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WEBMASTER

SOFT ANNUAL MEETING

ORLANDO , FLORIDA

OCTOBER 27—NOVEMBER 1, 2013

Submitted by Bruce Goldberger, Ph.D., D-ABFT

The SOFT 2013 meeting is only weeks away. If you haven't registered for the meeting and/or made hotel reservations, please do so now.

The meeting registration deadline was August 31, 2013. All registrations received are now subject to an additional \$200 late fee. A meeting registration worksheet is published in ToxTalk, as well as on the SOFT web-site, to assist you during the registration process. On-line preregistration closes on September 30, 2013.

Please reserve your hotel room early – prior to September 26, 2013. Use the link on the SOFT web-site (under the Hotel tab). While we have exceeded our contracted room block, the Buena Vista Palace Hotel & Spa continues to honor the SOFT conference room rate.

This year's workshop schedule includes four full-day workshops and eight half-day workshops on Monday and Tuesday. The scientific sessions begin Wednesday morning and end Friday mid-day. The program is jam-packed with 53 platform presentations and 127 poster presentations. There is a wide range of topics to be covered, but there are many presentations covering the analysis of synthetic cannabinoids, cathinones and other new emerging drugs. Other topics include the development of new immunoassays, postmortem drug

analysis, drugs and driving, and pharmacogenomics. Wednesday morning has been set aside for the ERA/YSMA awardee presentations, and Thursday morning, Robert Middleberg will give an update on the activities of SWGTOX. The Key-note speakers are Dr. Jan Garavaglia, star of Discovery Health Channel's "Dr. G: Medical Examiner", and Candice Lightner, founder of Mothers Against Drunk Driving.

New to SOFT this year is the Career/Education fair planned by the Young Forensic Toxicologists Committee. The program will promote



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2013 SOFT MEETING UPDATE (CONTINUED)

employment and educational opportunities in forensic toxicology. The fair will coincide with the Tuesday evening Welcome Reception.

Discounted tickets for all Disney attractions including Walt Disney World® Theme Park can be purchased through a link on the SOFT web-site (Disney tab) prior to October 28, 2013. Convention tickets (admission after 2 PM and 4 PM) and multi-day passes are available for purchase online.

The meeting will be held at the Buena Vista Palace Hotel & Spa in Orlando, Florida. The resort is an official Walt Disney World® Hotel and just five-minutes walking distance to Downtown Disney. The accommodations at the Buena Vista Palace Hotel & Spa are stylishly appointed and feature luxurious pillow-top mattresses and bedding, along with amenities such as a 32" HDTV, a mini-

refrigerator, and high-speed and wireless Internet access. The room rate is \$185 per night (single and double), plus a \$10 resort fee which provides access to the heated swimming pools, Jacuzzi and the fitness room. The Buena Vista Palace Hotel & Spa also provides complimentary transportation to the Walt Disney World® Theme Parks including Disney's Magic Kingdom® Park and Epcot®. In addition, there are numerous nearby attractions, dining and entertainment venues in Downtown Disney including Planet Hollywood, House of Blues and Splitsville Luxury Lanes.

There are many special events planned for SOFT 2013 including the traditional President's Reception followed by an evening at Cirque du Soleil® La Nouba™. Additional meeting festivities include the Sunday evening reception sponsored by Immunalysis, the Tuesday evening Welcome Reception, the Tuesday evening Ceril-

lant's Nite Owl Event, and the Thursday evening Thermo Fisher Halloween Reception.

SOFT would like to take this opportunity to acknowledge the exhibitors and sponsors that make this meeting a success, year after year. Their generous support provides SOFT members incredible venues to network and learn about emerging developments in forensic toxicology. In particular we want to thank our SOFT 2013 Tier 1 sponsors, ABSCIEX, Agilent Technologies, Cerilliant, Immunalysis, Randox, Restek, Thermo Scientific, UTAK Laboratories and United Chemical Technologies. Please let our sponsors and exhibitors know you appreciate their support.

The SOFT 2013 annual meeting will be a valuable educational and memorable social experience. I look forward to seeing you in Orlando.



SOFT VOTING MEMBERSHIP 'GIVEBACK' RAFFLE

The SOFT Board of Directors would like to thank the VOTING Membership of SOFT with the opportunity to win a meeting registration for 2014 SOFT-Grand Rapids, MI. If you are a Charter, Retired or Full member of SOFT and attend the entire business meeting in Orlando, FL, you will have the opportunity to **WIN!**

- The eligible member must attend the SOFT business meeting on Wednesday and sign-in to receive a 'Giveback' raffle ticket.
- The eligible member must remain until the end of the business meeting, as the selection of the 'Giveback' raffle winner will occur at the end of the business meeting in conjunction with the President Elect's introductory remarks.
- The meeting registration award excludes workshops and must be claimed during the subsequent year. The award cannot be sold or transferred.

If you are an Associate member and meet eligibility requirements of a FULL member, we encourage you to upgrade.

Life is good and can only get better —Just have to attend the business meeting for the chance to WIN!



PRESIDENT'S MESSAGE

Submitted by Dan Anderson, M.S., FTS-ABFT, D-ABC

Greetings to my SOFT Colleagues

Well that certainly was a very quick summer! We are into September and according to the calendar, the summer season has officially come to an end. Even Mother Nature seemed taken by surprise this summer with an extremely wet East Coast and unseasonably cool West Coast.

As you all finish your summer vacations, have that season ending BBQ with family and friends, and/or get the the kids ready for another school year, I hope you all are preparing to attend the Annual SOFT meeting in Orlando.

Something of a philosophical note...

Each Toxicology laboratory has its own structural organization for mentoring its young employees as well as training seasoned scientists. We all understand that knowledge is power; however, knowledge must come from outside the organization as well as within. I believe in the positive mentor system, but I am also a firm believer that the laboratory must reach out for help and accept 'Knowledge Networking.' Countless times the toxicologists in my laboratory have come to me with a problem or question where I don't have the answer. I certainly don't pretend to have the answer, rather I seek advice from other educated and experienced members in the field, who possibly have information they can share on the subject matter. Knowledge, shown by contributions to the field and assistance to others, ranks a professional in higher esteem more than mere position, title, or degree. I highly

encourage my staff as well as others to create their own professional network to seek answers, offer advice on debated subjects, or just understand how other laboratories possibly handle complicated situations. A toxicology laboratory should be open towards communications and be willing to share information. It's a case of give and take; you give your expertise to someone, and someone completely different can reciprocate with information that may be useful to you. Further, cooperation, not competition should be encouraged. The idea of being the first one to publish on a new drug or withholding a new extraction method or stability information only hinders the discipline. The element of competitiveness is inherent in all of us; however I believe that coordinating expertise from various people is better than always having to go at it alone. It is important to remember that reciprocal relations develop as collaboration increases. Overall, the philosophy of 'Knowledge Networking' is a very effective way of combining a person's skills and knowledge in pursuit of personal and organization gain and should be embraced and an accepted practice within the toxicology community.

2013 Orlando Annual Meeting

Bruce Goldberger and his wonderfully assembled team have done a tremendous and skilled job at organizing the 2013 Annual meeting in Orlando, FL. There are twelve workshops including four full-day and eight half-day sessions to choose from along with over 150 platform presentations and posters. Congratulations to the three Educational Research Awards (ERA)

recipients who will be presenting their research. The selection of two Dal Cortivo Awards will be made by the Young Forensic Toxicologists Committee as well as the Publications Committee will make the announcement of the EDIT award from Madeline Montgomery's edited Journal of Analytical Toxicology Special Issue. The meeting definitely promises to be an educationally packed and a 'Knowledge Networking' worthy event. From an entertainment standpoint, the evening together at the Cirque Du Soleil shall be like no other Presidential reception SOFT has ever witnessed. I would like to personally thank Exhibitor Liaison Jarrad Wagner and all the vendor support for this meeting, especially the 9 Tier I and 5 Tier II vendors he secured; together they allow SOFT to provide a wonderful experience for the membership. Come and enjoy a little of Mickey, Minnie, Goofy, and Donald Duck with the rest of the SOFT members. It will be quite a meeting to remember!

Board of Directors (BOD) Activity

For the past several months, the BOD has targeted specific ways to recognize the SOFT membership. First will be the opportunity for the annual meeting attendees who are voting members to win a 'Giveback' raffle of next year's registration for 2014 Grand Rapids, MI. Second will be the ability to recognize members who have demonstrated 'longevity' as a member of SOFT. Details are still being discussed and worked out; however, it is expected to be completely implemented by the 2013 Orlando Meeting. The last item, which was more coincidental than

PRESIDENT'S MESSAGE (CONTINUED)

planned, was the first annual National Forensic Science Recognition week that occurred September 12-16, 2013. Unfortunately late notification of the important week means that a true and concerted effort to recognize with more than my broadcast email to

the membership will have to occur in the years to come.

To Conclude...

As I wrote this President's message, my goal was to be short and sweet. Sort of got away from me! It's been a very long time since I've seen many of you

as the last Annual meeting of SOFT occurred in July of 2012 in Boston, MA, close to 14 months ago. I'm extremely excited for the 2013 Orlando meeting and hope to see you all there to share in the experiences! Take care.

Dan Anderson
M.S., FTS-ABFT, D-ABC,

EDUCATIONAL RESEARCH AWARDEES

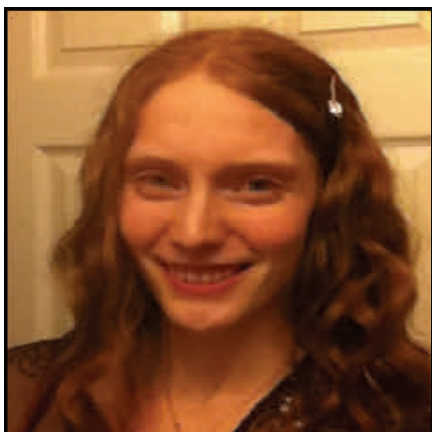
Congratulations to Three 2013 ERA Awardees

The SOFT Award Committee, chaired by Erin Spargo, Ph.D., has announced the following three 2013 ERA (Educational Research Award) winners. These three Awardees will give a presentation during one of the Scientific Sessions at the October 2013 annual meeting in Orlando, FL regarding the findings of their winning research projects.

The SOFT ERA program was established in 1980 to encourage academic training and research in areas of forensic toxicology. The award consists of a \$2,000 stipend, plus a waived basic meeting registration. The three Awardees will be presented with an honorary plaque during the SOFT Business Meeting.

SOFT also sponsors a Young Scientist Meeting Award, that compliments the ERA. The YSMA recognizes the bench level scientists with 5 years or less experience in the field of forensic toxicology. The award offers a \$2,000 stipend, plus a waived basic meeting registration. Sadly, there were no awardees for this YSMA category in 2013.

The SOFT website (www.soft-tox.org) has a link for eligibility and application information for both the ERA and the YSMA. SOFT members are urged to mentor accomplished students and those new to the forensic toxicology field that can result in valuable and prestigious recognition awards.



ERA Awardee: **Rebecca L. Hartman**, B.A., rebecca.hartman@nih.gov
Doctoral Candidate, Chemistry and Drug Metabolism, Intramural Research Program, NIDA, NIH, Biomedical Research Center
Baltimore, MD 21224

"Cannabinoids Disposition in Blood Following Controlled Cannabis Administration by Volcano® Vaporizer"

Mentor: Marilyn Huestis, Ph.D.



ERA Awardee: **Kim Samano**, MSFS
ksamano34@yahoo.com
Virginia Commonwealth University,
Richmond, VA

"Cannabimimetic Behavioral Effects of the Synthetic Cannabinoid, CP47,497 are Mediated by CB1 Receptors"

Mentor: Alphonse Poklis, Ph.D., DABFT



ERA Awardee: **Sarah Himes**, B.S.
sarah.himes@nih.gov
National Institute on Drug Abuse
Baltimore, MD 21224

"Risk for Neurobehavioral Disinhibition in Prenatal Methamphetamine-Exposed Young Children with Positive Hair Toxicology Results"

Mentor: Marilyn Huestis, Ph.D.



NOMINATING COMMITTEE OFFERS 2014 SLATE OF OFFICERS

Mission Statement:

The Nominating Committee shall provide a slate of officers and members-at-large of the Board of Directors to the Full Membership of SOFT at least thirty (30) days prior to the start of the Annual Meeting.

The President and Vice President serve one year terms, while the Secretary and Treasurer serve two year terms which expire in alternate years. Five additional Directors are elected for three year terms. If a Director cannot serve his/her entire term, an interim Director shall be named by the Board to serve the remaining term.

The 2013 SOFT Nominating Committee, comprised of Marc LeBeau, PhD, DABFT (Chair), Michael Smith, PhD., DABFT, Timothy Rohrig, PhD., DABFT respectfully submitted the following slate of Officer Nominations for consideration by the SOFT membership:

President

Peter Stout, PhD, DABFT

Vice President

Ruth Winecker, PhD, DABFT

Secretary

Bruce Goldberger, PhD, DABFT

Director (3 years)

Laura Liddicoat

Director (3 years)

Sumandeep Rana



Peter Stout
PhD, DABFT
President
(one year term)

Peter Stout, Ph.D. is a Senior Research Forensic Scientist in the Center for Forensic Sciences at RTI International (RTI), has more than 15 years of experience in forensic urine drug testing, postmortem toxicology, and human performance testing laboratories. He is a licensed Laboratory Director for New York and Tennessee. He has served as a Responsible Person of a federally certified urine drug-testing laboratory and as Director of a U.S. Navy Drug Screening Laboratory.

