



ToxTalk

TM

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**SOFT 2005 Annual Meeting
NASHVILLE, TENNESSEE
(MUSIC CITY, USA)**

October 17-21, 2005

**Host: Louis Kuykendall
SITE: Renaissance Nashville Hotel**

ToxTalk is mailed quarterly (bulk mail) to members of the Society of Forensic Toxicologists, Inc. It is each member's responsibility to report changes of address to the SOFT mailing address (Mesa, AZ - above). Non-members may now receive ToxTalk for \$15 per calendar year. Make your check payable to SOFT and mail it directly to the ToxTalk Editor.

Website:

www.soft-tox.org

Email:

info@soft-tox.org

DEADLINES: Feb. 1, June 1, Sept. 1, and Nov. 1

NEXT DEADLINE: NOVEMBER 1, 2004



PRESIDENT'S MESSAGE

Daniel Isenschmid, Ph.D., DABFT

It seems strange to be writing a President's message at the end of September, with the SOFT meeting already behind us. But what a meeting it was! I cannot praise the efforts of the meeting hosts enough. Chairman Marc LeBeau and his committee spent countless hours organizing a fantastic scientific and social program. Over 1100 people attended the FBI Symposium and/or the SOFT/TIAFT meeting from all over the globe!

For those who may not have attended, some of the meeting highlights included an Opening Ceremony featuring several special guest speakers: Howard Stead, Chief of the Scientific Section, United Nations Office on Drugs and Crime, Vienna, Austria; Sarah V. Hart, Director, National Institute of Justice, Washington, D.C.; and Dwight E. Adams, Director, FBI Laboratory, Quantico, VA. The Opening Ceremony also included a Symposium on the history of toxicology during which attendees were given a "blast from the past" with reflections by Dr. Irving Sunshine, Dr. Joseph Monforte and Dr. Alphonse Poklis. An historical look at forensic toxicology was continued during the Elmer Gordon Open Forum where we were honored by special guests Drs. Leo DalCortivo, Leo Goldbaum, Sidney Kaye and Irving Sunshine. In addition, the membership had an opportunity to meet some of Elmer Gordon's family and learn a little more about the toxicologist after whom the Open Forum was named. Major social events included a wonderful reception at the Smithsonian Museum of Natural History complete with mad scientists, "toxic tumbler" cocktails and great food! After a day on the mall, attendees enjoyed the President's Banquet in the beautifully decorated hotel ballroom featuring a delicious dinner and a band that kept people on the dance floor into the early hours of the morning. Of course, 278 posters and scientific presentations kept our eyes and ears busy as well, and between the 400+ page abstract / program book and the 650-page FBI Symposium book we all came home with a little extra weight, even before all the food!

This year, a record 78 booths were in the exhibit hall. Lisa O'Dell continues to do an incredible amount of work each year coordinating the exhibition with the meeting hosts as well as obtaining the financial support from our exhibitors without which the costs of our meetings would be significantly higher. For those who were not able to visit with all of the exhibitors or attend the meeting, the SOFT website has a link to all of the vendors that were present.

A special thanks to Peter Stout for editing the 2004 SOFT special issue of the Journal of Analytical Toxicology that was distributed at the Annual Meeting. It was an excellent issue with 28 articles, technical notes and case reports. Thanks also to Tinsley Preston at Preston Publications who has given SOFT the opportunity to edit a special issue each year for the past 24 years!

The Board made several decisions at its business meeting in October. Elsewhere in this issue you can read about the progress made in registering the SOFT logo with the U.S. Patent and Trademark office and the modification being made to the application process. In order to provide increased protection of the organization's financial assets, the Board has voted to purchase bonding insurance for its Officers and implement a co-signature requirement on all checks written on behalf of the organization at or above \$25,000. In addition, a decision was made to place the proceeds from the 2003 meeting in Portland into the Educational Research Award with the goal that the fund eventually becomes self-sustaining. Finally, during the annual business meeting the membership approved a change to the bylaws making the SOFT webmaster an *ex-officio* (non-voting) member of the Board of Directors.

In closing, I would like to thank those who attend our annual meetings. The amazing amount of planning and organization by the meeting hosts make it a great event for everyone. However, all of the planning in the world will not turn a meeting into a success without the people who attend it. In a time where words such as "downsizing" and "outsourcing" have become commonplace, it is important to remember that people do make a difference. All who attend our meetings help make them the success they are. There is no doubt that the scientific presentations and discussions among colleagues at SOFT meetings contribute to shaping the future of forensic toxicology, and, by attending, you are a part of that. For those who have attended meetings I know that you know what I mean; for those who have not yet been able to attend a meeting, it is my hope that someday you will have that opportunity. ☺

NEW TOXTALK EDITOR CONTACT INFORMATION - Reminder

Dr. Joseph R. Monforte, SOFT ToxTalk Editor, has joined the staff at Ameritox Laboratories. It is recommended that materials for ToxTalk be sent via e-mail. If you must send items by mail, send to:

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Please continue to send material to **ToxTalk** directly to the appropriate Editorial Staff person.



SOFT 2005 Annual Meeting
MUSIC CITY, USA
NASHVILLE, TENNESSEE
October 17-21, 2005

HOST: Louis Kuykendall SITE: Renaissance Nashville Hotel

The SOFT 2005 Planning Committee is proud to extend a gracious, southern-style invitation to Nashville for the Annual Meeting of the Society of Forensic Toxicologists. The conference will be held in the Renaissance Nashville Hotel which is situated downtown in the very center of Nashville's dual-personality as "The Athens of the South" and "Music City, USA". Museums, art galleries, and cosmopolitan lure abound within a two block stroll to the left out of the Renaissance Hotel; while clubs, tourist attractions, and a wide variety of music (country, blues, jazz, etc.) are within a two block sashay to the right. Attendees and their accompanying persons will find Tennessee's weather in October to be the mildest we have to offer, with a typically dry forecast, the first hints of colorful fall foliage, and average temperatures in the high 60s'to low 70's.

We have worked hard to strike a balance between an all-inclusive meeting and allowing our attendees time to enjoy this great town. The meeting will consist of workshops on Monday and Tuesday, with general sessions and posters Wednesday through Friday.

The Renaissance Nashville Hotel (615.255.8400 or 800-HOTELS-1) will accept reservations as of November 10, 2004. For the \$149 single/double convention rate use meeting code "SOFT Conference".

Have a program idea or want to participate in the 2005 SOFT annual meeting? Contact Meeting Host Louis Kuykendall at louis.kuykendall@state.tn.us or 615.744.4484.

