

ABSTRACTS

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RAPID ENZYME IMMUNOASSAY FOR COCAINE & METABOLITES

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Genetic Diagnostics Corporation, Great Neck, NY.

The use of cocaine in the U.S. continues to be a major health and social problem, which dictates a need for simple and reliable tests to identify the use of this illicit and potentially devastating drug. We report here on the development of a 75 minute competitive ELISA for the qualitative detection of benzoylecgonine and cocaine in human urine.

The test utilizes a polystyrene 96-well microtitre plate coated with benzoylecgonine (BE) linked to a carrier protein (bovine serum albumin) and a high affinity anti-benzoylecgonine antisera. After two immune incubations the plate is washed, developed for color with TMB, and quantitated with a microtiter plate reader. Test samples are compared to the positive control (0.3 ug/ml BE) for positive/negative determination.

Using this assay format, we evaluated 432 urine samples and compared the results to the Syva EMIT Cocaine Metabolite Assay. Our results were in good agreement with EMIT except for four EMIT positives which were found negative in the GDC ELISA. These four samples were analyzed by GC/MS, where two were found completely negative for cocaine and metabolite, and two were positive for benzoylecgonine below the GDC detection limit (0.3 ug/ml).

Cross-reactivity studies as well as GC/MS of 45 additional samples found positive by the GDC ELISA, indicated that the GDC ELISA also detects the presence of cocaine and methylecgonine, as well as the primary urinary metabolite, benzoylecgonine.

The ability to detect cocaine as well as metabolite may be advantageous for recognizing the use of cocaine free base, or 'crack', which is believed to sometimes result in high urinary cocaine concentrations with little or no benzoylecgonine.

#3

SUCCINYLCHOLINE SUICIDE - CASE REPORT

R. C. Backer, Ph.D.*, D. M. Andrenyak, Ph.D.,
and J. C. Morris, M.S., Office of the Chief
Medical Examiner, South Charleston, WV 25309

A nurse anesthetist was found dead in her apartment with a syringe beside her body. Routine toxicological analysis of her urine by TLC (Analytical Systems) and EMIT (Syva) was negative for all common acidic, basic and neutral drugs. Blood analysis by GLC found a BAC of 50 mg/dl. The only other drug detected was meperidine (1.0 ug/ml).

TLC analysis of a methanol extract of the syringe indicated the presence of meperidine and an unidentified substance at the origin in Davidow's solvent system, EtAc:MeOH:NH₄OH (85:10:3.5) with iodoplatinate visualization. Analysis of the syringe extract by TLC using MeOH:0.2 N HCl (80:20) showed the presence of a substance with the same R_f (0.33) as succinylcholine. The presence of succinylcholine could not be demonstrated in the excised skin and tissue from the injection site. Blood analysis for succinylcholine was not performed.

Confirmation of succinylcholine from the syringe was accomplished by GC/MS after hydrolysis to succinic acid and methylation to dimethylsuccinate with boron trifluoride (Alltech-Applied Science).

#24

SIGNIFICANCE OF CONFOUNDING FACTORS IN THE CORRELATION BETWEEN THE CONCENTRATION OF DRUGS IN BLOOD AND URINE AND ALTERED NEUROPHYSIOLOGICAL PERFORMANCE IN AN ADULT POPULATION by Tareyl Barton*, Mercer University School of Pharmacy, 345 Boulevard N.E., Atlanta, GA 30512, and other Committee members

The significance of confounding factors such as disease history, physiological status, previous and concurrent therapeutic drug use/abuse, O-T-C drug use/abuse and tolerance on the concentration of drugs in blood and urine and specific behavioral abnormalities was examined.

Participants in the study were individuals arrested in a metropolitan area who exhibited apparent DUI driving behaviors. These participants were "field tested" at the time of arrest and agreed to participate in the study by returning to a testing site 48-72 hours after arrest for additional testing in return for consideration at the time of sentencing. A prerequisite for participation was abstinence from use of any drugs from the time of arrest until retesting.

The specific data collection instruments utilized and preliminary results will be presented.

