



# TOXTALK

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## EDITORIAL:

### MANDATORY CERTIFICATION

by Yale H. Caplan, Ph.D., DABFT

Although certification has been available for forensic toxicologists from a number of organizations, such has been entirely voluntary. The National Academy of Sciences Report (February 2009) and the legislative and administrative fallout that followed has emphasized accreditation of laboratories and certification of toxicologists to insure the credibility of forensic evidence, testing and testimony. Legislation emanating from the United States Senate and action from the White House Subcommittee on Forensic Science is moving on a fast track. The operating philosophy is that it will be necessary that anyone who signs official reports or who testifies in court will need to be certified. No longer will certification be limited to a select few or to those willing to take the extra step. Rather, the profession must reorganize to be inclusive of forensic toxicologists and other specialists who test, report and/or interpret laboratory results.

To achieve this end and considering those practicing in toxicology today, a multi-tiered system is envisioned:

- **Alcohol Specialist:** This would include laboratory and breath testing personnel who perform tests and issue reports.
- **Drug Specialist:** This would include laboratory personnel

who test and/or issue reports describing the results of laboratory analysis.

- **Forensic Toxicologist Diplomate:** This would include personnel who may test and/or issue reports but who also interpret the results in the areas of toxicology as described by the profession (postmortem, human performance, workplace). This category would be deemed to include the requirements for the alcohol and drug specialists.
- **Forensic Toxicologist Diplomate/Fellow:** Same as above but who also has a minimum of 10 years as a Diplomate and has exceeded the minimum requirements of continuing education in a significant way (amount to be determined).

All levels of certification would require a minimum of a bachelor's degree and meet other requirements for education, training, experience, and pass a written examination. The focus would shift from the reliance on educational degrees to a reliance on experience and examination, thus accommodating the larger number of toxicologists and technical specialists who will require certification.

*The views expressed herein are solely those of the author and not necessarily those of any organization.*



## PRESIDENT'S MESSAGE

*Submitted by Bradford Hepler, Ph.D., DABFT*

### CHANGING TIMES REDUX:

“The more things change, the more they remain the same....” is a favorite cliché about how the same things seem to re-occur over and over, in slightly different scenarios, regardless of point of origin, and then seem to bring us right back to the same place, in moving through life's trials and tribulations. Or so it would seem... are we merely in a re-occurring “business as usual theme” as fall-out over the NAS report continues to have impact on our profession, or this time is real change in the wind?

As discussed by others in this electronic edition of ToxTalk, there indeed has been continuing activity relative to the federal government's response to the 2009 NAS report. The legislative branch of the federal government has indeed been busy drafting legislation to address what it thinks are the issues in context with the recommendations from this report. Additionally, new efforts by the executive branch in soliciting consultant advisor support for the Inter-governmental Working Groups (IWG) White House Subcommittee on Forensic Science (SoFS) has been initiated with a request to SOFT through BOD action to nominate 5 candidates for consideration in this role i.e. Marina Stajic, Bruce Goldberger, Bill Anderson, Ruth Winecker and Sarah Kerrigan in support of this subcommittee. We thank these individuals for their interest and willingness to be considered and represent our profession in support of this subcommittee's activity. It remains important for our interests i.e. Forensic

Toxicology interests, to be represented in the dialogue relative to both pending legislative actions, as well as, any executive branch activities involving our discipline.

Much of what the legislative branch is drafting in this context reflects the concept and activities of how the recommendations from the NAS report will be invoked. Early legislative drafts have designed within their response, a model based upon using a central authority group, the Forensic Science Commission (FSC) in oversight of the development of accreditation, certification standards in the Forensic Science profession. This makeup of this latter group would possibly include academic scientists, forensic scientists, judges, representatives of the prosecution and law enforcement community, representatives of the criminal defense community and innocence projects, as well as any other relevant stakeholder communities, definitely an eclectic group.

The direct responsibility of the FSC group in addition to accreditation and certification responsibilities would also be envisioned to include the development of profession codes of conduct, ethics, educational, research and professional standards of practice, which could include how we will practice what we do, what methods we use, reporting criteria, and who will be allowed to present evidence at trial as an expert witness. Much if not all of this will likely be delegated to “designate” professional organizations (as determined by the August FSC body) that will work out the

details of how this will be done. This is the point at which they say, “The rubber hits the road”. The question as noted above is whether or not the government's rush to oversight will have teeth and meaning this time around.

Regardless, we as a profession had better be ready to have sway, and input in the process. This is what the “hullabaloo” relative to involvement with the Consortium of Forensic Science Organizations (CFSO), and our newly formed SWG-Tox committee providing advice and professional input in this process. Finally, participation of our SOFT leadership within our industry's newly formed Forensic Toxicology Council (FTC) will further facilitate communication and focus on our common goals. As a profession, we must be organized in our goals, using the tools; of collective experience, standards of practice, i.e. guidelines, accreditation and certification programs that do exist in our discipline and bring them with us to our seats at the table when decisions impacting our discipline are being discussed and made. Hopefully as you can see from the reports of our representatives in many of these areas within this issue of Tox-Talk, that we are involved and active in the evolving process.

These efforts do not necessarily guarantee outcome, or even that there will be an outcome, but they do mean that we are doing the best we can to affect and influence process such as it is. You cannot complain about your lot in life, if you do not make the effort to influence the outcome.

## PRESIDENT'S MESSAGE (CONTINUED)

Lastly, I would like to remind and encourage all of our membership to be active in your organization. Participation does matter to your professional health, and to the health of your organization. Our annual meeting occurs this year in Richmond, VA. Michelle Peace and Lisa Moak, the 2010 Meeting Hosts and their meeting committee have been working very hard to assure that we will all enjoy an interesting, valuable and relevant professional event. The meeting will be interesting because of the ever-changing nature of our business; the value that comes in belonging to this organization, comes through participation, and

the relevance of our organization, comes this year from better understanding as an organization how government involvement will impact our profession. Additionally, this year's meeting is an especially significant one, as it will be the 40<sup>th</sup> anniversary of the birth of SOFT, and many special activities have been planned, with all of them occurring in a family friendly venue.

The fun and involvement with SOFT also comes from reporting on your own findings, new methods, and/ or improvements in existing methods, interesting case reports, observations and studies. Your insights and findings can lead to new insights for all of us. The

annual meeting provides the best opportunity for networking and meeting others just like yourself, who face many of the same issues, budget crunches, government oversight potential and constraints. It's the place to go, to gain knowledge from formal and informal presentations and discussions with colleagues in building a better understanding and appreciation of what we do. Support your own educational growth by contributing and attending our annual event. Please visit the SOFT 2010 Meeting Website and make your hotel reservations today at one of our meeting hotels for the October meeting.

## YOUNG FORENSIC TOXICOLOGISTS COMMITTEE

*Submitted by Teresa Gray, Ph.D., Chair of the Young Forensic Toxicologists Committee*

The abstract deadline for the 2010 Annual Meeting in Richmond is only a few weeks away (July 2, 2010)! For the first time, the Young Forensic Toxicologists Committee will sponsor an award for the best poster presented by a young forensic toxicologist.

To be eligible, you must be first author of the abstract, attend the meeting, and be less than 41 years old by October 18, 2010. Posters will be evaluated on analytical approach, scientific merit, and presentation quality. The young toxicologist with the best poster will receive

FREE REGISTRATION to the 2011 SOFT / TIAFT meeting in San Francisco!

When submitting your abstract, please note that you want to participate in the "best poster competition" in the body of your submission email (please see the call for abstracts for complete details).

Please share this information with any young toxicologist in your lab who may be interested in presenting data at this year's meeting. As always, toxicologists, young and not so young, are encouraged to submit an abstract!

If you have additional questions, please contact the Young Forensic Toxicologists Committee at [softyft@gmail.com](mailto:softyft@gmail.com) or visit our webpage on the SOFT 2010 meeting website ([www.soft2010.org](http://www.soft2010.org)).

See you in Richmond!  
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## CALL FOR ABSTRACTS DEADLINE IS JULY 2, 2010

*The Program Committee solicits abstracts on all forensic toxicology topics including postmortem toxicology, forensic urine drug testing, analytical toxicology of drugs, pharmacology as related to forensic toxicology, pathology as related to forensic toxicology, pediatric and geriatric case reports, and the relationship between drug concentrations and performance impairment. Scientific papers selected for presentation will be divided into two groups: 15-minute platform presentations and poster presentations. The Program Committee will select appropriate abstracts from those submitted by the July 2, 2010 deadline. Abstracts must be submitted on-line or by email to the program chair. You may request either a platform or poster presentation format and every effort will be made to accommodate your request; however final decision will be made based upon the number of submissions and time limitations. The presenting authors of all papers will be required to register for the meeting. Only abstracts written in English will be considered. The format for the preparation of the abstracts is on the submission form.*

# SOFT ANNUAL MEETING

## RICHMOND, VIRGINIA



We believe this is the perfect city to host the 2010 meeting and celebrate our 40<sup>th</sup> anniversary! What better place to contemplate our own past and plan for our future than in a city that has played a critical role in the transformational periods in the history of our nation?!