If you hope to present a workshop in 2005, contact workshop chair, Dr. Peter Stout, at pstout@aegislabs.com NOW.

More information will be published in the next issue of ToxTalk and noted at the SOFT web site.

We'll see ya'll in Nashville! ☺

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"Case Reports": Dr. Matthew "Bamey" Barnhill at
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CALLING ALL AMATEUR PHOTOGRAPHERS!

The SOFT Board of Directors has approved the expense to include 2 pages of color photos in one issue of ToxTalk per year. If you would be interested in having your photographs included in ToxTalk, please submit to ToxTalk in a form that can be edited. DEADLINE – November 1.

ALSO – Photos from the 2004 SOFT meeting were continuously displayed during the banquet. The photos received on CD or via e-mail for ToxTalk, and any others received, may also be utilized for similar purposes. If you have not "gone digital" or have but can print photos, send a copy any SOFT photos you are willing to share to Pat Monforte who is putting together a SOFT photo scrapbook. On the back of the photo, please note the date, occasion, and, if possible, identify persons on the photo.

Pat Monforte

5304 Widener Strip, Midland, TX 79707 (new address) ☺

NEXT TOXTALK DEADLINE: NOVEMBER 1, 2004

2004 FBI Laboratory Symposium on Forensic Toxicology and Joint Meeting of SOFT and TIAFT

Submitted by Marc LeBeau, Madeline Montgomery, Marilyn Huestis, and Rebecca Jufer-Phipps

The 2004 FBI Laboratory Symposium on Forensic Toxicology and Joint Meeting of SOFT and TIAFT was held in Washington, DC from August 28th – September 3rd, 2004. Over 1,200 attendees found the scientific and social content to be exceptional.

The event's motto was "Global Partners for Justice and Health" to emphasize the importance of worldwide partnerships, collaborations, and friendships. One of the nicest things about belonging to an organization such as SOFT or TIAFT is attending annual meetings and making new friends. The opportunity to meet people with different levels of experience and with similar work-related challenges is valuable and enjoyable. Frequently these colleagues become friends whom you can call upon to help you resolve problems and think about issues from different perspectives.

We were particularly proud to have welcomed 190 first-time attendees at the 2004 SOFT/TIAFT Joint Meeting. We hope these new attendees will return to meet with their new friends at future meetings.

The Opening Ceremony of the 2004 meeting included a presentation by Howard Stead from the United Nations Office on Drugs and Crime and welcoming remarks by the Presidents of both SOFT and TIAFT, as well as the Directors of the National Institute of Justice (NIJ) and the FBI Laboratory. The ceremony also included a special program entitled "History of Toxicology – Back to the Past" moderated by Dr. Joseph Monforte and included wonderful presentations by Dr. Irving Sunshine and Dr. Alphonse Poklis. The program was both educational and entertaining.

The 2004 scientific program provided 98 platform presentation and 168 poster presentations in six key topics: Alternative Matrices, Analytical Methods, Behavioral Toxicology, Clinical & Environmental Toxicology, Forensic Urine Drug Testing & Adulteration, and Postmortem Toxicology. As an extra educational opportunity, fourteen free workshops were provided by some of our meeting's exhibitors on Tuesday evening. The topics were of a wide variety to attract participants from all areas of toxicology, and the speakers were excellent.

The social program was equally as impressive. On Monday night we enjoyed the "Tastes of Washington" while being entertained by a fife and drum group in period costumes from the Revolutionary War. Afterwards, the annual Elmer Gordon Open Forum had a number of special guests including Dr. Sidney Kaye, Dr. Leo Goldbaum, and Elmer Gordon's daughters Beverly and Jeanine.

Wednesday evening was a special one as the entire Smithsonian National Museum of Natural History was ours for the night. With a wonderful selection of food and drinks, the attendees explored the magnificent exhibits of dinosaurs, insects, mammals, and more. By

far, the favorite attraction was the world-famous Hope Diamond.

Thursday afternoon provided a small break in the meeting as the attendees were treated to a tour of Washington's National Mall and its numerous monuments, memorials, and museums. That night we celebrated at the Presidents' banquet. Great entertainment (and the open bar) kept us dancing until 1:30 in the morning!

There were many people involved in the planning and implementation of the 2004 Symposium and Joint SOFT and TIAFT Meeting. The Planning Committee formally thanked these individuals at the Closing Ceremony, but we would like to acknowledge some of them again.

- Laurel Farrell served as our meeting treasurer and kept our meeting on budget from the start.
- Deborah Wang was our meeting secretary and kept meticulous minutes of our numerous planning meetings.
- Lisa O'Dell, as always, put together an amazing exhibition with 65 exhibitors taking up 78 booths!
- Bruce Goldberger oversaw the website and worked endless hours with updates and answering questions about the meeting.
- Eileen Waninger and Pamela Reynolds were critical in the planning of our social events and in the production of our printed programs.
- Peter Stout, Roman Karas, Eshwar Jagerdeo, and Jeffrey Leibowitz did an amazing job of organizing and running the oral presentations.
- Donna Bush, Buddha Paul, Marilyn Huestis, Alphonse Poklis, Anthony Costantino, and Barry Levine served as the Scientific Program Committee chairs and organized a fabulous scientific program.
- All the additional volunteers who served as moderators, ticket collectors, registration desk staff, and runners.

We also would like to acknowledge the attendees. With such a large number of participants, the security concerns for an FBI-labeled event, and the tight schedules we had for the week, we appreciated that our speakers and attendees stayed on schedule and were understanding of our extra security measures.

In closing, if you were able to attend the 2004 FBI Laboratory Symposium on Forensic Toxicology and the Joint Meeting of SOFT and TIAFT, thank you so much for coming and thank you for the kind words and letters of congratulations. If you couldn't make it this year, we're sorry that you missed it, but please do join us at next year's meetings in Nashville and Seoul. ☺

2005 SOFT MEETING – NASHVILLE – OCTOBER 17-21

SOFT BOARD NOTES

Diana G. Wilkins, Ph.D., SOFT Secretary dwilkins@alanine.pharm.utah.edu

SOFT Logo: At the 2004 Joint SOFT/TIAFT Business meeting, the SOFT Board of Directors announced its decision to pursue registration of the SOFT logo with the U.S. Patent and Trademark Office. The law office of Pate, Pierce & Baird submitted a trademark application to the appropriate agency on SOFT's behalf in August 2004. While the application is under review, the attorneys have advised that "TM" appear whenever the logo is used for SOFT educational activities. The "TM" should appear on the lower left side of the SOFT logo. If you are planning a SOFT sponsored event or educational activity, please be sure to incorporate this change when the logo is printed. If you have any questions, please contact the SOFT Secretary or Webmaster for further assistance.