#15

QUALITY CONTROL IN FORENSIC TOXICOLOGY LABORATORIES

Raymond J. Bath Ph.D., Bath Toxicology Group Inc., 17 Stone Lane, Marlboro, NJ 07746.

Quality Control for a forensic toxicology laboratory is the actual techniques used to determine if a laboratory result is in conformance with quality assurance requirements. QC techniques are an integral part of the overall QA program and is not just adding internal standards to a variety of samples. QC techniques for use in forensic toxicology laboratories including bias/precision, control charts, detection limits, and daily verification procedures are presented and the use of basic statistical parameters are introduced.

#31

AN EVALUATION OF THE TDx CANNABINOID ASSAY
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32204

A qualitative drug of abuse assay for the detection of cannabinoids in urine was evaluated using the Abbott TDx analyzer. The threshold concentration for cannabinoid detection by the fluorescence polarization immunoassay (FPIA) method was 25 ng/mL. Calibration curves of concentrations of 0-150 ng/mL were stable for at least 4 weeks. The sensitivity of the assay was 10 ng/mL.

The precision of the assay was determined by analyzing 5 patient samples in replicates of 3 on different days in various combinations for 4 weeks. Within run and between run CV's were less than 4% and 6%, respectively.

The FPIA method was compared to GC/MS, Syva EMIT-dau, and Roche ABUSCREEN. Method comparisons for 100 urine samples using the immunochemical methods - as well as for 30 urine samples using GC/MS - yielded excellent agreement. Parallel studies on 50 "negative" urines using the immunochemical methods yielded no false-positive results.

Experimental data demonstrating the performance characteristics of the assay are reviewed.

#4

PHARMACOLOGICAL INTERACTIONS OF ETHYL ALCOHOL AND MORPHINE WITH PHENCYCLIDINE (PCP) IN RATS by D. M. Bush¹, A. Mattia², J. E. Moreton², and Y. H. Caplan¹.
¹Dept. Pathol., Univ. of Maryland Sch. of Medicine and ²Dept. Pharmacol. & Toxicol., Univ. of Maryland Sch. of Pharmacy, Baltimore, MD 21201.

Statistics from the Medical Examiners Office in Maryland indicate that phencyclidine (PCP) is abused in combination with ethyl alcohol (EtOH) or morphine (MO). This study was conducted to determine the effects of PCP (1, 2 and 4 mg/kg, ip) alone and in combination with a standard dose of EtOH (1 g/kg, ip) or MO (5 mg/kg, ip) on analgesia using a hot plate and on locomotor activity (LA) using automated infrared actometers. PCP produced a dose-related increase in latency to hindpaw-lick and LA. The peak latency 30 min after 1, 2 and 4 mg/kg PCP alone was 32%, 54% and 75% of the maximal cut-off response of 60 sec, respectively, and was increased to 70%, 80% and 86%, respectively, when combined with 1 g/kg EtOH and to 44%, 72% and 95%, respectively, when combined with 5 mg/kg MO. The duration of effect at 2 and 4 mg/kg PCP was doubled by EtOH or MO. EtOH or MO potentiated the dose-related intensity and time-course of PCP-induced LA. These data indicate a significant interaction between EtOH or MO with respect to intensity and duration of analgesia and LA in rats. Other pharmacological effects related to human PCP abuse may be similarly potentiated and may account for the combined use of PCP and EtOH or MO by human drug abusers. (Supported by the Society of Forensic Toxicologists (DMB), the Maryland Medical Legal Foundation (DMB) and NIDA Grant DA 03173 JEM.)

#27

PREPARATION AND USE OF CONTROL SAMPLES FOR DRUG ANALYSIS BY RIA AND GC/MS, John T. Cody, Air Force Drug Testing Laboratory, Brooks AFB, TX 78235-5000

Preparation and use of controls for quantitative analysis of drugs are critical elements in the scientific and forensic validity of test results. A well designed and implemented internal quality control program can be greatly enhanced by the use of stable control samples over an extended period of time. Use of such controls for a period of more than a year has demonstrated the viability of this technique.