Dr. Stout is an active member of the Society of Forensic Toxicologists (SOFT) and is currently the treasurer, he is an American Academy of Forensic Sciences (AAFS) Fellow, and he is the past Chair of the Toxicology Section of AAFS. He has represented SOFT to the Consortium of Forensic Science Organizations (CFSO). Currently he is on the North Carolina Forensic Science Advisory Board He also serves as a laboratory inspector for the National Laboratory Certification Program (NLCP) (Substance Abuse and Mental Health Services Administration [SAMHSA]) and for the American Board of Forensic Toxicology (ABFT).

At RTI, he has served as the Project Leader for the Pilot Oral Fluid Performance Testing Program (SAMHSA) and as key personnel for the NLCP. He is currently the Principal Investigator (PI) for a National

Institute of Justice (NIJ) grant to develop a spectral, cheminformatic database for compounds of forensic interest. He also serves as Co-PI on several forensic science projects, including Technology Transfer Strategies of Forensic Science Research and Development to the Practitioner End User (NIJ) and for other projects that assess technology transfer strategies and Web-based educational materials for forensic scientists. Dr. Stout is also senior key staff in the Forensic Technology Center of Excellence.



Ruth E. Winecker
PhD, DABFT
Vice President
(one year term)

Ruth E. Winecker, Ph.D. is currently the Chief Toxicologist for the State of North Carolina's Office of the Chief Medical Examiner (NC-OCME) in Chapel Hill, North Carolina. Prior to her appointment as Chief Toxicologist, she served as the Deputy Chief Toxicologist with the NC-OCME from 1996-1999. Dr. Winecker is one of two toxicologists that technically and administratively serve the State of North Carolina's medical examiner system. The toxicology laboratory functions for all 100 counties of North Carolina by providing forensic analytical testing of specimens and evidence from medical examiner cases. The laboratory is responsible for analytical testing, records maintenance and review of analytical testing for >10,000 medical examiner cases per year.

Prior to employment with NC-OCME, Dr. Winecker was a labora-

NOMINATING COMMITTEE (CONTINUED)

tory technician with SmithKline Laboratories where she primarily tested for performance enhancing drugs during the 1996 Summer Olympics. Previously, she was employed in Gainesville, Florida as a chemist/certifying scientist with a forensic urine drug-testing laboratory (DRL, Inc) and a technician in the analytical laboratory of a chemical manufacturing company (PCR)

Dr. Winecker received a Bachelor of Science (Cum Laude) degree in Biology from Oglethorpe University in Atlanta, Georgia (1987), and a Doctor of Philosophy Degree specializing in Forensic Toxicology and Clinical Chemistry from the University of Florida, College of Medicine in Gainesville, Florida (1996). Her doctoral research focused on the determination of cocaine and its metabolites in specimens of neonatal and maternal origin. The American Board of Forensic Toxicology awarded Dr. Winecker certification in the specialty of forensic toxicology in 2004.

Dr. Winecker has published articles, book chapters and abstracts related to forensic toxicology whose topics include analytical methodology, reviews of therapeutic and abused drugs, the toxicology of metals, and the measurement of therapeutic and abused drugs in alternative matrices such as hair, amniotic fluid, umbilical cord tissue, meconium and breast milk. Additionally, she holds the academic position of Assistant Professor at the University of North Carolina School of Medicine, Department of Pathology and Laboratory Medicine.

An active member of the American Academy of Forensic Sciences (AAFS), the Society of Forensic Toxicologists (SOFT), and the International Association of Forensic Toxicologists (TIAFT), Dr. Winecker has continually presented research data, chaired and co-chaired work-

shops and presented various topics at workshops at both the AAFS and SOFT annual meetings since 1998. Dr. Winecker is currently serving as the Secretary for SOFT, the board of directors for ABFT and the editorial board of the Journal of Analytical Toxicology. She has held the following previous offices and appointments for the toxicology section of AAFS: workshop chair (2009-2010), program chair (2010-2011), secretary (2011-2012) and chair (2012-2013) and for SOFT: Board of Directors (2004-2006) and co-host and treasurer for the SOFT annual meeting held in Raleigh-Durham in October 2007. She has been a peer reviewer for the Journal of Analytical Toxicology, a guest reviewer for Journal of Forensic Science and an invited editor for Forensic Science Review SOFT Drug Monographs (Volumes 14 and 15).



Bruce Goldberger
PhD, DABFT
Secretary
(two year term)

Dr. Bruce Goldberger is Division Chief of Forensic Medicine, and Professor and Director of Toxicology in the Department of Pathology, Immunology and Laboratory Medicine in the College of Medicine at the University of Florida in Gainesville. He holds a joint Professor position in the Department of Psychiatry Division of Addiction Medicine in the College of Medicine and is also the Director of the William R. Maples Center for Forensic Medicine and Program Director for the Florida Emergency Mortuary Operations Response System.

Dr. Goldberger received a Bachelor of Arts Degree in Zoology from Drew University in Madison, New Jersey

and Master of Science and Doctor of Philosophy Degrees in Forensic Toxicology from the University of Maryland School of Medicine in Baltimore, Maryland. He is a Diplomate of the American Board of Forensic Toxicology, certified as a Toxicological Chemist by the National Registry of Certified Chemists and a Fellow of the National Academy of Clinical Biochemistry.

Dr. Goldberger is the Technical and Administrative Director of the Forensic Toxicology Laboratory at the University of Florida which provides toxicological services to Medical Examiner Offices and State and local law enforcement agencies throughout the State of Florida. Dr. Goldberger has been qualified as an expert witness more than 230 times in forensic toxicology in Federal, State, Military and Canadian courts of law.

Dr. Goldberger has published numerous articles related to forensic toxicology and is co-editor of the Handbook of Workplace Drug Testing and On-Site Drug Testing. His studies in forensic toxicology have included the analysis of alcohol in breath and the measurement of therapeutic, abused and emerging drugs in biological tissues, including alternative matrices such as hair, nails and vitreous humor. Dr. Goldberger's most significant contribution to the field of forensic toxicology was the identification and measurement of heroin and its metabolites in hair and other fluids and tissues.

In recognition of his research achievements in forensic toxicology, Dr. Goldberger was presented with the first annual Sunshine Award from the Toxicology Section of the American Academy of Forensic Sciences in 1988. In addition, he was the 1994 recipient of the American Association for Clinical Chemistry's Outstanding Scien-

NOMINATING COMMITTEE (CONTINUED)

tific Achievements by a Young Investigator Award. In 2004, Dr. Goldberger was the recipient of The International Association of Forensic Toxicologists' mid-career achievement award for excellence in forensic toxicology. Dr. Goldberger also received the Alexander O. Gettler Award in recognition of his outstanding contributions to the field and profession of forensic toxicology from the Toxicology Section of the American Academy of Forensic Sciences in 2006, the Outstanding Achievement Award from the Florida Association of Medical Examiners in 2008, and the Achievement in the Sciences Award from Drew University in 2012.

Dr. Goldberger is the editor-in-chief of the Journal of Analytical Toxicology. Dr. Goldberger is the past-President of the American Academy of Forensic Sciences and the current President of the American Board of Forensic Toxicology.

Dr. Goldberger has been featured on local, state and national radio, television and print media, including ABC News Good Morning America, ABC News 20/20, ABC News Nightline, Dateline NBC, CNN, MSNBC, Fox News, NPR, Court TV, CBS' 48 Hours, the A&E, Discovery Health and History Channels, ChannelOne and VH1.



Laura Liddicoat
BS
Director
(three year term)

Laura Liddicoat is Supervisor of the Forensic Toxicology Program at the Wisconsin State Laboratory of Hygiene (WSLH). Laura received a Bachelor of Science degree in Medical Technology at the University of Wisconsin-Madison. She has given numerous presentations on the topic of drug

impaired driving and is a member of the following professional organizations: National Safety Council's Alcohol, Drugs and Impairment Division (previously known as the Committee on Alcohol and Other Drugs), Society of Forensic Toxicologists (SOFT), American Academy of Forensic Sciences (AAFS), the International Association for Chemical Testing (IACT), the Joint SOFT Driving Under the Influence of Drugs Committee, and the Scientific Working Group for Forensic Toxicology (SWGTOX).

At the WSLH Toxicology Section Laura performed alcohol and drug analyses, trained chemists and provided expert witness testimony for eleven years prior to promotion to supervisor in 1997. As supervisor she serves as technical expert for alcohol and drug chemists, reviews testing, reports alcohol and drug results and provides interpretation and testimony regarding drugs and their effects on human performance. Laura has testified more than 700 times as an expert witness on the pharmacokinetics and effects of alcohol and other drugs in courts throughout the state of Wisconsin.



Sumandeep Rana
MS
Director
(three year term)

Sumandeep Rana is currently the Technical Director at Redwood Toxicology Laboratory in Santa Rosa, California. She also serves as the alternate Responsible Person for the Redwood Toxicology SAMHSA Laboratory. In her current role she manages and directs the development of the technical SOP's of the laboratory to maintain technical/scientific veracity, adherence to prevailing regulatory requirements

and to ensure legal acceptability. She also directs the research unit responsible for development and validation of new laboratory procedures.

With over 14 years of experience in the analytical toxicology field, Ms. Rana has worked extensively as a researcher, chemist, scientific and technical director. Her area of expertise includes analytical toxicology and emerging designer drugs. She is responsible for directing the development of some of the first analytical methods to detect synthetic cannabinoids and many designer stimulants in urine and oral fluid. Ms. Rana currently serves as the Chairperson of the Designer Drugs Committee of the Society of Forensic Toxicology.

She has authored or co-authored more than 40 scientific papers/abstracts and has presented numerous times at national and international toxicology conferences. She has also been an invited speaker on various occasions and has hosted technical workshops and training sessions at various toxicology meetings. Ms. Rana is a reviewer for the Journal of Analytical Chemistry, Journal of Chromatography, Journal of Forensic Science and the Journal of Mass Spectrometry. She has testified and qualified as an expert witness in various state courts.

Ms. Rana received her Master's degree in Forensic Science with a Toxicology Specialization from the Department of Forensic Science, Punjabi University, Patiala, India. She is a Six-Sigma yellow belt certified professional and is a member of various scientific organizations including The International Association of Forensic Toxicologists, the Society of Forensic Toxicologists, American Academy of Forensic Sciences and the California Association of Toxicologists.

2013 ORLANDO MEETING (CONTINUED)

SOFT 2013 Agenda

Sunday, October 27, 2013

- Registration Opens (8am-6pm)
- NSC-ADID Meeting (8am-12pm)
- NLCP Inspector Training (2pm-6pm)
- YFT Meeting (5pm-9pm)
- Dinner On Your Own
- Reception by Immunalysis (6pm-9pm)

Monday, October 28, 2013

- Continental Breakfast (7am-8:30am)
- Registration (7am-6pm)
- ABFT Exam Committee (8am-5pm)
- SOFT Workshops (8am-5:30pm)
- FTCB Examinations (9am-12pm)
- Lunch On Your Own (12pm-1:30pm)
- FTCB Board Meeting (2pm-5pm)
- SOFT-AAFS Drugs and Driving (5:30pm-7pm)
- Dinner On Your Own

Tuesday, October 29, 2013

- Continental Breakfast (7am-8:30am)
- Registration (7am-6pm)
- SOFT Board Meeting (7am-12pm)
- SOFT Student Enrichment Program (8am-5pm)
- SOFT Workshops (8am-5:30pm)
- ABFT Exam (8am-12pm)
- ABFT Accreditation Committee (8am-12pm)
- ABFT Board Meeting (12pm-6pm)
- Lunch On Your Own (12pm-1:30pm)
- Welcome Reception w/Exhibitors (6:30pm-8pm)
- Sunshine / Rieders Silent Auction (6:30pm-8pm)
- Education / Career Fair (7pm-8pm)
- Elmer Gordon Forum (8pm-9:30pm)
- SOFT Nite Owl Event (10pm-12am)

Wednesday, October 30, 2013

- Registration (7am-5pm)
- Exhibit Hall / Silent Auction Open (7am-5pm)
- Continental Breakfast (7am-9am)
- JAT/OUP breakfast by invitation only (7am-8am)
- Opening Ceremony (Plenary) Session (8am-9am)
- Scientific Session #1 (9am-10am)
- Refreshment Break (10am-10:30am)
- Scientific Session #2 (10:30am-12pm)
- Lunch with Exhibitors (12pm-1:20pm)
- Poster Session #1 (12pm-1:20pm)
- Scientific Session #3 (1:20pm-3:00pm)
- Refreshment Break (3:00pm-3:30pm)
- Scientific Session #4 (3:30pm-5:00pm)
- Happy Hour (5:00pm-6:00pm)
- President's Reception (6:00pm-8:00pm)
- Cirque du Soleil La Nouba (9:00pm-11:00pm)



