



NMS Labs

CONFIDENTIAL

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

Toxicology Report

Report Issued 12/21/2021 16:11

Patient Name Eller Matthew
Patient ID 211111-67
Chain 211111-67
Age 22 Y DOB 03/08/1999
Gender Male
Workorder 21395979

To: 147837
WMU School of Medicine
300 Portage Street

Kalamazoo, MI 49007

Page 1 of 4

Positive Findings:

Table with 4 columns: Compound, Result, Units, Matrix Source. Rows include Caffeine, Cotinine, Mitragynine, Creatinine (Vitreous Fluid), Sodium (Vitreous Fluid), Potassium (Vitreous Fluid), Chloride (Vitreous Fluid), and Urea Nitrogen (Vitreous Fluid).

See Detailed Findings section for additional information

Agency Case Number: W21-1383

Testing Requested:

Table with 2 columns: Analysis Code, Description. Rows include 0930B (Caffeine, Blood), 1919FL (Electrolytes and Glucose Panel (Vitreous), Fluid (Forensic)), 8042B (Postmortem, Expanded w/Vitreous Alcohol Confirmation, Blood (Forensic)), and 8050U (Postmortem, Urine Screen Add-On (6-MAM Quantification only) (Forensic)).

Specimens Received:

Table with 6 columns: ID, Tube/Container, Volume/Mass, Collection Date/Time, Matrix Source, Labeled As. Rows include 001 Gray Top Tube, 002 Gray Top Tube, 003 Red Top Tube, and 004 White Plastic Container.

All sample volumes/weights are approximations.

Specimens received on 11/12/2021.

**Detailed Findings:**

| Analysis and Comments          | Result        | Units  | Rpt. Limit | Specimen Source      | Analysis By        |
|--------------------------------|---------------|--------|------------|----------------------|--------------------|
| Caffeine                       | 0.85          | mcg/mL | 0.50       | 001 - Femoral Blood  | LC-MS/MS           |
| Cotinine                       | Positive      | ng/mL  | 200        | 001 - Femoral Blood  | LC/TOF-MS          |
| Mitragynine                    | 2100          | ng/mL  | 50         | 001 - Femoral Blood  | LC-MS/MS           |
| Creatinine (Vitreous Fluid)    | 1.05          | mg/dL  | 0.0500     | 003 - Vitreous Fluid | Colorimetry        |
| Sodium (Vitreous Fluid)        | 118           | mmol/L | 80.0       | 003 - Vitreous Fluid | Chemistry Analyzer |
| Potassium (Vitreous Fluid)     | 7.53          | mmol/L | 1.00       | 003 - Vitreous Fluid | Chemistry Analyzer |
| Chloride (Vitreous Fluid)      | 124           | mmol/L | 70.0       | 003 - Vitreous Fluid | Chemistry Analyzer |
| Glucose (Vitreous Fluid)       | None Detected | mg/dL  | 35.0       | 003 - Vitreous Fluid | Chemistry Analyzer |
| Urea Nitrogen (Vitreous Fluid) | 17.0          | mg/dL  | 3.00       | 003 - Vitreous Fluid | Chemistry Analyzer |

**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:**

- Caffeine - Femoral Blood:

Caffeine is a xanthine-derived central nervous system stimulant. It also produces diuresis and cardiac and respiratory stimulation. It can be readily found in such items as coffee, tea, soft drinks and chocolate. As a reference, a typical cup of coffee or tea contains between 40 to 100 mg caffeine.

Following the oral ingestion of 120 and 300 mg of caffeine, reported peak plasma concentrations of the drug averaged 3.0 mcg/mL (range, 2.0 - 4.0 mcg/mL) and 7.9 mcg/mL (range, 6.0 - 9.0 mcg/mL), respectively. A single oral dose of 500 mg produced a reported peak plasma concentration of 14 mcg/mL after 30 min.

Reported concentrations of caffeine in caffeine-related fatalities averaged 183 mcg/mL (range, 79 - 344 mcg/mL).
- Chloride (Vitreous Fluid) - Vitreous Fluid:

Normal: 105 - 135 mmol/L
- 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.
- Creatinine (Vitreous Fluid) - Vitreous Fluid:

Normal: 0.6 - 1.3 mg/dL



**Reference Comments:**

- 5. Glucose (Vitreous Fluid) - Vitreous Fluid:  
Normal: <200 mg/dL

Postmortem vitreous glucose concentrations >200 mg/dL are associated with hyperglycemia.

Since postmortem vitreous glucose concentrations decline rapidly after death both in vivo and in vitro, care should be taken in the interpretation of results. Stability of vitreous glucose for up to 30 days has been noted by NMS Labs when specimens are maintained frozen (-20°C).

