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# TEST CATALOG TOXICOLOGY LABORATORY

MAY 2005

INSTITUT NATIONAL DE SANTÉ PUBLIQUE DU QUÉBEC



# TEST CATALOG TOXICOLOGY LABORATORY

MAY 2005

CENTRE DE TOXICOLOGIE DU QUÉBEC

2005

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**TOXICOLOGY LABORATORY**

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**SECTION 1**  
**GENERAL INFORMATION**





## **SECTION 1 GENERAL INFORMATION**

### **1.1 INTRODUCTION**

The Toxicology Laboratory is part of the Institut national de santé publique du Québec (INSPQ). The laboratory's primary mandate is to provide specialized analytical toxicology services to the Public Health network of the Province of Quebec.

Our analytical services are also offered to a national and international clientele.

### **1.2 RESOURCES**

As an ISO 17025 accredited reference laboratory, we rely on the skills of highly competent and specialized personnel to ensure the quality of our analytical work. Our staff comprises eight chemists, of which one Ph.D. and five M.Sc. as well as 20 experienced medical technologists.

State-of-the-art instrumental techniques including GC-MS, HPLC-MS-MS and ICP-MS are used for the determination of trace amounts of toxic substances in biological and other matrices.

### **1.3 QUALITY SYSTEM**

Our laboratory is accredited under ISO 17025 by the Standards Council of Canada.

We participate in a number of internationally recognized quality control programs, including those from:

- Centers for Disease Control and Prevention, Atlanta
- College of American Pathologists
- FIOH Quality Assurance Program for organic and solvent metabolites, Finland
- German Society of Occupational Medicine and Environmental, Erlangen-Nuremberg
- Health Canada Interlaboratory Comparison Program for Hair Mercury
- Quasimeme, United Kingdom
- State of New York Department of Health
- Worldwide Interlaboratory Aluminum Quality Control Program, Poitiers France.

## 1.4 EQAS PROVIDER

We operate several external quality assurance schemes (EQAS) for toxicology laboratory worldwide:

- AMAP (Amap Ring Test for PCBs and Organochlorinated Pesticides in Human Blood Plasma)
- The program for organochlorinated pesticides and PCBs in human plasma is aimed at laboratories performing monitoring of populations exposed to these persistent organic pollutants ([www.ctq.qc.ca/amap.htm](http://www.ctq.qc.ca/amap.htm)).
- PCI (Interlaboratory Comparison Program for Metals in Biological Samples)
- The program includes more than 15 heavy metals in biological samples and is aimed at more than 150 laboratories in 30 different countries ([www.ctq.qc.ca/pciendes.html](http://www.ctq.qc.ca/pciendes.html)).
- QMEQAS (Quebec Multielements External Quality Assessment Scheme)
- This program allows laboratories using this analytical technique ICP-MS to compare their results for multielement determination in blood, hair, tissues and urine ([www.ctq.qc.ca/qmeqas.html](http://www.ctq.qc.ca/qmeqas.html)).

QC reference material from these programs (heavy metals and POPS in blood or urine) is available for purchase directly from our Webs site [www.inspq.qc.ca/ctq/sales](http://www.inspq.qc.ca/ctq/sales).

## 1.5 TYPES OF SERVICES AVAILABLE

### ***DRUGS AND ALCOHOLS***

#### ➤ ***Confirmation of drugs of abuse by mass spectrometry***

Drugs of abuse testing is conducted according to SAMHSA guidelines. All presumptive positives are confirmed by GC-MS.

Refer to “Procedure for screening and confirmation for drugs of abuse” (Section 4) for more details.

Results are reported to the requesting physician by first class mail or, by fax if specifically requested and authorized.

Turnaround time: The turnaround time is generally within seven working days (non-urgent analysis).

#### ➤ ***General drugs screen (non-urgent)***

Drugs/alcohols screen performed in either biological or non-biological (e.g.: scene residues) material. All analytes included in “Substances included in the general screening of drugs and alcohols” (Section 3) can be screened for.

Turnaround time: The turnaround time is generally within seven working days.

➤ ***Stat toxicology screen and/or specific analysis***

A toxicology screen is performed in cases where acute poisoning by an unknown agent is suspected. These cases are usually referred by the Quebec Poison Control Centre or emergency room physicians.

A full toxicology screen requires specimens of blood, urine and gastric fluid, as some analytes are not measurable in all biological media.

Please refer to: “Substances included in the general screening of drugs and alcohols” (Section 3).

Results are reported by phone or fax to the Poison Control Centre and to the requesting establishment or as requested by the Poison Control Centre.

Turnaround time: Stat screens are performed immediately upon sample receipt.

➤ ***Analyte-specific determination (non-urgent)***

Quantitative measurement of a drug substance, or its metabolite(s) in plasma. Refer to “Alphabetical listing of tests” (Section 2) for substance-specific information.

Results of TDM analyses outside the therapeutic range are immediately reported to the requester via phone, fax or e-mail.

Turnaround time: The turnaround time is generally within seven working days.

➤ ***Post-mortem toxicology***

In cases of post-mortem toxicology, in addition to the full toxicology screen, HPLC-MS-MS is used to screen for benzodiazepines and opiates in blood.

All substance detected during screening procedures are quantitated by specific GC-MS or HPLC-MS-MS, according to SAMHSA guidelines.

***WORKPLACE AND ENVIRONMENTAL TOXIC SUBSTANCES***

Biological monitoring of workers allows accurate evaluation of the health effects of toxic substances in the workplace. To this end, we measure a wide range of analytes in blood and urine, including heavy metals, solvents and their metabolites, PAHs, PCBs and pesticides.

Refer to “Alphabetical listing of tests” (Section 2) for substance-specific information.

Turnaround time: The turnaround time is generally within 2 weeks.

## **1.6 RARE AND UNUSUAL ANALYSES**

Our full-service laboratory can respond to requests for rare and unusual toxicology analyses. Please contact the laboratory for more information.

## **1.7 HPLC-MS-MS SERVICE**

This state-of-the-art analytical technique is targeted at special needs where ultimate sensitivity and specificity are required, or for the measurement of difficult samples. Please refer to Section 5 (HPLC-MS-MS Determinations) for more details.

## **1.8 BUSINESS HOURS**

Regular business hours are from 8:30 AM to 4:30 PM (EST) Monday through Friday.

**N.B.: In case of emergency or under exceptional circumstance, services are provided outside regular business hours. Contact the laboratory for details.**

## **1.9 SPECIMEN COLLECTION, PRESERVATION, PACKAGING AND SHIPPING**

Refer to "Sampling protocols" (Section 6) for specific information.

### **➤ General procedure**

Biological specimens (blood, urine, tissues) should be collected according to the appropriate protocol and unless otherwise specified, kept at 4°C until shipped to the laboratory. Pack in adequate containers (e.g.: Polyfoam Cooler) and ship via courier to:

Laboratoire de toxicologie  
Institut national de santé publique du Québec  
945, avenue Wolfe, 4<sup>e</sup> étage  
Sainte-Foy (Québec) G1V 5B3  
Canada

## **1.10 REPORTING OF RESULTS/TURNAROUND TIMES**

Results are reported to the requesting physician or laboratory by first class mail or by fax if specifically requested and authorized. Results are transmitted by e-mail upon request.

Turnaround times will depend upon the types of requests (refer to the appropriate section on the previous page). If required, a rush service is available at extra cost (50 to 100% more). Contact the laboratory for further details.

**SECTION 2**  
**ALPHABETICAL LISTING OF TESTS**



## SECTION 2 ALPHABETICAL LISTING OF TESTS

ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>ACEBUTOLOL</b> Sectral <sup>®</sup>	Blood, 5 mL, plastic lavender	Screening and quantitative HPLC. Refer to $\beta$ -blocker and calcium channel blocker.
<b>ACEPHATE</b>	Urine, 20 mL	Determination of acephate and its metabolite, methamidophos. Contact the laboratory for details.
<b>ACETOHEXAMIDE</b> Dimelor <sup>®</sup>	Blood, 5 mL, plastic lavender	Screening and quantitative HPLC. Refer to hypoglycemic agents.
<b>ACETONE</b>	Blood, 1 mL, plastic lavender	Refer to alcohol.
<b>ACETYL-MORPHINE (6-MONO)</b>	Urine, 20 mL	Quantitative GC-MS, heroin metabolite.
<b>ADALAT<sup>®</sup></b>		Refer to nifedipine.
<b>ALCOHOL</b>	Blood, 1 mL, plastic lavender	Includes: acetone, ethanol, isopropanol and methanol.
<b>ALKYL PHOSPHATES</b>	Urine, 100 mL	Exposure to organophosphorus pesticides. Determination of diethyl phosphate, dimethyl phosphate, diethyl phosphate, dimethyl thiophosphate, diethyl dithiophosphate, dimethyl dithiophosphate. Contact the laboratory for details.
<b>ALPHAPRODINE</b> Nisentil <sup>®</sup>	Blood, 5 mL, plastic lavender	
<b>ALPRAZOLAM</b> Xanax <sup>®</sup>	Blood, 5 mL, plastic lavender	Refer to benzodiazepines.
<b>ALUMINUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Dialysis fluid, 5 mL	Use a screw cap plastic (polypropylene) vial.
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Plasma or serum, 6 mL, plastic lavender BD7863 or glass red top BD9615	See section 2.3 of sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Water, 100 mL	Contact the laboratory for details.
<b><math>\Delta</math>-AMINOLEVULINIC ACID (ALA)</b>	Urine, 20 mL	
<b>AMITRIPTYLINE</b> Elavil <sup>®</sup>	Blood, 5 mL, plastic lavender	Refer to antidepressants tricyclic.
<b>AMOBARBITAL</b> Tuinal <sup>®</sup>	Blood, 5 mL, plastic lavender	Refer to barbiturates.
<b>AMOXAPINE</b> Asendin <sup>®</sup>	Blood, 5 mL, plastic lavender	Refer to antidepressants tricyclic.

ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>AMPA</b>		Refer to glyphosate.
<b>AMPHETAMINES AND METHAMPHETAMINES</b>	Urine, 20 mL	Quantitative GC-MS
	Urine, 20 mL	Screening
<b>ANAFRANIL®</b>		Refer to clomipramine.
<b>ANTIDEPRESSANTS (SSRI)</b> Selective serotonin reuptake inhibitors)	Blood, 5 mL, plastic lavender	Includes: citalopram, fluoxetine, fluvoxamine, paroxetine and sertraline.
<b>ANTIDEPRESSANTS TRICYCLIC</b>	Blood, 5 mL, plastic lavender	Screening and quantitation of 12 antidepressants. Includes: amitriptyline, amoxapine, clomipramine, desipramine, doxepin, imipramine, loxapine, maprotiline, nordoxepin, nortriptyline, protriptyline, trimipramine.
	Urine, 20 mL	Screening only.
<b>ANTIDEPRESSANTS NON-TRICYCLIC</b>	Blood, 5 mL, plastic lavender	Includes: Bupropion, clozapine, mirtazapine, moclobemide, olanzapine, pimozide, quetiapine, risperidone, trazodone, venlafaxine.
<b>ANTIMONY</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, glass lavender BD7665	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water	Contact the laboratory for details.
<b>ARSENIC, NON-DIETARY</b> (Sum of As <sup>+3</sup> , As <sup>+5</sup> , MAA and DMAA. Excludes the non-toxic forms such as those found in seafood)	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
<b>ARSENIC SPECIATION</b> (As <sup>+3</sup> , As <sup>+5</sup> , MAA and DMAA)	Urine, 20 mL	Contact the laboratory for details.
	Water, 100 mL	Contact the laboratory for details.
<b>ARSENIC, TOTAL</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).



<b>ANALYTE</b>	<b>SPECIMEN REQUIRED</b>	<b>COMMENT</b>
<b>ARSENIC, TOTAL (Concluded)</b>	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water, 100 mL	Contact the laboratory for details.
<b>ASENDIN®</b>		Refer to amoxapine.
<b>ATENOLOL Tenormin®</b>	Blood, 5 mL, plastic lavender	Screening only.
<b>ATIVAN®</b>		Refer to lorazepam.
<b>ATRAZINE</b>		Refer to triazine.
<b>AVENTYL®</b>		Refer to nortriptyline.
<b>BARBITAL Sodium barbitone</b>	Blood, 5 mL, plastic lavender	Refer to barbiturates.
<b>BARBITURATES</b>	Blood, 5 mL, plastic lavender	Screening of barbiturates. Includes: amobarbital, barbital, butabarbital, butalbital, butethal, heptabarbital, mephobarbital, pentobarbital, phenobarbital, secobarbital.
	Urine, 20 mL	Screening only.
<b>BARIUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies (p. 53)).
	Blood, serum	Contact the laboratory for details.
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine	Contact the laboratory for details.
	Water, 100 mL	Contact the laboratory for details.
<b>BENADRYL®</b>		Refer to diphenhydramine.
<b>BENOMYL (exposure to)</b>	Soil, 500 g	Determination of benomyl and carbendazim. Contact the laboratory for details.
	Urine	Refer to 5-HBC.
	Water, 500 mL	Determination of benomyl and carbendazim. Contact the laboratory for details.
<b>BENZENE (exposure to)</b>	Urine	Refer to t,t-muconic acid and phenol.

ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>BENZODIAZEPINES</b>	Blood, 5 mL, plastic lavender	Screening and quantitation of benzodiazepines. Includes: alprazolam, bromazepam, chlordiazepoxide, clobazam, clonazepam, N-1 desalkylflurazepam, desmethyldiazepam, diazepam, flunitrazepam, flurazepam, lorazepam, midazolam, nitrazepam, oxazepam, temazepam, triazolam.
	Saliva	HPLC-MS-MS.
	Urine, 20 mL	Screening only.
	Urine, 20 mL	Quantitation HPLC. Includes: dimethyldiazepam, lorazepam, oxazepam, temazepam.
<b>BERYLLIUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water, 100 mL	Contact the laboratory for details.
<b>β-2 MICROGLOBULIN</b>	Serum, 1 mL, red top BD9615	See sections 2.3 and 3 of sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Urine, 20 mL	See section 2.1 and 3.1 of sampling protocol for the determination of elements and trace metals in urine (p. 56).
<b>β-BLOCKER AND CALCIUM CHANNEL BLOCKER</b>	Blood, 5 mL, plastic lavender	Quantitation of 8 β-blocking agents and calcium channel blocker: acebutolol, diltiazem, metoprolol, naldolol, nifedipine, propranolol, timolol and verapamil.
<b>BISMUTH</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water	Contact the laboratory for details.
<b>BLOCADREN®</b>		Refer to timolol.

<b>ANALYTE</b>	<b>SPECIMEN REQUIRED</b>	<b>COMMENT</b>
<b>BORON</b>	Urine	Contact the laboratory for details.
	Water	Contact the laboratory for details.
<b>BROMACIL</b>	Water, 250 mL	Contact the laboratory for details.
<b>BROMAZEPAM</b> Lectopam®	Blood, 5 mL, plastic lavender	Refer to benzodiazepine.
<b>BUPROPION</b> Wellbutrin®	Blood, 5 mL, plastic lavender	Refer to antidepressants.
<b>BUTABARBITAL</b> Butisol sodium®	Blood, 5 mL, plastic lavender	Refer to barbiturates.
<b>BUTALBITAL</b>	Blood, 5 mL, plastic lavender	Refer to barbiturates.
<b>BUTETHAL</b>	Blood, 5 mL, plastic lavender	Refer to barbiturates.
<b>BUTISOL SODIUM®</b>		Refer to butabarbital.
<b>BUTYLCELLOSOLVE</b>	Blood, 5 mL, plastic lavender	
<b>CADMIUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water, 100 mL	Contact the laboratory for details.
<b>CAFFEINE</b>	Blood, 1 mL, plastic lavender	
<b>CALCIUM ANTAGONISTS</b>	Blood, 5 mL	Includes: diltiazem, propranolol, verapamil.
<b>CANNABINOIDS</b> Cannabis	Saliva	HPLC-MS-MS.
	Urine, 20 mL	Quantitation of delta 9-THC-9-carboxylic acid. Quantitative GC-MS.
	Urine, 20 mL	Screening.
<b>CANNABIS</b>		Refer to cannabinoids.
<b>CARBARYL</b> (exposure to)	Urine	Refer to naphtol.
	Water, 250 mL	Contact the laboratory for details.
<b>CARBENDAZIM</b>		Refer to benomyl.
<b>CARBOCAINE®</b>		Refer to mepivacaine.

ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>CARBON DIOXIDE</b>	Air	Contact the laboratory for details.
	Water	Contact the laboratory for details.
<b>CARBOXYHEMOGLOBIN</b>	Blood, 3 mL, plastic lavender	
<b>CARDIZEM®</b>		Refer to diltiazem.
<b>CHLORCYCLIZINE</b>	Blood, 5 mL, plastic lavender	
<b>CHLORDIAZEPOXIDE</b> Librium®	Blood, 5 mL, plastic lavender	Refer to benzodiazepine.
<b>CHLOROFORM</b>	Air	Contact the laboratory for details.
	Blood, 5 mL, plastic lavender	Contact the laboratory for details.
	Water, 10 mL	Contact the laboratory for details.
<b>CHLOROPHENOLS</b>	Blood, 5 mL, plastic lavender	Determination of pentachlorophenol and 2,3,4,6-tetrachlorophenol.
	Urine, 20 mL	Determination of pentachlorophenol.
<b>CHLOROPHENOXIDES</b>		Refer to "pesticides, chlorophenoxy".
<b>CHLORPROPAMIDE</b> Diabinese®	Blood, 5 mL, plastic lavender	Screening and quantitative HPLC, refer to hypoglycemic agents.
<b>CHLORPYRIFOS</b>	Soil, 50 g	Determination of chlorpyrifos and degradation products: 3,5,6-trichloro-2-pyridinol. Contact the laboratory for details.
	Urine 24 hour	Exposure to organophosphorus pesticide. Determination of chlorpyrifos and degradation products: 3,5,6-trichloro-2-pyridinol. Contact the laboratory for details.
	Water, 500 mL	Determination of chlorpyrifos and degradation products: 3,5,6-trichloro-2-pyridinol. Contact the laboratory for details.
<b>CHLORSULFURON</b>	Water, 250 mL	Refer to diuron.
<b>CHROMIUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Plasma, 1 mL, plastic lavender BD7863	See section 2.3 of the sampling protocol for the determination of elements and metals in blood (p. 55).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water, 100 mL	Contact the laboratory for details.

<b>ANALYTE</b>	<b>SPECIMEN REQUIRED</b>	<b>COMMENT</b>
<b>CITALOPRAM</b> Celexa®	Blood, 5 mL, plastic lavender	Refer to antidepressants (SSRI).
<b>CLOBAZAM</b> Frisium®	Blood, 5 mL, plastic lavender	Refer to benzodiazepines.
<b>CLOMIPRAMINE</b> Anafranil®	Blood, 5 mL, plastic lavender	Refer to antidepressants tricyclic.
<b>CLONAZEPAM</b> Rivotril®	Blood, 5 mL, plastic lavender	Refer to benzodiazepines.
<b>CLONAZEPAM, 7 amino</b>	Blood, 5 mL, plastic lavender	Refer to benzodiazepines.
<b>CLORAZEPATE</b> Tranxene®	Blood, 5 mL, plastic lavender	Refer to desmethyldiazepam.
	Urine, 20 mL	Refer to desmethyldiazepam.
<b>CLOZAPINE</b> Clozaril®	Blood, 5 mL, plastic lavender	Refer to antidepressants non-ticyclic.
<b>CLOZARIL®</b>		Refer to clozapine.
<b>COBALT</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water, 100 mL	Contact the laboratory for details.
<b>COCAINE</b>	Blood, 5 mL, grey stopper BD 6471	Quantitative GC-MS.
	Blood, 5 mL, plastic lavender	Screening.
	Hair	Screening.
	Saliva	HPLC-MS-MS.
	Urine, 20 mL	Quantitative GC-MS.
	Urine, 20 mL	Screening.
<b>CODEINE</b>	Blood, 5 mL, plastic lavender	Quantitative GC-MS.
	Urine, 20 mL	Quantitative GC-MS.
	Urine, 20 mL	Screening.

ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>COPPER</b>	Biologic tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender	See section 2.3 of the sampling protocol for the determination of elements and metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Liver needle biopsy (>1 mg)	See sampling protocol for the determination of elements and trace metals in hepatic needle biopsies (p. 53).
	Plasma or serum, 1 mL, plastic lavender BD7863 or red top BD9615	See section 2.3 of the sampling protocol for the determination of elements and metals in blood (p. 55).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water, 100 mL	Contact the laboratory for details.
<b>CORGARD®</b>		Refer to naldolol.
<b>COTININE</b>	Blood, 5 mL, plastic lavender	Metabolite of nicotine and a marker of exposure to tobacco smoke. Quantitative HPLC-MS-MS.
	Hair	Metabolite of nicotine and a marker of exposure to tobacco smoke. Quantitative GC/MS
	Saliva	Contact the laboratory for details.
	Urine, 20 mL	Metabolite of nicotine and a marker of exposure to tobacco smoke. Quantitative GC/MS.
<b>CREATININE</b>	Urine, 20 mL	
<b>CYANIDE</b>	Blood, 5 mL, plastic lavender	
<b>CYCLIZINE</b> Marzine®	Blood, 5 mL, plastic lavender	
<b>2,4-D</b>		Refer to "pesticides, chlorophenoxy".
<b>2,4-DP</b> (Also named dichlorprop)		Refer to "pesticides, chlorophenoxy".
<b>o,p'-DDE</b>		Contact the laboratory for details.
<b>o,p'-DDT</b>		Contact the laboratory for details.
<b>p,p'-DDE</b>		Refer to "pesticides, organochlorinated".
<b>p,p'-DDT</b>		Refer to "pesticides, organochlorinated".
<b>DALMANE®</b>		Refer to flurazepam.
<b>DARVON-N®</b>		Refer to propoxyphene.