Preparation of long term controls requires special handling to ensure stability for an extended period. Preparation varies slightly depending on the drug (metabolite) involved and the methodology for which the control will be used. Filtration, pH, storage containers, use of preservatives and temperature are critical elements in preparation, storage and use of the controls. Investigation of alternative methods showed optimum conditions to best implement use of these controls.

The preparation, storage and use of long term controls make a substantial contribution to demonstrate reliability of a laboratory's analytical results. This adds to overall scientific validity which enhances the forensic credibility and defensibility of the data.

#10

CORRELATION BETWEEN DRUG CONCENTRATIONS AND ALTERED NEUROPHYSIOLOGICAL PERFORMANCE IN AN ADULT POPULATION by John M. Holbrook, Ph.D.*, Mercer University School of Pharmacy, 345 Boulevard, N.E., Atlanta, GA 30312, and other Committee members

The relationships between drug concentrations in blood and urine and reported alternations in the ability to perform specific behavioral tests were examined. Study participants were individuals arrested in a metropolitan area who exhibited apparent DUI driving behaviors. These participants were "field tested" at the time of arrest and agreed to participate in the study by undergoing a battery of testing procedures 48-72 hours after arrest in exchange for consideration at the time of sentencing. A prerequisite for participation was abstinence from any drugs or alcohol from the time of arrest until retesting.

Testing procedures included commonly utilized "field tests" along with other procedures for physical and behavioral evaluation. The procedures used in testing the participants and preliminary results will be presented.

#14

SIMULTANEOUS ANALYSIS OF CODEINE, MORPHINE, HYDROCODONE, AND HYDROMORPHONE BY GC/MS. m.p. george, international clinical labs 11861 e. telegraph road sante fe springs, california 90670

Codeine, morphine, hydrocodone and hydromorphone are isolated into Amberlite XAD-2 columns (Biochemical Diagnostics, Inc. Brentwood, NY). The isolated analytes are eluted with n-butylchloride-Acetonitrile (70:30) mixture. The eluted solvent is evaporated to dryness under a stream of dry nitrogen. The concentrate is dissolved with 50mc1 of BSTFA (Peirce Chemical Rockport, Ill.) is added. The reaction vials are heated for 15 minutes at 75C. 3ml of this is injected into GC/MS equipped with HP-1 Capillary Column (0.20mm IDx12 meter length). Nalorphine is used as the internal standard. The following ions m/z are monitored: Codeine 146, 178, 234, 280, 313, 371, and 372; Hydrocodone 234, 314, 356, and 371; Hydromorphone 300, 342, and 357; Morphine 414, 415, 440, and 445. The sensitivity of the assay is 50ng/ml with 5ml sample. Over 300 samples were analyzed by this procedure.

#6

A 'MODERN' CHLOROFORM HOMICIDE

Graham R. Jones and Peter P. Singer, Office of the Chief Medical Examiner, P.O. Box 2257, 7007 - 116 Street, Edmonton, Alberta, Canada T5J 2P4.

A 36 year old mother was found dead, face-down on her bed, with a piece of sponge-cloth taped over her nose and mouth. Subsequent toxicology testing indicated she had been smothered with a chloroform soaked pad. Her husband claimed someone had broken into their house. He said he heard a noise, went downstairs to investigate and was overcome from behind by an intruder using a solvent soaked pad. He said he later regained consciousness, found his wife dead upstairs and called the police.

Chloroform was identified in blood and other specimens from both the dead wife and her surviving husband. Headspace gas chromatography (HS/GC) with flame ionization detection (FID) was used to analyse several blood samples taken at the autopsy of the wife - chloroform concentrations ranged from 85-124 mg/l. HS/GC with electron capture detection (ECD) revealed blood chloroform concentrations of 0.11 and 0.14 mg/l in two blood samples, which were drawn from the husband during his examination in hospital 6 hours after the police first arrived at the scene.

After a lengthy investigation the husband was charged with first-degree murder. He was convicted after a 3 week jury trial, on the basis of largely circumstantial evidence.

A more detailed case history, analytical methodology and the eventual interpretation will be presented.