New Member Application Fee: Currently, SOFT membership applicants submit an application with a \$10.00 application fee. Upon approval of the membership application by the Membership Committee, the applicant is sent a letter indicating their membership status and a request for the \$50.00 first-year's dues to complete the process. In an effort to streamline and improve the timeliness of the process for potential new members, the SOFT Board approved a motion that a \$50.00 non-refundable application fee be submitted along with the new membership application. Applicants for student membership will submit a \$15.00 fee. For any category of membership, this fee will also serve as the first year's annual membership dues upon approval of the application by the Membership Committee. Membership in SOFT can then be immediately effective upon approval of the application by the Membership Committee.

The Board voted to revise the application process, as proposed, effective January 1st, 2005. ☞

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Daniel S. Isenschmid, Ph.D., DABFT

*At the August meeting of the SOFT Board of Directions, in accordance with the bylaws (Chapter 3, Section 8, Item C), the Board elected Dr. Ashraf Mozayani to fulfill the remaining 1-year (2005) of Dr. Moore's 3-yr Director's term. ☞

SOFT AWARDS PROGRAM

HISTORY: The SOFT Educational Research Award was conceived in 1978 by Dr. Vincent Lynch of Saint John's University to encourage academic training and research in areas related to forensic toxicology. The award was approved by the Board of Directors in December, 1978, and the first award, funded by a grant from Hoffman LaRoche, was made in 1980. During the 1978 meeting, the Board also established a committee to review applications and make recommendations for awardees. In 1988, the size of the committee was established at 3 members plus the current Scientific Program Chair and President.

In 2002, the Board of Directors approved the establishment of the Young Scientist Meeting Award (YSMA) designed to recognize bench level scientists working in the field of forensic toxicology. The first YSMA was presented at the 2003 SOFT meeting in Portland, Oregon. The Awards Committee, chaired by Philip Kemp, reviews the applications and makes recommendations for the award recipients.

ERA: The Educational Research Award (ERA) is designed to recognize students pursuing advanced degrees (Ph.D. and M.S.) with research in an area relevant to forensic toxicology. Applications are competitive. Awardees may reapply. Abstracts must be for **oral** presentations and must be accepted by the scientific program committee for the current year's SOFT meeting.

YSMA: The Society of Forensic Toxicologists is offering the Young Scientist Meeting Award (YSMA) for bench level scientists to undertake projects and get involved in the SOFT annual meeting. The YSMA will provide funding to offset meeting and travel expenses. ☞

**AWARDS PROGRAM DETAILS FEATURED
IN THE NEXT ISSUE OF TOXTALK**

Call for Case Reports: ETHYLENE GLYCOL

Ethylene Glycol Poisoning in the Province of Alberta

Peter Singer, Alberta Justice-M.E.O., Edmonton, Alberta T6H 5R8 Canada

During the period 1999 to August 2004 there were six cases involving ethylene glycol ingestion in the Alberta Medical Examiner's System, 4 men and 2 women with ages ranging from 19 to 58. These cases were mainly suicides (5 of 6) and no alcohol and virtually no other drugs were found. Glycol is not generally detected in routine screening and is usually tested for as a result of scene investigation or pathology findings. Glycol appears to be rapidly and completely absorbed, amounts found in the stomach, when quantitated, were small.

Case #1

This 51-year-old female was found dead by a friend who was concerned because she hadn't answered her phone. The previous week she had sent her daughter away to stay with her father in the Middle East. The friend stated she had problems with alcohol and depression over the years, and a volatile mother-daughter relationship. When found, rigor was established and the fingers were beginning to dry. A hand written suicide note and antifreeze with a glass were found at the scene.

No autopsy was performed, cause of death was "Ethylene Glycol Toxicity" and manner was "Suicide".

Case #2

The deceased was a 19 year-old male found across the back seat of a truck in the garage. He had been there for 3 or 4 days as it was thought he was out of town. He was suffering from depression and had been leaving daily for work but did not have the job he pretended to have. At autopsy a suicide note was found in his sock. The truck was non-functional and the carboxyhemoglobin concentration was not elevated.

At autopsy there was no significant injury or disease. On sectioning the kidneys oxalate crystals could be observed. A relatively small amount of ethylene glycol was detected by toxicology testing but this is likely consistent with an extended survival period and conversion to oxalate. The cause of death was "Ethylene Glycol Toxicity" and manner was "Suicide".

Case #3

This 27 year-old male had a history of drug abuse and depression. He was found on the floor of his suite after not coming to work for several days. Suicide notes indicated he had consumed antifreeze.

At autopsy there was no significant injury or disease and specimens were submitted for toxicology. The cause of death was "Acute Ethylene Glycol Toxicity" and manner was "Suicide".

Case #4

This 58 year-old male had a history of substance abuse, including ethanol, hair spray and mouthwash. He visited his friend and appeared to be unwell, spending most of the day lying on the kitchen floor. Eventually paramedics were called and pronounced him dead at the scene. He was cool to the touch, limbs were immobile and emesis was present.

At autopsy there was microscopic evidence of meningitis and pneumonia in both lungs as well as oxalate crystals in the kidneys. Toxicology testing indicated a trace amount of glycol in the blood with more in the urine. The cause of death was "Ethylene Glycol Toxicity" due to "Chronic Ethanol and Drug Abuse" with "Meningitis" as a significant contributor to death. The manner was "Unclassified".

Case #5

The deceased, a 20-year-old male, had checked into a hotel room for two nights and was found naked, sitting on the floor between the beds. He had a history of depression and a previous suicide attempt. In the room was a container of antifreeze and a glass with antifreeze residue. That evening his father found a suicide note left in the home.

At autopsy there was no significant injury or disease. The cause of death was "Ethylene Glycol Toxicity" and manner was "Suicide".

continued next page

Case #6

This 45 year-old female died in hospital from respiratory distress syndrome about 20 days after ethylene glycol ingestion. She had a long history of depression, recently worse due to a diagnosis of breast cancer, and several suicide attempts. A container of antifreeze, with one quarter missing, was found on a search of the garage by her husband. A small amount of admission blood was obtained for analysis.