<b>ANALYTE</b>	<b>SPECIMEN REQUIRED</b>	<b>COMMENT</b>
<b>DELTAMETHRINE</b>	Urine	Refer to "pesticides, pyrethroids".
	Water, 500 mL	Contact the laboratory for details.
<b>DEMEROL<sup>®</sup></b>		Refer to meperidine.
<b>DESALKYL FLURAZEPAM, N-1</b>	Blood, 5 mL, plastic lavender	Refer to benzodiazepines.
<b>DESIPRAMINE</b> Norpramin <sup>®</sup>	Blood, 5 mL, plastic lavender	Refer to antidepressants tricyclic.
<b>DESMETHYLDIAZEPAM</b>	Blood, 5 mL, plastic lavender	Refer to benzodiazepines.
<b>DESYREL<sup>®</sup></b>		Refer to trazodone.
<b>DIABETA<sup>®</sup></b>		Refer to glyburide.
<b>DIABINESE<sup>®</sup></b>		Refer to chlorpropamide.
<b>DIAMICRON<sup>®</sup></b>		Refer to gliclazide.
<b>DIAZEPAM</b> Valium <sup>®</sup>	Blood, 5 mL, plastic lavender	Refer to benzodiazepines.
<b>DIAZINON</b> (exposure to)	Urine	Refer to IMPY
<b>DICAMBA</b>		Refer to "pesticides, chlorophenoxy".
<b>p-DICHLOROBENZENE</b> (exposure to)		Refer to 2,5-dichlorophenol.
<b>2,5-DICHLOROPHENOL</b>	Urine, 20 mL	Exposure to p-dichlorobenzene. Contact the laboratory for details.
<b>DICHLORPROP</b> (Also named 2,4-DP)		Refer to "pesticides, chlorophenoxy".
<b>DIETHYL DITHIOPHOSPHATE</b>		Refer to alkyl phosphates.
<b>DIETHYL PHOSPHATE</b>		Refer to alkyl phosphates.
<b>DIETHYL THIOPHOSPHATE</b>		Refer to alkyl phosphates.
<b>DILTIAZEM</b> Cardizem <sup>®</sup>	Blood, 5 mL, plastic lavender	Screening and quantitative HPLC. Refer to β-blocker and calcium channel blocker.
<b>DIMELOR<sup>®</sup></b>		Refer to acetohexamide.
<b>DIMENHYDRINATE</b> Gravol <sup>®</sup>	Blood, 5 mL, plastic lavender	Refer to diphenhydramine.
<b>DIMETHYL PHOSPHATE</b>		Refer to alkyl phosphates.
<b>DIPHENHYDRAMINE</b> Benadryl <sup>®</sup>	Blood, 5 mL, plastic lavender	

<b>ANALYTE</b>	<b>SPECIMEN REQUIRED</b>	<b>COMMENT</b>
<b>DIURON</b>	Water, 250 mL	Determination of diuron and chlorsulfuron. Contact the laboratory for details.
<b>DOXEPIN</b> Sinequan®	Blood, 5 mL, plastic lavender	Refer to antidepressants tricyclic.
<b>DRUGS</b> (General screening of pharmaceuticals)	Blood, 5 mL, plastic lavender	Includes quantitative alcohol. Refer to page 39.
	Gastric liquid, 20 mL	Refer to page 39.
	Urine, 20 mL	Refer to page 39.
<b>DRUG SUBSTANCES</b> (General screening of solids)	Capsule, powders, syringe, etc.	Refer to page 39.
<b>DRUGS OF ABUSE</b> (Street drugs)	Urine, 20 mL	Includes: amphetamines, benzodiazepines and barbiturates, cannabis, cocaine, opiates, phencyclidine and methadone with GC-MS confirmation. Refer to page 43.
<b>ECSTASY</b>		Refer to MDMA.
<b>EDDP</b> (Methadone metabolite)	Blood, 5 mL, plastic lavender	Screening.
	Blood, 5 mL, plastic lavender	Quantitative by GC-MS.
	Saliva	HPLC-MS-MS.
	Urine, 20 mL	Quantitative by GC-MS.
	Urine, 20 mL	Screening.
<b>EFFEXOR®</b>		Refer to venlafaxine.
<b>ELAVIL®</b>		Refer to amitriptyline.
<b>ETHANOL</b>	Blood, 1 mL, plastic lavender	Refer to alcohol.
<b>ETHYLBENZENE</b> (exposure to)	Urine	Refer to mandelic acid.
<b>ETHYLENE GLYCOL</b>	Blood, 5 mL, plastic lavender	
<b>FENTANYL</b>	Blood, 5 mL, plastic lavender	Quantitative by GC-MS.
<b>FLUAZIFOP</b>	Soil, 500 g	Exposure to fluazifop-butyl (fusilade) Determination of fluazifop and fluazifop-butyl. Contact the laboratory for details.
	Urine 24 hour	Determination of fluazifop. Contact the laboratory for details.
	Water, 500 mL	Determination of fluazifop and fluazifop-butyl. Contact the laboratory for details.
<b>FLUAZIFOP-BUTYL</b> (Exposure to)		Refer to fluazifop.



<b>ANALYTE</b>	<b>SPECIMEN REQUIRED</b>	<b>COMMENT</b>
<b>FLUORIDE</b>	Plasma or serum, 2 mL, plastic lavender BD7863 or red top BD9615	See section 2.3 of the sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water, 100 mL	Contact the laboratory for details.
<b>FLUOXETINE</b> Prozac®	Blood, 5 mL, plastic lavender	Quantitative by GC-MS.
<b>FLURAZEPAM</b> Dalmane®	Blood, 5 mL, plastic lavender	
<b>FLUVOXAMINE</b> Luvox®	Blood, 5 mL, plastic lavender	Quantitative by GC-MS.
<b>FRISIUM®</b>		Refer to clobazam.
<b>GALLIUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Water	Contact the laboratory for details.
<b>GAMMA-HYDROXY- BUTYRATE</b>		Refer to GHB.
<b>GHB</b> Gamma-hydroxy-butyrate	Urine, 20 mL	Screening by GC-MS.
<b>GLICLAZIDE</b> Diamicon®	Blood, 5 mL, plastic lavender	Screening and quantitative HPLC. Refer to hypoglycemic agents.
<b>GLIPIZIDE</b> Glucotrol®	Blood, 5 mL lavender	Screening and quantitative HPLC. Refer to hypoglycemic agents.
<b>GLUCOTROL®</b>		Refer to glipizide.
<b>GLUTETHIMIDE</b>	Blood, 5 mL, plastic lavender	
<b>GLYBURIDE</b> Diabeta®	Blood, 5 mL, plastic lavender	Screening and quantitative HPLC, refer to hypoglycemic agents.
<b>GLYPHOSATE</b>	Urine, 20 mL	Determination of glyphosate and its degradation product, AMPA. Contact the laboratory for details.
	Water, 500 mL	Determination of glyphosate and its degradation product, AMPA. Contact the laboratory for details.
<b>GOLD</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).

(See next page)

<b>ANALYTE</b>	<b>SPECIMEN REQUIRED</b>	<b>COMMENT</b>
<b>GOLD (Concluded)</b>	Serum, 1 mL, red top BD9615	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water, 100 mL	Contact the laboratory for details.
<b>GRAVOL®</b>		Refer to dimenhydrinate.
<b>HALCION®</b>		Refer to triazolam.
<b>5-HBC</b>	Urine 24 hour	Exposure to benomyl. Contact the laboratory for details.
<b>HEPTABARBITAL</b>	Blood, 5 mL, plastic lavender	Refer to barbiturates.
<b>HEROIN</b>	Blood, 5 mL, plastic lavender	Quantitative GC-MS.
	Urine, 20 mL	Quantitative GC-MS.
<b>2,5-HEXANEDIONE</b>	Urine, 20 mL	Exposure to n-hexane.
<b>n-HEXANE (Exposure to)</b>		Refer to 2,5-hexanedione.
<b>HEXAZINONE</b>	Urine 24 hour	Determination of parent product and three of its metabolites. Contact the laboratory for details.
<b>HIPPURIC ACID</b>	Urine, 20 mL	Exposure to toluene.
<b>HMX</b>	Urine, 20 mL	Refer to RDX.
<b>HYDROXY PHENANTHRENES</b>		Refer to PAH metabolites.
<b>HYDROXYPYRENE</b>	Urine, 100 mL	Exposure to PAHs. Determination of 1-hydroxypyrene.
<b>HYPOGLYCEMIC AGENTS</b>	Blood, 5 mL, plastic lavender	Includes: acetohexamide, chlorpropamide, gliclazide, glipizide, glyburide, tolbutamide and others.
<b>IMIPRAMINE Tofranil®</b>	Blood, 5 mL, plastic lavender	Refer to antidepressants tricyclic.
<b>IMPY 2-isopropyl-6-methyl- 4-pyrimidinol</b>	Urine, 20 mL	Exposure to diazinon
<b>INDERAL®</b>		Refer to propranolol.

ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>IODINE</b>	Blood, 6 mL, plastic lavender BD 7863	See sampling protocol for determination of elements and trace metals in blood (p. 55).
	Serum, 1 mL, red top BD9615	See sampling protocol for determination of elements and trace metals in blood (p. 55).
	Urine, 20 mL	See sampling protocol for determination of elements and trace metals in urine (p. 56).
<b>IRON</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Liver needle biopsy (>1 mg)	See sampling protocol for the determination of elements and trace metals in hepatic needle biopsies (p. 53).
	Water, 100 mL	Contact the laboratory for details.
<b>ISOPTIN®</b>		Refer to verapamil.
<b>ISOPROPANOL</b>	Blood, 1 mL, plastic lavender	Refer to alcohol.
	Urine, 20 mL	
<b>KEMADRIN®</b>		Refer to procyclidine.
<b>LABETALOL</b> Trandate®	Blood, 5 mL, plastic lavender	Screening only.
<b>LEAD</b>	Air	Contact the laboratory for details.
	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Dust (>10 mg)	Contact the laboratory for details.
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Soil	Contact the laboratory for details.
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water, 100 mL	Contact the laboratory for details.
<b>LEAD ISOTOPIC RATIOS</b>	All matrices	Done by ICP-MS. Contact the laboratory for details.