Thursday, October 31, 2013

- Karla Moore Memorial Fun Run/Walk (6:30am-8am)
- Registration (7am-5pm)
- Continental Breakfast (7am-9am)
- Exhibit Hall / Silent Auction Open (7:30am-1:30pm)
- Exhibitor Feedback Meeting (8am-9:30am)
- SWGTOX update (8-8:45am)
- Keynote Speaker (8:45-9:15am)
- Scientific Session #5 (9:15am-10:00am)
- Refreshment Break (10:00am-10:30am)
- Scientific Session #6 (10:30am-12pm)
- Lunch with Exhibitors (12pm-1:30pm)
- Poster Session #2 (12pm-1:30pm)
- DFSA Committee (12pm-1pm)
- Scientific Session #7 (1:30pm-3:00pm)
- Refreshment Break (3:00pm-3:30pm)
- SOFT Business Meeting (3:30pm-5:00pm)
- ABFT Certificate Reception (5:00pm-6pm)
- Dinner On Your Own
- Thermo Fisher Halloween Reception (7pm-10pm)

Friday, November 1, 2013

- Continental Breakfast (7am-9am)
- AAFS Steering Committee (7am-9am)
- Scientific Session #8 (8:00am-10:00am)
- Refreshment Break (10:00am-10:30am)
- Scientific Session #9 (10:30am-12:30pm)

EXHIBITS OPEN

Tuesday – 6:30pm-8:00pm
 Wednesday – 7am-5pm
 Thursday – 7am-1:30pm

REVISED – September 15, 2013



Society of Forensic Toxicologists
Orlando, Florida, USA – October 27-November 1, 2013
Workshops – October 28 and 29, 2013



#	Title	Abstract	Co-Chairs	Date
1	Overview and Review of Forensic Toxicology - Part 1 (SOFT Continuing Education Committee Workshop)	This is part 1 of a 2 part workshop. Participants may take one or both parts of the workshop. The practice of forensic toxicology covers wide and multidiscipline fields of practice. Forensic toxicology includes drug and substance testing that are involved in fields such as performance enhancing in athletics, performance impairment in DUI/DUID, compliance monitoring in pain management testing, the ever evolving world in drug abuse testing, and post-mortem testing. While these fields are at times very different, they have the same foundation in common. This workshop will provide an overview and review of these basic toxicology principles and practices. This workshop is designed for individuals with a few years of work experience or individuals who are looking for a review of forensic toxicology. The workshop will cover drug ADME, math and terminology, instrumentation, current trends in drug testing, and interpretation of results.	Carl Wolf, PhD, MS Justin Poklis, BS	Monday Full-day
2	SWGTOX Standard Practices for Method Validation in Forensic Toxicology	Validation is the process of performing a set of experiments that reliably estimates the efficacy, reliability, and reproducibility of an analytical method. The goal of conducting validation experiments is to establish evidence which demonstrates that a method is capable of successfully performing at the level of its intended use and to identify the method's limitations under normal operating conditions. A survey of the literature finds there are numerous approaches used to demonstrate that a method is "valid", yet they differ in their level of thoroughness. This suggests that some approaches are insufficient while others may be overly rigorous. The Scientific Working Group for Forensic Toxicology (SWGTOX) has developed minimum standards of practice for the validation of analytical methods used in forensic toxicology. This workshop will present a review of basic statistical principles, including an in-depth look at regression analysis for quantitative analyses. Examples and exercises will be provided to help demonstrate how to apply these practices in everyday laboratory methodologies.	Marc LeBeau, PhD Jennifer Limoges, MS	Monday Full-day
3	Solid Phase Extraction: Applications in Forensic Toxicology	From attending this workshop, attendees will learn about the chemistry behind solid phase extraction and its application in validation, practice and application in forensic toxicology. The various speakers discuss their use of this technique for gaining the maximum information from biological matrices in medicolegal laboratories.	Jeffery Hackett, PhD Albert Elian, MS	Monday Morning
4	Ethanol Facilitated Sexual Assault (SOFT DFSA Committee Workshop; Co-sponsored by the University of Florida)	Drug-facilitated sexual assaults (DFSA) and other drug-facilitated crimes have been occurring for centuries. Forensic toxicologists have become increasingly aware of their role in helping to solve these crimes over the last decade. Ethanol continues to be the drug identified with the most prevalence in DFSA casework. Even though this drug is well understood by the forensic toxicology community, it presents particular challenges to DFSA cases. Attendees at this workshop will hear from various professionals involved in different aspects of ethanol as related to sexual assault, from blackouts to the stigmas associated with a "drunk" victim.	Madeline Montgomery, BS Laureen Marinetti, PhD	Monday Morning
5	Identifying and Publishing Quality Research for the Bench Level Scientist (SOFT Young Forensic Toxicologists Committee Workshop)	Forensic Toxicology is continuously developing and evolving, making quality new research a vital key to the advancement of our field. It is important to stay current with research in the field both for the purposes of developing sound analytical methods and for proper interpretation of results. However, those actively working in the field are often times limited in the amount of time they can devote to traditional research. This workshop will explain the importance of continuing research in the field, offer advice on identifying and locating quality existing research, and provide suggestions on performing and publishing your own research.	Tim Grambow, BS Jayne Thatcher, PhD	Monday Afternoon
6	High Profile Cases in Toxicology - Lessons Learned	Presenters will provide their expertise and experience in High Profile cases they have testified in or worked on. Kathy Augustine, Roger Clemons, and Michael Jackson are a few of the cases that will be discussed. A focus will be placed on case do's and don'ts, how toxicology was relevant in the case, the aftermath, dealing with the media and other problems a toxicologist is faced with in High Profile Cases.	J. Robert Zettl, BS, MPA Diane M. Boland, PhD	Monday Afternoon

#	Title	Abstract	Co-Chairs	Date
7	Overview and Review of Forensic Toxicology - Part 2 (SOFT Continuing Education Committee Workshop)	This is part 2 of a 2 part workshop. Participants may take one or both parts of the workshop. The practice of forensic toxicology covers wide and multidiscipline fields of practice. This workshop is intended for the toxicologist with a few years of experience and will provide an overview of stimulants, cannabinoids, opioids, party drugs, atypical antidepressants and antipsychotics, and NSAIDS. An emphasis will be placed on basic pharmacology, impairment and toxicity.	Ann Marie Gordon, MS Deborah Denson, MPM	Tuesday Full-day
8	The Sober and Impaired Subject (SOFT Continuing Education Committee Workshop)	The workshop will begin with the audience observing the Standardized Field Sobriety Exercises (SFSE) on sober subjects. The subjects will then be taken off to another room to participate in a controlled "Drinking Lab". The lecture will continue with the Concepts and Principles of the SFSE's, the Three Phases of DUI Detection, Observations of the Eyes and the relationship of impairment to the Seven Major Drug Categories. The subjects will then be brought back in front of the audience and the subjects will perform the SFSE's while impaired on alcoholic beverages. The audience will be able to utilize the drunk goggles to experience the effects of the different levels of impairment. Numerous visual aids will be brought in to assist with the demonstrations.	Dustin Tate Yeatman, MS Nicholas Tiscione, MS	Tuesday Full-day
9	Pharmacology and Toxicology of Synthetic Cannabinoids (SOFT Designer Drugs Committee)	Synthetic cannabinoids continue to be one of the most common emerging drugs of abuse. Though laboratories have been testing for these compounds for several years, there is still a deficit of information on their pharmacology and metabolism. Through a brief history of their use as drugs of abuse this workshop will update the toxicology community on the current status of knowledge. The synthetic cannabinoids will be described both from a forensic and clinical perspective as well as through the latest research.	Robert Kronstrand, PhD Sherri Kacinko, PhD	Tuesday Morning
10	Unusual Causes of Death: From Analysis to Interpretation	The analytical techniques in use (TLC,GC, HPLC) 10-20 years ago were quite adequate for their current use but were much to insensitive if an unusual drug was to be analyzed. The advent of immunoassays changed the analytical scene markedly. The increased sensitivity they provided made analysis feasible for a large group of substances, but some are still undetectable. As the staff developed expertise and funding became more available they moved forward with hyphenated mass spectrometric procedures (headspace GC-MS, ICP-MS, GC-MS/MS, and LC-MS/MS). Applying these techniques to routine analysis insured the desired sensitive and specific results. The pursuit of zero began. As the technology of analysis has grown, so have its applications. Attendees to this workshop will find author's suggestions that will resolve many questions, including exposure to unusual drugs (elements, plants, pesticides, gas), detection of unstable and complicated poison (cyanide), recent analytical development, new research in postmortem redistribution and finally, interpretation of postmortem results.	Pascal Kintz, PharmD, PhD Jean-Pierre Goullé, PharmD, PhD	Tuesday Morning
11	High Resolution Accurate Mass Spectrometric Methods for Toxicology	High resolution accurate mass spectrometric methods can detect drugs and metabolites with high sensitivity and specificity. Instruments with mass accuracy greater than 1 milli-Dalton (mDa) search for the presence of ions expected for a target compound's molecular formula and measure the mass accuracy and abundance of expected isotope ions. Coupled with retention time matching, these methodologies provide highly accurate drug identification. Non-targeted screening for suspected drug intoxications also is possible when the toxicant is unknown. High resolution accurate mass spectrometry can identify unknown human metabolites of synthetic cannabinoids produced by incubation of the parent drug with human hepatocytes. This is an advantage not available by LC-MS/MS. With sensitivities similar to LC-MS/MS, accurate mass methods can be a better alternative for drug screening. In addition, high resolution mass spectrometry can simultaneously identify and quantify low concentration analytes of different chemical characteristics.	Stephanie Marin, PhD Marilyn Huestis, PhD	Tuesday Afternoon
12	Marijuana: Old Drug, New Data (SOFT/AAFS Drugs and Driving Committee Workshop)	Marijuana continues to be the most frequently encountered chemical in drug impaired driving investigations, and therefore it is the drug about which forensic toxicologists are most often called to testify. This SOFT/AAFS Drugs & Driving Committee sponsored workshop will review the pharmacology of marijuana, focusing on some of the more recent data available (i.e., chronic users); and include results from the latest driving simulator studies being conducted in Iowa. A current legal update will be provided discussing the impact of marijuana legislative changes such as decriminalization, medical use, and per se. Lastly, toxicologists will share their expert testimony as it relates to various marijuana DUID cases.	Jennifer Limoges, MS Christine Moore, PhD	Tuesday Afternoon

For more information, contact Workshop Co-Chairs:

Chris Chronister (chronist@pathology.ufl.edu) and Jeri Roper-Miller (jerimiller@rti.org)

SOFT 2013 ANNUAL MEETING
Buena Vista Palace (\$185 room rate & \$10 resort fee)
Orlando, Florida, USA — October 27-November 1, 2013



REGISTRATION WORKSHEET

On-Line registration will be available on April 15, 2013

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Shirt Size Preferred (S,M,L,XL)-Men: _____ Women: _____ Special Dietary Needs? Yes /No Describe _____

Accompanying Person(s) _____

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I plan to attend the (free) Sunday Young Forensic Toxicologists Forum (5pm-9pm). Yes /No Attendees must be 40-years-old or younger.

REGISTRATION DATES TO NOTE:	FULL MEETING REGISTRATION CLUDES:	IN-	SOFT Mem	Accomp. Person	Non-Mem	Univ. Student	Daily W, Th or F
Apr. 15-Aug. 31	Full Meeting - Includes: ▶ Welcome Reception Tues. Eve ▶ Entrance to Scientific Sessions (W, Th, F) ▶ W, Th, F Breakfasts, Lunches, Refresh Breaks ▶ Wed. Eve "President's Banquet" ▶ Wed. Eve "Cirque du Soleil" (after Banquet) ▶ SOFT 2013 Meeting Program/Abstract Book ▶ SOFT 2013 Meeting Bag / Shirt		\$499	\$399 Family Member 17+ 16 & younger pay \$125 Includes Banquet & Cirque Tickets	\$675	\$175 Picture ID from Univ. Reqd.	\$275 Does NOT Incl. Wed. Special Events
Sep. 1-30	LATE REGISTRATION ----- Added to Reg. Fee		\$200	n/a	\$200	\$200	n/a
After Oct. 1	ON-SITE REGISTRATION-----Added to Reg. Fee		\$300	n/a	\$300	\$300	n/a
Ind. Event Ticket	▶ Wed. Cirque du Soleil Tkt. \$100 - <u>Call for assistance</u> Extra Tickets will NOT be available on site.		Incl.	Included	Incl.	Incl.	\$100
Ind. Event Ticket	▶ Wed. Pres. Banquet (17+) \$90 - <u>Call for assistance</u>		Incl.	Included	Incl.	Incl.	\$90

WS#	Schedule	Workshop Titles (all workshops provide C.E. credits from the AACC)	Mem Cost	Non-Mem Cost	Late Fee After 8/31
WS#1	Mon Full-Day 8am-5:30pm	Overview & Review of Forensic Toxicology – Part 1 (SOFT C.E. Committee)	\$200	\$250	\$25
WS#2	Mon Full-Day 8am-5:30pm	SWGTOX Standard Practices for Method Validation in Forensic Toxicology	\$200	\$250	\$25
WS#3	Mon Half-Day 8am-noon	Solid Phase Extraction: Applications in Forensic Toxicology	\$150	\$200	\$25
WS#4	Mon Half-Day 8am-noon	Ethanol Facilitated Sexual Assault (SOFT DFSA Committee w/Univ. of FL sponsorship)	\$150	\$200	\$25
WS#5	Mon Half-Day 1:30pm-5:30pm	Identifying & Publishing Quality Research for the Bench Level Scientist (SOFT YFT Committee)	\$150	\$200	\$25
WS#6	Mon Half-Day 1:30pm-5:30pm	High Profile Cases in Toxicology – Lessons Learned	\$150	\$200	\$25
WS#7	Tue Full-Day 8am-5:30pm	Overview & Review of Forensic Toxicology – Part 2 (SOFT C.E. Committee)	\$200	\$250	\$25
WS#8	Tue Full-Day 8am-5:30pm	The Sober & Impaired Subject (SOFT C.E. Committee)	\$200	\$250	\$25
WS#9	Tue Half-Day 8am-noon	Pharmacology & Toxicology of Synthetic Cannabinoids (SOFT Designer Drugs Committee)	\$150	\$200	\$25
WS#10	Tue Half-Day 8am-noon	Unusual Causes of Death: From Analysis to Interpretation	\$150	\$200	\$25
WS#11	Tue Half-Day 1:30pm-5:30pm	High Resolution Accurate Mass Spectrometric Methods for Toxicology	\$150	\$200	\$25
WS#12	Tue Half-Day 1:30pm-5:30pm	Marijuana: Old Drug, New Data (SOFT/AAFS Drugs & Driving Committee)	\$150	\$200	\$25

YOU MUST WEAR YOUR NAME BADGE DURING ALL MEETING FUNCTIONS

IMPORTANT REFUND POLICY: Refunds for a complete registration will be honored if written request is received prior to 8-31-13 minus a \$100 USD administrative fee. No refunds offered after 9-1-13.