#28

ROBOTICS SAMPLE PREPARATION FOR DRUG ANALYSIS APPLICATIONS by R. Kazmer Latven,* and James L. Merdink, American BioTest Laboratories, Inc., 3350 Scott Blvd., Bldg. 15, Santa Clara, CA 95054

Robotics is defined as "the extension of programmable computers which allows computers to do physical work as well as process data."

The introduction of robotics to the area of sample preparation for chromatography (GC or GC/MS) reduces personnel requirements, improves reproducibility and, when interfaced to a database minimizes errors in tracking the sample through the laboratory.

The system described here consists of a Zymark Zymate Laboratory Robotics System and robotics stations for aliquotting, dispensing, incubating, extracting, evaporating, transferring and crimp capping. In addition, several customized pieces for barcode reading and database interface are also employed.

For maximum throughput, the sample preparation process is divided into four separate phases. All samples complete one phase before beginning the next. Within one phase, sample steps are interleaved. Although challenging to program, this structure is necessary for optimal operation of the system.

For this paper, the design criteria of an automated sample preparation system will be described together with a detailed description of the mechanical and chemical processes used. In addition, timing and performance data will also be presented.

#9

A COMPUTER SYSTEM FOR TARGET COMPOUND ANALYSIS OF DRUGS OF ABUSE by Lynn S. Matthews* and Tim R. Matthews, Thru-Put Systems, Inc., P.O. Box 617290, Orlando, Florida 32861-7290

TARGET is a system designed to automate the calibration, data acquisition, data reduction and reporting of analysis of drugs of abuse by GC/MS. This system is compatible with Hewlett-Packard GC/MS systems with HP Model 9000 controllers. It can operate in the manual injection or autosampler mode.

TARGET can be customized to a specific protocol for analysis, making it turn-key. It incorporates quality control procedures and has provisions for isolating data that is not within the required limits for qualitative or quantitative detection.

Reports combine graphics and tabular data with special formats for SIM plots, ion ratio calculations and quantitation by internal standard. Final reports can be transmitted to another computer system.

#5

ILLINOIS STATE POLICE BLOOD ALCOHOL QUALITY ASSURANCE PROGRAM by Christopher Long, Ph.D., DABFT* and Daniel J. Brown, Ph.D., Illinois State Police, Division of Forensic Services and Identification, Bureau of Forensic Sciences, 215 West Lawrence Street, Springfield, IL 62704

The Illinois State Police in starting a statewide Forensic Toxicology Laboratory began with blood alcohol testing. The development of this program includes chain of evidence, sample preservation, documentation generation and analytical protocol. The procedure has been statistically evaluated, using NCCLS criteria and the CV is less than 3.0%.

#32

INTERPRETATION OF BLOOD AND URINE CANNABINOID CONCENTRATIONS by Arthur J. McBay, Ph.D.* Chief Toxicologist, Office of the Chief Medical Examiner and Professor of Pathology and Pharmacy, Un. NC, Chapel Hill, NC. 27514

The availability of relatively simple and inexpensive screening tests for cannabinoids has produced a very great increase in the number of urine and to a lesser extent blood determinations being made for cannabinoids. The need for adequate confirmatory identifications has been established by the forensic scientific community.

Identifying and quantitating the metabolite of THC, THC-COOH, in urine indicates ingestion of THC. If its concentration is high enough, its presence probably was not due to passive inhalation but could be due to involuntary ingestion of marijuana. Because THC-COOH can be excreted in urine for weeks, it is not possible to determine the amount, frequency or time the drug was used.

The effects of marijuana on performance are very subtle and last for only an hour or two. Urine cannabinoid concentrations cannot be correlated with possible effects on performance. Reports of attempts to correlate blood concentrations with performance are rare and not helpful.

Some interpretations that have been made will be discussed.

#12

THE DETERMINATION OF IBUPROFEN IN POST MORTEM BLOOD USING TMAH by Joseph R. Monforte, Ph.D., and Karen Galka, Wayne County Medical Examiner's Office, 400 E. Lafayette St., Detroit, MI 48226

Ibuprofen (2-(4-isobutylphenyl) propionic acid, Motrin) is a commonly used over-the-counter anti-inflammatory drug often taken for the pain associated with arthritis. The usual adult dose is 400 mg, four times daily.