<b>ANALYTE</b>	<b>SPECIMEN REQUIRED</b>	<b>COMMENT</b>
<b>LECTOPAM®</b>		Refer to bromazepam.
<b>LIBRIUM®</b>		Refer to chlordiazepoxide.
<b>LIDOCAINE</b>	Blood, 5 mL, plastic lavender	
<b>LITHIUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water, 100 mL	Contact the laboratory for details.
<b>LOPRESOR®</b>		Refer to metoprolol.
<b>LORAZEPAM</b> Ativan®	Blood, 5 mL, plastic lavender	Refer to benzodiazepines.
	Urine, 20 mL	Quantitative HPLC.
<b>LOXAPINE</b>	Blood, 5 mL, plastic lavender	
<b>LUDIOMIL®</b>		Refer to maprotiline.
<b>LUVOX®</b>		Refer to fluvoxamine.
<b>MAGNESIUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water	Contact the laboratory for details.
<b>MALATHION</b> (Exposure to)	Urine	Refer to malathion mono and dicarboxylic acid.
<b>MALATHION, MONO AND DICARBOXYLIC ACID</b>	Urine, 24 hour	Exposure to malathion. Determination of malathion dicarboxylic acid and malathion monocarboxylic acid. Contact the laboratory for details.
<b>MANCOZEB</b>	Soil, 500 g	Contact the laboratory for details.
	Water, 500 mL	Contact the laboratory for details.

ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>MANDELIC ACID</b>	Urine, 20 mL	Exposure to ethyl benzene or styrene.
<b>MANERIX<sup>®</sup></b>		Refer to moclobemide.
<b>MANGANESE</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for elements and trace metals in hair (p. 54).
	Serum, red top BD9615	See section 2.3 of protocol for the determination of elements and trace metals in blood (p. 55).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water	Contact the laboratory for details.
<b>MAPROTILINE</b> Ludimil <sup>®</sup>	Blood, 5 mL, plastic lavender	Refer to antidepressants tricyclic.
<b>MARZINE<sup>®</sup></b>		Refer to cyclizine.
<b>MDMA</b> <b>METHYL DIOXY</b> <b>METHAMPHETAMINE</b> Ecstasy <sup>®</sup>	Urine, 20 mL	Quantitative GC-MS.
<b>MECOPROP</b>	Urine	Refer to "pesticides chlorophenoxy".
<b>MEPERIDINE</b> Demerol <sup>®</sup>	Blood, 5 mL, plastic lavender	
<b>MEPHOBARBITAL</b>	Blood, 5 mL, plastic lavender	Refer to barbiturates.
<b>MEPIVACAINE</b> Carbocaine <sup>®</sup>	Blood, 5 mL, plastic lavender	
<b>MERCURY, INORGANIC</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
<b>MERCURY, TOTAL</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
<b>(See next page)</b>	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).

ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>MERCURY, TOTAL (Concluded)</b>	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water, 100 mL	Contact the laboratory for details.
<b>METAL SCREENING</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53). Includes: aluminum, antimony, arsenic, barium, beryllium, bismuth, calcium, cadmium, cobalt, chromium, copper, iron, gallium, gold, lanthanum, lead, lithium, magnesium, manganese, molybdenum, niobium, nickel, rubidium, selenium, silver, strontium, tellurium, thallium, tin, tungsten, uranium, vanadium, zinc, zirconium.
	Blood	See sampling protocol for the determination of elements and trace metals in blood (p. 55). Includes: antimony, arsenic, beryllium, bismuth, cadmium, cobalt, copper, lead, lithium, manganese, molybdenum, nickel, selenium, silver, tellurium, thallium, tin, uranium, zinc, zirconium.
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54). Includes: idem Biological tissues.
	Serum	See section 2.3 of the sampling protocol for the determination of elements and trace metals in blood (p. 55). Includes: antimony, arsenic, beryllium, bismuth, cadmium, cobalt, copper, chromium, lead, lithium, manganese, molybdenum, nickel, selenium, silver, tellurium, thallium, tin, uranium, zinc, zirconium.
	Urine	See sampling protocol for the determination of elements and trace metals in urine (p. 56). Includes: antimony, arsenic, beryllium, bismuth, cadmium, cobalt, copper, lead, lithium, manganese, molybdenum, nickel, silver, thallium, tin, uranium, zinc, zirconium.
	Water	Contact the laboratory for details. Includes: aluminum, antimony, arsenic, barium, beryllium, bismuth, calcium, cadmium, cobalt, chromium, copper, iron, gallium, gold, lanthanum, lead, lithium, magnesium, manganese, molybdenum, niobium, nickel, platinum, rubidium, selenium, silver, strontium, tellurium, thallium, tin, tungsten, uranium, vanadium, zinc, zirconium.
<b>METHADONE</b>	Blood, 5 mL, plastic lavender	
	Urine, 20 mL	Quantitative GC-MS.
<b>METHAMIDOPHOS</b>	Urine, 20 mL	Exposure to acephate.

ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>METHAMPHETAMINE</b>	Urine, 20 mL	Quantitative GC-MS
	Urine, 20 mL	Screening
<b>METHANE</b>	Air	Contact the laboratory for details.
	Water	Contact the laboratory for details.
<b>METHANOL</b>	Blood, 1 mL, plastic lavender	Refer to alcohol.
<b>METHAQUALONE</b>	Blood, 5 mL, plastic lavender	
<b>METHYL CHLOROFORM</b> (Exposure to)		Refer to trichloroacetic acid in urine and trichloroethanol in blood and urine.
<b>METHYL ETHYL KETONE</b> (Exposure to)	Urine, 20 mL	To avoid evaporation of the solvent, the sampling container should be filled to the brim and tightly closed.
<b>METHYLHIPPURIC ACID</b>	Urine, 20 mL	Exposure to xylene.
<b>METOPROLOL</b> Lopresor <sup>®</sup>	Blood, 5 mL, plastic lavender	Screening and quantitative HPLC. Refer to $\beta$ -blocker and calcium channel blocker.
<b>MIDAZOLAM</b>	Blood, 5 mL, plastic lavender	
<b>MIRTAZAPINE</b> Remeron <sup>®</sup>	Blood, 5 mL, plastic lavender	Refer to antidepressants non-tricyclics.
<b>MOCLOBEMIDE</b> Manerix <sup>®</sup>	Blood, 5 mL, plastic lavender	Refer to antidepressants non-tricyclic.
<b>MOLYBDENUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water, 100 mL	Contact the laboratory for details.
<b>MORPHINE</b>	Blood, 5 mL, plastic lavender	Quantitative GC-MS.
	Saliva	HPLC-MS-MS
	Urine, 20 mL	Quantitative GC-MS.
	Urine, 20 mL	Screening.
<b>t,t-MUCONIC ACID</b>	Urine, 20 mL	Exposure to benzene.
<b>NALDOLOL</b> Corgard <sup>®</sup>	Blood, 5 mL, plastic lavender	Screening and quantitative HPLC. Refer to $\beta$ -blocker and calcium channel blocker.

ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>NAPHTHALENE</b> (Exposure to)		Refer to naphthol.
<b>NAPHTOL</b>	Urine, 20 mL	Exposure to carbaryl or naphthalene. Determination of 1-naphthol and 2-naphthol. Contact the laboratory for details.
<b>NARCOTICS</b>	Urine, 20 mL	Includes: drugs of abuse, meperidine, methadone, pentazocine, propoxyphene.
<b>NEMBUTAL®</b>		Refer to pentobarbital.
<b>NICKEL</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies (p. 53)).
	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Plasma, 1 mL, plastic lavender BD7863	See section 2.3 of the sampling protocol for the determination of elements and metals in blood (p. 55).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water, 100 mL	Contact the laboratory for details.
<b>NICOTINE</b>	Hair	See also cotinine.
	Urine, 20 mL	See also cotinine.
<b>NIFEDIPINE</b> Adalat®	Blood, 5 mL, plastic lavender	Screening and quantitative HPLC. Refer to $\beta$ -blocker and calcium channel blocker.
<b>NIOBIUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Water, 100 mL	Contact the laboratory for details.
<b>NISENTIL®</b>		Refer to alphaprodine.
<b>NITRAZEPAM</b>	Blood, 5 mL, plastic lavender	Refer to benzodiazepines.
<b>NITRAZEPAM, 7-amino</b>	Blood, 5 mL, plastic lavender	Refer to benzodiazepines.
<b>NORDOXEPIN</b>	Blood, 5 mL, plastic lavender	Refer to antidepressants tricyclic.
<b>NORPRAMIN®</b>		Refer to desipramine.
<b>NORTRIPTYLINE</b> Aventyl®	Blood, 5 mL, plastic lavender	Refer to antidepressants tricyclic.



ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>OLANZAPINE</b> Zyprexa <sup>®</sup>	Blood, 5 mL, plastic lavender	Refer to antidepressants non-tricyclic.
<b>OPIATES</b>	Blood, 5 mL, plastic lavender	Quantitative GC-MS.
	Saliva	Quantitative GC-MS.
	Urine, 20 mL	Quantitative GC-MS.
	Urine, 20 mL	Screening.
<b>ORGANOCHLORINE COMPOUNDS</b>		Refer to "pesticides, organochlorinated".
<b>ORGANOPHOSPHORUS or ORGANOPHOSPHATE COMPOUNDS</b>		Refer to "pesticides, organophosphorus".
<b>ORINASE<sup>®</sup></b>		Refer to tolbutamide.
<b>OXAZEPAM</b> Serax <sup>®</sup>	Blood, 5 mL, plastic lavender	Refer to benzodiazepines.
	Urine, 20 mL	Quantitative by HPLC.
<b>OXYCODONE</b>	Blood, 5 mL, plastic lavender	Quantitative by GC-MS.
	Urine, 20 mL	Quantitative by GC-MS.
	Urine, 20 mL	Screening.
<b>PAHs</b> Polycyclic aromatic hydrocarbons		Contact the laboratory for details.
<b>PAH METABOLITES</b>	Urine, 100 mL	Determination of PAHs metabolites: 1-naphtol, 2-naphtol, 1-hydroxyphenanthrene, 1-hydroxypyrene, 2-hydroxyphenanthrene, 3-hydroxyphenanthrene, 4-hydroxyphenanthrene. Contact the laboratory for details.
<b>PARAQUAT</b>	Urine, 20 mL	Only available in case of acute intoxication. Contact the laboratory for details.
<b>PAROXETINE</b> Paxil <sup>®</sup>	Blood, 5 mL, plastic lavender	Refer to antidepressants (SSRI).
<b>PAXIL<sup>®</sup></b>		Refer to paroxetine.
<b>PCBs</b> (Polychlorinated biphenyls)	Blood, 10 mL, plastic lavender	Determination of PCB congeners: 28, 52, 101, 105, 118, 128, 138, 153, 156, 170, 180, 183, 187. Determination of total PCBs as Aroclor 1260. Other congeners are quantitated upon special request. See also PCBs and organochlorinated pesticides.

ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>PCBs AND ORGANOCHLORINATED PESTICIDES</b>	Biological tissues, 5 g	Determination of PCB congeners: 28, 52, 99, 101, 105, 118, 128, 138, 153, 156, 170, 180, 183, 187.
	Biopsies, 1 g	Determination of total PCBs as Aroclor 1260.
	Blood, 10 mL, plastic lavender	Determination of: $\beta$ -BHC, $\alpha$ -chlordane, $\gamma$ -chlordane, cis-nonachlor, hexachlorobenzene, mirex, oxychlordane, p,p'-DDE, p,p'-DDT, trans-nonachlor, dieldrin, heptachlor epoxide. Other organochlorinated and congeners are quantitated upon special request. Contact the laboratory for details.
	Fish, 5 g	
	Milk, 20 mL	
	Placenta, 15 g	For blood, includes the above-mentioned analytes plus the determination of aldrin.
	Vegetation, 50 g	
<b>PENTACHLOROPHENOL</b>		Refer to chlorophenols.
<b>PENTAZOCINE</b> Talwin <sup>®</sup>	Blood, 5 mL, plastic lavender	
	Urine, 20 mL	Refer to narcotics.
<b>PENTOBARBITAL</b> Nembutal <sup>®</sup>	Blood, 5 mL, plastic lavender	Refer to barbiturates.
<b>PENTOTHAL<sup>®</sup></b>		Refer to thiopental.
<b>PERCHLORETHYLENE</b> (Exposure to)	Urine, 20 mL	Refer to trichloroacetic acid in urine.
<b>PESTICIDES, CHLOROPHENOXY</b>	Berries, 25 g Twigs or vegetation, 50 g	The determination of pesticides chlorophenoxy includes salt and acid forms. The ester form will be quantitated on special request. Determination of 2,4-D and/or dicamba, and/or dichlorprop (2,4-DP) and/or picloram and/or triclopyr. Contact the laboratory for details.
	Soil, 50 g	The determination of pesticides chlorophenoxy includes salt and acid forms. The ester form will be quantitated on special request. Determination of 2,4-D and/or dicamba, and/or dichlorprop (2,4-DP) and/or picloram and/or triclopyr. Contact the laboratory for details.
	Urine 24 hour	Determination of free 2,4-D and/or picloram and/or mecoprop. Contact the laboratory for details.
	Urine 24 hour	Determination of total 2,4-D, dicamba and mecoprop. Contact the laboratory for details.
	Water, 500 mL	The determination of pesticides chlorophenoxy includes salt and acid forms. The ester form will be quantitated on special request. Determination of 2,4-D and/or dicamba, and/or dichlorprop (2,4-DP) and/or picloram and/or triclopyr. Contact the laboratory for details.

ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>PESTICIDES, ORGANOCHLORINATED</b>	Biological tissues, 5 g	Determination of $\beta$ -BHC, $\alpha$ -chlordane, $\gamma$ -chlordane, cis-nonachlor, dieldrin, heptachlor epoxide, hexachlorobenzene, mirex, oxychlordane, p,p'-DDE, p,p'-DDT, trans-nonachlor and other organochlorinated are quantitated upon special request. Contact the laboratory for details. For blood, includes above-mentioned analytes plus the determination of aldrin.
	Biopsies, 1 g	
	Blood, 10 mL	
	Fish, 5 g	
	Milk, 20 mL	
	Placenta, 15 g	
	Vegetation, 50 g	
<b>PESTICIDES, ORGANOPHOSPHORUS</b>	Soil	Refer to chlorpyrifos.
	Urine	Refer to chlorpyrifos and alkyl phosphates.
	Water	Refer to chlorpyrifos.
<b>PESTICIDES, PYRETHROIDS</b>	Urine 24 hour	Determination of cis-Cl <sub>2</sub> CA, trans-Cl <sub>2</sub> CA, Br <sub>2</sub> CA and 3-PBA. Contact the laboratory for details.
	Water, 500 mL	Refer to deltamethrine.
<b>PETHIDINE</b>	Blood, 5 mL, plastic lavender	Refer to meperidine.
<b>PFOA</b>	Plasma, 2 mL, plastic lavender, BD7863	Contact the laboratory for details.
<b>PFOS Perfluoro octane sulfonate</b>	Plasma, 2 mL, plastic lavender, BD7863	Contact the laboratory for details.
<b>PHENCYCLIDINE (PCP)</b>	Blood, 5 mL, plastic lavender	Screening.
	Blood, 5 mL, plastic lavender	Quantitative GC-MS.
	Urine, 20 mL	Quantitative GC-MS.
	Urine, 20 mL	Screening.
<b>PHENOBARBITAL</b>	Blood, 5 mL, plastic lavender	Refer to barbiturates.
<b>PHENOL</b>	Urine, 20 mL	Exposure to benzene or phenol.
<b>PHENOTHIAZINE</b>	Blood, 5 mL, plastic lavender	Screening only.
	Gastric liquid, 20 mL	Screening only.
	Urine, 20 mL	Screening only.
<b>PHENYLGLYOXYLIC ACID</b> (Exposure to styrene)	Urine, 20 mL	Exposure to styrene.
<b>PICLORAM</b>		Refer to "pesticides, chlorophenoxy".
<b>PIMOZIDE</b> Orap <sup>®</sup>	Blood, 5 mL, plastic lavender	Refer to antidepressants tricyclic.

<b>ANALYTE</b>	<b>SPECIMEN REQUIRED</b>	<b>COMMENT</b>
<b>PINDOLOL</b> Visken®	Blood, 5 mL, plastic lavender	Screening and quantitative HPLC. Refer to $\beta$ -blocker and calcium channel blocker.
<b>PLATINIUM</b>	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
<b>POLYBROMINATED DIPHENYLETHER (PBDE)</b>	Blood, 10 mL, plastic lavender	Congeners 47, 99, 100, 153 including PBB 153.
<b>POLYCHLORINATED BIPHENYLS</b>		Refer to PCBs.
<b>POPs</b> (Persistent organic pollutants)		Refer to PCBs and organochlorinated pesticides.
<b>PROCYCLIDINE</b> Kemadrin®	Blood, 5 mL, plastic lavender	
<b>PROPRANOLOL</b> Inderal®	Blood, 5 mL, plastic lavender	Screening and quantitative HPLC. Refer to $\beta$ -blocker and calcium channel blocker.
<b>PROPOXYPHENE</b> Darvon-N®	Blood, 5 mL, plastic lavender	
<b>PROTRIPTYLINE</b> Triptil®	Blood, 5 mL, plastic lavender	Refer to antidepressants tricyclic.
<b>PROZAC®</b>		Refer to fluoxetine.
<b>PYROGLUTAMIC ACID</b>	Blood, 5 mL, plastic lavender	Possibly increased in acetaminophen intoxication.
<b>QUETIAPINE</b> Seroquel®	Blood, 5 mL, plastic lavender	Refer to antidepressants tricyclic.
<b>RDX</b>	Urine, 20 mL	Determination of RDX and HMX. Contact the laboratory for details.
<b>RESTORIL®</b>		Refer to temazepam.
<b>RIVOTRIL®</b>		Refer to clonazepam.
<b>RUBIDIUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Hair	See sampling protocol for determination of elements and trace metals in hair (p. 54).
	Water	Contact the laboratory for details.
<b>SECOBARBITAL</b> Seconal®	Blood, 5 mL, plastic lavender	Refer to barbiturates.
<b>SECONAL®</b>		Refer to secobarbital.
<b>SECTRAL®</b>		Refer to acebutolol.

ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>SELENIUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender, BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Plasma or serum, 1 mL, plastic lavender BD7863 or red top BD9615	See section 2.3 of the sampling protocol for the determination of elements and metals in blood (p. 55).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water, 100 mL	Contact the laboratory for details.
<b>SERAX®</b>		Refer to oxazepam.
<b>SERTRALINE</b> Zoloft®	Blood, 5 mL, plastic lavender	Refer to antidepressant (SSRI).
<b>SILVER</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water, 100 mL	Contact the laboratory for details.
<b>SIMAZINE</b>		Refer to triazine.
<b>SINEQUAN®</b>		Refer to doxepin.
<b>SOLVENTS</b> (Volatile)	Blood, 5 mL	Contact the laboratory for details.
<b>STRONTIUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood	Contact the laboratory for details.
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Water	Contact the laboratory for details.
<b>STYRENE</b> (Exposure to)		Refer to mandelic acid.
<b>SURMONTIL®</b>		Refer to trimipramine.
<b>TALWIN®</b>		Refer to pentazocine.

ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>TEBUTHIURON</b>	Soil, 500 g	Determination of tebuthiuron and N-desmethyl tebuthiuron metabolite. Contact the laboratory for details.
	Water, 500 mL	Contact the laboratory for details.
<b>TELLURIUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water	Contact the laboratory for details.
<b>TEMAZEPAM</b> Restoril®	Blood, 5 mL, plastic lavender	Refer to benzodiazepines.
	Urine, 20 mL	Quantitative HPLC.
<b>TENORMIN®</b>		Refer to atenolol.
<b>2,3,4,6-TETRACHLORO-PHENOL</b>		Refer to chlorophenols.
<b>THALLIUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water	Contact the laboratory for details.
<b>THIOCYANATE</b>	Blood, 5 mL, plastic lavender	
<b>THIOPENTAL</b> Pentothal®	Blood, 5 mL, plastic lavender	
<b>TIMOLOL</b> Blocadren®	Blood, 5 mL, plastic lavender	Screening and quantitative HPLC. Refer to $\beta$ -blocker and calcium channel blocker.
<b>TIN</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).

ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>TOFRANIL<sup>®</sup></b>		Refer to imipramine.
<b>TOLBUTAMIDE</b> Orinase <sup>®</sup>	Blood, 5 mL, plastic lavender	Screening and quantitative HPLC. Refer to hypoglycemic agents.
<b>TOLUENE</b> (Exposure to)		Refer to hippuric acid.
<b>TOXAPHENE</b>	Biological tissues, 5 g	Determination of commercially available congeners and total toxaphene. Contact the laboratory for details.
	Blood, 10 mL, plastic lavender	Determination of commercially available congeners and total toxaphene. Contact the laboratory for details.
<b>TRANDATE<sup>®</sup></b>		Refer to labetalol.
<b>TRANXENE<sup>®</sup></b>		Refer to clorazepate.
<b>TRAZODONE</b> Desyrel <sup>®</sup>	Blood, 5 mL, plastic lavender	Refer to antidepressants non-tricyclic.
<b>TRIAZINE</b>	Soil, 500 g	Determination of atrazine or simazine and their metabolites. Contact the laboratory for details.
	Urine 24 hour	Determination of atrazine or simazine and their metabolites. Contact the laboratory for details.
	Water, 500 mL	Determination of atrazine or simazine and their metabolites. Contact the laboratory for details.
<b>TRIAZOLAM</b> Halcion <sup>®</sup>	Blood, 5 mL, plastic lavender	Refer to benzodiazepines.
<b>3,5,6-TRICHLORO-2-PYRIDINOL</b>	Soil	Refer to chlorpyrifos.
	Urine	Refer to chlorpyrifos.
	Water	Refer to chlorpyrifos.
<b>TRICHLOROACETIC ACID</b>	Berries, 25 g	<b>Used as pesticide.</b> Contact the laboratory for details.
	Soil, 500 g	<b>Used as pesticide.</b> Contact the laboratory for details.
	Urine, 20 mL	Exposure to methyl chloroform [1,1,1-trichloroethane], perchloroethylene or trichloroethylene.
	Water, 500 mL	<b>Used as pesticide.</b> Contact the laboratory for details.
<b>TRICHLOROPYRIDINOL</b>		Refer to chlorpyrifos.
<b>1,1,1-TRICHLOROETHANE</b> (Exposure to)		Refer to trichloroacetic acid in urine and trichloroethanol in blood and urine.

ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>TRICHLOROETHANOL</b>	Blood, 5 mL, plastic lavender	Exposure to 1,1,1-trichloroethane (methyl chloroform) or trichloroethylene. Ingestion of chloral hydrate.
	Urine, 20 mL	Exposure to 1,1,1-trichloroethane (methyl chloroform) or trichloroethylene exposure.
<b>TRICHLOROETHYLENE</b> (Exposure to)		Refer to trichloroacetic acid in urine and trichloroethanol in blood and urine.
<b>TRICLOPYR</b>		Refer to pesticides chlorophenoxy and triclopyr (2-butoxy-ethyl) ester.
<b>TRICLOPYR (2-BUTOXY-ETHYL) ESTER</b>	Soil, 500 g	Contact the laboratory for details.
	Twigs, 50 g	Contact the laboratory for details.
	Water, 500 mL	Contact the laboratory for details.
<b>TRIMETHYLAMINE</b>	Water, 20 mL	Contact the laboratory for details.
<b>TRIMETHYLAMINE OXIDE</b>	Water, 20 mL	Contact the laboratory for details.
<b>TRIMIPRAMINE</b> Surmontil®	Blood, 5 mL, plastic lavender	Refer to antidepressants tricyclic.
<b>TRIPTIL®</b>		Refer to protriptyline.
<b>TUINAL®</b>		Refer to amobarbital.
<b>TUNGSTEN</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Water	Contact the laboratory for details.
<b>URANIUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water	Contact the laboratory for details.
<b>VALIUM®</b>		Refer to diazepam.



ANALYTE	SPECIMEN REQUIRED	COMMENT
<b>VANADIUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water	Contact the laboratory for details.
<b>VENLAFAXINE</b> Effexor®	Blood, 5 mL, plastic lavender	Refer to antidepressants non-tricyclic.
<b>VERAPAMIL</b> Isoptin®	Blood, 5 mL, plastic lavender	Screening and quantitative HPLC. Refer to $\beta$ -blocker and calcium channel blocker.
<b>VISKEN®</b>		Refer to pindolol.
<b>VITAMIN A</b>	Blood, 5 mL, heparin	See sampling protocol for the determination vitamin A and vitamin E (p. 57).
<b>VITAMIN E</b>	Blood, 5 mL, heparin	See sampling protocol for the determination vitamin A and vitamin E (p. 57).
<b>XANAX®</b>		Refer to alprazolam.
<b>XYLENE</b> (exposure to)		Refer to methylhippuric acid.
<b>ZINC</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Plasma or serum, 2 mL, plastic lavender BD7863 or red top BD9615	See section 2.3 of the sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water	Contact the laboratory for details.
<b>ZINC PROTOPORPHYRIN</b>	Blood, 6 mL, plastic lavender BD7863	
<b>ZIRCONIUM</b>	Biological tissues	See sampling protocol for the determination of elements and trace metals in biological tissues (other than biopsies) (p. 53).
	Blood, 6 mL, plastic lavender BD7863	See sampling protocol for the determination of elements and trace metals in blood (p. 55).
	Hair	See sampling protocol for the determination of elements and trace metals in hair (p. 54).
	Urine, 20 mL	See sampling protocol for the determination of elements and trace metals in urine (p. 56).
	Water	Contact the laboratory for details.

<b>ANALYTE</b>	<b>SPECIMEN REQUIRED</b>	<b>COMMENT</b>
<b>ZOLOFT<sup>®</sup></b>		Refer to sertraline.
<b>ZPP</b>		Refer to zinc protoporphyrin.
<b>ZYPREXA<sup>®</sup></b>		Refer to olanzapine.

**SECTION 3**  
**SUBSTANCES INCLUDED IN THE GENERAL**  
**SCREENING OF DRUGS AND ALCOHOLS**



### SECTION 3 SUBSTANCES INCLUDED IN THE GENERAL SCREENING OF DRUGS AND ALCOHOLS

Acebutolol	GF	PI	Ur	Dichloralphenazone	GF		
Acetaminophen	GF	PI	Ur	Diethylpropion	GF		Ur
Acetone		PI	Ur	Diltiazem	GF	PI	Ur
Acetopromazine	GF			Dimenhydrinate	GF <sup>3</sup>	PI	Ur <sup>3</sup>
Acetylsalicylic acid	GF	PI <sup>1</sup>	Ur <sup>1</sup>	Dimethothiazine	GF		
Alphaprodine	GF	PI	Ur	Diphenhydramine	GF	PI	Ur
Alprazolam	GF	PI		Diphenylpyraline	GF		
Amitriptyline	GF	PI	Ur	Disopyramide	GF	PI	
Amobarbital	GF	PI	Ur	Doxepine	GF	PI	
Amoxapine	GF	PI		Doxepine, desmethl		PI	Ur
Amphetamines	GF		Ur	Doxylamine	GF		
Anileridine	GF	PI	Ur	Ecgonine methyl ester		PI	Ur
Atenolol	GF	PI		EDDP		PI	Ur
Barbital	GF	PI	Ur	Ephedrine	GF		Ur
Benzocaine	GF			Etafedrine	GF		
Benztropine	GF		Ur	Ethanol		PI	Ur
Bromazepam	GF	PI		Ethoheptazine	GF		
Bromodiphenhydramine	GF			Ethopropazine	GF		Ur
Brompheniramine	GF			Ethosuximide	GF	PI	
Bupropion	GF	PI		Fenfluramine	GF	PI	
Butabarbital	GF	PI	Ur	Fentanyl	GF		
Butalbital	GF	PI	Ur	Flecainide	GF	PI	
Butethal	GF	PI	Ur	Flunitrazepam	GF	PI	
Caffeine	GF	PI	Ur	Fluoxetine	GF	PI	Ur
Caramiphene	GF			Fluphenazine	GF		Ur
Carbamazepine	GF	PI		Flurazepam	GF	PI <sup>8</sup>	Ur <sup>8</sup>
Carbamazepine, 10-11 epoxide		PI	Ur	Flurazepam, hydroxy-ethyl		PI	Ur
Carbinoxamine	GF			Flurazepam, N-1 desalkyl		PI	Ur
Carbromal	GF			Fluvoxamine	GF	PI	Ur
Chlorthalidol	GF			Glutethimide	GF	PI	
Chlorcyclizine	GF	PI		Haloperidol	GF		
Chlordiazepoxide	GF	PI	Ur <sup>8</sup>	Heptabarbital	GF	PI	Ur
Chlordiazepoxide, desmethyl	GF			Heroin	GF <sup>5</sup>	PI	Ur
Chloroquine		WB		Hydrocodone	GF	PI	Ur
Chlorothene	GF			Hydromorphone	GF		
Chlorpheniramine	GF			Hydroxyzine	GF		
Chlorphentermine	GF	PI		Imipramine	GF	PI	Ur
Chlorpromazine	GF	PI	Ur	Isopropanol		PI	Ur
Chlorprothixene	GF	PI		Ketamine	GF	PI	
Clemastine	GF			Levallorphan	GF		
Clobazam	GF	PI	Ur	Levorphanol	GF		
Clomipramine	GF	PI	Ur	Lidocaine	GF	PI	
Clonazepam	GF	PI		Lorazepam	GF	PI	Ur
Clozapine	GF	PI	Ur	Loxapine	GF	PI	
Cocaine	GF		Ur	LSD	GF		
Cocaethylene		PI	Ur	Maprotiline	GF	PI	Ur
Codeine	GF	PI	Ur	Mazindol	GF		
Cotinine		PI	Ur	MDMA (Ecstasy)	GF	PI	Ur
Cyclizine	GF	PI		MEGX		PI	Ur
Cyclobenzaprine	GF			Meperidine	GF	PI	Ur
Cyclopentamine	GF			Mephentermine	GF		Ur
Cyproheptadine	GF			Mephobarbital	GF	PI	Ur
Desipramine	GF	PI	Ur	Mepivacaine	GF	PI	
Deshydrométhypyrylon		PI	Ur	Meprobamate	GF	PI	Ur
Dextromethorphan	GF		Ur	Mepyramine	GF		
Diazepam	GF	PI	Ur <sup>8</sup>	Mescaline	GF		Ur
Diazepam, desmethyl	GF	PI.	Ur	Mesoridazine	GF		Ur