REGISTRATION DESK will be open Sunday - Friday. Delegates are advised to pick-up badge and materials upon arrival.

DESIGNER DRUGS DATABASE

Submitted by Sumandeep Rana, M.S., Committee Chair

A new SOFT committee was established in January this year to track the rapidly-changing landscape of designer drugs. The mission statement of the committee is to: *Promote awareness and provide means of information exchange for SOFT membership, professionals in healthcare, law enforcement, government agencies and others in related fields regarding the prevalence, toxicology, pharmacology, and analysis of emerging designer drugs.*

Specifically, the committee will be providing information on these new compounds (synthetic cannabinoids, bath salts, spice, substituted cathinones, or any of the other current designations) in the following categories:

- **Drug Monographs** - detailed information about pharmacological drug class, metabolism, blood concentrations, effects/toxicity, and analysis, these monographs will be written by the committee members.
- **Government Reports** – published and free-to-download reports from various governmental agencies, such as the DEA, UNODC, EMCDDA, NIFLIS, ONDCP, etc., regarding emerging designer drugs
- **Published Literature** – in an effort to keep pace with this ever-evolving field, this section will present citations of published journal articles pertaining to designer drugs. Culled primarily from the PubMed database, this searchable citation database will be the most extensive, and the most often updated, section of the overall database.
- **Case Reports** – similar to the case reports presented in ToxTalk, this section will present designer drug-related case reports submitted by SOFT members and, hopefully, members of other organizations. The committee urges members to submit emerging designer drug related case reports through the web-fillable form available in this section.
- **Useful Links** – a categorized list of websites pertaining to designer drug information

The Designer Drug website is available now, although it will be some months before it is fully populated. Additionally, each section of the site will be searchable. As updates are made to the website, the committee will notify the SOFT membership either through e-mails, ToxTalk, or reports presented at the annual meeting.

The website can be accessed from the **Features** menu on the SOFT homepage, or it can be reached directly at: [www.soft-tox.org/Designer Drugs](http://www.soft-tox.org/Designer%20Drugs)

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DRUGS IN THE NEWS

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Dwain Fuller, B.S., D-FTCB, TC-NRCC

Dwain.Fuller@va.gov

Organophosphates: From the Farmer’s Field to the Battlefield

Submitted by Dwain Fuller, Section Editor



In the quiet of my office, I was startled by the abrupt ping of an email alert. Within seconds, it pinged again. The two emails were identical, both from a reporter from a foreign news service out of Washington, D.C. Before I could finish reading the email, my phone rang. It was the same reporter, breathlessly expressing her desire for me to participate in an on-air interview about a breaking story; the apparent poisoning deaths of 23 school children in India. She wanted me to talk specifically about “whether it could happen here.” At the time however, the source and identity of the poison had not been determined. I was finally able to convince her that it would be “quite speculative of me to opine on whether it could happen here, when we did not yet know what had happened.” Evidently my logic prevailed and she decided that perhaps she should wait for further information.

We now know that the poison was monocrotophos, an organophosphate insecticide, marketed under various names, including Azodrin, Bilobran, Crisodrin, Monocil 40, Monocron, Nuvacron, Pillardrin, and Plantdrin. Monocrotophos use was discontinued in the United States in 1988 and was a “Restricted Use Pesticide” before its withdrawal.

I have not previously written about organophosphates even though they are abundant in our daily lives. So I am taking this opportunity to provide a refresher for the veteran toxicologist who may not have encountered an organophosphate case in a while and a primer for those newer to the field who may not have encountered one at all.

“Organophosphate” is a general term for esters of phosphoric acid, but the term also includes esters of phosphorous acid and phosphinic acid as well. Organophosphates range in their use from agricultural pesticides such as malathion to “nerve agents”, such as sarin, used in chemical warfare. While the relative toxicity across this spectrum differs greatly, the mode of action is essentially the same.

History

In 1932 the German chemist Willy Lange, and his graduate student Gerde von Krueger, first described the effects of organophosphates on



the cholinergic nervous system. Later German chemist Gerhard Schrader began experimenting with organophosphates as insecticides. In January 1936 Schrader had an opportunity to observe the effects of organophosphates on human beings first hand, when a drop of the organophosphate known as Tabun was spilled on a laboratory counter. Within minutes, Schrader’s laboratory assistant began to experience miosis, shortness of breath, and dizziness. He didn’t fully recover for three weeks.

It wasn’t long until the Nazi government recognized the potential of organophosphates as chemical warfare agents and put Schrader in charge of their development. The most effective organophosphates as poisons are those which contain: a terminal oxygen connected to phosphorus by a double bond, two lipophilic groups bonded to the phosphorus, and a leaving group, such as a halide, bonded to the phosphorus. Schrader’s laboratory discovered what is now known as the G (German) series of

Organophosphates: From the Farmer's Field to the Battlefield (CONTINUED)

weapons, which include Sarin, Tabun, and Soman. The Nazis produced large quantities of these agents, but did not use them in World War II. This may have been because the Nazis believed that the Allies also had knowledge of these compounds, assuming that they were not being discussed in scientific journals because information about them was being suppressed. This, however, was not the case, even though tabun and sarin had been disclosed in scientific journals as early as 1902, and both of these compounds had been patented in 1937 and 1938, it wasn't until the allies advanced that stocks of these nerve agents were discovered. The United States and the British split the seized stocks, while the Red Army apparently captured a factory producing these agents and subsequently dismantled it and moved it in its entirety back to Russia. That notwithstanding, Hitler was warned by his advisors that if he used these agents, the Allies would likely retaliate and be able to produce these compounds in much larger quantities than the Nazis. While today many countries possess nerve agents, since World War II, there have been few documented incidents of their use. In 1988, in the closing days of the Iran – Iraq war, the Kurdish village of Halabja was attacked with chemical weapons that likely included nerve agents, killing 3200 – 5000 people. And in 1995, a terrorist attack by the Aum Shinrikyo religious group, resulted in the release of Sarin into the subway system in Tokyo.

No nerve agents were known to be used during the Gulf War; however a number of U.S. and U.K. personnel were exposed to them as the Khamisayah chemical depot was destroyed.

The use of organophosphates in the U.S. as insecticides has de-

creased by 75% between 1980 and 2007, the date of the latest EPA estimate. However an estimated 33 million pounds of organophosphates were still being used in 2007, accounting for 35% of all pesticide use.

Toxic Mechanism

As a quick review, acetylcholine (ACh) is a neurotransmitter that acts upon acetylcholine receptors in the synaptic cleft to facilitate nerve transmission. The enzyme, acetylcholinesterase (AChE), is responsible for terminating nerve transmission by hydrolyzing ACh in the synaptic cleft.

The action of an organophosphate is to phosphorylate AChE. This phosphorylation deactivates AChE, leading to an accumulation of the ACh. This deactivation, or inhibition, results in an increased and prolonged stimulation of the ACh receptors. The type and location of the ACh receptors affected determines the effect on the body: In cardiac tissue ACh neurotransmission has an inhibitory effect, which lowers heart rate. However, ACh also behaves as an excitatory neurotransmitter at neuromuscular junctions in skeletal muscle. Accumulation of ACh at motor nerves causes overstimulation of nicotinic receptors and results in muscle weakness, fatigue, muscle cramps, fasciculation, and paralysis. Accumulation of ACh at the autonomic ganglia causes overstimulation of nicotinic receptors in the sympathetic nervous system resulting in tachycardia, hypertension, and hypoglycemia. Accumulation of ACh in the central nervous system caus-

es overstimulation of nicotinic receptors and results in anxiety, headache, convulsions, ataxia, bradypnea, depressed circulation, tremor, general weakness, and potentially coma. The action of ACh on the muscarinic receptors causes visual disturbances, tightness in the chest, wheezing, increased bronchial secretions, increased salivation, increased lacrimation, increased sweating, increased peristalsis, and increased urination.

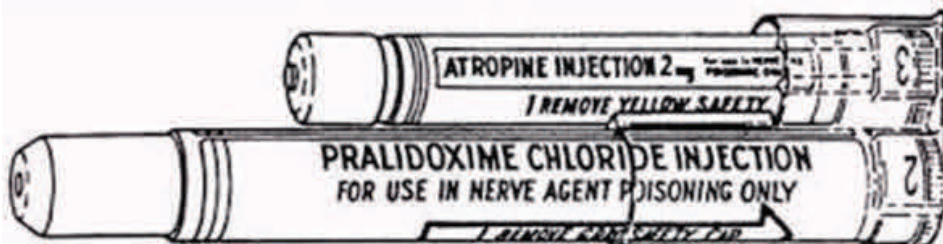
Diagnosis

As an aid in remembering the effects of organophosphates on the muscarinic system, medical students are often taught one or more mnemonics, such as: **SLUDGEM** (Salivation, Lacrimation, Urination, Defecation, Gastrointestinal motility, Emesis, Miosis) or **MUDDLES** (Miosis, Urination, Diarrhea, Diaphoresis, Lacrimation, Excitation, Salivation). Personally, I find **DUMBELS** easiest to remember, standing for Diarrhea, Urination, Miosis, Bradycardia (and/or Bronchorrea), Emesis, Lacrimation, and Sweating (and/or Salivation).

Clinical testing to confirm a diagnosis of organophosphate poisoning often consists of measuring the activity of butylcholinesterase and acetylcholinesterase in the blood.

Treatment

The treatment for organophosphate poisoning is typically to administer atropine, an anticholinergic, which acts as an antagonist at the muscarinic ACh receptors.



Organophosphates: From the Farmer's Field to the Battlefield (CONTINUED)

Often atropine is accompanied by an oxime, the purpose of which is to dephosphorylate the phosphorylated AChE, thereby reactivating it. However, the efficacy and safety of the use of oximes is disputed.

On the battlefield of today, troops facing the danger of poisoning by nerve agents are issued appropriate clothing to serve as a barrier to dermal exposure, respirators to prevent inhalation, and autoinjector devices designed to administer atropine and/or an oxime directly into the muscle of the thigh in case of exposure to organophosphate agents.

As is the case with many discoveries, organophosphate compounds have the potential for good and evil. As insecticides they help combat mosquito-borne pathogens and protect harvests that feed the hungry. However, as chemical warfare agents, they can be the instruments of devastation as well.

References and Further Reading

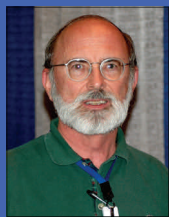
1. Indian Police Arrest School Principal in Food Poisoning Case. <http://www.reuters.com/article/2013/07/24/us-india-children->
2. Monochrotophos. <http://en.wikipedia.org/wiki/Monocrotophos>, Accessed 7/24/13
3. Acetylcholine. <http://en.wikipedia.org/wiki/Acetylcholine>, Accessed 8/12/13
4. Acetylcholinesterase. <http://en.wikipedia.org/wiki/Acetylcholinesterase>, Accessed 8/12/13
5. Atropine. <http://en.wikipedia.org/wiki/Atropine>, Accessed 7/23/13
6. Organophosphate. <http://en.wikipedia.org/wiki/Organophosphate>, Accessed 7/24/13
7. Organophosphate Poisoning. http://en.wikipedia.org/wiki/Organophosphate_poisoning, Accessed 7/23/13
8. Balai-Mood M, Shariat M. Treatment of Organophosphate Poisoning. Experience of Nerve Agents and Acute Pesticide Poisoning on the Effects of Oximes. *J Physiology (Paris)*, 1998; 92, 375-378
9. Bardin PG, Van Eeden SF, Joubert JR. Intensive Care Management of Acute Organophosphate Poisoning. *South African Medical Journal*, 1987, 72; 593-597
10. Lee P, Tai DYH. Clinical Features of Patients with Acute Organophosphate Poisoning Requiring Intensive Care. *Intensive Care Medicine*, 2001, 27; 694-699
11. Rosenstock L, Kiefer M, Daniell WE, McConnell R, Claypoole K. Chronic Central Nervous System Effects of Acute Organophosphate Pesticide Intoxication. *Lancet*, 1991, 338; 223-227
12. Nerve Agent. http://en.wikipedia.org/wiki/Nerve_agent, Accessed 8/12/13
13. Halabja Poison Gas Attack. http://en.wikipedia.org/wiki/Halabja_poison_gas_attack, Accessed 8/12/13
14. 2006-2007 Pesticide Market Estimates. http://www.epa.gov/opp00001/pestsales/07pestsales/table_of_contents2007.htm#pdfreport, Accessed 8/14/13

THE CONSORTIUM OF FORENSIC SCIENCE ORGANIZATIONS (CFSO) NEWSLETTER

The Society of Forensic Toxicologists and American Board of Forensic Toxicology are members of CFSO.