No autopsy was performed, cause of death was "Ethylene Glycol Toxicity" and manner was "Suicide".

Results:

Case #	Ethylene glycol g/l	Ethanol g/l	Other Findings / Drugs
1	subclavian blood - 1.9 urine - 7.8	ND	ND
2	subclavian blood - 0.21 femoral blood - 0.24 gastric - trace amount	ND	Acetone urine 0.06 g/l, trace amounts in blood and vitreous (<0.05 g/l). Glucose vitreous 40 mg/dl, urine ND
3	subclavian blood - 1.5 gastric - 0.14/70 g	ND	ND
4	cardiac blood - 0.08 urine - 4.8 vitreous - < 0.05	ND	small amounts of diazepam, nordiazepam
5	femoral blood - 1.6 gastric - 0.44/20 g vitreous - 2.5	ND	ND
6	antemortem blood - 9.3	NT	NT

ND - None detected. NT - No other testing performed.

Method: Ethylene glycol was determined as the phenylboronic acid derivative by GC-FID. 1,3-propanediol was used as internal standard. ☒

A Fatality Due to Ethylene Glycol with Underlying Disease

John Rorabeck, Office of the Coroner, Lake County, Waukegan, IL 60085

A 61-year-old male presented at the hospital suffering from possible ethylene glycol intoxication. On admission the plasma level was found to be 290 mg/dl. The subject died approximately six hours later. At the time of his death, the subject was being treated for liver cancer, CVA and HTN. The cause of death was listed as cardiorespiratory arrest due to multisystem failure due to ethylene glycol ingestion, and the manner of death was suicide (there was a note). There were no postmortem toxicology studies. ☒

A Fatality Due to Ethylene Glycol Ingestion

R.J. Warren, Centre of Forensic Sciences Northern Regional Laboratory, Sault-Ste. Marie, Ontario P6A 6V3 Canada

According to records, there appears to have been only 1 positive case for ethylene glycol for approximately the past five and a half years in this laboratory. This involved a male, age 42, with a history of psychiatric problems and past attempts at suicide. He was found comatose at home, transferred to hospital, and died approximately 3 days later. A bottle of antifreeze was found at the scene.

The postmortem heart blood ethylene glycol concentration was 570 mg/L. No ethanol, acetone, isopropanol or methanol was detected in an antemortem admission blood sample. No other drug screens were performed on either sample.

The coroner ruled the manner of death as suicide. ☒

CASE NOTES: Ethylene Glycol continued next page

SPACE IN ToxTalk HAS BEEN RESERVED FOR YOUR CASE NOTE

Submit to: *Editorial Staffer: Matthew "Barney" Barnhill, Ph.D,*
mbarnhilljr@worldnet.att.net

An Ethylene Glycol Fatality Involving Other Drugs

Norman A. Wade, Office of the Chief Medical Examiner, Forensic Science Center, Phoenix, AZ 85007-2908

The subject was a 66-year-old female who had been depressed over her husband's recent demise. She was found sitting fully clothed in a chair in the hotel room where she had checked in the day before. A suicide note was found along with open bottles of anti-freeze, allergy-sinus pills and OTC sleep-aid pills. She had apparently mixed all of these with chocolate milk and consumed them.

Autopsy Findings:

External: Weight, 136 pounds; height, 67inches; pupils dilated 0.3cm; extremities symmetrical with 1+ pitting edema; no trauma

Brain weighs 1340 grams; cerebral hemispheres are edematous with mild flattening of the gyral pattern

Heart shows mild amount of atherosclerosis and is enlarged (520 grams) with a mild concentric ventricular hypertrophy (1.9cm) and luminal narrowing of 10% for right and left coronary arteries

Left lung weighs 380 grams; right lung weighs 440 grams with a dark red-blue, markedly congested parenchyma

Liver weighs 1610 grams and is moderately congested

Stomach contains 10 mL of brown partially digested food material but no tablets; gastric mucosa is red, congested with superficial erosions

Left kidney weighs 190 grams; right kidney weighs 160 grams; cortex is thin; 150 mL of cloudy yellow urine

Spleen weighs 190 grams

Microscopic Examination:

Heart - congested with enlarged myocytes with prominent nuclei and increased luminal narrowing of intramyocardial vessels and atherosclerosis

Lung - marked congestion with focal postmortem agonal changes and focal emphysematous changes of both lungs' parenchyma

Liver - marked congestion with no diagnostic abnormality

Pancreas - marked autolysis with focal areas of congestion

Kidneys - congestion with mild arteriolonephrosclerotic changes; polarized calcium oxalate crystals within the tubules

Toxicology:

Vitreous and cardiac blood negative for methanol, ethanol, acetone and isopropanol.

Cardiac blood: Ethylene glycol, 740 mg/L
Diphenhydramine, 0.99 mg/L
Pseudoephedrine, 1.54 mg/L
Phenylpropanolamine, 0.09 mg/L
Chlorpheniramine, trace amount;
Negative by ELISA for:

barbiturates, benzodiazepines, benzoylcegonine, opiates and methamphetamine.

Urine: Ethylene glycol, diphenhydramine, pseudoephedrine, PPA, chlorpheniramine

Cause of Death: Toxic effects of ethylene glycol

Manner of Death: Suicide ☠

CASE NOTES: Ethylene Glycol *continued next page*

*Read an interesting drug-related article
in a newspaper, magazine or on the
web? Send to "Drugs in the News"
Dr. Andrew Mason at
forn6tox@aol.com*

RECENT INCIDENCES OF ETHYLENE GLYCOL POISONING IN THE STATE OF GEORGIA

Christopher S. Tilson and H. Horton McCurdy, Georgia Bureau of Investigation Division of Forensic Sciences, P.O. Box 370808, Decatur, GA 30037-0808

Ethylene glycol (EG) is a clear, colorless, slightly syrupy liquid. Its principle industrial application is as a solvent for paint, plastics and inks, but is generally more recognized as an agent used in antifreeze and in de-icing solutions. It is perhaps unfortunate that EG has a slightly sweet taste making it quite palatable to both humans and animals alike, and making small children and pets especially vulnerable to ethylene glycol toxicity. When EG is ingested, it results in varying degrees of metabolic acidosis, renal failure and/or nervous system damage depending on the dose. Standard therapy for ethylene glycol usually involves administration of an alcohol dehydrogenase (ADH) inhibitor such as ethanol, or more recently, the potent ADH inhibitor, fomepizol (Antizole). Such inhibitors help to prevent the metabolism of ethylene glycol to glycolaldehyde and ultimately to glycolic acid, which can result in severe acidosis. If not blocked, further metabolism of ethylene glycol results in the formation of oxalate, whose mono- and bidentate calcium crystals are responsible for the sometimes-severe renal tubule necrosis. Death can occur from CNS depression when large amounts are consumed, but the most frequent cause of death is generally due to the secondary complications that arise from EG ingestion.

