



**NMS Labs**

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Robert A. Middleberg, PhD, F-ABFT, DABCC-TC, Laboratory Director

**Toxicology Report**

Report Issued 11/01/2016 11:01

To: **60C**  
Santa Cruz County Coroner  
Attn: Sgt. Ian Patrick  
5200 Soquel Avenue  
Santa Cruz, CA 95062

Patient Name ARLT Sean  
Patient ID 16-08229  
Chain 66745  
Age 32 Y DOB 06/25/1984  
Gender Male  
Workorder 16320528

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**Positive Findings:**

<u>Compound</u>	<u>Result</u>	<u>Units</u>	<u>Matrix Source</u>
Ethanol	47	mg/dL	001 - Femoral Blood
Blood Alcohol Concentration (BAC)	0.047	g/100 mL	001 - Femoral Blood
Cotinine	Positive	ng/mL	001 - Femoral Blood
Bupropion	13	ng/mL	001 - Femoral Blood
Hydroxybupropion	160	ng/mL	001 - Femoral Blood
11-Hydroxy Delta-9 THC	2.0	ng/mL	001 - Femoral Blood
Delta-9 Carboxy THC	27	ng/mL	001 - Femoral Blood
Delta-9 THC	7.5	ng/mL	001 - Femoral Blood

See Detailed Findings section for additional information

**Testing Requested:**

<u>Analysis Code</u>	<u>Description</u>
8054B	Postmortem, Expanded with NPS, Blood (Forensic)

**Specimens Received:**

<u>ID</u>	<u>Tube/Container</u>	<u>Volume/ Mass</u>	<u>Collection Date/Time</u>	<u>Matrix Source</u>	<u>Miscellaneous Information</u>
001	Gray Top Tube	10.25 mL	10/18/2016 14:30	Femoral Blood	

All sample volumes/weights are approximations.

Specimens received on 10/21/2016.



## Detailed Findings:

Analysis and Comments	Result	Units	Rpt. Limit	Specimen Source	Analysis By
Ethanol	47	mg/dL	10	001 - Femoral Blood	Headspace GC
Blood Alcohol Concentration (BAC)	0.047	g/100 mL	0.010	001 - Femoral Blood	Headspace GC
Cotinine	Positive	ng/mL	200	001 - Femoral Blood	LC/TOF-MS
Bupropion	13	ng/mL	10	001 - Femoral Blood	LC-MS/MS
Hydroxybupropion	160	ng/mL	100	001 - Femoral Blood	LC-MS/MS
11-Hydroxy Delta-9 THC	2.0	ng/mL	1.0	001 - Femoral Blood	LC-MS/MS
Delta-9 Carboxy THC	27	ng/mL	5.0	001 - Femoral Blood	LC-MS/MS
Delta-9 THC	7.5	ng/mL	0.50	001 - Femoral Blood	LC-MS/MS
Ethanol	Confirmed	mg/dL	10	001 - Femoral Blood	Headspace GC

Other than the above findings, examination of the specimen(s) submitted did not reveal any positive findings of toxicological significance by procedures outlined in the accompanying Analysis Summary.

## Reference Comments:

## 1. 11-Hydroxy Delta-9 THC (Active Metabolite) - Femoral Blood:

11-Hydroxy Delta-9 THC is an active intermediate metabolite of tetrahydrocannabinol (THC) the active component of marijuana. Usual peak levels: Less than 10% of THC levels after smoking.

## 2. Bupropion (Wellbutrin®) - Femoral Blood:

Bupropion is a drug that is marketed for oral use as an antidepressant (Wellbutrin®) and as a smoking deterrent (Zyban®). As an antidepressant, it is chemically different than other antidepressant compounds; it is structurally similar to the sympathomimetic compound diethylpropion. For use as an antidepressant, the common adult dosage of bupropion is up to 300 mg daily, given in 3 divided doses (via immediate-release tablets) or once daily (by using extended-release tablets). For use as an aid to stop smoking, the recommended dosage is 300 mg per day, given as 150 mg twice daily (sustained-release tablets).

Maximum antidepressant response was observed at trough plasma concentrations of 50 - 100 ng/mL bupropion with virtually no response below 25 ng/mL. Juvenile patients taking once daily, extended release bupropion for two weeks had the following peak plasma levels:

100 mg/day (n = 11), 25 +/- 8 ng/mL bupropion

200 mg/day (n = 8), 53 +/- 22 ng/mL bupropion

Bupropion is extensively metabolized to several products (e.g., hydroxybupropion, and erythroamino and threoamino metabolites). Although all metabolites have less pharmacological activity than the parent drug, they have longer elimination half-lives than bupropion and generally exceed the plasma concentration of the parent compound.

Adverse effects of bupropion overdose may include nausea and vomiting, agitation, dizziness, seizures, sleep disturbances, tachycardia, lethargy, confusion, tremors and death. In five fatalities from overdose of bupropion, postmortem blood concentrations have been reported to range from 4000 - 13000 ng/mL (mean, 7300 ng/mL). The ratio of whole blood concentration to serum or plasma concentration is unknown for this analyte.