Historical considerations are important, not only because they allow us to pay tribute but, more importantly, they allow us to understand where and how to move forward. The Committee has assembled a wide variety of workshops for Monday and Tuesday that will challenge us in our scientific progress and responsibilities, provide timely information to improve processes, expose us to cutting edge research, and invite us to contemplate history.

So, join us in celebrating our history! Please bring your pictures and stories to Richmond! Some of you will be contacted specifically to help us pay tribute to those facts and people important in our history! If you have something that you believe is worth hailing, please let us know!! We are in the process of developing a creative anthology to help us celebrate - **we need your help (gentle nudge to the past presidents!)**.

So, book your room soon! The conference will be held between the Marriott and Convention Center. The Hilton Garden is across the street.

[www.soft2010.org](http://www.soft2010.org)

**OCTOBER 18-22**

**40 YEARS**

### SOFT2010 ONLINE

Please visit us online often! We have built a site to help you find all the information you may want or need for your trip! On the front page, you will find a "Hot in the 804" Section with a picture slide show of past meetings. Please fill free to submit photos for us to post! You will also see a Twitter feed. You do not need to join Twitter or Facebook, but you can access the information we post for as long as you see it in the feed. We encourage you to join the SOFT2010 Facebook page where there is a lot of conversation about what to see and where to eat. And, we can answer questions quickly and publicly! Chances are, if you are asking, then others are wondering!

On the Accommodations page, you will find a live map of Richmond. We update it with new sites to see around town so that you can easily find them from your hotel.

### WHILE YOU ARE HERE...

...you should see a few sites! SO-SOFT has a couple of exciting trips planned (see link under "Attractions"). We will also be running a bus around town early in the week to Must-See destinations. One of the most popular things to do in Richmond these days is to visit these sites on a Segway (they're donating a free tour to the Silent Auction!).

#### What are some of our favorite locations?

*Michelle:* St. John's Episcopal Church: Liberty! The original structure has been preserved - it has the very pews where Washington and Jefferson sat. *Dick:* Poe's House: An authentic example of middle class early 19<sup>th</sup> century living. *Joe & Carl:* VA Museum of Fine Arts : With the recent renovations, it's in the Top 10 in the United States. *Julia:* Hollywood Cemetery: Amazing history and spectacular views of the river and downtown Richmond. *Lisa & Sarah:* Maymont: Where architecture, southern hospitality, Japanese gardens, buffalo, bear, and eagles meet. *Al:* Tredegar: Quote at Mayo Bridge: "Blow her to hell." *Sue:* The Canal Walk: The combination of experiences of downtown, nature, history, and the powerful river. *Daune:* Lewis Ginter Botanical Garden: Glass sculptures, live music, wine tastings, and acres of gardens to stroll - something for everyone!





## SOFT 2010 Workshops

Workshop #	Title	Chair / Co-Chair	Time / Length
W - 1	<b>Marijuana Pharmacology - Practical Applications for the Forensic Toxicologist</b>	Fiona Couper Amy Miles	10/18/10 Full Day
	<p>According to a 2007 roadside survey by NHTSA, 16.3% of randomly stopped drivers tested positive for drugs. Of that total, marijuana was generally the most common drug class across all the regions both in daytime (3.9%) and nighttime (6.1%) samples. The drug impaired driving case poses several challenges for law enforcement and toxicology communities. This SOFT/AAFS Drugs &amp; Driving Committee sponsored workshop will look at marijuana, the most prevalent drug found in impaired driving cases. Providing the toxicologist with the mechanism of action of marijuana, the interpretive challenges in the chronic versus acute user, actual case histories and how to prepare not only themselves but attorneys for trial.</p>		
W - 2	<b>The tools for DIY methods validation!</b>	Brandi Bellissima Diane Boland	10/18/10 Full Day
	<p>In light of the National Academy of Science report on forensic science and the many laboratories striving for accreditation, the requirement for complete and thorough methods validation is becoming imminent. For this reason, this workshop is designed to provide attendees with an overview of the validation process. Experienced instructors will provide detailed lectures regarding the importance of validating a method and its relevance to the accreditation process. Further topics to be discussed include the parameters commonly associated with methods validation, current MSMS guidelines as related to forensic analysis, and level of uncertainty with regard to analytical measurements. After the fundamental concepts are presented, instructors will focus on the various validation steps required for analytical techniques, specifically immunoassay and LCMSMS. Attention will also be directed towards the validation of alternative matrices. To conclude, the future of Forensic Toxicology in terms of accreditation will be discussed with the hopes of generating questions and input from attendees.</p>		
W - 3	<b>Use of Pharmacogenetics in Personalized Pain Management</b>	Saeed Jortani Elaine Stauble	10/18/10 Morning
	<p>Opioids and NSAIDs are the primary pharmacological tools for pain management. Opioids or NSAIDs (alone or in combination) are used to treat a wide spectrum of pain intensities. Clinically useful opioids are capable of producing a wide variety of desired effects, and severe side effects involving the respiratory system, gastrointestinal tract, cardiovascular system, and mental processes. This workshop will focus on the postoperative pain management using opioids, and the role of genetic variations in metabolism and clinical efficacy of opioids will be discussed. Emphasis will be on codeine and hydrocodone as two of the most popular analgesics used clinically.</p>		
W - 4	<b>Getting the Most from ELISA: Tips and Tricks for the Professional Toxicologist</b>	Christine Moore Jennifer Limoges	10/18/10 Morning
	<p>ELISA testing for drugs in various biological matrices is carried out by the majority of forensic laboratories. While the principles of ELISA are well known by professional laboratory personnel, the utility of cross reactivity, understanding discriminatory points, and the manipulation of sensitivity to create robust assays are areas which have not been well targeted. The workshop will provide the attendee with tips and tricks for the laboratory which will improve routine assays and allow personnel to troubleshoot batch failures by systematically evaluating potential problems.</p>		
W - 5	<b>DFSA Applications and Interpretations</b>	Lauren Marinetti Mark A. LeBeau	10/18/10 Afternoon
	<p>This case-oriented workshop will focus on how toxicologists apply pharmacological and toxicological principles in drug facilitated sexual assault cases. Challenges and solutions in DFSA-related casework will be presented. Pre-registered attendees will receive a complementary copy of the January 2010 Issue of Forensic Science Review on Drug-Facilitated Sexual Assault.</p>		
W - 6	<b>Tips, Tricks and Methods from Current Practitioners of LCMS in Toxicology</b>	Raymond Van Orden John Hughes	10/19/10 Full Day
	<p>The last few years we have seen a large increase in the presentation of applications of Liquid Chromatography – Mass Spectrometry (LC/MS) to forensic toxicology. This workshop is intended to supply the participants with proven information and applications on LC/MS uses in the toxicology field by knowledgeable toxicologists. The participants will walk away with proven LC/MS techniques and applications that they can return to their laboratories and apply.</p>		