While most incidences of exposure by humans and animals to EG have been more closely associated with accidental poisonings, it is seldom employed as an agent used in cases of suicide or homicidal poisoning. In our laboratory, it is typical for us to experience no more than 1 or 2 incidences of ethylene glycol related deaths in any given year. However, in little more than a year, the Atlanta metropolitan area has witnessed a total of 10 deaths attributed to EG, which can only be regarded as highly atypical for this or any other municipality of comparable size. Two of the ethylene glycol cases have in particular garnered much press coverage and intense scrutiny by the news media because they involve cases where a woman's husband and then subsequently her boyfriend both died as a result of ethylene glycol poisoning. Such intense media exposure could perhaps serve to explain, at least in part, the number of EG suicides that followed due to this highly publicized event. While it might be surmised that such intense media exposure of EG poisonings might have served to help educate the public that antifreeze can be a highly toxic substance, any such conjecture would be difficult to prove.

Among the variety of EG poisonings, exclusively male, recently encountered in the past year, at least two cases stand out as being of particular interest. One of the cases involved the disinterment of a 6-year old embalmed body, who was the deceased husband of the woman alluded to above, with the request that it be tested for ethylene glycol. This is the first reported successful analysis that we are aware of involving the analysis of ethylene glycol in embalmed tissue. The other case involved an individual who, despite being under hospital care, eventually died from complications as a result of ingesting EG. In this case, blood samples were collected periodically from this individual prior to death and, thus, presented an opportunity to collect some potentially highly useful pharmacokinetic data regarding EG elimination at toxic doses. We wish to report the details of these 2 cases, as well as 8 other cases of EG poisoning that we have recently experienced.

Results and EG Case Reports

The following are the details of 11 ethylene glycol cases submitted to the Georgia Bureau of Investigation, Division of Forensic Sciences for analysis:

Case 1

A 76-year-old male was taken into custody by police after he was discovered taking lewd pictures of himself and his 11 year-old female neighbor. This individual was later found in his prison cell unresponsive. Emergency medical personnel arrived to find the decedent with fixed and dilated pupils and devoid of independent cardiac function. Death was suspected to be of secondary causes. Decedent was in an intoxicated state when booked at the jail; however he did not have access to antifreeze while incarcerated. Autopsy showed innumerable foreign bodies consistent with oxalate crystals in the kidneys. Toxicology screen was negative for certain drugs of abuse including alcohol. The blood and urine were positive for ethylene glycol, at concentrations of 0.68 g/L and 7.55 g/L, respectively. The cause of death was ruled suicide due to ethylene glycol toxicity.

Case 2

A 55 year-old man became violently ill after having a meal at his girlfriend's home. This individual suffered numerous falls during the course of the evening and cause of death was attributed to intracranial hemorrhage. Toxicology screens were negative for common drugs and alcohol. Ethylene glycol analysis revealed 0.40 g/L EG in the blood, 4.2 g/L in the urine and 0.31 g/L in the gastric contents.

(continued next page)

Case 3

A 48-year-old male was found unresponsive approximately 10-11 hours after he was last seen by his girlfriend. The decedent had a history of drug abuse and allegedly feared going back to jail for failure to pay back child support. It was reported that he took a container of antifreeze from his mother's residence some hours before he was found dead. Autopsy revealed no remarkable cause of death, but examination of the kidneys revealed numerous birefringent polarizable oxalate crystals. Blood, urine and tissues were analyzed for ethylene glycol. The manner of death was ruled as a suicide due to complications arising from ethylene glycol ingestion.

Case 4

A 58-year-old male was found in a state of advanced decomposition. A suicide note and a glass of suspected antifreeze were found in the decedent's refrigerator. Blood toxicology screens did not reveal the presence of drugs, but were positive for ethanol at a concentration of 0.10 g/dL. Vitreous fluid was not obtained for any further alcohol or drug analysis. Examination of the blood sample revealed the presence of 2.5 g/L EG. Cause of death was initially indicated as natural, secondary to alcohol abuse and congestive heart failure.

Case 5

A 37-year-old man presented himself at a hospital in an obvious altered mental state whereupon he died a few hours later. Symptoms included headache, severe metabolic acidosis and respiratory failure. Hospital tests revealed the presence of EG. Autopsy showed oxalate crystals in the kidneys. Analysis of the blood sample (clotted) showed 4.5 g/L of EG, 1.87 g/L was found in muscle tissue and greater than 0.8 g/L in vitreous. Manner of death was ruled suicide caused from acute ingestion of ethylene glycol.

Case 6

A 48-year-old male was found in the back seat of his car found parked at a shopping center. He had a previous history of attempting suicide by ingesting antifreeze. Toxicology analysis revealed the presence of diphenhydramine in the blood at 0.02 g/dL. Further analysis of the blood showed 1.5 g/L of EG in the blood, 6.5 g/L in the urine and 8.2 g/L in the gastric.

Case 7

A 32-year-old male was found unresponsive on his living room sofa by one of his co-workers. The decedent had been to the emergency room two days prior complaining of nausea and vomiting. Physicians at the time suggested possible kidney failure and scheduled a follow-up exam in 2 days. His medical history showed that he had a severe sinus infection and fitted him with an IV port for the administration of antibiotics approximately 2 months prior to the time of his death. At autopsy, large amounts of birefringent polarizable crystals were found in the kidneys. Laboratory tests of the urine showed 1400 $\mu\text{mol/L}$ oxalate, BUN 30 mg/dL and creatinine 2.5 mg/L. The pathology report noted an enlarged heart and possible coronary insufficiency. Blood toxicology analysis showed butalbital, 1.9 mg/L, and was negative for alcohol. Depending on which blood tube was analyzed for EG, different results were obtained. Tube A containing clotted blood gave a result for EG of 0.18 g/L. Tube B containing unclotted blood gave 0.35 g/L EG. Independent laboratory analysis of tube A gave a result 0.16 g/L, in close agreement with our result. Urine gave a result for EG of 2.4 g/L.