Methadone	GF	PI	Ur	Prochlorperazine	GF		Ur
Methamphetamine	GF		Ur	Procyclidine	GF	PI	Ur
Methanol		PI	Ur	Promazine	GF	PI	Ur
Methapyrilene	GF	PI		Promethazine	GF		
Methaqualone	GF	PI	Ur	Propranolol	GF		
Methdilazine	GF		Ur	Propoxyphene	GF	PI	Ur
Methotrimeprazine	GF	PI	Ur	Protriptyline	GF	PI	Ur
Methoxyphenamine	GF			Pyrrobutamine	GF		
Methsuximide	GF			Quetiapine	GF		
Methylphenidate	GF			Quinidine	GF	PI	
Methyprylone	GF	PI	Ur	Quinine	GF	PI	
Metoprolol	GF	PI	Ur	Risperidone	GF		
Midazolam	GF	PI		Salicylic acid	GF	PI	Ur
Mirtazapine	GF			Secobarbital	GF	PI	Ur
MMDA		PL	Ur	Sertraline	GF	PI	Ur
Moclobemide	GF	PI	Ur	Strychnine	GF	PI	
Morphine	GF			Temazepam	GF	PI	Ur
Morphine, 6 acetyl	GF			Tetracaine	GF		
Nalorphine	GF			Theophylline	GF	PI	Ur
Nefazodone	GF			Thiethylperazine	GF		Ur
Nicotine		PI	Ur	Thiopental	GF		
Nifedipine	GF	PI		Thioridazine	GF	PI	Ur
Nitrazepam	GF	PI		Tranlycypromine	GF		
Norcodeine		PI	Ur	Trazodone	GF	PI	
Nordiphenhydramine		PI	Ur	Triazolam	GF	PI	Ur
Nordisopyramide	GF			Trifluoperazine	GF		Ur
Norfluoxetine		PI	Ur	Triflupromazine	GF		Ur
Normeperidine		PI	Ur	Trihexyphenidyle	GF		Ur
Normethadone		PI	Ur	Trimeprazine	GF		
Norpropoxyphene		PI	Ur	Trimipramine	GF	PI	Ur
Norpropoxyphene amide		PI	Ur	Tripelennamine	GF	PI	
Nortriptyline	GF	PI	Ur	Tripolidine	GF		
Olanzapine	GF	PI	Ur	Valproic acid	GF		
Oxazepam	GF	PI	Ur	Venlafaxine	GF	PI	Ur
Oxycodone	GF			Venlafaxine, desmethyl		PI	Ur
Oxymorphone	GF			Verapamil	GF	PI	Ur
Oxyphenbutazone	GF						
Pargyline	GF		Ur				
Paroxetine	GF	PI	Ur				
PEMA		PI	Ur				
Pentazocine	GF		Ur				
Pentobarbital	GF	PI	Ur				
Pericyazine	GF		Ur				
Perphenazine	GF						
Phenazocine	GF						
Phencyclidine	GF	PI	Ur				
Phendimetrazine	GF						
Pheniramine	GF						
Phenmetrazine	GF	PI					
Phenobarbital	GF	PI	Ur				
Phentermine	GF	PI					
Phenylbutazone	GF						
Phenylpropranolamine	GF		Ur				
Phenyltoloxamine	GF						
Phenytaine	GF						
Pimazide	GF						
PMA		PI	Ur				
PMAA		PI	Ur				
Prilocaine	GF						
Primidone	GF	PI					
Procaine	GF	PI					

**LEGEND:**

- GF: Gastric fluid
- PI: Plasma
- WB: Whole blood
- Ur: Urine
- <sup>1</sup> Identified as salicylic acid
- <sup>2</sup> Identified as desmethyldiazepam
- <sup>3</sup> Identified as diphenhydramine
- <sup>4</sup> Identified as diazepam and desmethyldiazepam
- <sup>5</sup> See morphine
- <sup>6</sup> Identified as brompheniramine
- <sup>7</sup> Identified as chlorpheniramine
- <sup>8</sup> Identified as the metabolite

N.B. Some substances ingested in therapeutic doses may not be detected.

**SECTION 4**  
**DRUGS OF ABUSE IN URINE**





## **SECTION 4 DRUGS OF ABUSE IN URINE**

### **4.1 PROCEDURES FOR SCREENING AND CONFIRMATION FOR DRUGS OF ABUSE IN URINE**

The laboratory performs the screening and GC/MS confirmation of drugs of abuse in urine. The request must originate from a physician who agrees to act as a review officer. Results will be transmitted solely to this physician.

Testing is conducted according to SAMHSA (Substance Abuse and Mental Health Services Administration) as published in the Federal Register 2004, 69(71):19643-19732 "Mandatory Guidelines for Federal Workplace Drug Testing Programs".

#### ***SUBSTANCES INCLUDED***

Amphetamines, barbiturates, benzodiazepines, cannabinoids, cocaine, methadone, opiates and phencyclidine.

The laboratory will respond to inquiries regarding other drugs. Contact the laboratory for details.

#### ***COLLECTION PROCEDURE***

The urine collection procedure Guideline (Section 4.2) summarizes the way to collect the urine specimen and ensure its integrity.

#### ***RECEIPT AND HANDLING OF URINE SPECIMEN***

The laboratory maintains an internal chain of custody form and keeps all specimens under lock and key considering the forensic issues involved. Clients are required to complete a chain of custody form, from sample collection to receipt in our laboratory.

#### ***CONFIRMATION OF POSITIVE RESULTS***

Positives are automatically confirmed by GC/MS.

**DETECTION TIMES FOR DRUGS OF ABUSE IN URINE**

Product	Usual metabolite	Detection time (days)	Detection cut-off
Amphetamines	Amphetamine	1 day	500 ng/mL
Cannabinoids	11-NOR- $\Delta^9$ -THC-COOH	5 days and more	50 ng/mL
Cocaine	Benzoylcegonine	1 to 2 days	300 ng/mL
Phencyclidine	Phencyclidine	10 days and more	25 ng/mL
Opiates	Morphine	1 to 4 days	300 ng/mL
Benzodiazepines	Nordiazepam	1 to 2 days	200 ng/mL
Barbiturates	Secobarbital	5 to 7 days	200 ng/mL
Metabolite method	EDDP	---	100 ng/mL

**4.2 URINE COLLECTION PROCEDURE GUIDELINES AND CHAIN OF CUSTODY FOR THE SCREENING OF DRUGS OF ABUSE**

**MATERIAL**

**Doxtech<sup>®</sup>\*** urine collection kits:

- Collection bottle
- Special lid
- ID labels
- Temperature sensor

\* See [www.doxtech.com](http://www.doxtech.com) for more information.

**PHYSICIAN RELEASE STATEMENT**

**Important:** The request must originate from a physician or an authorized representative. Results will be transmitted solely to the requesting physician.

**PRECAUTIONS**

Before proceeding with the urine collection, the collector must verify that:

- No adulteration or tampering took place.
- No water source is available in the collection room.

### ***SAMPLE COLLECTION***

Fill out the plastic ID label with pencil (not ink) and place it inside the bottle with printed side **out**.

- The donor is then given the bottle and asked to produce a 30 mL urine sample, which must be **immediately** submitted to the collector.
- The collector then checks the sample for appearance and **seals the bottle with the special closure until it “snaps” tight**.
- The temperature is then read on the sensor: the reading should be in the acceptable range of 32–38°C. The temperature along with any other pertinent data should be consigned on the chain of custody form.
- Finally, the exterior label should be filled out and applied to the side of the bottle.

### ***CHAIN OF CUSTODY FORM***

An external chain of custody form must be filled out and detail the following items:

- Name of donor, file #, time and date, urine temperature, name of physician, name of collector and comments if necessary.

**Finally both collector and donor must sign the form.**

### 4.3 SCREENING FOR DRUGS OF ABUSE (POSITIVES ARE FOLLOWED BY GC/MS CONFIRMATION)

#### AMPHETAMINES

d,l Amphetamine  
d,l Methamphetamine  
MDA  
MDMA (Ecstasy)  
MDE  
PMA  
PMMA

#### BENZODIAZEPINES

Alprazolam  
Bromazepam  
Chlordiazepoxide  
Clobazam  
Clonazepam  
N-1 Desalkylflurazepam  
Desmethylchlordiazepoxide  
Diazepam  
Flunitrazepam  
Flurazepam  
Lorazepam  
Nitrazepam  
Oxazepam  
Temazepam  
Triazolam

#### COCAINE

Benzoylcegonine  
Ecgonine methyl ester  
Cocaine

#### OPIATES

Codeine  
Dihydrocodeine  
Dihydromorphine  
Heroin  
Hydrocodone  
Hydromorphone  
Morphine  
Morphine-3- $\beta$ -glucuronide  
Oxycodone  
Oxymorphone  
6-Monoacetylmorphine

#### BARBITURATES

Amobarbital  
Aprobarbital  
Barbital  
Butobarbital  
Butalbital  
Heptobarbital  
Mephobarbital  
Pentobarbital  
Phenobarbital  
Secobarbital

#### CANNABINOIDS

Acid 11-NOR- $\Delta^9$ -THC-COOH  
8 $\beta$ -11-Dihydroxy- $\Delta^9$ -THC  
8 $\beta$ -Hydroxy- $\Delta^9$ -THC  
11-Hydroxy- $\Delta^9$ -THC  
 $\Delta^9$ -THC  
 $\Delta^9$ -THC-glucuronide

#### METHADONE

EDDP : Methadone metabolites

#### PHENCYCLIDINE

Phencyclidine  
4-OH pip PCP  
TCP

**SECTION 5**  
**HPLC-MS-MS DETERMINATIONS**



## SECTION 5 HPLC-MS-MS DETERMINATIONS

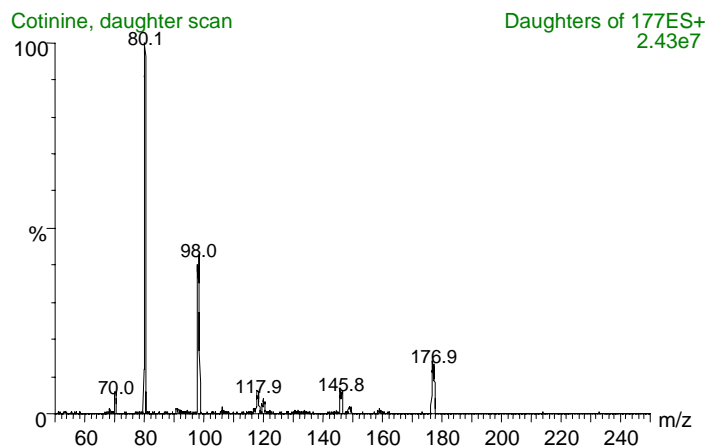
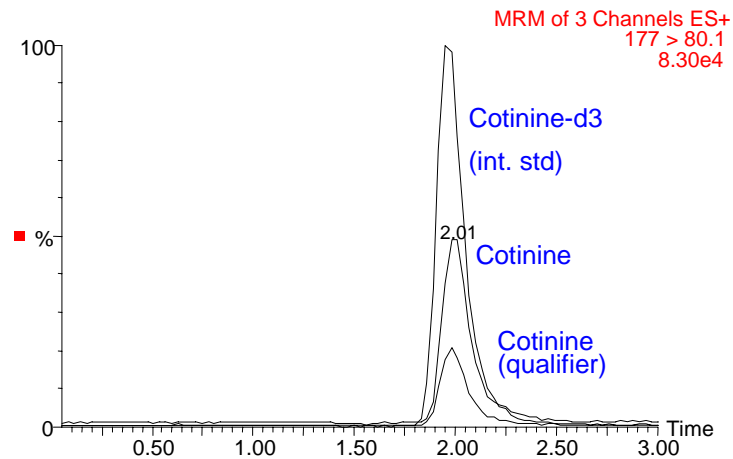
Our laboratory is equipped with HPLC-MS-MS (High performance liquid chromatography coupled to a tandem mass spectrometer).