## 3. Cotinine (Nicotine Metabolite) - Femoral Blood:

Cotinine is a metabolite of nicotine and may be encountered in the fluids and tissues of an individual as a result of tobacco exposure.

Anabasine is a natural product occurring in tobacco, but not in pharmaceutical nicotine and a separate test for anabasine in urine can be used to distinguish tobacco from pharmaceutical nicotine use.

The reported qualitative result for this substance was based upon a single analysis only. If confirmation testing is required please contact the laboratory.

**Reference Comments:**

## 4. Delta-9 Carboxy THC (Inactive Metabolite) - Femoral Blood:

Delta-9-THC is the principle psychoactive ingredient of marijuana/hashish. Delta-9-carboxy-THC (THCC) is the inactive metabolite of THC. The usual peak concentrations in serum for 1.75% or 3.55% THC marijuana cigarettes are 10 - 101 ng/mL attained 32 to 240 minutes after beginning smoking, with a slow decline thereafter. The ratio of whole blood concentration to plasma concentration is unknown for this analyte. THCC may be detected for up to one day or more in blood. Both delta-9-THC and THCC may be present substantially longer in chronic users. THCC is usually not detectable after passive inhalation.

## 5. Delta-9 THC (Active Ingredient of Marijuana) - Femoral Blood:

Marijuana is a DEA Schedule I hallucinogen. Pharmacologically, it has depressant and reality distorting effects. Collectively, the chemical compounds that comprise marijuana are known as Cannabinoids.

Delta-9-THC is the principle psychoactive ingredient of marijuana/hashish. It rapidly leaves the blood, even during smoking, falling to below detectable levels within several hours. Delta-9-carboxy-THC (THCC) is the inactive metabolite of THC and may be detected for up to one day or more in blood. Both delta-9-THC and THCC may be present substantially longer in chronic users.

THC concentrations in blood are usually about one-half of serum/plasma concentrations. Usual peak levels in serum for 1.75% or 3.55% THC marijuana cigarettes: 50 - 270 ng/mL at 6 to 9 minutes after beginning smoking, decreasing to less than 5 ng/mL by 2 hrs.

## 6. Ethanol (Ethyl Alcohol) - Femoral Blood:

Ethyl alcohol (ethanol, drinking alcohol) is a central nervous system depressant and can cause effects such as impaired judgment, reduced alertness and impaired muscular coordination. Ethanol can also be a product of decomposition or degradation of biological samples. The blood alcohol concentrations (BAC) can be expressed as a whole number with the units of mg/dL or as a decimal number with units of g/100 mL which is equivalent to % w/v. For example, a BAC of 85 mg/dL equals 0.085 g/100 mL or 0.085% w/v of ethanol.

## 7. Hydroxybupropion (Bupropion Metabolite) - Femoral Blood:

Bupropion is a drug that is marketed for oral use as an antidepressant (Wellbutrin®) and as a smoking deterrent (Zyban®). Bupropion is extensively metabolized to several products (e.g., hydroxybupropion, and erythroamino and threoamino metabolites). Although all metabolites have less pharmacological activity than the parent drug, they have longer elimination half-lives than bupropion and generally exceed the plasma concentration of the parent compound.

Juvenile patients taking once daily, extended release bupropion for two weeks had the following peak plasma levels:

100 mg/day (n = 11), 450 +/- 210 ng/mL hydroxybupropion

200 mg/day (n = 8), 710 +/- 350 ng/mL hydroxybupropion

A delayed death due to overdose with bupropion had serum concentrations of 446 ng/mL bupropion and 3212 ng/mL hydroxybupropion at 20 hours post ingestion.

The ratio of whole blood concentration to Serum or plasma concentration is unknown for this analyte.

Unless alternate arrangements are made by you, the remainder of the submitted specimens will be discarded six (6) months from the date of this report; and generated data will be discarded five (5) years from the date the analyses were performed.

Workorder 16320528 was electronically  
signed on 11/01/2016 10:50 by:

Sherri L. Kacinko, Ph.D., F-ABFT  
Forensic Toxicologist

**Analysis Summary and Reporting Limits:**

All of the following tests were performed for this case. For each test, the compounds listed were included in the scope. The Reporting Limit listed for each compound represents the lowest concentration of the compound that will be reported as being positive. If the compound is listed as None Detected, it is not present above the Reporting Limit. Please refer to the Positive Findings section of the report for those compounds that were identified as being present.