The manner of death in this case was ruled homicide, which garnered much press coverage. Investigation of the decedent's girlfriend revealed that she had a history of financial difficulties. Further investigation by the press revealed similar circumstances between the death of the decedent and the death of his girlfriend's former husband. This led to the exhumation of her former husband's body in EG case #8.

Case 8

A 31-year-old embalmed body, linked to case 7, was exhumed after being interred for approximately 6 years. Originally, the decedent had been found lifeless at home after being treated the day before at the emergency room for flu-like symptoms. The day of the decedent's death and in the early morning hours, his wife had reported that he had begun to act irrationally, was in a paranoid state and complaining of severe thirst. The wife had allegedly observed him drinking what appeared to be gasoline from a jar. She left the decedent at approximately 9:00 a.m. to run errands and upon returning at approximately 2:30 p.m. found him lifeless on the bed.

At autopsy, it was ruled that the cause of death was due to cardiac dysrhythmia due to cardiomegaly. It was noted that the decedent had approximately 100 mL of a greenish fluid in his stomach and gastrointestinal tract. At the time of exhumation of the body, re-examination of the original autopsy slides revealed the presence of polarizable crystals in the kidney.

Analysis of the embalmed liver tissue for ethylene glycol showed the presence of EG at a concentration of 1.6 g/kg. In independent laboratory analysis reported a level of EG of 0.98 g/kg. While the disparity between the 2 analyses could be viewed as significant, it is suspected that different sampling techniques used by two independent laboratories

(continued next page)

could explain the results. The independent testing laboratory did not have sufficient tissue to allow the cross-section sampling that was considered necessary to obtain consistent results. It was initially found that sampling various parts of the liver tissue would give different, although still significant, results. The independent testing laboratory also reported 660 g/kg of glycolic acid in the liver tissue.

Case 9

A 57-year-old male checked into the hospital with symptoms of vomiting and diarrhea and was also in a "highly altered mental state". The decedent died approximately 24 hours later. Hospital tests showed that this individual had been suffering from metabolic acidosis and anion gap. The subject had reported to be suffering from headaches for the past 6 weeks prior to his death. Analysis of the hospital admission blood revealed the presence of EG at a level of 0.17 g/L. Prior to the time of death, blood samples had been periodically collected and were submitted for EG analysis. At autopsy, blood was collected and was negative for EG. The elimination of EG appeared to follow first order kinetics with a determined half-life of 167 minutes (2.8 hr).

Case 10

A 45-year-old male was admitted to a local hospital and was determined through hospital tests to be positive for the presence of EG. Subsequent toxicological analyses showed the femoral blood to be positive for EG at a concentration of 0.30 g/L and the subclavian blood sample to have 0.29 g/L EG.

Discussion

In 9 death cases where blood was analyzed the average level found was 1.3 g/L (range: 0.27-3.2). The average level found in urine was 4.6 g/L (range: 2.2-7.6). The average urine result, as might be expected in consideration of the quite small value for the volume of distribution for EG (0.65) could be expected to be several fold higher than that found in blood. Our observed EG averages for blood and urine are somewhat less than those previously reported results with blood levels in these cases averaging 2.4 g/L and urine levels averaging 5.7 g/L. It is often observed in deaths due to EG, that delayed deaths are common, and could have the tendency to skew the results either higher or lower depending on the length of time before death actually occurs.

The stability of EG in refrigerator stored blood was also examined. Five cases were re-analyzed anywhere from 39 to 115 days later and showed significant changes in the results. Three of the 5 cases showed significant decreases in concentration by almost one-third. Case 2 was the exception where re-analysis showed an increase in concentration by nearly a third. Due to the clotted nature of Case 5, the re-analysis results should possibly not be considered accurate since homogeneous sampling of the blood was not possible. The experimental error is such that no definitive estimate of the changes in EG concentration over time is possible and it should probably be expected that at least based on these few results, a decrease in EG concentration is therefore considered likely.

The observed half-life in one patient (Case 9) was a little less than that reported in the literature. This half-life may have been augmented by the fact the patient was given dialysis treatment while in the hospital and this may have contributed to the shorter half-life.

To our knowledge, this is the first reported analysis of ethylene glycol in embalmed tissue. Although much time and effort was spent in determining what the best analytical approach would be since it was expected that only oxalate could be detected, it was with some surprise that unchanged EG could be analyzed in 6 year-old embalmed tissue with good recovery. ☹

CASE NOTES continued next page

CALL FOR CASE NOTES

Your case note should be about 1/2 page in length, no more than a full page is necessary. Material should be submitted in Microsoft Word to:

Dr. Matthew "Barney" Barnhill at mbarnhilljr@worldnet.att.net

Although ToxTalk may feature cases dealing with specific subject matters, other case notes are always encouraged and welcome. Material from non-members is also considered.

Other items of interest to SOFT members are also welcome and should be submitted to the appropriate Editorial Board member or Joseph R. Monforte, Ph.D., DABFT, ToxTalk Editor, at DrMonforte@aol.com

NEXT DEADLINE: NOVEMBER 1ST

CASE NOTES - OTHER:

AN UNUSUALLY HIGH LEVEL OF BARIUM IN A PRISON FATALITY

Elizabeth Spratt, M.S., DABFT, Kunjlata Asher, M.D., and Robert Deluca, Westchester County Department of Labs and Research, Valhalla, NY

A 20-year-old male prisoner was admitted to the infirmary at 9:00 p.m. with complaints including nausea and vomiting. He was found unresponsive around 8:15 the following morning. CPR was attempted around 8:50, but the patient was already cold and deceased.

Routine toxicology was negative. Special testing was also performed for opiates. Blood and gastric contents were sent to a reference laboratory for a heavy metals panel. Subsequently, liver and brain were also sent. The following results were reported:

Blood	Barium	540 mcg/L	(Reference: up to 400 mcg/L)
	Selenium	170 mcg/L	(Reference: 20-220 mcg/L)
Gastric Contents (250 cc)	Barium	4.8 mcg/L	
	Selenium	90 mcg/L	
Liver	Barium	0.030 mcg/g	
Brain	Barium	0.064 mcg/g	

Cause of death: Acute pulmonary edema of unknown etiology
Note: High level of barium was found in blood and tissues, the significance of which is unclear.

Manner of death: Undetermined ☒

ATTN: ANY MEMBER WHO IS INVOLVED WITH OR HAS KNOWLEDGE OF A UNIVERSITY FORENSIC TOXICOLOGY PROGRAM

“LOOKING FOR A UNIVERSITY TOXICOLOGY PROGRAM. . .”