<b>SOFT 2010 Workshops (Continued)</b>			
<b>Workshop #</b>	<b>Title</b>	<b>Chair / Co-Chair</b>	<b>Time / Length</b>
<b>W - 7</b>	<b>A Stroll through the Cannabinoid Field: Pharmacology, Therapeutics and Untoward Effects</b>	<b>Justin Poklis Aron Lichman</b>	<b>10/19/10 Morning</b>
	This workshop will focus on the pharmacology of Cannabis sativa, D <sup>9</sup> -tetrahydrocannabinol the primary psychoactive constituent of this plant, and other naturally occurring and synthetic cannabinoids. Basic scientists with expertise in cannabinoid pharmacology from the Department of Pharmacology and Toxicology at Virginia Commonwealth University will present an overview of the pharmacology of marijuana; medical marijuana versus various plant derived, endogenously produced, and synthetic cannabinoids; pre-clinical investigation of cannabinoids; and untoward effects of cannabinoids.		
<b>W - 8</b>	<b>Elemental Analysis and Interpretation of Findings</b>	<b>Laura Labay Barry Logan</b>	<b>10/19/10 Morning</b>
	Elements are ubiquitous in the environment and some play critical roles in the maintenance of proper physiologic function. At times, element(s) is suspected in causing either an illness or a death. To best evaluate this type of circumstance from a toxicological perspective it is important to understand and consider the factors that are involved when processing and interpreting cases of this type. This workshop will provide an introduction to elemental analysis and review some commonly utilized analytical techniques. Best specimen collection and handling practices, signs and symptoms associated with exposure and/or poisoning will be discussed in conjunction with the interpretation of analytical findings. Postmortem cases and occupational and environmental exposures will be considered. Finally, the workshop will conclude by discussing some case examples.		
<b>W - 9</b>	<b>Drug Recognition Expert Program - Principles and Practice</b>	<b>Brianna Peterson Matthew Juhascik</b>	<b>10/19/10 Morning</b>
	The Drug Recognition Expert (DRE) program is coordinated by the International Association of Chiefs of Police with support from the National Highway Traffic Safety Administration and the U.S. Department of Transportation. The program was designed to train law enforcement officers with the knowledge and skills to determine if an individual is under the influence of drug(s), and identify the broad category(ies) of drugs inducing the observable signs and symptoms of impairment. The ability of a toxicologist to understand the components of a DRE examination and how to interpret the DRE matrix can assist in directing their analyses. In addition, these observations are often used to support the toxicology results in court.		
<b>W - 10</b>	<b>The Historical Practice of Medicine in Virginia</b>	<b>Carrie Haglock Julia Pearson</b>	<b>10/19/10 Afternoon</b>
	With the rich early American history that Richmond, Virginia has to offer, it was only appropriate that SOFT 2010 will host a historical workshop. This workshop will be based on the medicinal, medical and surgical procedures of the Colonial period through the Civil War. Resources from Williamsburg and Jamestown to the Battlefield Parks of Richmond will be represented in this half day workshop		
<b>W - 11</b>	<b>Piperazines, Designer Amphetamines and Tryptamines</b>	<b>Frank Peters Sarah Kerrigan</b>	<b>10/19/10 Afternoon</b>
	Piperazines, new designer amphetamines and tryptamines are of growing concern among forensic toxicology laboratories in the United States. This workshop will highlight the prevalence and scheduling of these substances by the Drug Enforcement Administration, and attempt to highlight the drugs of greatest concern. The workshop will provide an overview of the toxicology of these emerging drugs and discuss analytical approaches for detection in toxicological samples.		
<b>W - 12</b>	<b>"To Err is Human... to Identify it is Divine"</b>	<b>Jennifer Limoges Dan Anderson</b>	<b>10/19/10 Afternoon</b>
	The dichotomy of the forensic industry goes something like this... there is no room for error, yet human error is inevitable. The way to balance this reality is to have a strong quality assurance program. Laboratory must first set a strong foundation through comprehensive training programs and well written SOPs. then implement monitoring processes, ranging from daily QC tracking to annual self assessments, to identify and prevent problems. When problems are discovered, the laboratory must be prepared to handle them quickly and effectively. This workshop will assist laboratories in developing and strengthening their QA program using a variety of tools from ISO guides, accreditation programs, and forensic labs with successful quality assurance programs. This will better prepare laboratories for accreditation and also maintain accreditation, and provide customers with the utmost confidence in their product.		

## NATIONAL ISSUES

## SCIENTIFIC WORKING GROUP FOR TOXICOLOGY (SWGTOX)- UPDATE

*Submitted by Robert Middleberg, Ph.D., DABFT*

Since reporting in the last ToxTalk, the major activity of the SWG-Tox Co-Chairs was to attend the FBI Sponsored Scientific Working Group (SWG) Meeting held May 12-13, 2010 at the FBI Laboratory in Quantico, VA. This important meeting was a joint session between the Interagency Working Groups (IWGs) and the Scientific Working Groups (SWGs). Also in attendance, and who opened and facilitated the meeting, were Ken Melson (Acting Chair, ATF) and Mark Stolorow (OLES Director, NIST). These two gentlemen, along with Duane Blackburn (Policy Analyst, OSTP), are Co-Chairs of the Subcommittee on Forensic Science as established by the National Science and Technology Council (NSTC) within the Executive Branch of the Federal Government's Office of Science and Technology Policy (OSTP). The shorthand version of all this is the OSTP, a White House executive office, established the NSTC via executive order of then President Clinton. The NSTC established the Subcommittee on Forensic Science in July, 2009 in response to the NAS report on forensic science. The NSTC then established the IWGs. Ironically, many of the SWGs far preceded any of the masters they now must interact with, and in spirit, report to.

Represented at the joint IWG-SWG meeting were 20 different SWGs ranging from SWGANTH (forensic anthropology) to SWGIT (imaging technol-

ogy) to SWGTREAD (shoeprint and tire tread evidence) and everything in-between. The IWGs were represented by at least one of their co-Chairs from the broad categories of: Research, Development, Testing and Evaluation; Standards, Practices and Protocols; Education and Ethics; Certification, Accreditation and Licensing; and Outreach. Each IWG representative gave an overview of IWG activities to date and what their expectations and views of the future will look like, with many things still a work in progress. What was the overall theme, however, is that the NSTC and IWGs are almost completely relying on the SWGs to develop the standards and practices requirements for each of the forensic disciplines. In fact, it almost became a begging situation from these overseers so that none of our disciplines are dictated to, instead, we do the dictating.

So, with the groundwork laid firmly, the question becomes how will the SWGs, including SWG-Tox, accomplish the goal of defining our individual disciplines encompassing everything from policies to procedures to certification and accreditation to education and everything else necessary to establish our footprints. Many SWGs are ahead of the game since they have been long-standing. Toxicology, while a fledgling, formal SWG, has long established practice standards and other required elements, albeit not codified as well as the formal SWG process

would dictate. All three of the SWG-Tox Co-Chairs have established committees or subcommittees or task groups to get us to be more formal in our processes. Other background issues, e.g., By-laws, also need to be considered or addressed. What is clear, though, and a common theme of the IWG-SWG meeting was the need for funding in order for the SWGs to do their jobs effectively. In that respect, some of the long-established SWGs are sponsored by the FBI. Unfortunately, due to budget constraints, the FBI is accepting no more SWGs for funding purposes. That leaves SWG-Tox on its own to find funding. Currently, we have received limited funding from SOFT and ABFT. Importantly, we also received funding from NIJ for our first formal meeting held in Seattle at the AAFS meeting, but no additional funding was set forth. SWG-Tox will be turning to the FTC (Forensic Toxicology Council), that chartered the SWG-Tox, to go through the formal process of applying to NIJ for funding. Without such funding, the SWG-Tox mission will be slow and done exclusively through email and phone conferences, not always the most efficient way to accomplish certain functions and tasks. Regardless, the SWG-Tox will plow forward. The SWG-Tox Co-Chairs remain thankful to everyone for their efforts and willingness to volunteer and dedicate time in this respect.

## NATIONAL ISSUES

## CONSORTIUM OF FORENSIC SCIENCE ORGANIZATIONS (CFSO)-UPDATE

*Submitted by Peter Stout, Ph.D., DABFT*

Since the last Tox Talk issue, things have begun to move at a faster pace with both the legislation and with the Whitehouse. In March, multiple forensic organizations including SOFT were solicited to provide nominations for representatives to the Interagency Working Groups (IWGs) under the Office of Science a Technology Policy (OSTP) subcommittee on Forensic Sciences that was formed in about July of last year. To refresh memories and as there are a lot of players involved, this subcommittee is the under the Whitehouse (executive branch) that presented about the work of the subcommittee at the SOFT meeting in Oklahoma City. If you were unable to attend that session at the meeting we do have an demand version of the presentation available at [www.forensiced.org](http://www.forensiced.org) that is freely available for you to review, we would encourage you to look at that presentation to familiarize yourself with the effort in the Whitehouse to address the NAS report. SOFT nominated Dr. Ruth Winecker, Dr. Bruce Goldberger, Dr. Marina Stajic, Bill Anderson and Dr. Sarah Kerrigan for the requested 5 slots. Dr. Stajic was also nominated by AAFS for one of its requested 5 names and Dr. Yale Caplan was nominated by CFSO for one of its slots.

In April all of the nominees were contacted by the subcommittee to submit the required materials to be vetted for selection. There has been some discussion about why the subcommittee is taking so long to include the solicited individuals from State and Local facilities when the subcommittee, currently with representation only from Federal agencies, continues to conduct business and work toward actionable items. The two co chairs of the subcommittee, Ken Melson (acting direc-

tor of ATF) and Mark Stolorow (NIST) met with CFSO in April to explain. The Federal Advisory Committee Act (FACA) was pointed to as the major impediment to completing this task and the inclusion of State and Local representatives as has been the effort of this subcommittee is a highly unusual step which has required significant legal consultation to facilitate this happening. CFSO also met with Whitehouse counsel and liaison to the subcommittee who also explained a similar logic. As of this issue of Tox Talk, no one has been appointed to the IWGs from the nominations.

