
Thebaine	2.1
Codeine	1.7
Naloxone	1.4
6-MAM	1.1

Phencyclidine (PCP)

Compound	CR%
PCP	100

Tramadol

Compound	CR%
Tramadol	100
O-Desmethyltramadol	34.8
(±)-N-Desmethyl tramadol	1.39
N,0-didesmethyl-tramadol	0.6

Tricyclic Antidepressants (TCA)

Compound	CR%
Nortriptyline	100
Imipramine N Oxide	1127
Imipramine	294
Trimipramine	238
Desipramine	206
Cyclobenzaprine	201
Amitriptyline	190
Opipramol	167
Promazine	117
Maprotiline	96
Doxepin	95
Clomipramine	76
Protryptiline	67
Cyproheptadine	61
Lofepramine	58
Dothiepin	50
Chlorpromazine	24.3
2 Hydroxyimipramine	19.5
Nordoxepin	19.4
Perphenazine	17.3
Prochlorperazine	9.3
Oxycarbazepine	0.13
Diphenhydramine HCl	0.1

Zolpidem

Compound	CR%
Zolpidem	100
Metabolite I: (4-carboxyzolpidem)	47.5
Alpidem	0.1

Synthetic Cannabinoids (JWH-018)

Compound	Urine CR%
JWH-018	100.0
AM1220	239
JWH 018 N-(5-hydroxypentyl) metabolite	227
AM2201	219
(1-(4-Carboxybutyl)-1H-indol-3-yl)(naphthalen-1-yl)methanone (N-carboxybutyl) JWH-018	180
JWH 200 6-hydroxyindole metabolite	146
(5'-Carboxy) JWH-018	145
JWH-073 N-Butanol	143
JWH 073 N-(4-hydroxybutyl) metabolite	138
JWH 019 N-(6-hydroxyhexyl) metabolite	131
JWH-073	128
(±)-JWH 018 N-(4-hydroxypentyl) metabolite	127
AM2201 N-(4-fluoropentyl) isomer	118
JWH-200	115
(±)-JWH 073 N-(3-hydroxybutyl) metabolite	112
JWH 018 N-(3-methylbutyl) isomer	96
JWH 073 6-hydroxyindole metabolite	86
JWH-019	82
JWH 018 6-methoxyindole analog	81
JWH-022	70
AM2201 N-(4-hydroxypentyl) metabolite	68
JWH 018 5-hydroxyindole metabolite	66
JWH 018 N-(5-hydroxypentyl) β-D-glucuronide	65
JWH 018 6-hydroxyindole metabolite	63
JWH 018 N-pentanoic acid metabolite	59
JWH 073 5-hydroxyindole metabolite	58
JWH 018 N-(2,2-dimethylpropyl) isomer	56
AM2201 6-hydroxyindole metabolite	54
JWH 073 N-(2-methylpropyl) isomer	51
JWH 073 7-hydroxyindole metabolite	49
JWH 018 7-hydroxyindole metabolite	45
JWH 018 N-(2-methylbutyl) isomer	45
JWH-073 4-butanoic acid metabolite	28
JWH 019 5-hydroxyindole metabolite	25
JWH 018 N-(1-methylbutyl) isomer	25
JWH 398 N-(5-hydroxypentyl) metabolite	21
JWH 073 N-(1-methylpropyl) isomer	17.6
JWH 200 5-hydroxyindole metabolite	17.1
JWH-020	16.9
JWH-424	13.6
JWH 073 N-butanoic acid metabolite	12.1