A gas chromatographic method employing TMAH for on-column methylation was applied to the analysis of this drug in post-mortem blood.

After the addition of the internal standard (MPPH) and 0.2 M phosphoric acid, the specimen is extracted with toluene and the toluene re-extracted with a small quantity of TMAH. One microliter is then injected onto a 10% SE-30 column which is temperature programmed.

The procedure is linear up to 50 mcg ibuprofen per ml of blood. Neither the commonly prescribed barbiturates nor diphenylhydantoin interfere. Confirmation is made by capillary column gas chromatography-mass spectrometry.

#23

AUTOMATIC GC/MS DATA ANALYSIS USING TARGET COMPOUND ANALYSIS TECHNIQUES by William Price, Hewlett-Packard Co. 2000 South Park Place, Atlanta, GA 30339

To increase productivity in the GC/MS analysis of toxicology specimens, Target Compound Analysis (TCA) can be applied to automate the reduction of GC/MS data. Using the HP RTE-GC/MS Data System, MS data files are examined for a user-defined list of "target" compounds. Identifications are based on ion-ratios and GC retention times as defined in the Target List. A variety of output formats is available, and if quantitative calibration standards are maintained, the software allows for identification, confirmation and quantitation of multiple drugs in a single GC/MS analysis.

The time required for the data analysis depends on the length of the target list, averaging 3 seconds/compound, and the system is capable of performing the data reduction and report generation while simultaneously acquiring data from up to four GC/MS systems.

The Target Compound approach can allow a toxicology lab to automate the analysis of many routine samples, freeing additional time for cases that require individual attention.

#30

A SIMPLE AND RAPID RIA PROCEDURE EVALUATION OF COCAINE (BENZOYLECGONINE) AND PHENCYCLIDINE USING COAT-A-COUNT

Jain, Naresh C.* (Rancho Los Amigos Medical Center, Downey, CA 90242 and Sneath, T.C. (National Toxicology, Bakersfield, CA 93301)

An evaluation of two new RIA procedures using antibody coated tubes for the detection and quantitation of benzoylecgonine/cocaine and phencyclidine will be presented. Several hundred samples were tested and compared with Roche Abuscreen, Syva EMIT d.a.u. and Gas chromatography/mass spectrometry. Coat-A-Count gave excellent correlation with other methods.

Coat-A-Count procedure is easy to perform. There is only one reagent to dispense and requires one hour incubation with no centrifugation. Sample and tracer can be added simultaneously allowing use of an automatic pipette a standard curve for quantitation.

Cocaine reacts to a much greater extent to the antibody than benzoylecgonine. When cocaine is present the apparent concentration of benzoylecgonine will be greatly elevated. This may allow for detecting small levels of cocaine in forensic samples to determine recent usage of cocaine.

Phencyclidine assay is very specific and quantifiable as confirmed by Gas chromatography/mass spectrometry. Data on forensic cases will be presented.

#1

QUALITY GC/MS DRUG CONFIRMATIONS DEPEND ON THE SAMPLE SEQUENCE by Joseph J. Saady, Ph. D.,* Virginia Commonwealth University, Medical College of Virginia, Box 597 MCV Station, Richmond, VA 23298-0597

Confirmational assays using GC/MS are frequently performed after results of the presumptive test are found to be positive. Our laboratory presents a cost effective and efficient way of sequencing specimens so as to minimize biased results.

A QC Supervisor prepares a batch of approximately 12-18 patient specimens by aliquoting the appropriate volumes into individual extraction tubes. Additionally, aliquots of a known negative are aliquoted and spiked with varying concentrations of analyte.

The QC Supervisor then codes the extraction tubes with numbers, and arranges the order such that a standard or control follows every three or four patient specimens. Further, two negatives are included, one of the negatives being inserted after the highest standard. Thus the standard curve is "buried" among the patient specimens.

The QC Supervisor then gives the extraction tubes to the individual who will perform extraction and GC/MS. Thus the analyst performing the extraction and/or GC/MS is running the batch blind.