That's the message in numerous e-mails received by the **ToxTalk** Editor, probably because Dr. Monforte's e-mail address is noted on the SOFT website. Most are from third- and fourth-year university students looking for serious guidance; some are high school juniors or seniors who seem to have a sincere interest (or CSI wannabees?).

Since one of SOFT's goals is to promote the science, I am appealing to any member with knowledge of or involvement in a forensic toxicology educational program to submit

- information about the program, and/or
- a short, single-paragraph synopsis, as well as contact information

to me (Pat Monforte) at DrMonforte@aol.com. This information will then appear in a future issue of **ToxTalk** and be available for distribution. ☒

DON'T FORGET TO CHECK THE SOFT WEBSITE

www.soft-tox.org

for the latest information regarding SOFT activities

Unauthorized access or printing is protected by copyright laws. ☒



DRUGS IN THE NEWS

ToxTalk editorial staff: Andrew P. Mason, Ph.D., DABFT, DABCC-T

Send your media items of interest to Dr. Mason at forn6tox@aol.com

Follow-up on Sativex® Submitted by Andrew P. Mason, Ph.D., DABFT, DABCC-TC

One article in the "Drugs in the News" feature of the last issue of "ToxTalk" Vol. 28, No. 2, June 2004) described a new pharmaceutical preparation containing cannabinoids called "Sativex®" (GW Pharmaceuticals, UK). Later I received a communication from Laurent Galichet, Managing Editor of "Clarke's Isolation and Identification of Drugs and Poisons" (Pharmaceutical Press), who kindly informed me about their new book: "The Medicinal Uses of Cannabis and Cannabinoids" [1]. This book contains, among other information, a thorough review of the botany, chemistry and pharmacology of cannabis and cannabinoids that led to the development of Sativex® and the investigation of other cannabis-based extracts as pharmaceutical preparations. Additional information regarding this product may also be found at the producer's website [2].

Sativex® is a 1:1 formulation of delta-9-THC (THC) and cannabidiol (CBD) that will be administered as a sub-lingual fixed-dose spray. The cannabinoids are obtained from cannabis extracts, and are not synthetically derived. The spray will be administered using a new secure and tamper-resistant device/technology called the Advanced Dispensing System (ADS). This method is intended to provide high security in the administration, while allowing clinicians the

capability to remotely monitor drug delivery, or if necessary, to control it in real time.

The company reports initial positive results for Sativex® in Phase III clinical studies of spasticity in patients with multiple sclerosis, in Phase III clinical studies of patients with neuropathic pain, and in Phase II clinical studies of pain in patients with rheumatoid arthritis. Other clinical studies are ongoing. Applications for regulatory approval have been submitted in both Canada and in the UK. If approved, Sativex® will be exclusively distributed by Bayer HealthCare (UK) in both countries.

As Sativex does contain THC, reactivity with immunoassays for THC metabolites, and GC/MS positivity in assays for THC and its metabolites may be expected, of course depending on the doses administered. One approach to the discrimination of cannabis and Sativex® use could employ the detection of other cannabinoids in blood (or their metabolites in urine) found in the botanical sources but found only in trace amounts in the pharmaceutical preparation. Cannabinol (CBN) or tetrahydrocannabivarin (the propyl homologue of THC) stand out as obvious candidates for investigation. Tetrahydrocannabivarin has already been used as a target analyte to distinguish the use of cannabis from the use of Marinol® [3] which contains only THC.

References:

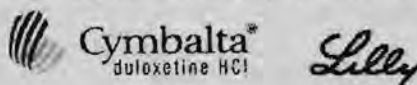
1. "The Medicinal uses of Cannabis and Cannabinoids," Guy GW, Whittle BA, Robson PJ, Eds., Pharmaceutical Press, London, 2004, 488 pp.
2. See www.gwpharma.com, visited 09/13/04.
3. ElSohly MA, deWit H, Wachtel SR, Feng S, Murphy TP, "Delta-9-tetrahydrocannabivarin as a marker for the ingestion of marijuana versus Marinol: results of a clinical study," J Anal Toxicol, 25/7: 565-71 (2001). ♀

DULOXETINE (Cymbalta®)

Submitted by Dan Anderson, Los Angeles County Dept. of Coroner

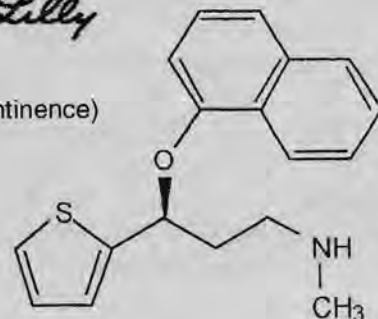
Danderson@coroner.co.la.ca.us

Duloxetine (Cymbalta®), manufactured by Eli Lilly and Company, was first approved in the US by the FDA on August 3, 2004 for the treatment of major depressive disorder. The drug is a potent reuptake inhibitor of serotonin and norepinephrine. In addition, the FDA approved duloxetine, in September 2004, for the management of pain associated with diabetic peripheral neuropathy.



General Information

Common Name:	Duloxetine HCL
Trade Names:	Cymbalta®, Yentreve® (Europe-Female urinary incontinence)
Chemical Name:	2-Thiophenepropanamine, N-methyl-gamma-(1-naphthalenyloxy)-,hydrochloride,(gammaS)-
Chemical Formula:	C ₁₈ H ₁₉ NOS · HCl
Formula Weight:	333.88
Molecular Weight:	297
CAS Number:	136434-34-9
Capsule Size:	20, 30 & 60 mg strengths (delayed release)
Dosage:	Dose 40-60 mg/day (given as 20 or 30 mg BID) for depression Dose 60 mg/day given once a day for diabetic peripheral neuropathic pain



Pharmacology

Half-Life:	~12 hours (8-17 hours)
Absorption:	C _{max} occurs within 6-10 hours of oral dose
Elimination:	Primarily through hepatic metabolism – P450 (CYP2D6 & CYP1A2) Desmethyl duloxetine (active) and Hydroxy metabolite (active)
V _d :	1640 L
Oral Doses:	Given oral doses 20 mg, mean peak plasma level of 13 ng/ml
Mechanism of Action:	Dual-selective serotonin and norepinephrine reuptake inhibitor. Structurally unrelated to venlafaxine and milnacipran, the mechanism and pharmacodynamic characteristics are similar. Structurally similar to fluoxetine and atomoxetine.