However the subcommittee has continued to progress with an agenda much the same as the legislative agenda. In May CFSO chair Pete Marone was invited to speak at a subcommittee meeting to present the counter point to a presentation by Peter Neufeld and Barry Scheck (directors of the Innocence Project [IP]) about IP's legislative proposal. Much of this discussion centered on the desire to see more objective oversight of research efforts and to have the involvement of the National Science Foundation in forensic Science research.

The most significant movement has been the development of potential legislation to address issues raised in the NAS report. Senator Leahy's (D-VT, chair of the Senate Judiciary committee) office has circulated a draft outline of the possible legislation for discussion. We have included this outline here in ToxTalk for the SOFT community to read and comment on. Many of you may have already seen this outline from the Academy as Joe Bono, president of the Academy distributed it to all the Academy membership.

Major items in this of note are the intention for a broad mandate for accreditation and certification from the federal level. Also the concept would create an Office of Forensic Science (OFS) which reports to the Deputy Attorney General (DAG) and a Forensic Science Commission informed by discipline specific subcommittees of scientific working groups (SWGs). Research efforts in forensic sciences would become part of NIST with NIJ retaining programs for capacity building in the public laboratories.

This is a draft document for discussion and there are many opinions and comments currently circulating about how to improve and change this. It is a living document that WILL change many times before there is any final legislation. There are a variety of things from apparent bi partisan support of this effort and support from those in charge of appropriations to the timing of other legislative efforts in the larger Senate agenda that support the possibility of this legislation taking shape this summer.

While it is still difficult to divine how likely or unlikely ultimate passage of legislation will be, the similarities between the Whitehouse efforts and the legislature's efforts increases the likelihood something at the federal level will address these issues of accreditation, certification, education and research.

If you have comments on the legislative proposal we have started a discussion thread on the LinkedIn group which can be accessed at [www.linkedin.com/home?trk=hb\\_home](http://www.linkedin.com/home?trk=hb_home). This way we can collect comments and discussion about the draft legislation.

## NATIONAL ISSUES—CFSO ADDENDUM

### PRELIMINARY OUTLINE OF DRAFT FORENSIC REFORM LEGISLATION 5-5-10

#### **Accreditation:**

- All laboratories that receive federal funds or are funded by an organization that receives federal funding or performs services for the federal government must be accredited.
- The Forensic Science Commission (FSC) will set rigorous standards for accreditation, including educational, proficiency testing, and competency standards for laboratory practitioners, and will reassess these standards periodically. The process for setting and re-assessing these standards must be open and transparent. The FSC will determine what constitutes a laboratory for purposes of accreditation.
- Generally, the FSC will delegate the determining of standards for accreditation to a qualified professional organization. In those instances where this role is delegated, the FSC must perform regular and thorough oversight and reassess the decision to delegate periodically. The designated professional organization must be open and transparent in its process.
- The FSC, or the designated professional organization, will also determine testing, maintenance, and auditing requirements for accredited labs. The FSC will determine a fair fee structure for accreditation, in consultation with the professional organization as appropriate.
- The FSC shall administer the accreditation requirement, or at its

discretion oversee the administering of accreditation by a qualified professional organization, shall determine an appropriate enforcement scheme, and shall oversee enforcement. The FSC or the designated professional organization shall develop and maintain a public list of those laboratories accredited, those denied accreditation, and those whose accreditation has been suspended, limited, or revoked.

#### **Certification:**

- The Forensic Science Commission will determine which disciplines and which practitioners require certification and will periodically reassess this determination.
- In all laboratories and other entities that receive federal funds, are funded by an organization that receives federal funding, or perform services for the federal government, and in all laboratories wishing to be accredited or re-accredited, all individuals who perform forensic analysis in the disciplines requiring certification must be certified.
- The Subcommittees in each discipline will determine the standards for certification, in coordination with the FSC and those professional organizations to which the FSC delegates responsibility for setting accreditation standards. The FSC and Subcommittees shall reassess these certification standards periodically. The standards and the process for determining them must be open and transparent. The substantive Subcommittees

will also determine the parameters of practitioners in their disciplines who must be certified.

- Where a Subcommittee determines that one or more qualified professional certifying organizations exist for a particular discipline, the Subcommittees will generally delegate the determining of standards for certification to those organizations. Should a Subcommittee decide to do so, it must perform regular and thorough oversight and reassess the decision to delegate periodically. The designated professional organization must be open and transparent in its process.
- The certification requirement will be implemented over time, giving current practitioners several years, as determined by the Subcommittee in each discipline, to become certified and giving laboratories several years to come into compliance. The FSC shall determine a deadline by which the certification requirements in all covered disciplines must be implemented.
- The FSC will determine a process for current practitioners to test in to certification, or become certified in a gradual multi-part process, with waiver of some or all degree and training requirements. The FSC will determine a process for new practitioners which requires education and training as part of the certification process. The FSC and Subcommittees will determine a fair fee structure for certification, in consultation with qualified pro-

## NATIONAL ISSUES—CFSO ADDENDUM

### PRELIMINARY OUTLINE OF DRAFT FORENSIC REFORM (CONTINUED)

- professional organizations as appropriate.
- The FSC shall administer certification, or at its discretion oversee the administering of certification by qualified professional organizations in particular disciplines, shall determine an appropriate enforcement scheme, and shall oversee enforcement.
  - NIJ shall administer a grant program and provide technical assistance to assist laboratories and other entities through the transition of continuing work while certifying personnel and seeking accreditation and to help them pay fees for the accreditation and certification process, as well as to assist qualified professional organizations in administering the certification and accreditation processes. Congress shall authorize \$\_\_\_\_ to NIJ for this grant program and technical assistance.
  - The FSC shall consider whether and in what form a new federal rule of evidence or procedure would be appropriate requiring that all those who testify in federal court as forensic experts be certified. The FSC must consider how any such rule would be implemented in a way that guarantees access by defense counsel to certified experts. The FSC shall also consider whether any other changes to the federal rules would be appropriate.
- Research:**
- The Forensic Science Commission shall develop a comprehensive strategy for increasing and improving peer-reviewed scientific research related to the forensic science disciplines, including research addressing issues of accuracy, reliability, and validity in the various disciplines.
  - The Forensic Science Commission, in consultation with the substantive Subcommittees, shall develop a set of priorities for research funding. This list of priorities will be reviewed and reassessed periodically by the Forensic Science Commission.
  - Each of the Subcommittees established by the Forensic Science Commission shall examine the research needs in its applicable forensic science discipline or disciplines, and shall conduct a comprehensive survey of existing research pertaining to each discipline. As part of this survey, each Subcommittee shall identify key areas in which additional research is needed.
  - The Forensic Science Commission and the Director of the Commission shall coordinate with the National Institute of Standards and Technology (NIST) to administer a program to award grants for peer-reviewed research in areas consistent with both the research priorities developed by the Forensic Science Commission and the research needs identified by the Subcommittees.
  - NIST shall solicit proposals and competitively award grants for such peer-reviewed research, and shall, to the extent necessary and appropriate, consult and coordinate with the National Science Foundation (NSF) to ensure the integrity of the process for reviewing and funding these proposals.
  - The Forensic Science Commission shall coordinate with the National Institute of Justice (NIJ) to solicit proposals and competitively award grants for peer-reviewed research related to the applicability of forensic science to civil and criminal legal systems, in accordance with priorities developed by the Forensic Science Commission. This program shall also encourage research aimed toward increasing the efficiency and effectiveness of forensic testing procedures, including the use of new technologies, and increasing the capacity of forensic testing that may be effectively processed by forensic labs. NIJ shall consult and coordinate with NSF to ensure the integrity of the process for reviewing and funding these proposals.
  - NIST and NIJ shall each submit a report to the FSC annually detailing the application process, grants awarded, and as appropriate status and results of previously awarded grants. The FSC shall evaluate these reports and if appropriate redirect these grant programs in accordance with the FSC's priorities.
  - Congress shall authorize \$ \_\_\_\_ annually for the research grants administered by NIST, and \$\_\_\_\_ annually for the research grants administered by NIJ.

## NATIONAL ISSUES—CFSO ADDENDUM

### PRELIMINARY OUTLINE OF DRAFT FORENSIC REFORM (CONTINUED)

#### **Standards/Best Practices:**

- The Forensic Science Commission shall, in consultation with the Subcommittees and NIST, establish standard protocols, methods, practices, quality assurance standards, and reporting terminology for each applicable forensic science discipline in order to ensure the quality and integrity of the data generated.
- The Subcommittees shall develop standard protocols, methods, practices, quality assurance standards, and reporting terminology for each applicable discipline, and transmit these to the Forensic Science Commission for approval. The Subcommittees shall periodically review these standards and recommend any necessary revisions.
- The Subcommittee in each discipline may alternatively at its discretion delegate to a qualified professional organization the task of determining standards, protocols, methods, practices, and reporting terminology. Should a Subcommittee decide to do so, it must perform regular and thorough oversight and reassess the decision to delegate periodically. The designated professional organization must be open and transparent in its process.
- The FSC shall promulgate and disseminate these standards, and shall develop and oversee a system for enforcing these standards.