Compound	Urine CR%
JWH 122 N-(5-hydroxypentyl) metabolite	11.6
JWH 018 N-(1,2-dimethylpropyl) isomer	11.1
JWH 018 4-hydroxyindole metabolite	10.7
JWH-122	9.8
JWH 073 4-hydroxyindole metabolite	9.5
Win 55, 212-3 mesylate	8.0
JWH 081 5-methoxynaphthyl isomer	6.5
JWH 122 7-methylnaphthyl isomer	6.2
JWH 073 2-methylnaphthyl analog	6.0
JWH 122 6-methylnaphthyl isomer	5.7
JWH-398	5.6
JWH-147	5.4
N-desalkyl JWH-018	5.4
JWH-015	5.1
JWH 073 4-methylnaphthyl analog	4.0
JWH 122 2-methylnaphthyl isomer	3.9
JWH 210 7-ethylnaphthyl isomer or JWH-234	3.8
AM2233	3.6
JWH-030	3.2
AM694	3.1
JWH 398 5-chloronaphthyl isomer	2.6
JWH 081 N-(5-hydroxypentyl) metabolite	2.5
JWH-016	2.5
JWH-307	2.3
JWH 018 2'-naphthyl-N-(2-methylbutyl) isomer	2.0
JWH-007	2.0
RCS-4 2-methoxy isomer	2.0
JWH 081 2-methoxynaphthyl isomer or JWH-267	1.9
JWH 081 7-methoxynaphthyl isomer or JWH-164	1.7
JWH 200 4-hydroxyindole metabolite	1.5
RCS-4 3-methoxy isomer	1.5
JWH-210	1.4
AM694 3 iodo Isomer	1.2
(+)-WIN 55,212-2 (mesylate)	0.9
JWH 210 5-hydroxyindole metabolite	0.8
(R)-AM1241	0.2
AM694 4 iodo Isomer	<5
JWH 073 2'-naphthyl-N-(2-methylpropyl) isomer	<5
JWH 210 2-ethylnaphthyl isomer	<5
JWH 210 N-(5-carboxypentyl) metabolite	<5
AB-PINACA N-Pentanoic Acid	<1

Synthetic Cannabinoids (UR-144/XLR-11)

Compound	Urine CR%
UR-144 N-Pentanoic Acid	100
A-796260	155
AB-005	146
A-834735	126
UR-144 N-(5-hydroxypentyl) β-D-Glucuronide	104
UR-144 N-(5-hydroxypentyl) metabolite	98
UR-144 N-(4-hydroxypentyl) metabolite	93
UR-144 Desalkyl	40
XLR-11	18.9
XLR-11 N-(4-hydroxypentyl) metabolite	17.7
XLR-11 N-(4-pentyl) analog	15.6
UR-144	15.3
XLR-11 N-(2-fluoropentyl) isomer	14.8
XLR-11 Degradant	8.6
UR-144 N-(5-chloropentyl) analog	6.8
UR-144 N-(5-bromopentyl) analog	5
UR-144 N-(heptyl) analog	2.2
UR-144 degradant	1.3

Synthetic Cannabinoids (AB-CHMINACA)

Compound	Urine CR%
AB-CHMINACA	100
MA-CHMINACA	32
MDMB-CHMINACA	27
MDMB-CHMICA	12
AB-CHMINACA metabolite N-[[1-(cyclohexylmethyl)-IH-indazole-2-yl]-carbonyl]-L-valine	6.7
AB-PINACA	6.2
APP-CHMINACA	6
5-Fluoro-AB-PINACA	5.2
ADB-CHMICA	3.2
5-Fluoro-ADB-PINACA	2.9
5-Fluoro ADBICA	1.7
AB-CHMINACA metabolite MIA	1.2
AB-FUBINACA	1

Synthetic Cannabinoids (AB-PINACA)

Compound	Urine CR%
AB-PINACA N-Pentanoic Acid	100
AB-PINACA N-(5-Hydroxypentyl) Metabolite	153
AB-PINACA Pentanoic Acid Metabolite	139
5-Fluoro-AB-PINACA	127
AB-CHMINACA Metabolite MIA	94
AB-PINACA N-(4-Hydroxypentyl) Metabolite	78
AB-PINACA	66
ADB-PINACA Pentanoic Acid Metabolite	50
ADB-PINACA N-(5-Hydroxypentyl) Metabolite	49
5-Fluoro-ADB-PINACA	45
5-Fluoro-AB-PINACA N-(4-Hydroxypentyl) Metabolite	32
AB-CHMINACA	17.5
5-Fluoro ADBICA	15
AB-FUBINACA	7.2
AB-PINACA carboxylic acid	6.6
AB-FUBINACA carboxylic acid	4.2
ADBICA	1