Toxicology

Extraction:	Extracts as a basic drug utilizing an n-butylchloride liquid/liquid basic drug extraction; survives an acid back extraction.
Detection:	Although one would think that it should behave similar to other Anti-depressant drugs, this particular one does not respond very well on a GC/NPD. Response on GC/MS is good. Linearity and detection limits are yet to be determined.
Elution Order:	Norserttraline, Sertraline, Citalopram, DULOXETINE , Diazepam, Paroxetine ☹



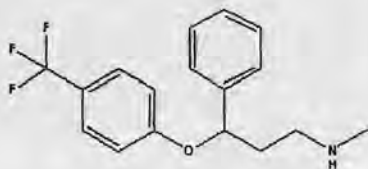
NEW DRUGS - TECHNICAL NOTE:

Quantitation of Atomoxetine Using Fluoxetine Standards

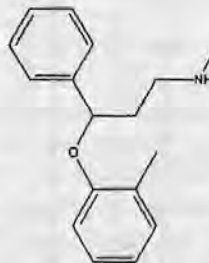
Submitted by: Jeanne M. Beno, Ph.D., Donna Nemeth, M.S. and Eric Baker, B.S., Monroe County Medical Examiner's Office, Rochester, NY.

As discussed in the past two issues of **ToxTalk**, atomoxetine is a new drug for the treatment of ADHD marketed under the brand name Strattera. Atomoxetine is structurally similar to fluoxetine, differing only by the presence of a *p*-trifluoromethylphenoxy ring in fluoxetine versus an *o*-methylphenoxy ring in atomoxetine. As is common with new drugs, reference standards are limited in availability and quite expensive.

Fluoxetine (MW 309)



Atomoxetine (MW 255)



In our laboratory, routine screening for organic bases includes acetylation of the extract with acetic anhydride and analysis by GC/MS. Our first encounter with atomoxetine involved the finding of a peak with an excellent mass spectral match to the N-acetyl derivative of fluoxetine (match quality 91), but with a retention time approximately 1 minute later. Subsequent extraction and derivatization with trifluoroacetic anhydride (TFAA) likewise produced a mass spectrum for atomoxetine that was almost identical to that of the TFAA derivative of fluoxetine due to the fact that none of the most abundant ions in these mass spectra are derived from the phenoxy ring. We hypothesized therefore that fluoxetine could be used as a reference standard for quantitating atomoxetine if calculations are based on equimolar concentrations of each drug.

Fluoxetine and norfluoxetine were purchased from Cerrillant. Atomoxetine and noratomoxetine were obtained from Eli Lilly Corporation. Standards and controls were prepared in whole blood and extracted by solid phase extraction using UCT Clean Screen 200 mg columns. Extracts were derivatized with TFAA, evaporated, reconstituted with ethyl acetate and analyzed by GC/MS. Target and qualifier ions for fluoxetine/atomoxetine were 140, 117 and 244. Target and qualifier ions for norfluoxetine/noratomoxetine were 117, 126 and 230. When quantitating atomoxetine/noratomoxetine against a fluoxetine/norfluoxetine standard curve, the molar conversion factors were 0.825 and 0.817, respectively. When calculating fluoxetine/norfluoxetine against an atomoxetine/noratomoxetine standard curve, the conversion factors were 1.21 and 1.22, respectively.

Results:

Triplicate blood controls targeted to contain 0.5 micrograms/ml atomoxetine and noratomoxetine measured 0.461 +/- 0.004 and 0.466 +/- 0.004, respectively, when calculated against the fluoxetine/norfluoxetine curve. All qualifier ions were within +/- 20% of target values. Fluoxetine controls of 0.5 and 5.0 micrograms/ml measured 0.493 and 4.75 micrograms/ml when measured against an atomoxetine curve. Blood from a death involving atomoxetine measured 0.346 and 0.326 micrograms/ml when calculated against the atomoxetine and fluoxetine curves, respectively. We conclude that if necessary, atomoxetine can be accurately quantitated in blood using less expensive and more readily available fluoxetine standards. ☹

ON DECK:

2005 SOFT/JAT Special Issue

The 2005 SOFT/JAT special issue editor is

Dr. Jeri Roper-Miller

Details in the next issue of **ToxTalk**

ELMER GORDON OPEN FORUM AN OPPORTUNITY FOR INFORMAL DIALOGUE

Two of **Elmer Gordon's** daughters were warmly welcomed at the 2004 Elmer Gordon Open Forum in D.C.

Congratulations to Michael and Michelle Schaffer who were married recently. ♀

CAREER OPPORTUNITIES

Positions available are listed for the consideration of SOFT members. There is no fee for this service. The information will be repeated in the next issue only if the person who submitted it confirms the information. If you have a job position available, e-mail ToxTalk Editor Monforte at DrMonforte@aol.com.

Some posting from the SOFT website. For details go to www.soft-tox.org

Criminalist I- Toxicology, Las Vegas NV
Ph.D. Post Doctoral, Valparaiso IN
Forensic Laboratory Technician, San Francisco CA
Manager, Human Drug Lab, Mississauga Ontario
Tox Lab Director & RP, Research Triangle Park NC
Toxicology Scientist & Alt RP, Raritan NJ
Lab Supervisor, Johnson City TN
Field Service Representative, Bethlehem PA
Forensic Toxicologist, Washington D.C.
Criminalist II, Scottsdale AZ
Forensic Toxicologist I, Worcester MA

PROFESSIONAL CALENDAR

SOFT MEETINGS:

- 2005 Nashville, TN – Louis Kuykendall October 17 – 21, 2005**
Renaissance Nashville Hotel
- 2006 Austin, TX – Rod McCutcheon**
- 2007 Chapel Hill, NC – Ruth Winecker**
- 2008 Phoenix, AZ – Vickie Watts**
- 2009 Oklahoma City, OK – Phil Kemp**

Nov 4-6, 2004: SOUTHWESTERN ASSOCIATION OF TOXICOLOGISTS, Oklahoma City, Oklahoma; Spring 2005 - Dallas/Fort Worth, Texas

December 5-10: R. F. Borkenstein course "Alcohol and Highway Safety: Testing, Research and Litigation." Indiana University. Contact Darlena Lindsay dlindsay@indiana.edu

February 21-26, 2005: American Academy of Forensic Sciences, New Orleans, LA

March 11-12: California Association of Toxicologists, Workshop tentatively "Medical Conditions Affecting DUI," Sacramento, CA. Tentative future meetings -Summer - Orange County, CA; Winter - "Alternative Matrix" workshop - Las Vegas, NV

pat 10/14/04