- NIJ shall develop and disseminate a manual explaining the standards and best practices, and their use and applicability in the context of the justice system.

#### **Oversight and Coordination:**

- The President shall appoint members to a Forensic Science Commission (FSC) after reviewing recommendations from the National Academy of Sciences and the American Academy of Forensic Sciences. The members of the FSC shall include scientists from a variety of disciplines including the forensic sciences, judges, representatives of the federal and state and local prosecution and law enforcement communities, representatives of the criminal defense community and post-conviction advocates, and other relevant stakeholder communities. A majority of FSC members must have comprehensive scientific backgrounds.
- The FSC shall operate out of the office of the Deputy Attorney General. The FSC shall be staffed by an Office of Forensic Science (OFS), which shall include a Director appointed by the Deputy Attorney General, a Deputy Director appointed by the Director of the National Institute of Standards and Technology and detailed to the OFS, and whatever other staff the FSC deems necessary. The FSC shall also consult regularly with

the Directors of the National Science Foundation and the National Institute of Justice and senior officials from other relevant federal agencies.

- The OFS shall have the authority to implement recommendations of the FSC. Implementation of scientific recommendations made by the FSC shall be coordinated by the Deputy Director, in consultation with NIST. The FSC and OFS shall have interagency authority.
- The FSC shall determine a list of major forensic disciplines for which there shall be appointed substantive Subcommittees to examine research needs, promulgate standards and best practices, develop certification standards, and other appropriate duties. The FSC shall periodically revisit and update this list. In addition, the FSC shall consider what role, if any, should be played in this process by existing Scientific Working Groups.
- The FSC shall consider every field in which courts hear forensic testimony and shall come up with recommendations in any fields for which it determines no Subcommittee is necessary. Should the FSC determine that a Subcommittee is not necessary because a field has no scientific basis, the FSC must issue a public statement setting out and explaining this decision. Should the FSC determine that a field can appropriately be cov-

## NATIONAL ISSUES—CFSO ADDENDUM

### PRELIMINARY OUTLINE OF DRAFT FORENSIC REFORM (CONTINUED)

- |   |   |   |
|---|---|---|
| <p>ered by a Subcommittee in a related field or is already sufficiently regulated by some other existing entity, it must clearly and publicly set out and explain this conclusion.</p>  | <p><i>and corporations with appropriate disclosure and safeguards, in order to ensure cost-effective and highly reliable research;</i></p>  | <p><i>science and fundamental scientific principles, including the competent use and evaluation of forensic science evidence;</i></p>   |
| <ul style="list-style-type: none"> <li>• Subcommittees shall be made up of scientists from a variety of scientific disciplines including the forensic sciences, all of whom have knowledge relevant to the individual discipline, though they need not be specialists in that particular discipline. ◇</li> </ul> | <ul style="list-style-type: none"> <li>◇ <i>Determine requirements for education and degree programs in the forensic fields, and encourage the development of more and higher quality academic programs in the forensic fields;</i></li> </ul>  | <ul style="list-style-type: none"> <li>◇ <i>Determine effective ways to encourage inter-operability of databases and technologies in all forensic disciplines; and</i></li> </ul>   |
| <ul style="list-style-type: none"> <li>• The members of each Subcommittee shall be appointed by the FSC’s Deputy Director in consultation with the members of the FSC. ◇</li> </ul>   | <ul style="list-style-type: none"> <li>◇ <i>Determine steps to encourage all jurisdiction to require the comprehensive use of medical examiners and to encourage more well-qualified individuals to become medical examiners;</i></li> </ul>  | <ul style="list-style-type: none"> <li>◇ <i>Develop a Code of Ethics for the forensic sciences, and determine an appropriate system for encouraging its use and enforcement.</i></li> </ul>   |
| <ul style="list-style-type: none"> <li>• NIST shall provide support to the Subcommittees and shall perform periodic oversight to ensure that the Subcommittees are performing their duties appropriately. Any problems found by NIST shall be reported back to the FSC. ◇</li> </ul>                              | <ul style="list-style-type: none"> <li>◇ <i>Examine ways that the forensic sciences can be marshaled toward emergency preparedness, in coordination with the Department of Homeland Security;</i></li> </ul>  | <ul style="list-style-type: none"> <li>• Congress shall authorize \$_____ annually for the operation and staffing for the FSC and Subcommittees, \$_____ annually for the operation and staffing of OFS, and \$_____ annually for NIST for oversight and other duties connected with</li> </ul> |
| <ul style="list-style-type: none"> <li>• In addition to the duties set out above with respect to accreditation, certification, research, and standards, the FSC shall, in coordination and consultation with qualified professional organizations, perform or oversee the following functions: ◇</li> </ul>       | <ul style="list-style-type: none"> <li>◇ <i>Coordinate as appropriate with the National Science Foundation, the Department of Defense, the National Institute of Health, and any other relevant federal agencies, particularly in regard to making efficient and appropriate use of existing research expertise and funding;</i></li> </ul> |   |
| <ul style="list-style-type: none"> <li>◇ <i>Determine steps to encourage research collaboration between universities, state and local forensic laboratories, and private laboratories</i> ◇</li> </ul>  | <ul style="list-style-type: none"> <li>◇ <i>Determine steps to encourage the education and training of law students, attorneys, and judges in forensic</i></li> </ul>   |   |

NOTABLE QUOTE:

FACTS ARE STUBBORN THINGS; AND WHATSOEVER EVER MAY BE OUR WISHES, OUR INCLINATIONS OR THE DICTATES OF OUR PASSION, THEY CAN NOT ALTER THE STATE OF FACTS AND EVIDENCE.

*John Adams*



**TOXICOLOGY - BITS & PIECES**  
*Section Editor, J. Robert Zettl, MPA (jrzettl1@msn.com)*

**AAFS -  
 TOXICOLOGY SECTION NEWS**

*Submitted by Ruth Winecker, Ph.D.,  
 Section Program Chair*

The theme for the AAFS 2011 meeting (Chicago, IL Feb 21-26) is Relevant, Reliable and Valid Forensic Science: Eleven Sections—One Academy.

What does this topic mean to you and what types of toxicology presentations would you like to see at the 2011 AAFS meeting? Are there any topics that you feel are particularly timely and in need of further research? As your 2011 toxicology section program chair ([winecker@ocme.unc.edu](mailto:winecker@ocme.unc.edu)), I would like to encourage you to take the proverbial horse by the reigns, get involved and make this program yours.

I know that the August 1<sup>st</sup> deadline has a tendency to catch you by surprise and is not the best time of year for many with end of fiscal year issues and university related deadlines, however the academy is a large and busy organization and the deadline is firm so plan ahead. The process for submission of abstracts and special session and workshop proposals is entirely on-line via the academy website ([www.aafs.org](http://www.aafs.org)).

Plans for the program are taking shape with the focus on recruiting special sessions and workshops. Robert Middleburg (Robert.Middleburg@NMSLABS.COM) has once again graciously agreed to moderate a special session on pediatric toxicology. This topic is a highly regarded staple of the scientific program which is not routinely covered elsewhere and therefore of much importance to the AAFS membership. If you have an interest in presenting a case or being involved in this session, please contact me or Rob. At present, we have three potential workshop chairs that have contacted Loralie Langman ([Langman.Loralie@mayo.edu](mailto:Langman.Loralie@mayo.edu)) with various topics that they intend to

submit. Thank you to these brave souls who are venturing to provide AAFS attendees with quality continuing education options.

Of course, we could still use more ideas and volunteers to help coordinate workshops and special sessions. As a bonus and incentive, the advantage to moderating a special session over a workshop is that there is no need to provide handout materials to the attendees so the AAFS deadlines are a bit more forgiving. I would encourage you all to think about participating in this way. Again, anyone with an interest in chairing workshops or moderating special sessions should contact me or Loralie.

**AAFS / SOFT  
 JOINT DRUGS &  
 DRIVING  
 COMMITTEE**

*Submitted by Jennifer Limoges, M.S.,  
 Committee Chair*

The SOFT/AAFS Drugs & Driving Committee will be very active at the upcoming SOFT annual meeting in Richmond. The committee is sponsoring the workshop "Marijuana Pharmacology - Practical Applications for the Forensic Toxicologist" on Monday, October 18, co-chaired by Amy Cochems and Fiona Couper. And the Drugs & Driving Special Session later in the week will be coordinated by Mike Wagner. The committee meeting will be held Monday evening, right after the workshops, and is always open to anyone who's interested in our activities. Also, don't forget about those early submission deadlines for the AAFS 2011 Special Session, coordinated by Laura Liddicoat.