The Consortium of Forensic Science Organizations Monthly Reports can be found on the CFSO website www.thecfso.org.





CASE NOTES

Send interesting "Case Notes" to Section Editor

Matthew Barnhill, Ph.D., DABFT

mbarnhilljr@worldnet.att.net

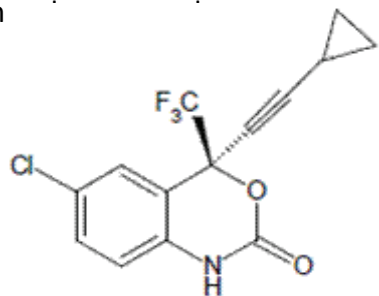
Atripla and DUI Cases

Submitted by Denise N. Carter,

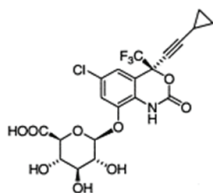
Georgia Bureau of Investigation, Division of Forensic Sciences

Introduction

Atripla is an HIV cocktail that contains three drugs: Sustiva (efavirenz), Emtriva (emtricitabine), and Viread (tenofovir disoproxil fumarate). The purpose of the cocktail is to stop the replication of the HIV virus and to increase the amount of T cells. Increasing the amount of T cells will help an individual's immune system to improve. One tablet contains 600 mg of efavirenz, 200 mg of emtricitabine, and 300 mg of tenofovir disoproxil fumarate. The drug efavirenz in Atripla may cause samples to test indicative by some THC immunoassays. The cross reactivity with the THC Immunoassay is due to the efavirenz-8-glucuronide and



Efavirenz



Efavirenz-8-glucuronide

Case History and Results

For one subject, an attorney called suggesting that his client was taking an HIV medication called Atripla. He wanted to know if this drug could be the reason that his client's urine tested positive for THC-COOH (11-nor-delta9-tetrahydrocannabinol-9-carboxylic acid). He was informed that due to the efavirenz component of this cocktail drug, it was possible for his client's sample to generate an indicative response using the THC Immunoassay screen but due to the more specific testing by GC/MS, it confirmed that his client's urine was confirmed for THC-COOH.

For a second subject, a six panel CEDIA screen testing for amphetamines, barbiturates, cannabinoids, benzodiazepines, opioids, and cocaine/cocaine metabolites was performed on the blood using reagents from the Microgenics Corporation. The case was determined to be indicative for benzodiazepines and cannabinoids by this screen. A confirmation test was performed by GC/MS for both benzodiazepines and THC-COOH. The confirmation test for benzodiazepines was positive for diazepam 0.22 mg/L (+/- 16%), nordiazepam 0.10 mg/L (+/- 16%), and temazepam lower than the lowest calibrator of 100 µg/L but the THC-COOH confirmation test was found to be negative. The confirmation extraction for benzodiazepines also found a large peak for efavirenz but it was not reported.

Discussion

Since efavirenz was found in the blood sample of the second subject, the indicative THC Immunoassay screen was attributed to this finding. This suggests that the event could also occur in the blood using the CEDIA screen reagents from the Microgenics Corporation, although the only data found was for the urine THC Immunoassay. The patient information statement by the Bristol-Myers Squibb Company states that false positive urine cannabinoid test results have been observed in non-HIV infected volunteers receiving Sustiva (a component of Atripla) when using the Microgenics CEDIA[®] DAU Multi-Level THC assay for screening. Negative results were obtained when more specific confirmatory testing was performed with GC/MS.

References

Rossi Steven, Yaksh Tony, Bentley Heather, Geoffrey van den Brande, Grant Igor, Ellis Ross *Characterization of interference with 6 commercial Δ^9 -Tetrahydrocannabinol Immunoassays by Efavirenz (Glucuronide) in Urine.* *clinchem.2006.067058,*

Bristol-Myers Squibb Company
Princeton, NJ 08543 U.S.A

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A Death Involving Hydrogen Sulfide Exposure from a Domestic Sink Drain

Submitted by Megha Garg^{1,2}, Diane C. Peterson, M.D.¹, Uttam Garg, Ph.D., DABFT³, Robert Pietak, M.D.¹ and Mary H. Dudley, M.D.¹

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³Department of Pathology and Laboratory Medicine, Children's Mercy Hospitals and Clinics, 2401 Gillham Road, Kansas City, MO 64108

Introduction

Often referred to as "pit gas", hydrogen sulfide is a highly toxic gas. It is naturally produced by decaying organic material in the absence of oxygen and is a byproduct of many industrial processes. Its toxicity most often occurs in occupational settings such as petroleum refineries, commercial fishing holds, and pools of sewage sludge or liquid manure. Fatalities often involve exposure to high concentrations of hydrogen sulfide (>150 ppm) (1).

Hydrogen sulfide concentrations as low as 0.03 ppm can be easily detected by its characteristic rotten egg odor. The recommended workplace limit is 10 ppm for an 8-hour work time average, with a short term exposure limit of 15 ppm (1). Respiratory tract irritations occur between 50-100 ppm. Olfactory nerve paralysis, causing a loss of ability to smell the characteristic odor, occurs between 100-150 ppm. Pulmonary edema occurs within 300-500 ppm; levels of 600-800 ppm are promptly fatal (2).

Hydrogen sulfide causes its effects through inhibition of the cytochrome oxidase system and cellular respiration. Clinical presentation of hydrogen sulfide toxicity includes headache, nausea and vomiting. High dose exposure may result in unconsciousness, seizure and coma. Massive exposure can cause cardiovascular and respiratory failure leading to death (1).

Diagnosis of hydrogen sulfide poisoning is generally made on the basis of history and clinical presentation. Laboratory diagnosis is helpful and is made through measurement of sulfide and thiosulfate concentrations.

Case study

The subject was a 44-year old white female who was reported to have been attempting to unclog a drain under a kitchen sink. She was reported to have been living with a friend. The two were working on the drain immediately before the friend left for work. When the friend returned home a few hours later, she noted the subject was unresponsive on the kitchen floor with her head inside the cabinet under the sink. The drain pipes, specifically the drain trap, had been removed by the subject, and a solution known as "Liquid Fire" had been poured in the drain. The solution was noted to be in the cabinet near the subject's head with the cap off. According to the MSDS for "Liquid Fire", the product contains sulfuric acid and rodine.

The subject's friend called 911, and the police and fire departments arrived at the scene. The responding officer described the horrific sewer gas smell coming from the house. The subject was immediately transported to a local hospital where she was pronounced. The subject was asystole throughout the code. The subject had a known history of chronic obstructive pulmonary disease and chronic asthma.

Results

External examination did not reveal any injury. Autopsy revealed a dusky gray-green discoloration to the gray matter of the cerebral hemispheres (Figure 1).

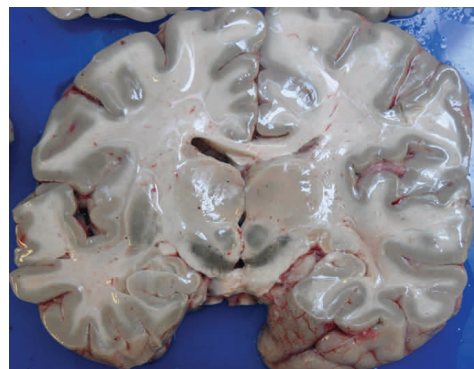
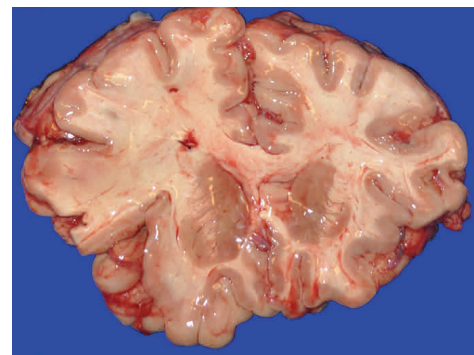


Figure 1: Coronal section of the brain of the subject showing gray discoloration (top image). Shown for comparison, the bottom image is a coronal section of a normal brain.



These findings are likely due to sulfur compounds imparting a green color to the tissue (3). Histology of the cortical neurons exhibited focal early hypoxic changes. The lungs exhibited moderate pulmonary edema and focal bronchioles with mucus plugs consistent with a history of asthma.

Death Involving Hydrogen Sulfide Exposure from a Domestic Sink Drain (Contd)

Postmortem femoral blood, vitreous fluid, urine samples, and lung tissue were submitted for toxicological analysis. The analysis of antemortem blood included enzyme immunoassays for drugs of abuse, gas-chromatography flame ionization detection for volatiles (ethanol, methanol, isopropanol and acetone), and broad spectrum drug screening (>150 drugs) by gas-chromatography mass spectrometry. In addition, femoral blood was sent to a reference laboratory for the analysis of sulfhemoglobin and thiosulfate. Sulfhemoglobin was analyzed by spectrophotometry; thiosulfate was analyzed by ion chromatography. Lung tissue was also sent to the reference laboratory for a hydrocarbon and oxygenated volatiles panel by gas chromatography. Thiosulfate was detected in femoral blood at a concentration of 15.5 mcg/mL. The femoral blood sulfhemoglobin level was 6.3%. Methamphetamine,

cannabinoids, and ethanol were also detected in antemortem blood. The toxicology results are summarized in Table 1.

Discussion

Hydrogen sulfide is a poisonous gas with well-known morbidity and mortality. The mechanism of toxicity of hydrogen sulfide is the inhibition of cellular respiration. Hydrogen sulfide forms a complex with the ferric moiety of mitochondrial cytochrome oxidase, thus causing its inhibition. Hydrogen sulfide affects all organs, with predominant effects on the central nervous system and pulmonary system. Clinical presentation of hydrogen sulfide exposure includes headache, nausea, vomiting, unconsciousness, seizure, and coma. Death is generally due to cardiovascular and respiratory failure. High doses may cause insufficient cardiac output, irregular heartbeat, and

conduction abnormalities in the heart as well as bronchitis and accumulation of fluid in the lungs.

The vast majority of hydrogen sulfide poisonings occur in occupational settings (3-12). Accidental fatal poisoning in domestic settings is very rare and exceptional. A recent search of the literature revealed only one report, involving a mother and her infant daughter, who were found dead in the kitchen of their home (13). The emergency medical team observed a strong odor of rotten eggs, which suggested hydrogen sulfide poisoning. Autopsies revealed multi-organ congestion. Hydrogen sulfide was found in the lungs of both the mother and daughter at concentrations of 1.46 mg/kg and 1.92 mg/kg, respectively. Expert surveys suggested the poisoning involved defective maintenance of the pipes and drains of the building, which led to

Table 1: Postmortem Toxicology Results

<u>Antemortem Blood, Drugs of Abuse (EIA)</u>	<u>Result</u>	<u>Lung tissue hydrocarbon and oxygenated volatiles (GC)</u>	
Amphetamine	Positive	Benzene	< 0.050 mcg/g
Barbiturates	Negative	Diethyl Ether	< 1.0 mcg/g
Benzodiazepines	Negative	Ethanol	< 5.0 mcg/g
Cannabinoids	Positive	Ethyl acetate	< 1.0 mcg/g
Cocaine metabolite	Negative	Ethylbenzene	< 0.10 mcg/g
Methadone	Negative	Isopropanol	< 1.0 mcg/g
Opiates	Negative	Methanol	< 5.0 mcg/g
Phencyclidine	Negative	Methyl Acrylate	< 1.0 mcg/g
Propoxyphene	Negative	Methyl Ethyl Ketone	< 0.30 mcg/g
		Methyl Isobutyl Ketone	< 0.50 mcg/g
<u>Antemortem blood (GC-MS)</u>		Methyl Tertiary Butyl Ether	< 1.0 mcg/g
Amphetamine Quant	< 100 ng/mL	Methyl n-Butyl Ketone	< 0.50 mcg/g
		Methylpentanes (2- and 3- isomers)	< 2.0 mcg/g
Methamphetamine Quant	378 ng/mL	Pentane	< 2.0 mcg/g
		Styrene	< 0.10 mcg/g
<u>Antemortem Blood Volatiles (GC-FID)</u>	<u>Result</u>	Toluene	< 0.30 mcg/g
Ethanol	91 mg/dL	Xylenes (O,M,P)	< 0.30 mcg/g
Acetone, Methanol, Isopropanol	< 5 mg/dL	n-Butanol	< 2.0 mcg/g
		n-Heptane	< 2.0 mcg/g
<u>Vitreous Fluid Volatiles (GC-FID)</u>	<u>Result</u>	n-Hexane	< 2.0 mcg/g
Ethanol	101 mg/dL	n-Propanol	< 2.0 mcg/g
Acetone, Methanol, Isopropanol	< 5 mg/dL		
<u>Other Results:</u>			
Thiosulfate (Femoral Blood)	15.5 mcg/mL		
Thiosulfate (Urine)	9.4 mg/g creatinine		
Sulfhemoglobin (Femoral Blood)	6.30%		

Death Involving Hydrogen Sulfide Exposure from a Domestic Sink Drain (*Contd*)

stagnant waste water and formation of a pocket of hydrogen sulfide. Our report is similar in that the clog likely caused stagnant waste water. When our subject removed the pipes and drain trap, she effectively released the pocket of hydrogen sulfide into the air under the cabinet.