**Acode 52012B - Bupropion and Metabolite Confirmation, Blood (Forensic) - Femoral Blood**

-Analysis by High Performance Liquid Chromatography/  
TandemMass Spectrometry (LC-MS/MS) for:

<u>Compound</u>	<u>Rpt. Limit</u>	<u>Compound</u>	<u>Rpt. Limit</u>
Bupropion	10 ng/mL	Hydroxybupropion	100 ng/mL

**Acode 52198B - Cannabinoids Confirmation, Blood (Forensic) - Femoral Blood**

-Analysis by High Performance Liquid Chromatography/  
TandemMass Spectrometry (LC-MS/MS) for:

<u>Compound</u>	<u>Rpt. Limit</u>	<u>Compound</u>	<u>Rpt. Limit</u>
11-Hydroxy Delta-9 THC	1.0 ng/mL	Delta-9 THC	0.50 ng/mL
Delta-9 Carboxy THC	5.0 ng/mL		

**Acode 52250B - Alcohols and Acetone Confirmation, Blood (Forensic) - Femoral Blood**

-Analysis by Headspace Gas Chromatography (GC) for:

<u>Compound</u>	<u>Rpt. Limit</u>	<u>Compound</u>	<u>Rpt. Limit</u>
Acetone	5.0 mg/dL	Isopropanol	5.0 mg/dL
Ethanol	10 mg/dL	Methanol	5.0 mg/dL

**Acode 8054B - Postmortem, Expanded with NPS, Blood (Forensic) - Femoral Blood**

-Analysis by Enzyme-Linked Immunosorbent Assay (ELISA) for:

<u>Compound</u>	<u>Rpt. Limit</u>	<u>Compound</u>	<u>Rpt. Limit</u>
Barbiturates	0.040 mcg/mL	Salicylates	120 mcg/mL
Cannabinoids	10 ng/mL		

-Analysis by Headspace Gas Chromatography (GC) for:

<u>Compound</u>	<u>Rpt. Limit</u>	<u>Compound</u>	<u>Rpt. Limit</u>
Acetone	5.0 mg/dL	Isopropanol	5.0 mg/dL
Ethanol	10 mg/dL	Methanol	5.0 mg/dL

-Analysis by High Performance Liquid Chromatography/  
TandemMass Spectrometry QTRAP (LC-MS/MS QTRAP) for:

<u>Compound</u>	<u>Rpt. Limit</u>	<u>Compound</u>	<u>Rpt. Limit</u>
5F-AB-001	1.0 ng/mL	AB-FUBINACA	1.0 ng/mL
5F-ADB	0.20 ng/mL	AB-PINACA	0.20 ng/mL
5F-ADB-PINACA	1.0 ng/mL	ADB-CHMINACA	0.10 ng/mL
5F-ADBICA	1.0 ng/mL	ADB-FUBINACA	1.0 ng/mL
5F-AMB	0.10 ng/mL	ADB-PINACA	0.20 ng/mL
5F-APICA	1.0 ng/mL	ADBICA	1.0 ng/mL
5F-APINACA (5F-AKB-48)	2.0 ng/mL	AM-2201	0.10 ng/mL
5F-MN-18	0.10 ng/mL	AMB	0.10 ng/mL
5F-PB-22	0.10 ng/mL	APICA	0.20 ng/mL
AB-CHMINACA	1.0 ng/mL	APINACA (AKB-48)	1.0 ng/mL



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Workorder 16320528  
Chain 66745  
Patient ID 16-08229

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**Analysis Summary and Reporting Limits:**

<u>Compound</u>	<u>Rpt. Limit</u>	<u>Compound</u>	<u>Rpt. Limit</u>
APP-CHMINACA (PX3)	0.20 ng/mL	MMB-CHMINACA (MDMB-CHMICA)	0.10 ng/mL
BB-22	0.10 ng/mL	MN-18	0.10 ng/mL
EG-2201	0.20 ng/mL	MN-25	0.10 ng/mL
FUB-144	0.10 ng/mL	NM-2201	0.10 ng/mL
FUB-AKB-48	0.20 ng/mL	PB-22	0.10 ng/mL
FUB-AMB	0.10 ng/mL	PX1	0.10 ng/mL
FUB-JWH-018	0.20 ng/mL	PX2	0.20 ng/mL
FUB-PB-22	0.10 ng/mL	THJ-018	0.10 ng/mL
FUBIMINA	0.10 ng/mL	THJ-2201	0.10 ng/mL
JWH-018	0.10 ng/mL	UR-144	0.20 ng/mL
JWH-122	0.10 ng/mL	XLR-11	0.20 ng/mL
MA-CHMINACA	0.20 ng/mL		
MDMB-CHMINACA	0.10 ng/mL		

-Analysis by High Performance Liquid Chromatography/

Time of Flight-Mass Spectrometry (LC/TOF-MS) for: The following is a general list of compound classes included in this screen. The detection of any specific analyte is concentration-dependent. Note, not all known analytes in each specified compound class are included. Some specific analytes outside these classes are also included.

For a detailed list of all analytes and reporting limits, please contact NMS Labs.

Amphetamines, Anticonvulsants, Antidepressants, Antihistamines, Antipsychotic Agents, Benzodiazepines, CNS Stimulants, Cocaine and Metabolites, Hallucinogens, Hypnotosedatives, Hypoglycemics, Muscle Relaxants, Non-Steroidal Anti-Inflammatory Agents, Opiates and Opioids.