**NATIONAL SAFETY  
 COUNCIL—  
 COMMITTEE ON  
 ALCOHOL AND  
 OTHER DRUGS**

*Submitted by Laura Liddicoat, B.S.,  
 NSC Secretary*

The next meeting of the NSC Executive Board will be held at the upcoming SOFT annual meeting on Friday, October 22 from 1-5pm. All COAD members are invited to attend. Current committee officers are:

- Mack Cowan - Chair,
- Dennis Canfield - Vice Chair
- Laura Liddicoat – Secretary

To access the CAOD policies, previous Borkenstein Award recipients or learn more about the committee go to [www.nsc.org](http://www.nsc.org) and type in Committee on Alcohol and Other Drugs under the search engine.

The Executive Board has yet to announce its next recipient of the Robert F. Borkenstein Award. This distinguished honor will be presented at a banquet and ceremony which will be held at the annual AAFS meeting next February in Chicago.

The individual receiving the Borkenstein award is one who has a minimum tenure of 25 years of active service in the area of alcohol/drugs and traffic safety, has contributed to that field to a degree that their achievements are nationally recognized and has a minimum of 10 years of active and productive involvement as a volunteer with the National Safety Council.



## NEW DRUGS

Section Editor, Dan Anderson, M.S., FTS-ABFT (danderson@coroner.lacounty.gov)

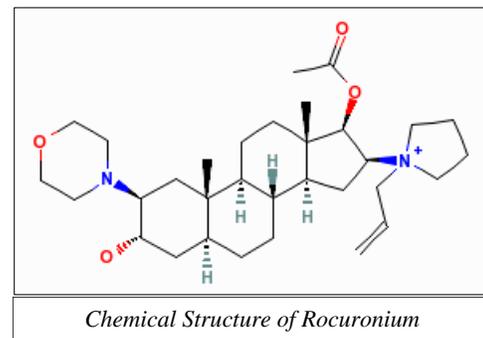
## NEW "OLD" DRUG: Rocuronium (Zemuron®)

Submitted by: Kevin G. Shanks (kshanks@aitlabs.com) AIT Laboratories, Indianapolis, IN 46241

Rocuronium, a non-depolarizing neuromuscular blocking agent, was released to the market in the United States in 1994 and marketed under the trade name Zemuron®. It is manufactured by Baxter Pharmaceutical Solutions, LLC (Bloomington, IN, USA) and Organon Ltd. (Dublin, Ireland) and distributed by Schering Corporation. It is indicated as an adjunct to general anesthesia to aid both rapid sequence and routine tracheal intubation, and to provide skeletal muscle relaxation during surgery or mechanical ventilation<sup>1,2</sup>. Due to its use in routine medical procedures, in which death could follow, as well as its possible role in suicides and murder cases, the drug was added to our comprehensive panel of drugs in 2008. In routine casework over the past 2 years, rocuronium has been detected in 68 cases and postmortem whole blood concentrations ranged from 25 ng/mL – 24,633 ng/mL. Analytical reference standards can be purchased from Sigma-Aldrich (R5155) and Toronto Research Chemicals, Inc. (R639500). Its primary metabolite, 17-desacetylrocuronium is available from Toronto Research Chemicals, Inc. (D288705). Rocuronium is chemically related to Pancuronium (Pavulon®) and Vecuronium (Norcuron®).

### General Information

IUPAC name:	1-[17β-(acetyloxy)-3α-hydroxy-2β-(4-morpholinyl)-5α-androstan-16β-yl]-1-(2-propenyl)pyrrolidinium bromide
Common name:	Rocuronium, Rocuronium bromide, Org-9426
Trade Name:	Zemuron® (United States), Esmeron® (outside of United States)
Appearance:	White to off-white colored powder; clear to yellow/orange liquid
Chemical formula:	C <sub>32</sub> H <sub>53</sub> N <sub>2</sub> O <sub>4</sub> <sup>+</sup> (base), C <sub>32</sub> H <sub>53</sub> BrN <sub>2</sub> O <sub>4</sub> (base + salt)
Molecular weight:	529.77 (base), 609.68 (base + salt)
CAS number:	119302-91-9
Rx dosage:	Tracheal Intubation – initial dose of 0.6 mg/kg Rapid Sequence Intubation – 0.6 to 1.2 mg/kg Continuous Infusion – initial rate of 10 to 12 mcg/kg/minute <sup>3</sup>
Recreational dose:	N/A
Availability:	Hospitals, Medical Facilities, Emergency Rooms 5 mL vial with 50 mg of active ingredient (10 mg/mL) 10 mL vial with 100 mg of active ingredient (10 mg/mL)



### Pharmacology

Half-Life:	1.0 – 1.8 hours <sup>4</sup>
Elimination:	Eliminated in the urine as unchanged drug and 17-desacetylrocuronium
Mechanism of Action:	Competes for cholinergic receptors at the motor-end plate in the neuromuscular junction

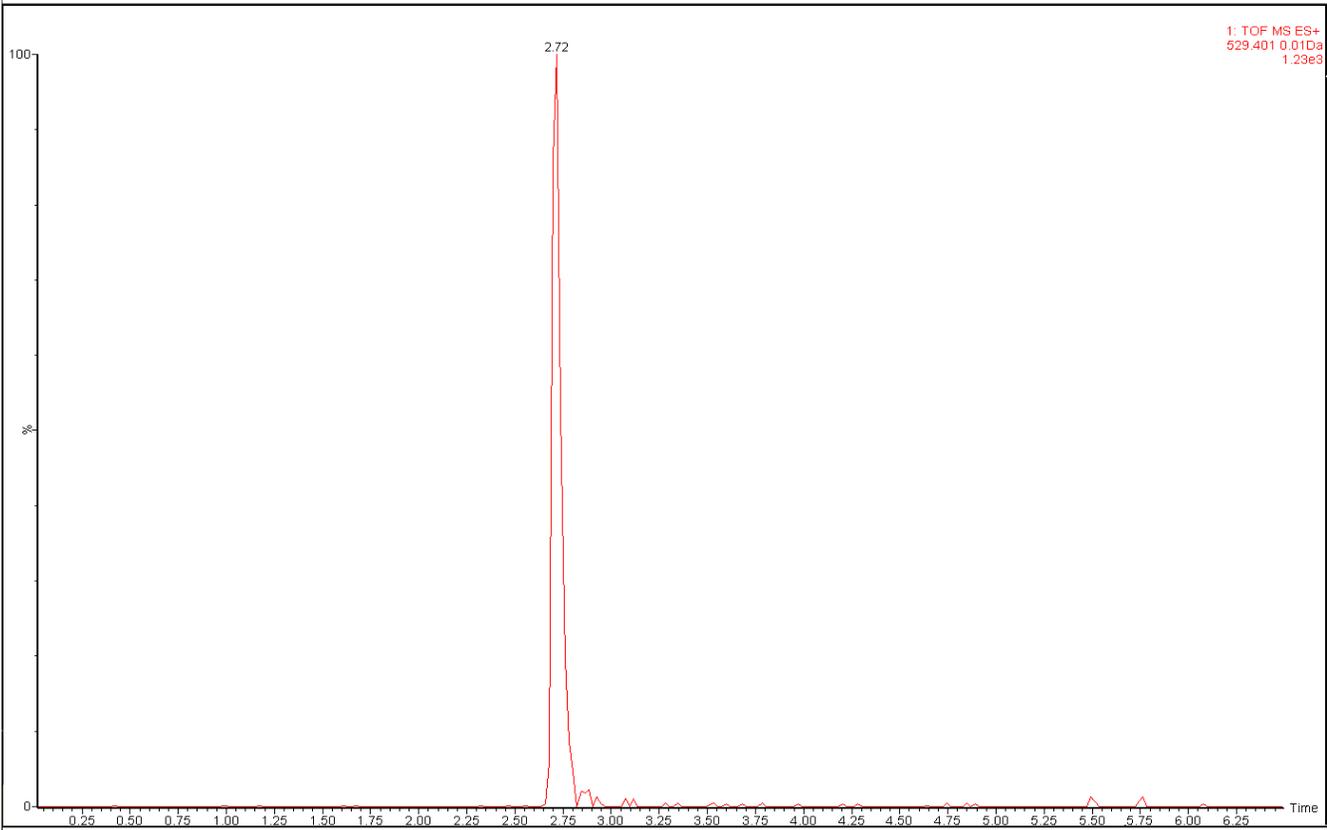
### Analytical Toxicology

Screening Analysis:	LC-ToF following a protein precipitation extraction with acetonitrile; Limit of detection (LOD) is 10 ng/mL Theoretical accurate [M+H] <sup>+</sup> is 529.4005. Theoretical accurate [M+2H] <sup>2+</sup> is 265.2042.
Confirmatory Analysis:	LC/MS/MS following a liquid-liquid extraction with methylene chloride Linearity 25 ng/mL – 10,000 ng/mL; Quadratic curve fit; Laudanosine as an internal standard Quantitative MRM is 529.389 → 70.06 Qualitative MRM is 529.389 → 112.14