Bath Salts I (Mephedrone / Methcathinone)

Compound	Urine CR%
Mephedrone HCl	100
Methylone HCl	80
Methedrone HCl	78.2
Flephedrone HCl	46.6
Methcathinone HCl	42.7
R(+)-Methcathinone HCl	38.3
3-Fluoromethcathinone HCl	21.3
3-Methoxymethcathinone (3-MeOMC) HCl	13.5
4-Methylethcathinone HCl	11.3
S(-) Methcathinone HCl	8.9
Ethylone HCl	6.5
N-Ethylcathinone HCl	5.7
Buphedrone HCl	5.3
Butylone HCl	3.5
Mexedrone HCl	1.2

Bath Salts II (α-PVP / MDPV)

Compound	Urine CR%
α-Pyrrolidinovalerophenone (α-PVP)	100
Pyrovalerone	232
3,4-Methylenedioxypyrovalerone (MDPV)	204
Naphyrone	167
α-Pyrrolidinopentithiophenone	82
4'Methyl-α-Pyrrolidinobutiophenone (MPBP)	51
4-Methyl-α-Pyrrolidinohexanophenone (4-MPHP)	25
MDPBP	11
4-Methoxy-PV8	6
4-Fluoro-PV9	2
4'Methyl-α-Pyrrolidinopropiophenone	1
Pyrrolidinopropiophenone	1
3,4-Methylenedioxy-α-Pyrrolidinopropiophenone (MDPPP)	0.4

Benzylpiperazines

Compound	Urine CR%
1-Benzylpiperazine	100
1-[4-(Trifluoromethyl)benzyl]piperazine	328.7
4-Hydroxy-benzylpiperazine (p-OH-BZP)	172.1
3-(Piperazin-1yLmethyl)phenol diHCl	123.7
1-Piperonylpiperazine	101.5
N-(3-Methylbenzyl)piperazine diHCl	52.9
1-[3-(Trifluoromethyl)benzyl]piperazine	12.3
1-(3-Methylphenyl)piperazine	3.9
1-Phenylpiperazine	3.4
1-(2-Methoxyphenyl)piperazine diHCl	3.2
1-(3-Trifluoromethylphenyl)piperazine HCl	1.9
1-(4-Methylphenyl)piperazine	1.3
1-(3-Hydroxyphenyl)piperazine	1.0

Phenylpiperazines I

Compound	Urine CR%
1-(3-Chlorophenyl)piperazine monohydrochloride (mCPP)	100
1-(2-Chlorophenyl)piperazine HCl	122.4
1-(3-Methylphenyl)piprazine	119.5
1-(4-Methoxyphenyl)piperazine DiHCl	99.4
1-(4-Chlorophenyl)piperazine	76.2
Para-Fluorophenyl piperazine DiHCl	72.2
1-Phenylpiperazine	64.9
1-(4-Methylphenyl)piperazine	60.9
1-(4-Hydroxyphenyl)piperazine	35
1-(3-Hydroxyphenyl)piperazine	28.7
1-(3-Trifluoromethylphenyl)piperazine HCl	12.5
1-[4-Trifluoromethyl)phenyl]piperazine	5.3

Phenylpiperazines II

Compound	Urine CR%
1-(3-Chlorophenyl)piperazine monohydrochloride (mCPP)	100
1-(3-Methylphenyl)piprazine	196.2
1-(2-Chlorophenyl)piperazine HCl	159.0
1-(3-Hydroxyphenyl)piperazine	119.4
1-Phenylpiperazine	112.0
1-(3-Trifluoromethylphenyl)piperazine HCl	48.0
Para-Fluorophenyl piperazine DiHCl	32.4
1-(2-Methoxyphenyl)piperazine DiHCl	31.0
1-(4-Methylphenyl)piperazine	25.5
1-(4-Chlorophenyl)piperazine	23.7
1-(4-Methoxyphenyl)piperazine DiHCl	16.2
1-(4-Hydroxyphenyl)piperazine	10.0
1-[4-Trifluoromethyl)phenyl]piperazine	2.4

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