When GC/MS is completed, the QC Supervisor takes the data and decodes the specimens, checks linearity, and performs data reduction.

This serves two purposes: 1)An unbiased standard curve is generated and 2)Controls, blind to the analyst, are included in each batch.

#8

ATTEMPTS AT THE DETERMINATION OF CARBOXYMYOGLOBIN (COMb) CONCENTRATIONS IN HUMAN MYOCARDIUM, Bernard Sangalli and Jesse H. Bidanset*, Department of Pharmaceutical Sciences, St. John's University, Jamaica, New York 11439.

In this study, the qualitative and quantitative measurement of COMb in human post-mortem myocardial tissue was attempted. Human left-ventricular myocardial extracts were prepared from victims of carbon monoxide poisoning, with non-CO death myocardium as controls. Initial attempts at microfiltration techniques using membrane separation of hemoglobin from myoglobin derivatives were unsuccessful. An anion exchange high performance liquid chromatography method with diode-array spectrophotometric detection provided a rapid, practical, reproducible and specific way to determine oxymyoglobin and metmyoglobin, the commonly encountered myocardial myoglobin derivatives. Identification and quantitation of these myoglobin derivatives was based upon their spectral characteristics and published extinction coefficients. Hemoglobin did not interfere with the assay. COMb could not be demonstrated in myocardial extracts in deceased individuals with COHb of up to 80%. Careful examination of the technique revealed that a myoglobin carbon monoxide-oxygen exchange occurred under the conditions of analysis. Oxygen displaced CO from COMb during either preparation or chromatographic analysis.

#29

DUI DRUGS STUDY: A NOVEL APPROACH by Everett T. Solomons*, Georgia Bureau of Investigation, Division of Forensic Sciences, Decatur, GA 30037-0808, and other Committee members

Previous DUI Drugs studies concentrating on traffic fatalities have yielded little or no information characterizing the DUI Drugs driver. The major finding of these studies has shown that the contribution to traffic deaths is small compared to the contribution by alcohol impaired drivers.

The rationale and design of a novel approach involving a detailed study of living DUI suspects apprehended in a segment of the Atlanta Metro area will be described.

The results of a trial run utilizing this approach will also be presented.

#13

CYANIDE DISAPPEARANCE FROM NAF/REFRIGERATED BLOOD SAMPLES. Michael I. Schaffer, Ph.D.* and Robert J. Stein, M.D., Office of The Medical Examiner, County of Cook, 2121 West Harrison St., Chicago, IL 60612

The disappearance of cyanide from two post mortem blood samples was studied. These blood samples represented two intentional overdose cases which were signed out as suicide. The Conway microdiffusion method was used to separate the cyanide from the blood. The captured NaCN was reacted with chloramine-T to form cyanogen chloride. This was then reacted with a pyridine-barbituric acid reagent to form a violet color which was measured at 580 nm. Cyanide standards were prepared from Fisher A.C.S. reagent. They were prepared fresh every 3 months and served as a stock solution of 100 mg/L. Dilutions of this stock, were made every 30 days to produce a 1 and 4 mg/L standard. Tests were performed which demonstrated the stability of these reagents which were maintained refrigerated at between 4-7°C. Typical absorbance values for the 1 and 4 mg/L standards were 0.333 ± 0.0195 and 1.3396 ± 0.0151 , respectively. Storage of the two blood samples for 1, 2 and 3 weeks showed an average loss of cyanide of 22.9%, 35.3% and 38.2%, respectively. The experiment continued until total loss of cyanide was observed or exhaustion of the blood sample. A 44.1% loss was seen after storage of one blood sample for 58 days. In the other case, a 93.8% loss of cyanide was determined after storage for 80 days. Even after the 80 day storage, the blood cyanide value was 1.1 mg/L. Allowing the blood samples to remain unrefrigerated demonstrated a 16% and 62% loss after 4 and 8 days, respectively. Even though it is best to perform the cyanide analysis as soon as possible, after proper storage, the determination can be made.