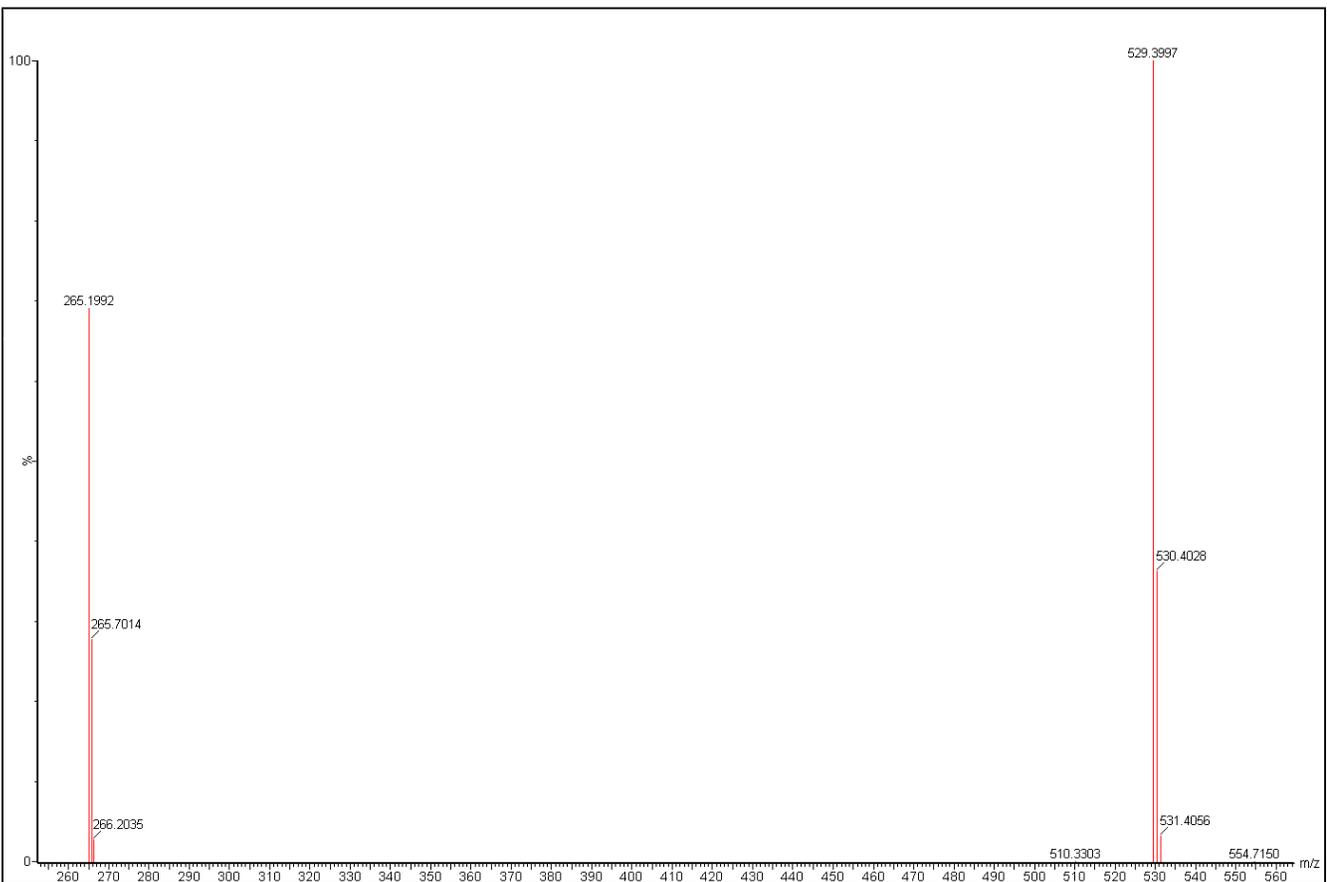
### References

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### NEW DRUGS (CONTINUED)

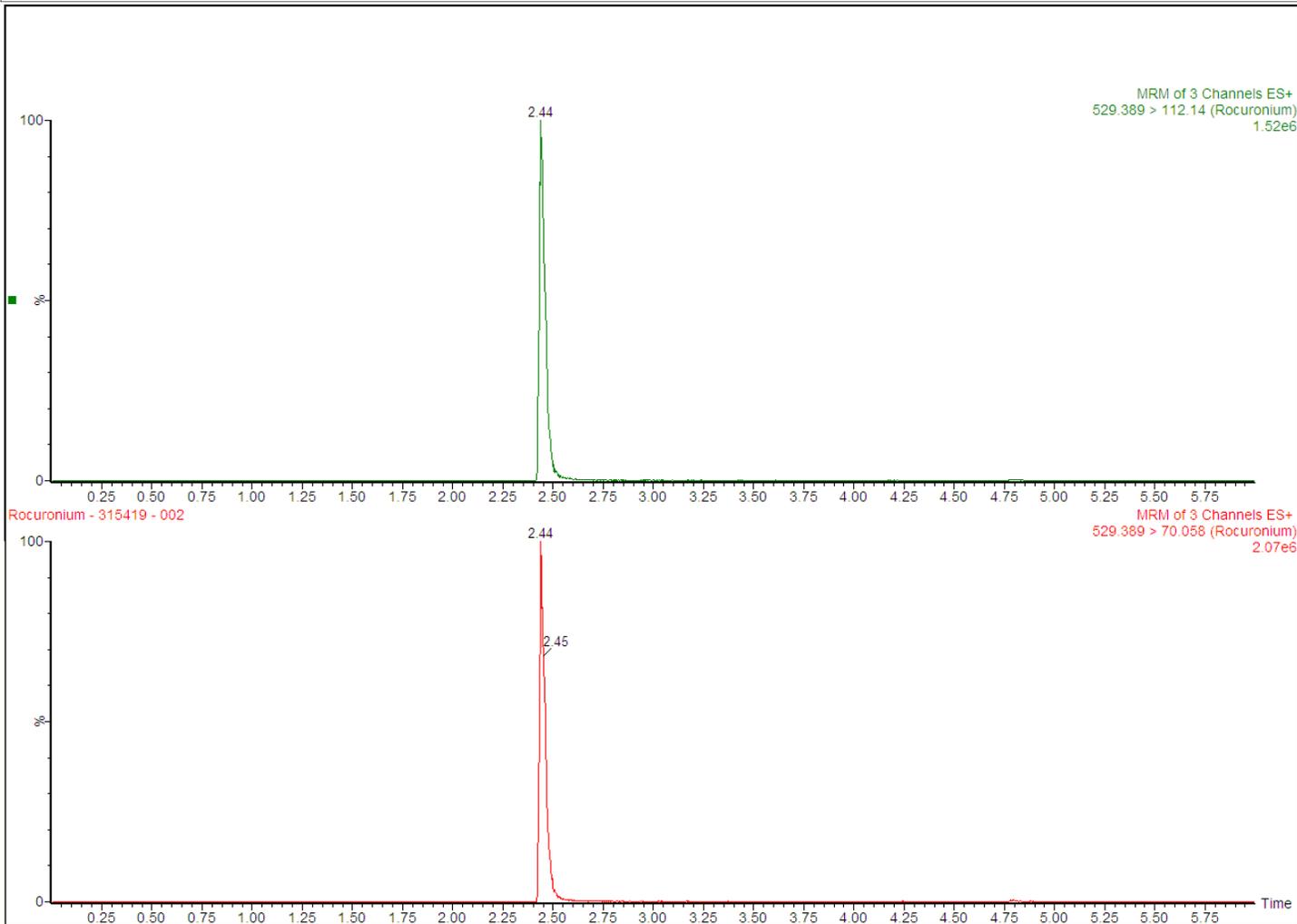


**Figure 1 -  
LC-ToF Extracted Ion Chromatogram (XIC) of Rocuronium in  
Postmortem Whole Blood Specimen**



**Figure 2 -  
LC-ToF Extracted Ion Spectrum (XIS) of Rocuronium in Postmortem  
Whole Blood**

## NEW DRUGS (CONTINUED)



**Figure 3 -**  
**Confirmatory Analysis of Rocuronium by LC/MS/MS – Postmortem Whole Blood Specimen (750 ng/mL)**

## ANNUAL MEETING REGISTRATION FOR SOFT 2010 NOW AVAILABLE

Registration is now “open” for the October 18-22, 2010 annual meeting of the Society of Forensic Toxicologists. The link is now “live” at the main meeting website, [www.soft2010.org](http://www.soft2010.org). Plan to visit the meeting website frequently to learn of updated planned activities, and familiarize yourself with Richmond tourist attractions! This website also includes information on the four participating hotels. Reservations and accommodations can easily be made utilizing the provided links.