- 6. Mitragynine (Kratom) - Femoral Blood:

Mitragynine is an alkaloid found in the plant Kratom which originates from Asia. The leaves of the plant are consumed for their stimulant and analgesic effects and these effects are attributed to mitragynine. Plant extracts are sold for their medicinal use and may be subject to abuse. Adverse effects include seizures, coma, and death. Mitragynine blood concentrations listed in fatalities ranged from 20-600 ng/mL; other substances may have also been present.

- 7. Potassium (Vitreous Fluid) - Vitreous Fluid:  
Normal: <15 mmol/L

Quantitative results for Potassium will be affected if performed on gray top tubes since these collection tubes contain potassium oxalate.

- 8. Sodium (Vitreous Fluid) - Vitreous Fluid:

Normal: 135 - 150 mmol/L  
Quantitative results for sodium will be affected if performed on gray top tubes since these collection tubes contain sodium fluoride.

- 9. Urea Nitrogen (Vitreous Fluid) - Vitreous Fluid:  
Normal: 8 - 20 mg/dL

Unless alternate arrangements are made by you, the remainder of the submitted specimens will be discarded one (1) year from the date of this report; and generated data will be discarded five (5) years from the date the analyses were performed.

Workorder 21395979 was electronically signed on 12/21/2021 15:21 by:

Brianna L. Peterson, 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 0930B - Caffeine, Blood - Femoral Blood

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

| <u>Compound</u> | <u>Rpt. Limit</u> | <u>Compound</u> | <u>Rpt. Limit</u> |
|-----------------|-------------------|-----------------|-------------------|
| Caffeine        | 0.50 mcg/mL       |                 |                   |

Acode 1919FL - Electrolytes and Glucose Panel (Vitreous), Fluid (Forensic) - Vitreous Fluid



**Analysis Summary and Reporting Limits:**

-Analysis by Chemistry Analyzer for:

| <u>Compound</u>            | <u>Rpt. Limit</u> | <u>Compound</u>                | <u>Rpt. Limit</u> |
|----------------------------|-------------------|--------------------------------|-------------------|
| Chloride (Vitreous Fluid)  | 70.0 mmol/L       | Sodium (Vitreous Fluid)        | 80.0 mmol/L       |
| Glucose (Vitreous Fluid)   | 35.0 mg/dL        | Urea Nitrogen (Vitreous Fluid) | 3.00 mg/dL        |
| Potassium (Vitreous Fluid) | 1.00 mmol/L       |                                |                   |

-Analysis by Colorimetry (C) for:

| <u>Compound</u>             | <u>Rpt. Limit</u> | <u>Compound</u> | <u>Rpt. Limit</u> |
|-----------------------------|-------------------|-----------------|-------------------|
| Creatinine (Vitreous Fluid) | 0.0500 mg/dL      |                 |                   |

Acode 52495B - Mitragynine Confirmation, Blood - Femoral Blood

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

| <u>Compound</u> | <u>Rpt. Limit</u> | <u>Compound</u> | <u>Rpt. Limit</u> |
|-----------------|-------------------|-----------------|-------------------|
| Mitragynine     | 50 ng/mL          |                 |                   |

Acode 8042B - Postmortem, Expanded w/Vitreous Alcohol Confirmation, 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      | Gabapentin      | 5.0 mcg/mL        |
| Cannabinoids    | 10 ng/mL          | Salicylates     | 120 mcg/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/Time of Flight-Mass Spectrometry (LC/TOF-MS) for: The following is a general list of analyte classes included in this screen. The detection of any specific analyte is concentration-dependent. Note, not all known analytes in each specified analyte class are included. Some specific analytes outside of these classes are also included. For a detailed list of all analytes and reporting limits included in this screen, please contact NMS Labs. Amphetamines, Anticonvulsants, Antidepressants, Antihistamines, Antipsychotic Agents, Benzodiazepines, CNS Stimulants, Cocaine and Metabolites, Hallucinogens, Hyposedatives, Hypoglycemics, Muscle Relaxants, Non-Steroidal Anti-Inflammatory Agents, Opiates and Opioids.

Acode 8050U - Postmortem, Urine Screen Add-On (6-MAM Quantification only) (Forensic)

-Analysis by Enzyme Immunoassay (EIA) for:

| <u>Compound</u>       | <u>Rpt. Limit</u> | <u>Compound</u>         | <u>Rpt. Limit</u> |
|-----------------------|-------------------|-------------------------|-------------------|
| Amphetamines          | 500 ng/mL         | Fentanyl / Metabolite   | 2.0 ng/mL         |
| Barbiturates          | 0.30 mcg/mL       | Methadone / Metabolite  | 300 ng/mL         |
| Benzodiazepines       | 50 ng/mL          | Opiates                 | 300 ng/mL         |
| Cannabinoids          | 50 ng/mL          | Oxycodone / Oxymorphone | 100 ng/mL         |
| Cocaine / Metabolites | 150 ng/mL         | Phencyclidine           | 25 ng/mL          |