In a report of an occupational accident, two individuals died simultaneously by inhalation of hydrogen sulfide (3). This was caused either by the putrefaction of a large amount of sweet corn or by heavy oil that flowed out of the fuel tank of a cargo vessel. The workers died with partial green discoloration of the skin and pulmonary edema. Their blood thiosulfate concentrations were 0.089 mmol/L (9.97 mcg/mL) and 0.142 mmol/L (15.9 mcg/mL), respectively. The autopsy of patient A showed petechial hemorrhage of the palpebral conjunctiva and mucous membranes of the mouth and erosion of the respiratory tract. The autopsy of patient B did not present these findings. Based on the higher levels of blood thiosulfate, the authors presumed that the latter patient may have been exposed to higher hydrogen sulfide levels and had cardiovascular and respiratory arrest faster than patient A. The thiosulfate level of 15.5 mcg/mL in our case is comparable to the levels seen in these cases.

Death from hydrogen sulfide exposure can be very quick. This is evident in a report involving the death of four dye workers. One worker entered a pit to remove sludge in a drainage pipe and quickly became unconscious. Three workers who entered the pit to rescue him lost consciousness in the pit and died soon after the accident (10).

Arnold et al. (14) looked at records of 250 workers who were exposed to hydrogen sulfide. Respiratory

and ophthalmic symptoms were reported in majority of the cases with 54% becoming unconscious after the exposure. The overall fatality rate was 2.8%.

Although most fatalities involving hydrogen sulfide are accidental, interestingly many deaths due to intentional use of hydrogen sulfide have also been reported. Maebashi et al. (15) reported 17 autopsy cases in which inhalation of hydrogen sulfide was intentional. In recent years, an increasingly popular method of suicide involves inhaling hydrogen sulfide gas synthetically generated by mixing sulfur-based bath powders or pesticides with acidic detergents. In Maebashi et al., the concentrations of thiosulfate in such cases ranged from 0.014 – 0.648 mmol/L.

Toxicological analyses in hydrogen sulfide poisonings include measurement of sulfide and thiosulfate in various body fluids and tissues. Thiosulfate, at least in urine, is considered better than sulfide in the detection of hydrogen sulfide exposure (16). The thiosulfate concentration of 15.5 mcg/mL found in our case correlates with the concentrations reported in the literature. Thiosulfate concentrations reported in various fatalities range from 2.8 – 72.6 mcg/mL (3, 7, 10, 11, 15, 16). Sulfhemoglobin is another marker of hydrogen sulfide exposure (17). Sulfur binds to the heme moiety of hemoglobin to form sulfhemoglobin. The S-Hb complex is stable and stays in the blood till affected red blood cells complete their life cycle. In normal blood, the concentration of sulfhemoglobin is <1%. In the case presented, sulfhemoglobin concentration was 6.3%.

Based on the circumstances surrounding the death and the findings at autopsy, the subject of this case report died as a result of hydrogen sulfide intoxication with

methamphetamine abuse and asthma as contributing factors. The manner of death was accidental.

References

1. Munday S. Hydrogen Sulfide. In: Olson K, ed. Poisoning and Drug Overdose. New York: McGraw-Hill Medical, 2004:224-5.
2. Baselt R. Hydrogen Sulfide. Disposition of Toxic Drugs and Chemicals in Man. 9th ed. Seal Beach: Biomedical Publications, 2011:816-7.
3. Ago M, Ago K, Ogata M. Two fatalities by hydrogen sulfide poisoning: variation of pathological and toxicological findings. Leg Med (Tokyo) 2008;10:148-52.
4. Ballerino-Regan D, Longmire AW. Hydrogen sulfide exposure as a cause of sudden occupational death. Arch Pathol Lab Med 2010;134:1105.
5. Campanya M, Sanz P, Reig R, Nogue S, Obiols J, Freixa A, et al. Fatal hydrogen sulfide poisoning. Med Lav 1989;80:251-3.
6. Chaturvedi AK, Smith DR, Canfield DV. A fatality caused by accidental production of hydrogen sulfide. Forensic Sci Int 2001;123:211-4.
7. Fujita Y, Fujino Y, Onodera M, Kikuchi S, Kikkawa T, Inoue Y, et al. A fatal case of acute hydrogen sulfide poisoning caused by hydrogen sulfide: hydroxocobalamin therapy for acute hydrogen sulfide poisoning. J Anal Toxicol 2011;35:119-23.
8. Gerasimon G, Bennett S, Musser J, Rinard J. Acute hydrogen sulfide poisoning in a dairy farmer. Clin Toxicol (Phila) 2007;45:420-3.
9. Ikebuchi J, Yamamoto Y, Nishi K, Okada K, Irizawa Y.

A Death Involving Hydrogen Sulfide Exposure from a Domestic Sink Drain (Cont)

[Toxicological findings in a death involving hydrogen sulfide]. Nihon Hoigaku Zasshi 1993;47:406-9.

10. Kage S, Ikeda H, Ikeda N, Tsujita A, Kudo K. Fatal hydrogen sulfide poisoning at a dye works. Leg Med (Tokyo) 2004;6:182-6.

11. Kage S, Kashimura S, Ikeda H, Kudo K, Ikeda N. Fatal and nonfatal poisoning by hydrogen sulfide at an industrial waste site. J Forensic Sci 2002;47:652-5.

12. Snyder JW, Safir EF, Summer-ville GP, Middleberg RA. Occupational fatality and persistent neurological sequelae after mass ex-

posure to hydrogen sulfide. Am J Emerg Med 1995;13:199-203.

13. Sastre C, Baillif-Couniou V, Kintz P, Cirimele V, Bartoli C, Christia-Lotter MA, et al. Fatal accidental hydrogen sulfide poisoning: a domestic case. J Forensic Sci 2013;58 Suppl 1:S280-4.

14. Arnold IM, Dufresne RM, Alleyne BC, Stuart PJ. Health implication of occupational exposures to hydrogen sulfide. J Occup Med 1985;27:373-6.

15. Maebashi K, Iwadate K, Sakai K, Takatsu A, Fukui K, Aoyagi M, et al. Toxicological analysis of 17 autopsy cases of hydrogen sulfide

poisoning resulting from the inhalation of intentionally generated hydrogen sulfide gas. Forensic Sci Int 2011;207:91-5.

16. Kage S, Takekawa K, Kurosaki K, Imamura T, Kudo K. The usefulness of thiosulfate as an indicator of hydrogen sulfide poisoning: three cases. Int J Legal Med 1997;110:220-2.

17. Ensabella F, Spirito A, Dupre S, Leoni V, Schinina ME, Strinati F, et al. [Measurement of sulfhemoglobin (S-Hb) blood levels to determine individual hydrogen sulfide exposure in thermal baths in Italy]. Ig Sanita Pubbl 2004;60:201-17.

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A Premeditated Infanticide by Administration of Zopiclone

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Zopiclone is a hypnotic agent belonging to a class of hypnosedative drugs, the cyclopyrrolones, with a chemical structure unrelated to benzodiazepines. It is intended for once-nightly consumption at a dose of 7.5 mg. Despite its selective interaction with omega-1 receptors, several side effects, including visual disturbance and hallucinations have been described. Moreover, impairment of psychomotor performance and effects on recent or remote recall can be both significant.

Zopiclone is prescribed in the treatment of occasional insomnia in adults and doesn't have any official French market authorization for children. Zopiclone is sold in France since 1987, and was believed to not have any abuse potential. However, during the past few years there have been an increasing number of reports on the abuse and misuse of zopiclone (1).

Some off-label prescriptions have

been described in adolescents (2) but none in children. Fatal poisonings are mainly represented by suicides, essentially in elderly and/or in patients with an incurable disease, often in combination with other drugs. To our knowledge, no deaths have been reported in children. We present here a double infanticide with premeditation by zopiclone administration and drowning.

Description

Mrs. X., 38 years old, called the emergency services explaining she had found her children lifeless in the bathtub. The paramedics found the two children, G. 2 years old, and R., 5 years old, dead in the bathtub full of water. Suspicions quickly turned to the mother who rapidly confessed to having drowned her children after drugging them with zopiclone. Autopsies were performed 48 hours later and revealed lung and brain edema and a small amount of water in the lungs and stomach of the eldest.

No sign of abuse or injury in self-defense was noted. Samples were taken for conventional toxicological analysis (heart and femoral blood, gastric content, urine, vitreous humor and hair). An analysis of maternal hair was also performed to confirm the alleged use of psychotropic drugs by the mother during interrogation.

Methods

Benzodiazepines, Z-drugs (zolpidem and zopiclone), neuroleptics and other sedatives were determined in peripheral blood and urine by liquid chromatography coupled to tandem mass spectrometry (LC-MS/MS) after liquid-liquid extraction in Tox-itubes A, and in hair by LC-MS/MS after liquid-liquid extraction (3).

Results

Results presented in the tables 1 and 2 were obtained from samples of the victims and their mother:

Table 1:

	Peripheral blood (ng/mL)	Urine (ng/mL)	Hair (pg/mg)	
			Segment 1 (4 cm) 09/2009 – 01/2010	Segment 2 (4 cm) 05/ 2009 – 09/ 2009
Victim G.	Zopiclone : 260	Zopiclone : 1580	Zopiclone : 16	Zopiclone : 12
Victim R.	Zopiclone : 174	Zopiclone : 946	Zopiclone : 45	Zopiclone : 40

Table 2

	Hair (pg/mg)			
	Segment 1 (3 cm) 09/2009 – 01/2010	Segment 2 (3 cm) 05/ 2009 – 09/ 2009	Segment 3 (3 cm) 05/ 2009 – 09/ 2009	Segment 4 (3 cm) 05/ 2009 – 09/ 2009
Mother	Zolpidem: 1,7	Zolpidem: 18	Zolpidem: 10	Zolpidem: 2,5
	Zopiclone : -	Zopiclone : 18	Zopiclone : 45	Zopiclone : 54
	Cyamemazine : 61	Cyamemazine : 53	Cyamemazine : 44	Cyamemazine : 41
	Amitriptyline : 1568	Amitriptyline : 1236	Amitriptyline : 772	Amitriptyline : 627

A Premeditated Infanticide by Administration of Zopiclone (*Continued*)

No reference values exist for zopiclone in children. The postmortem blood concentrations found in the victims correspond to toxic concentrations in adults. The presence of very low concentrations of zopiclone in all segments of hair shows regular exposure of the two victims during the 8 months preceding the death. However, the children were never prescribed zopiclone and the mother denied any administration.

As a consequence, contamination was considered as an issue and interpretation of the results was a challenge that deserves particular attention. There are many differences between the physiology of

hair from children and those from adults: the hair from children is thinner and more porous, the ratio anagen and catagen phases is not maintained, and the growth rate can be different, at some periods, from the usual 1 cm/month.

The analysis of maternal hair confirms a regular intake of benzodiazepine hypnotics, as cyamemazine and amitriptyline. The mother was found responsible for her acts by expert psychiatrists and sentenced to 25 years imprisonment.

References

1. G. Hajak, W.E. Müller, H.U. Wittchen et al., Abuse and dependence potential for the non-benzodiazepine hypnotics zolpidem and zopiclone: a review of case reports and epidemiological data. *Addiction*, 2003, 98: 1371-1378
2. J. Mancini, X. Thirion, A. Masut et al., Anxiolytics, hypnotics, and antidepressants dispensed to adolescents in a French region in 2002. *Pharmacoepidemiology Drug Safety*, 2006, 15: 494-503
3. M. Villain, M. Chèze, A. Tracqui, B. Ludes, P. Kintz. Testing for zopiclone in hair. Application to drug-facilitated crimes. *Forensic Science International*, 2004, 145 : 117-121

SOFT 2013 AV INSTRUCTIONS FOR WORKSHOP SPEAKERS AND PLATFORM PRESENTERS

The SOFT Audio-Visual support staff are tasked with making sure all the workshop and scientific presentations run smoothly. Attendees and presenters expect to focus on the information provided in the presentations, not on making the computers and projectors run properly.

SOFT members Frank Wallace and Dale Hart will be working at the meeting to make sure all the workshops, scientific presentations, and other AV functions come together to provide the high-quality meeting experience attendees have come to expect.

The laptops used in the workshop will have Microsoft Office 2010 installed (backward compatible with older versions). Presentations will be loaded onto the workshop laptops ahead of time and tested to make sure they run properly. The presentations will be hyperlinked from agenda slides providing a seamless flow between presentations. All files will be backed up and can be re-loaded quickly if a problem occurs.