#25

SIMULTANEOUS IDENTIFICATION OF COCAINE AND BENZOYLECGONINE USING GAS CHROMATOGRAPHY/MASS SPECTROMETRY Robert W. TAYLOR*, Naresh C. Jain, and M.P. George Rancho Los Amigos Medical Center, Toxicology Dept., 7601 E. Imperial Hwy., Downey, Ca. 90242

A procedure for the simultaneous detection and quantitation of cocaine and benzoylecgonine from urine is described. Using solid phase extraction, cocaine, benzoylecgonine, deuterated cocaine, and deuterated benzoylecgonine (two internal standards) are extracted from urine. Benzoylecgonine and the deuterated benzoylecgonine are derivatized to their trimethylsilyl esters. The underivatized cocaine and derivatized benzoylecgonine are separated by electron impact mass spectrometry in the selected ion monitoring mode. The cocaine and benzoylecgonine are detectable to 50 ng/mL. This procedure is simple, rapid, and suitable for a large number of analyses.

Extraction from blood using this method is under investigation.

#11

The confirmation of drugs of abuse in urine specimens is accomplished at the Ft Meade Drug Testing Laboratory using GC/MS (HP 5880A GC/5970 MSD). The ion ratios from the 3 most prominent fragments are compared to those for a quantitation standard (which is run with each batch).

When the GC/MS instrumentation was new, between run ion ratios were fairly steady, and quality assurance requirements were based on our historical ratios. As the instruments aged and as the components became worn, however, the ion ratios began to vary, to a point that they frequently fell outside the 2 SD range of our historical ion ratios. We discovered that linear autotune relative ion ratio versus drug relative ion ratio plots could be used to save time and materials in the operation of the GC/MS instrumentation. These plots give useful information which can be used to make quality assurance decisions involving the use of ratios. They can also be used for organized manual tuning leading to optimal instrument performance for a particular drug. Finally, they open the possibility for individual drug specific autotunes that should also lead to superior instrument performance.

#7

Demographic and laboratory data obtained on DUI-drugs suspects during this project will be extensive, thus requiring an efficient and versatile system for statistical analysis. We chose to utilize IBM-compatible hardware coupled with dBASE III Plus, Lotus 1-2-3 and SPSS/PC software. Large amounts of data can be stored in dBASE III Plus. Lotus 1-2-3 can display subsets of the data in a spreadsheet format and write to SPSS/PC-accessible files. SPSS/PC is an information analysis system which can be used to compare groups, compute multivariate statistics, and calculate non-parametric statistical tests (e.g., ANOVA, correlation, and chi-square). Application of this system towards DUI-drugs data will be presented.

#16

THE ANALYSIS OF COCAINE METABOLITE IN URINE: A COMPARISON OF THE TDx FPIA COCAINE METABOLITE ASSAY WITH GAS CHROMATOGRAPHY/MASS SPECTROMETRY
Douglas E. Lewis*, Erin Omori, Junko Nishio (Northwestern University Medical School, Chicago, Illinois), Sidney H. Schnoll (Medical College of Virginia, Richmond Virginia).

Studies were performed to evaluate the Abbott TDx Cocaine Metabolite Assay. Two hundred and forty-nine clinical samples were analyzed. Of these, 69 were positive for benzoylecgonine by GC/MS and evaluated by TDx FPIA.

The TDx utilizes a six point calibration curve. This curve, along with the specificity of the assay for benzoylecgonine, allows the TDx to generate a semi-quantitative result. These semi-quantitative results were used in this analysis. Statistical evaluation by least square regression revealed excellent correlation (.963). TDx quantitative results correlate extremely well with GC/MS values at urine values from 0.1 ug/mL to 200 ug/mL. The increased sensitivity may extend duration of detectability of this cocaine metabolite in urine by as much as 50% in comparison with other immunoassay screening methods thereby extending detectability by perhaps one or two days.

The availability of a semi-quantitative result and the good correlation with GC/MS can assist in quantitative confirmation as required in all forensic work. Any necessary sample dilutions can be based on the initial TDx results. This process can extend detector life, avoid detector and column overload, and reduce technician work load.

#2

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