This state-of-the-art technology offers several advantages over conventional techniques such as GC-MS, including lower detection limits, better specificity and the possibility of measuring difficult analytes. The method development process is generally simplified, leading to lower costs.

This powerful tool is used to address special analytical requests related to clinical, forensic, environmental and industrial toxicology. As an example we are able to screen for benzodiazepines and opiates (including oxycodone) in blood using HPLC-MS-MS.

Clients with special analytical needs are invited to contact us for more details.

### HPLC-MS-MS daughter spectrum of cotinine (nicotine metabolite) and a chromatogram of a 2 ng/mL cotinine serum extract



### Determinations currently available by HPLC/MS/MS

Analyte	Type	Advantages
Tricyclic antidepressants	Quantitative	Sensitivity & specificity
Benzodiazepines (19 substances)	Quantitative	Sensitivity & specificity
Cotinine (nicotine metabolite) in serum	Quantitative	Sensitivity (LOQ=0.2 ng/ml)
Cotinine (nicotine metabolite) in saliva	Quantitative	Sensitivity (LOQ=0.2 ng/ml)
Fentanyl	Quantitative	Sensitivity (LOQ=0.03 nmol/L)
Pyroglutamic acid (acetaminophen)	Quantitative	Rapid & specific
Risperidone	Quantitative	Sensitivity (LOQ=0.2 nmol/L)
Benzodiazepine screen in Blood	<b>Screen</b>	<b>Specificity</b>
Opiate screen in Blood	<b>Screen</b>	<b>Specificity</b>

Note: Other determinations can be developed upon request



**SECTION 6**  
**SAMPLING PROTOCOLS**



## SECTION 6 SAMPLING PROTOCOLS

### 6.1 SAMPLING PROTOCOL FOR THE DETERMINATION OF ELEMENTS AND TRACE METALS IN BIOLOGICAL TISSUES (OTHER THAN BIOPSIES)

#### 1. *Material:*

- Polypropylene bottle 125 mL (Nalgene #2104-0004)
- Cooler with "Ice-Pak<sup>®</sup>" for transportation

#### 2. *Sampling:*

Collect at least 2 g of tissue and place in a polypropylene (Nalgene bottle).

#### 3. *Storage:*

Store samples at 4°C.

### 6.2 SAMPLING PROTOCOL FOR THE DETERMINATION OF ELEMENTS AND TRACE METALS IN HEPATIC NEEDLE BIOPSIES

#### 1. *Material:*

- Polypropylene 7 mL screw cap tubes, (Sarstedt #60550) or plain vacutainer (Becton-Dickinson) without anticoagulant
- Cooler with "Ice-Pak<sup>®</sup>" for transportation.

#### 2. *Sampling:*

- Retrieve a minimum of 1 mg of tissue. More is preferred.
- Place biopsy tissue in either the polypropylene tube or the vacutainer.
- **Do not add anything to the sample such as water, formaldehyde, etc.**
- **Do not fix the tissue.**

#### 3. *Storage:*

Maintain at 4°C until shipped.

### 6.3 SAMPLING PROTOCOL FOR THE DETERMINATION OF ELEMENTS AND TRACE METALS IN HAIR

#### 1. **Material:**

- Stapler
- Cardboard paper (12 x 20 cm approx.)
- Plastic bags (e.g. Ziploc®)

#### 2. **Procedure:**

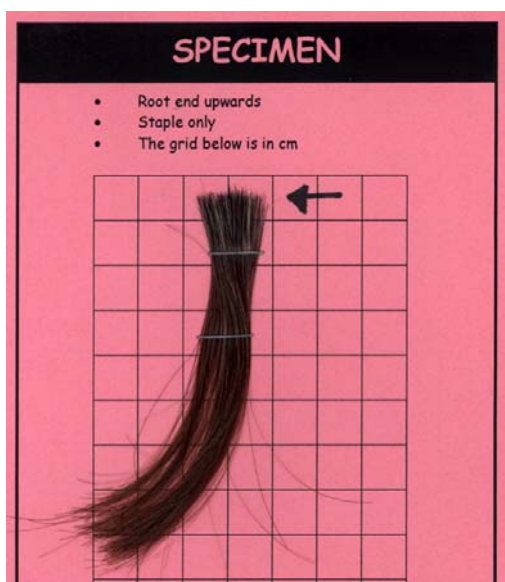
It is recommended to wash the hair with a mild shampoo prior to sampling to eliminate gross external contamination.

Cut a strand of hair as close to the scalp as possible. The strand should be at least 0.5 cm in diameter. Collect a sample in the upper neck region.

Using a stapler (do not use adhesive tape) fix the strand onto the cardboard paper. Indicate which end of the strand is the root.

Clearly identify the sample. Provide any relevant information regarding the types of shampoos or conditioners used and also special colour treatments, perms, etc.

Insert the cardboard paper with the sample inside into the plastic bag and close tightly.



#### 3. **Storage:**

Store at room temperature inside the plastic bag.

## 6.4 SAMPLING PROTOCOL FOR THE DETERMINATION OF ELEMENTS AND TRACE METALS IN BLOOD

### 1. Material:

- Sampling tubes (Becton-Dickinson, Vacutainer, Hemogard).
- Plastic transfer tubes (Sarstedt #60550).
- Plastic transfer pipets.
- Cooler with "Ice-Pak<sup>®</sup>" for transportation.

### 2. Sampling:

Recommended tubes:

ANALYTE		PLASTIC	GLASS			
		Plasma/Blood Lavender #7863	Serum Red #9615 (without clot activator)	Plasma/Blood Lavender #7665	Serum Royal Blue #9737 (without anticoagulant)	Plasma/Blood Royal Blue #9736
Aluminum <sup>(R)</sup> (S/P)	Al	√	√		√	
Antimony (S/P/B)	Sb		√	√	√	
Arsenic B	As	√		√		
β <sub>2</sub> microglobulin (S)	β <sub>2</sub>		√		√	
Beryllium (S/P/B)	Be	√	√	√	√	
Bismuth (S/P/B)	Bi	√	√	√	√	
Cadmium (B)	Cd	√		√		√
Chromium <sup>(R)</sup> (S/P)	Cr	√	√	√		
Cobalt <sup>(R)</sup> (S/P/B)	Co	√	√	√	√	
Copper (S/P) B*	Cu	√	√	√	√	√
Fluoride <sup>(R)</sup> (S/P)	F	√	√		√	
Gold (S/P)	Au	√	√	√	√	
Iodine (S/P/B)	I	√		√		√
Lead (B)	Pb	√		√		√
Lithium (S/P/B)	Li	√			√	
Manganese <sup>(R)</sup> (S)	Mn		√		√	
Manganese (B)	Mn	√		√		√
Mercury (B)	Hg	√		√		√
Metal screening (B)		√		√		
Molybdenum (S/P/B)	Mo	√		√	√	
Nickel <sup>(R)</sup> (S/P/B)	Ni	√	√	√	√	
Selenium (S/P/B)	Se	√	√	√	√	√
Silver (S/P/B)	Ag	√	√	√	√	
Tellurium (S/P/B)	Te	√	√	√	√	
Tin (S/P/B)	Sn	√	√	√	√	
Thallium (S/P/B)	Tl	√	√	√	√	
Uranium (S/P/B)	U	√	√	√	√	
Zinc <sup>(R)</sup> (S/P) B*	Zn	√	√		√	√
Zinc protoporphyrin (B)	ZP P	√		√		√
Zirconium (S/P/B)	Zr	√			√	

Notes: <sup>(R)</sup> Transfer pipettes must be pre-washed with nitric acid 0.5 % followed by distilled water:

\* Screening only      (S): Serum      (P): Plasma      (B): Blood

*Post sampling instructions:*

*Whole blood:* Immediately invert the tubes 8 to 10 times to avoid clots.

*Plasma/serum isolation from whole blood:* If plasma or serum is requested for the tests (according to 2.1), follow these simple steps:

- Spin down the samples and transfer the plasma/serum to a plastic transfer tube.

When transferring, use a pre-rinsed transfer pipet (Nitric acid 0.5% followed by distilled water).

**3. Storage:**

*β<sub>2</sub>-microglobulin:* Store at 4°C for 2 days or otherwise at -20°C.

*Elements and trace metals:* Store at 4°C prior to shipping for up to 1 week.

**6.5 SAMPLING PROTOCOL FOR THE DETERMINATION OF ELEMENTS AND TRACE METALS IN URINE**

**1. Material:**

- Nalgene bottle 125 mL #2104-0004)
- Cooler with "Ice-Pak<sup>®</sup>" for transportation.

**2. Sampling:**

**Precautions to avoid contamination**

Applies to workers in their work area. To avoid potential contamination from dust particles and clothing, it is highly recommended to take a shower and change clothes before taking a sample. Collect a spot sample in a Nalgene container.

**β<sub>2</sub>-microglobulin**

After voiding the bladder, drink one full glass of water. Collect a spot sample in a Nalgene container 1 hour later.

**Trace elements**

- Workers

Collect a spot sample in a Nalgene container at the end of the work shift and at the end of the week. It is sometimes recommended to take a sample before the work shift at the beginning of the week in order to estimate a baseline level.

- Individuals

Collect a spot sample in a Nalgene container anytime during the day but preferably the first morning urine.

### **3. Preservation /Storage**

- $\beta$ 2-microglobulin

Adjust pH between 6 and 8 with sodium hydroxide solution (1 M).

Store refrigerated 2 days. Can be frozen for a period of 2 months.

Avoid freezing/thawing cycles.

- Trace elements

Store refrigerated 1 month. Can be frozen for a period of 1 year.

## **6.6 SAMPLING PROTOCOL FOR THE DETERMINATION OF VITAMIN A AND VITAMIN E**

### **1. Material:**

- Blood collection tube (Heparin)
- Plastic tube Sarstedt #60.542

### **2. Sampling:**

It is important to separate plasma from the red blood cells as soon as possible.

Draw 5 mL of blood on heparin (other anticoagulants are not adequate).

Centrifuge immediately and transfer the plasma into a plastic tube (Sarstedt #60.542).

### **3. Storage:**

Store frozen at -20°C.