The SOFT Audio-Visual support staff would like presenters to begin sending in their presentations as soon as possible. There are two ways to send presentations:

Preferred – Follow the upload link on the SOFT web-site in the “Members Only” area of the web-site (at Web Login tab). Since presentation files are often too large to send by e-mail, please use the upload page.

Alternative – e-mail your presentation to Frank.Wallace.2@gmail.com. This method works well in most instances.

Presentations should be submitted **now thru noon on October 25, 2013**. For late edits to your presentation, please leave a message for Frank Wallace at the Registration Desk.

Anyone with special requests should contact Frank Wallace as soon as possible. Last minute updates prior to each workshop will be accommodated only if time permits.

Pharmacogenetic Testing: Impact in Pain Management

Submitted by Kate L. Miller, Pharm.D.; Anne Z. DePriest, Pharm.D., BCPS; David L. Black, Ph.D., DABFT; and Yale H. Caplan, Ph.D., DABFT
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There is little doubt that personalized medicine is the future of clinical and forensic toxicology. Although a considerable amount of pharmacogenetic research has been published and the clinical impact of pharmacogenetic testing has been elucidated in certain specialty care areas (e.g., oncology, cardiology), a consensus regarding the clinical value of pharmacogenetic testing in pain management has not been reached.

Conflicting opinions regarding the role of pharmacogenetic testing in pain management exist. For example, drug testing laboratories may unequivocally promote pharmacogenetic testing as a beneficial component of every patient's care plan; however, this approach may greatly increase cost of care and evidence to support this approach is lacking. Additionally, laboratory personnel and practitioners may not be aware of the following considerations related to the implementation of pharmacogenetic testing:

- As with many other toxicology or clinical tests, false positives and false negatives are a possibility. If inaccurate pharmacogenetic information is documented in a patient's medical record, it could result in long-term negative effects on the patient's care.^{1,2}
- The decision to implement pharmacogenetic testing should be based on a substantial amount of research, investigation, and preparation. The impact of particular genotypes of interest on patient care outcomes should be validated in the literature, and testing

need be incorporated into a clear treatment algorithm. Authors of Vanderbilt University's PREDICT study, which examines the impact of pharmacogenetic testing for patients likely to require future treatment with clopidogrel, note the institutional investigation and approval process took approximately one year for each genotype of interest.¹

Knowledge of which pharmacogenetic testing applications are appropriate in pain management may be used to tailor treatment and limit unnecessary costs, rather than recommending a global testing approach.

Pharmacogenetics in Pain Management: Opioids, Benzodiazepines, Antidepressants

Opioids, benzodiazepines, and antidepressants are often used in the therapeutic management of chronic pain patients. Several genes have been studied for their involvement in drug response (i.e., OPRM1, MDR1 transporter/ABCB1),² however, their overall effect on clinical outcomes is not well-characterized in the literature. A large proportion of pharmacogenetic literature, as it relates to pain management, focuses on cytochrome P450 (CYP) enzymes which are heavily involved in drug metabolism. CYP2D6 and CYP2C19 are also subject to significant genetic variability and several polymorphisms have been identified and investigated for their potential role in pharmacogenetic testing. Although many CYP3A4 polymorphisms have been identified, the observed frequencies of specific polymorphisms are low and do not explain the wide varia-

tion in this enzyme's activity.³ Thus, it is not a typical target of pharmacogenetic testing, and is most often recognized for its frequent involvement in drug-drug interactions. CYP2D6 and CYP2C19 are also associated with many drug-drug interactions.

Evidence to support the clinical usefulness of pharmacogenetic testing for the majority of benzodiazepines, antidepressants, and opioids is either lacking, inconclusive, or contradictory. Pharmacogenetic research related to benzodiazepines has focused on CYP3A5, CYP2C19, and UGT2B15 enzymes. Although some studies have found pharmacokinetic effects such as increased plasma levels and longer half lives, especially for CYP2C19 polymorphism and diazepam, the overall clinical impact of these effects remains to be established.

The Clinical Pharmacogenetics Implementation Consortium (CPIC) has published peer-reviewed consensus guidelines for tricyclic antidepressants (TCAs)/CYP2D6, CYP2C19; and codeine/CYP2D6. The CPIC provides recommendations for medication regimen adjustments based on existing pharmacogenetic information versus recommendations for conducting or implementing testing.² The TCA dosing recommendations tend to apply to higher doses, such as those used for treatment of depression, versus lower doses used for treatment of pain conditions (i.e., neuropathic pain). Overall, fewer adjustments are recommended for doses used in the treatment of pain. The authors note the recommendations are most likely to be helpful upon initiation of treatment as opposed to

Pharmacogenetic Testing: Impact in Pain Management (*Continued*)

maintenance therapy. Guidelines for selective serotonin reuptake inhibitors (SSRIs) are in progress.⁴

Codeine/CYP2D6 and tramadol/CYP2D6 are the only two opioid/gene pairs for which the CPIC has established specific dosing adjustments. The therapeutic effect of codeine depends on its conversion to morphine; thus, poor metabolizers may not achieve an adequate response, whereas ultra-rapid metabolizers may be prone to adverse effects and toxicity. Prompted by case reports, the FDA issued a public health advisory in 2007 related to codeine use in breastfeeding mothers. The advisory described the risk of serious adverse effects or death for infants of mothers categorized as ultra-rapid metabolizers and asked manufacturers to include language related to this issue in drug package inserts.^{2,5-6} The codeine CPIC guidelines state there is insufficient or inconsistent evidence linking metabolizer status to patient response for hydrocodone and oxycodone;² the literature echoes this conclusion.⁷⁻¹⁷

The role of pharmacogenetic testing for methadone has not been clearly demonstrated. However, certain genetic polymorphisms may increase a patient's risk for serious cardiac effects. Methadone is available as a racemic mixture in the U.S.; (R)-methadone is thought to be the primary isomer responsible for therapeutic activity of the drug and (S)-methadone, which may have greater affinity for the hERG voltage-gated potassium channel, has been associated with risk of serious cardiotoxicity (i.e. torsade de pointes, prolonged QTc interval).¹⁸ Studies have supported the hypothesis that administration of (R)-methadone may be safer than (R,S)-methadone.²⁰⁻²² Metabolism of methadone enantiomers is ste-

reoselective, with (S)-methadone undergoing metabolism primarily by CYP2B6. Thus, poor metabolizers of CYP2B6 may have higher concentrations of (S)-methadone and may be prone to increased risk of adverse cardiac effects.

Although some studies may demonstrate variation in specific pharmacokinetic parameters based on genetic disposition, the overall impact of such variation on pharmacodynamic effect and clinical benefit is not clearly substantiated. Pharmacogenetic testing has not been shown to be a superior approach to the traditional medical model of patient assessment, medication adjustment, and patient monitoring.

Drug-Drug Interactions (DDIs)

The importance and potential sequelae of DDIs tend to be underappreciated and may go unrecognized. Knowledge and management of DDIs by prescribers and pharmacists is lacking and often inconsistently applied; a national survey of prescribers indicated that less than half (43%) of potential DDIs were correctly identified.²³ It has been estimated that 40-60% of adverse drug events (which include DDIs) are preventable.^{24, 25}

In some cases, DDIs may be more relevant than pharmacogenetic disposition in terms of altering therapeutic effect; they may have the potential to alter a patient's predicted phenotype (observed effect), thus becoming a more important consideration than the patient's genotype (predicted effect). DDIs may also strongly influence patient response, alter pharmacokinetic parameters, contribute to adverse effects and morbidity, increase healthcare costs, and affect toxicology results. Manufacturers often include warnings regarding the potential for significant drug-drug interactions with concomitant

administration of specific medications. For example, fentanyl has a black box warning for fatal overdose in cases of co-administration with CYP3A4 inhibitors.²⁶

A postmortem pharmacogenetic study which assessed CYP2D6 genotypes in 15 oxycodone toxicity cases concluded genotypic information was helpful in four of the cases. The study aimed to demonstrate the usefulness of pharmacogenetic testing in interpreting postmortem cases, but found no statistical significance in oxycodone concentrations between the different phenotypes. Additional drugs were present in all of the cases except one which brings to question the roles of DDIs and additive drug effects. The authors referenced a separate postmortem study that found DDIs to be more significant than poor metabolizer status.⁸

DDIs are known to alter pharmacokinetic parameters and subsequently affect parent drug/metabolite patterns observed in toxicology results. A case study of a patient who complained of unrelieved pain despite prescriptions for both controlled- and immediate-release formulations of oxycodone highlighted the potential consequences of a significant drug-drug interaction. The patient was prescribed rifampin (a potent CYP3A4 inducer) which caused metabolism of oxycodone to be shunted to the noroxycodone pathway. This DDI resulted in recurrent negative drug test results since noroxycodone was not included in analyses; consequently, the patient appeared to be non-compliant with therapy.²⁷ Patients with negative drug test results may be accused of non-compliance and/or diversion, resulting in negative consequences such as discharge from practice, precipitation of withdrawal, or

Pharmacogenetic Testing: Impact in Pain Management (*Continued*)

legal action. Therefore, accurate and thorough toxicology testing is crucial for medication compliance assessment.

Overall, the clinical benefit of pharmacogenetic testing remains to be determined for most drugs used in the pain management population. Peer-reviewed expert consensus guidelines detailing application of genetic information for medication regimen adjustment have yet to be published for most pain management medications. Drug-drug interactions continue to have an underestimated influence on patient outcomes and adverse drug reactions; awareness and identification of such interactions is critical for safe and effective medication therapy management. Toxicology testing may provide a platform for assessment of drugs known to interact with a patient's primary medication therapy. Undoubtedly, future pharmacogenetic research and continued advancements in toxicology testing methodology will allow for improvement in medication management, toxicology interpretation, and patient care.

References

- Pulley JM, Denny JC, Peterson JF, et al. Operational implementation of prospective genotyping for personalized medicine: the design of the Vanderbilt PREDICT project. *Clin Pharmacol Ther.* 2012;92(1):87-95.
- Crews KR, Gaedigk A, Dunnenberger HM. Clinical pharmacogenetics implementation consortium (CPIC) guidelines for codeine therapy in the context of cytochrome P450 2D6 (CYP2D6) genotype. *Clin Pharmacol Ther.* 2012;91(2):321-326.
- Ward MB, Sorich MJ, McKinnon RA. Cytochrome P450 part 2: genetics of inter-individual variability. *Journal of Pharmacy Practice and Research.* 2008;38(3):226-229.
- PharmGKB. CPIC Gene-Drug Pairs. Available at: <http://www.pharmgkb.org/page/cpicGeneDrugPairs>. Accessed August 17, 2013.
- U.S. Food and Drug Administration. Public Health Advisory: Use of Codeine By Some Breastfeeding Mothers May Lead To Life-Threatening Side Effects In Nursing Babies. Available at: <http://www.fda.gov/Drugs/DrugSafety/PostmarketDrugSafetyInformationforPatientsandProviders/DrugSafetyInformationforHealthcareProfessionals/PublicHealthAdvisories/ucm054717.htm>. Accessed August 17, 2013.
- Koren G, Cairns J, Chitayat D, Gaedigk A, Leeder SJ. Pharmacogenetics of morphine poisoning in a breastfed neonate of a codeine-prescribed mother. *Lancet.* 2006;368(9536):704.
- Samer CF, Daali Y, Wagner M, et al. Genetic polymorphisms and drug interactions modulating CYP2D6 and CYP3A activities have a major effect on oxycodone analgesic efficacy and safety. *Br J Pharmacol.* 2010;160:919-30.
- Jannetto PJ, Wong SH, Gock SB, et al. Pharmacogenomics as molecular autopsy for postmortem forensic toxicology: genotyping cytochrome P450 2D6 for oxycodone cases. *J Anal Toxicol.* 2002;26:438-47.
- Otton SV, Schadel M, Cheung SW, et al. CYP2D6 phenotype determines the metabolic conversion of hydrocodone to hydromorphone. *Clin Pharmacol Ther.* 1993;54(5):463-72.
- de Leon J, Dinsmore L, Wedlund P. Adverse drug reactions to oxycodone and hydrocodone in CYP2D6 ultrarapid metabolizers. *J Clin Psychopharmacol.* 2003;23(4):420-1.
- Kalso E. Oxycodone. *J Pain Symptom Manage.* 2005;29(55):S47-56.
- Zwisler ST, Enggaard TP, Mikkelson S, et al. Impact of the CYP2D6 genotype on post-operative intravenous oxycodone analgesia. *Acta Anaesthesiol Scand.* 2010;54:232-40.
- Andreassen TN, Eftedal I, Klepstad P, et al. Do CYP2D6 genotypes reflect oxycodone requirements for cancer patients treated for cancer pain? A cross-sectional multicentre study. *Eur J Clin Pharmacol.* 2012;68:55-64.
- Lalovic B, Kharasch E, Hoffer C, et al. Pharmacokinetics and pharmacodynamics of oral oxycodone in healthy human subjects: role of circulating active metabolites. *Clin Pharmacol Ther.* 2006;79:461-79.
- Zwisler ST, Enggaard TP, Noehr-Jensen L, et al. The hypoalgesic effect of oxycodone in human experimental pain models in relation to the CYP2D6 oxidation polymorphism. *Basic Clin Pharmacol Toxicol.* 2009;104:335-44.
- Heiskanen T, olkkola KT, Kalso E. Effects of blocking CYP2D6 on the pharmacokinetics and pharmacodynamics of oxycodone. *Clin Pharmacol Ther.* 1998;64:603-11.
- Kaplan HL, Busto UE, Baylon GJ, et al. Inhibition of cytochrome P450 2D6 metabolism of hydrocodone to hydromorphone does not importantly affect abuse liability. *J Pharmacol Exp Ther.* 1997;281(1):103-8.
- Lin C, Somberg T, Molnar J, Somberg J. The effects of chiral isolates of methadone on the cardiac potassium channel

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- IKr. Cardiology. 2009;113:59-65.
19. Ansermot N, Albayrak O, Schlapfer J, et al. Substitution of (R,S)-Methadone by (R)-Methadone: impact on QTc interval. Arch Intern Med. 2010;170(6):530-536.
 20. Eap CB, Crettol S, Rougier JS, et al. Stereoselective block of hERG channel by (S)-methadone and QT interval prolongation in CYP2B6 slow metabolizers. Clin Pharmacol Ther. 2007;81(5):719-728.
 21. Totah RA, Sheffels P, Roberts T, et al. Role of CYP2B6 in stereoselective human methadone metabolism. Anesthesiology 2008;108:363-374
 22. Chang Y, Fang WB, Lin SN, Moody DE. Stereo-selective metabolism of methadone by human liver microsomes and cDNA-expressed cytochrome P450s: a reconciliation. Basic Clin Pharmacol Toxicol 2010; 108:55-62.
 23. Hines LE, Malone DC, Murphy JE. Recommendations for generating, evaluating, and implementing drug-drug interaction evidence. Pharmacotherapy. 2012;32(4):304-13.
 24. Agency for Healthcare Research and Quality. Reducing and Preventing Adverse Drug Events to Decrease Hospital Costs. Available at: <http://www.ahrq.gov/research/findings/factsheets/errors-safety/aderia/index.html>. Accessed August 17, 2013.
 25. World Health Organization. Medicines: safety of medicines – adverse drug reactions. Available at: <http://www.who.int/mediacentre/factsheets/fs293/en/>. Accessed August 17, 2013.
 26. DailyMed. Fentanyl package insert. Available at: <http://dailymed.nlm.nih.gov/dailymed/lookup.cfm?setid=245a75e6-3b45-4dc6-bc58-2e33196faca0>. Accessed August 17, 2013.
 27. Lee HK, Lewis LD, Tsongalis GJ et al. Negative urine opioid screening caused by rifampin-mediated induction of oxycodone hepatic metabolism. Clin Chim Acta. 2006;367(1-2):196-

MIDWEST ASSOCIATION FOR TOXICOLOGY AND THERAPEUTIC DRUG MONITORING MEETING

Submitted by Sally S. Aiken, MD Spokane Medical Examiner

The Midwest Association for Toxicology and Therapeutic Drug Monitoring meeting

April 3-4, 2014

Detroit, MI

<http://www.midwesttox.org/annualMeeting.html>

for registration

If you want to know why children are not small adults and infants not small children, then this is the meeting for you. The meeting has confirmed speakers from the Michigan and West Virginia Poison Control Centers, Oakland County Sheriff's Department, Nationwide Children's Hospital, Cayman Chemical, Western Slope Laboratory, Warde Laboratory, The State of Michigan, Biotage, and Essential Testing. Topics will include pediatric pain management, poisonings, designer drugs, and newborn screening.

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FROM THE TOXICOLOGY LITERATURE

Submitted by Barry Levine, Ph.D., DABFT

Toxicology Laboratory, Armed Forces Medical Examiner System

Journal of Forensic Sciences, Volume 58, March 2013

Danke et al investigated 348 post-mortem cases where citalopram was identified in blood. The purpose of the review was to determine blood concentrations found as an incidental finding versus blood concentrations in cases where citalopram caused or contributed to death. The median blood concentration when citalopram was the sole drug identified in a drug death was 1.3 mg/L (range 0.5 to 3.0 mg/L). These cases accounted for only 5 of the 73 cases where citalopram contributed to death. The median blood concentration when citalopram was an incidental finding was 0.3 mg/L (range 0.1 to 4.4 mg/L, n=275).

Ely et al reported 17 deaths from diabetic ketoacidosis in 17 psychiatric patients treated with second generation neuroleptic drugs. Drugs detected most often in these cases included quetiapine (7 cases), olanzapine (6 cases), and risperidone (3 cases). In 16 of these cases, the authors believed the drug use was primary or contributory to the cause of death, as only one case had a previous history of diabetes mellitus.

Journal of Analytical Toxicology Volume 37, March 2013

Johnson and Botch-Jones studied the stability of 4 designer drugs, methylenedioxypropylvalerone (MDPV), mephedrone, N-benzylpiperazine (BZP) and 1-[3-(trifluoromethyl)phenyl] piperazine (TFMPP) in blood, serum and urine at freezer, refrigerator and room temperatures. MDPV was stable at all temperatures in all specimens. BZP and TFMPP were stable at freezer and refrigerated tempera-

tures in all 3 matrices. Mephedrone was stable in the freezer, but unstable in blood and plasma (>30% loss) at refrigerated temperature. At room temperature, all mephedrone was lost by day 7; in urine, approximately 60% was lost after 2 weeks.

Journal of Analytical Toxicology Volume 37, April 2013

Marinetti and Antnides reported toxicology findings in 32 cases where designer cathinones (bath salt) were detected. Both postmortem (23) and human performance (9) toxicology cases were included. The 6 drugs in these cases were MDPV, methyloone, pyrovalerone, pentylone, alphapyrrolidinopentiphenone (α -PVP) and mephedrone. The most common designer cathinone found was MDPV, with blood concentrations ranging from 10 to 640 ng/mL in postmortem cases and from < 10 to 368 ng/mL in human performance cases. However, no direct relationship was found between drug concentration and death due to drug intoxication.

Journal of Analytical Toxicology Volume 37, May 2013

Thoren et al examined the potential in vitro absorption of carbon monoxide (CO) and hydrogen cyanide (HCN) in exposed blood. Blood specimens from living individuals stored in desiccators were exposed to different concentrations of CO or HCN and then reanalyzed for carboxyhemoglobin (COHb) and cyanide. Exposure times up to 60 minutes were studied. Small, but forensically non-significant increases of COHb were detected to a maximum of 11% saturation. Conversely, cyanide concentrations showed significant increases to a maximum concentration of 5.01

mg/L, after HCN exposure, a concentration that could be interpreted as toxic if it reflected a blood cyanide concentration prior to death.

Lewis et al reported postmortem sertraline and desmethylsertraline concentrations in 11 fatal aviation accidents. Blood sertraline concentrations ranged from 0.0056 to 0.392 mg/L and desmethylsertraline concentrations ranged from 0.011 to 0.77 mg/L. The highest tissue to blood concentration ratios were found with the liver and the lung, suggesting that significant postmortem redistribution may potentially occur.

Canadian Society of Forensic Science Journal Volume 46, March 2013

In this issue, the recommended standards and procedures of the Society's alcohol committee are presented. This committee is the primary scientific advisor to the Canadian Department of Justice. These standards involve the evaluation of new breath testing equipment as well as the use of approved equipment, including operator training, instrument operation and maintenance.

American Journal of Forensic Medicine and Pathology Volume 34, June 2013

Molina and Hargrove compared drug concentrations in postmortem heart, subclavian and femoral blood in 28 cases to ascertain whether subclavian blood should be considered a "central" blood specimen or a "peripheral" blood specimen. Drugs identified included antidepressants, narcotic analgesics, benzodiazepines, antihistamines, and sedative-hypnotic

NAME ANNOUNCEMENT

Submitted by *Sally S. Aiken, MD Spokane Medical Examiner*

The National Association of Medical Examiners (NAME) presents a half-day interim meeting in conjunction with the American Academy of Forensic Sciences. In 2014, the NAME interim meeting will be in Seattle on Tuesday February 18.

NAME has selected a topic for the 2014 interim meeting that will be of interest to SOFT membership, and NAME invites toxicologists to attend. The presentation "The Opioid Epidemic and the Medical Examiner: Investigation, Diagnosis, and Certification of Opioid Deaths" will be centered on recommendations made by the CDC-sponsored expert panel convened

in 2012 to study opioid deaths. The panelists were comprised of members of the American College of Medical Toxicology and the National Association of Medical Examiners.

The four sessions will consist of presentations by Dr. Leonard Paulozzi of the CDC (detailing the epidemiology of the opioid epidemic and current problems with death certification), Dr. Robert A. Middleberg of National Medical Services (addressing "what toxicologists wish medical examiners knew"), Dr. Lewis Nelson of the NYU Emergency Department, and New York City Poison Control Center

(addressing problems in interpretation of toxicology tests, from a clinical perspective), and Dr. Sally Aiken of the Spokane County, WA Medical Examiner's Office (presenting the recommendations of the Opioid Panel).

Beginning in December 2013 SOFT members can register for the NAME interim meeting on the NAME website, www.thename.org. Use New Visitor Registration to create a log in, click "Online Store" on the left, then "Go to Shopping" Registration is \$ 100 in advance and \$150 at the door.

FROM THE TOXICOLOGY LITERATURE (Continued)

drugs. The authors found that in general, subclavian blood did not act like either the heart blood or the femoral blood, but produced drug concentrations between the 2 specimen types. The drug class that was an exception to this finding was benzodiazepines, where the subclavian blood concentration more closely reflected the heart blood concentration. The authors recommended that in toxicology reports, blood drug concentrations should reflect the anatomical location of collection rather than the generic "central" or "peripheral" blood.

NEW DRUGS AND TECHNOLOGY TIDBITS



Send interesting "New Drugs and Tech-IN Tidbit" articles to
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DEA SOLICITATION FOR INFORMATION ON KRATOM

Mitragyna speciosa, also known as kratom, is a psychoactive tree that has been used for hundreds of years in Southeast Asia and Africa as a stimulant, a substitute for opium, and to manage opioid withdrawal symptoms. The recent increase in the appearance of kratom in the recreational drug market in the United States is of concern to the Drug Enforcement Administration (DEA).

Kratom is marketed as a euphoriant, dietary supplement, "incense", or "legal opioid". It is sold under the self-title "kratom", or, as part of the kratom-based product known as "Krypton". Kratom is sold in head shops, gas stations, smoke shops, and on the internet. It is manufactured as tablets, capsules, concentrated extracts, or chopped leaves.

Kratom contains more than twenty different alkaloids, however, mitragynine and 7-hydroxy mitragynine are believed to be responsible for its opioid-like effects. Kratom is the only species of *Mitragyna* that contains mitragynine. The number of reports of adverse effects resulting from kratom use has increased. Users of kratom have reported adverse effects such as nausea, vomiting, diarrhea, and tolerance develop-

ment. Withdrawal symptoms were also reported upon terminating the use of kratom.

In the last few years, there has also been a marked increase in the number of online vendors selling kratom, and discussion boards disseminating information about kratom. The rise in online sales and user discussions suggest a growing demand for this substance in the United States.

Evidence from law enforcement indicates that the use of kratom is growing. In 2010, the National Forensic Laboratory Information System (NFLIS) and the System to Retrieve Information on Drug Evidence (STRIDE) received 1 report of mitragynine in analyzed seizures. In 2012, there were 181 reports of mitragynine from analyzed seizures in NFLIS and STRIDE. Several states including Indiana (2012), Louisiana (2012), and Tennessee (2013) have passed laws to control *Mitragyna speciosa*, mitragynine, and/or 7-hydroxy mitragynine.

The leaves are typically smoked, eaten raw, or steeped or brewed in teas. Abusers report effects within ten minutes of ingestion, with effects lasting up to one hour. The powders of mitragynine and 7-hydroxy mitragynine can be pur-

chased on the internet. These powders can be mixed with other psychoactive drugs. There have been reports of deaths associated with the consumption of a mixture of mitragynine powder with propylhexadrine, and with the use of the Krypton, which contained kratom and O-desmethyltramadol.

The Drug and Chemical Evaluation Section (ODE) of the Office of Diversion Control in DEA continues to gather information about the toxicity, and the abuse and addiction potential of kratom (*Mitragyna speciosa*), mitragynine, 7-hydroxy mitragynine, and products containing these substances. ODE would greatly appreciate any information related to law enforcement encounters, drug identification, toxicology reports, medical examiner reports, risk assessments, abuse related to these substances, and suspicion of poisonings connected to patients or postmortem samples. Information that connects these substances to adverse health effects is of particular interest and would provide valuable assistance in the evaluation of these substances for a federal control action.

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2014: Grand Rapids, MI.....Oct. 18-25th, 2014.....Ben Kuslikis/Michael Smith
2015: Atlanta, GA.....Oct. 17-25th, 2015.....Robert Sears
2016: Dallas, TX.....Oct. 15-23rd, 2016.....Chris Heartsill/Erin Spargo
2017: Boca Raton, FL.....Sept. 10-15th, 2017.....Ruth Winecker/Dan Anderson
2018: Minneapolis, MN.....Oct. 15-12th, 2018.....Loralie Langman
2019: San Antonio, TX.....Oct.11-18th, 2019.....TBD

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