A second option to link to the SOFT2010 Meeting Registration can be found at the SOFT organization website, [www.soft-tox.org](http://www.soft-tox.org).

Anyone encountering problems, or simply needing questions answered about the 2010 annual meeting registration, can call the SOFT Admin. Office, toll free @ 888-866-7638, or send an email to [bonnie\\_soft@yahoo.com](mailto:bonnie_soft@yahoo.com).



## DRUGS IN THE NEWS

Submitted by Section Editor, Dwain C. Fuller, D-FTCB, TC-NRCC

Original news item submitted by Troy Merrick

## HERBAL INCENSED

Send interesting "Drugs In The News" to Section Editor, Dwain Fuller, (Dwain.Fuller@va.gov)

You've probably guessed it by now. I am a skeptic by nature. I am particularly circumspect about believing anecdotal accounts of just about anything. I've become even more jaded in light of the number of urban legends that otherwise intelligent people send to my inbox each week. Thus is my reason for waiting this long to cover the Spice/K2 issue. It was my contention that I should wait and see what happens. I figured that if one is willing to smoke some mix of herbs that one doesn't even know the identity of, a person is likely to get sick and have some bad experiences, as well as some real, or perhaps imagined, good experiences, i.e. placebo effect. However, there now appears to be reliable scientific evidence



that at least some of these products contain potent cannabinoid-like compounds.

### What are "K2" and "Spice"?

K2 and Spice are trade names for two different products, but what they have in common is that they are sold as "herbal incense" or "herbal smoking blends". These products have become very popular with teenagers across the nation who are using them in place of marijuana, fueled by their ease of

purchase (internet and "head shops") and their legal status in most areas. The users of these and similar products are beginning to show up in emergency rooms with hallucinations, nausea, vomiting, hypersomnolence, agitation, and other adverse reactions.

The origins of Spice and K2 appear to be primarily in Europe, China and Korea, with many competing products, or "knock-offs", appearing for sale on the internet daily. A check of one website offered various K2 products: K2 Summit, K2 Blue, K2 Pink, K2 Mango, K2 Citron, and K2 Bubblegum, for sale at prices ranging from about \$10 to \$15 per gram. The ingredient list on the package claims that it contains a number of herbal products. However, there is growing evidence that herbs are not the only active ingredients.



announced that another synthetic cannabinoid known as CP 47,497 had been detected in Spice.

- In March 2009 the Drug Enforcement Administration reported in the *Microgram Bulletin* that Customs and Border Protection – Chicago Laboratory, had recently found the synthetic cannabinoid, HU-210, in "small but verifiable amounts" in "incense" labeled as "Spice Gold", "Spice Silver", "Spice Diamond", "Genie", and "Yucatan Fire".
- Not to be outdone, in October 2009 the Johnson County Criminalistics Laboratory in Mission, Kansas reported that it detected the presence of two synthetic cannabinoids, JWH-018 and JWH-073, in a K2 product submitted to the laboratory.

### Synthetic Cannabinoids, a Primer:

This subject is too vast to cover in depth in an article such as this, so I will provide an overview of the various synthetic cannabinoids that have been implicated in these "herbal blends":

#### JWH-018

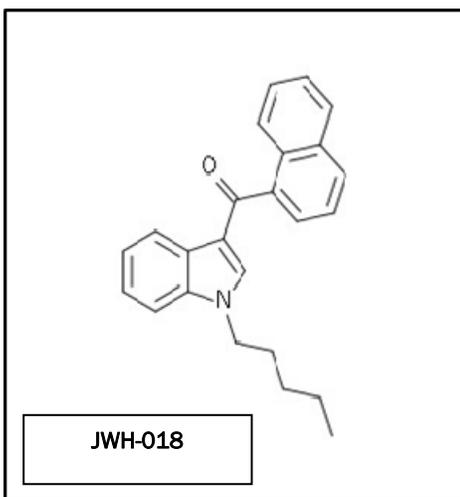
All of the "JWH" designated cannabinoids take their prefix initials from Clemson University organic chemist, John W. Huffman. Dr. Huffman's research interests include the synthesis of analogues and metabolites of THC, with the goal of developing new pharmaceutical prod-

- On December 15, 2008 the German pharmaceutical company, THCPharm, announced that it had found the synthetic cannabinoid, JWH-018, in at least three versions of Spice.
- On January 19, 2009 the University of Freiburg in Germany

## DRUGS IN THE NEWS (CONTINUED)

ucts and elucidating the geometry of the CB<sub>1</sub> and CB<sub>2</sub> receptor.

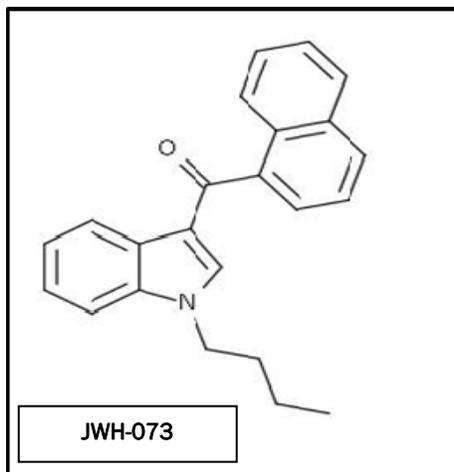
Dr. Huffman first synthesized JWH-018 in the mid-1990's, but notes that JWH-018 was being sold as a plant growth stimulant in China and Korea even before he published a book chapter of the synthetic scheme for this and other cannabinoid agonists.



JWH-018 has a molecular mass of 341.45 and bears the IU-PAC name, Naphthalen-1-yl-(1-pentylindol-3-yl)methanone. JWH-018 acts as an agonist at both the CB<sub>1</sub> and CB<sub>2</sub> receptors with some selectivity for the CB<sub>2</sub>, and produces marijuana-like effects of somewhat longer duration. JWH-018 is not currently scheduled in the United States.

### JWH-073

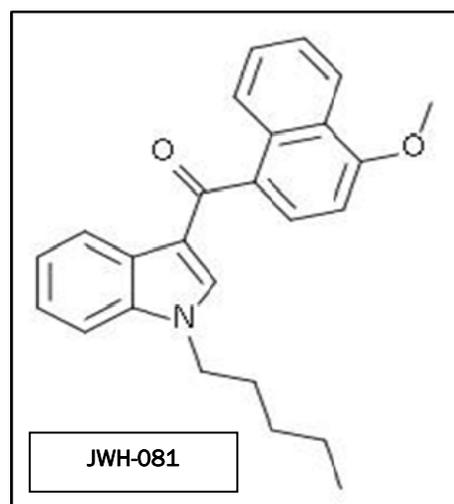
JWH-073 has a molecular mass of 327.42 and bears the IU-PAC name, Naphthalen-1-yl-(1-butylindol-3-yl)methanone, differing by only a methylene group in the alkyl chain on the indole portion of the molecule from JWH-018. JWH-073 is a CB<sub>1</sub> and CB<sub>2</sub> receptor agonist with approximately 5 times the affinity for the CB<sub>2</sub> compared to the CB<sub>1</sub> receptor.



JWH-073 is not currently scheduled in the United States.

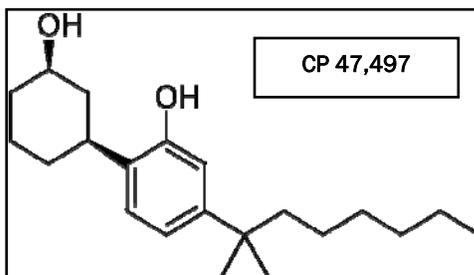
### JWH-081

JWH-081 has a molecular mass of 371.47 and bears the IU-PAC name, 4-methoxynaphthalen-1-yl-(1-pentylindol-3-yl)methanone, differing from JWH-018 by a methoxy group in the 4 position of the naphthalene portion of the molecule. JWH-081 is a CB<sub>1</sub> and CB<sub>2</sub> receptor agonist with selectivity for the CB<sub>1</sub> receptor approximately 10 times that of the CB<sub>2</sub> receptor. There is speculation that JWH-081 is replacing JWH-018 in herbal blends that are being marketed in states where the latter is being banned. JWH-081 is not currently scheduled in the United States.



### CP 47,497

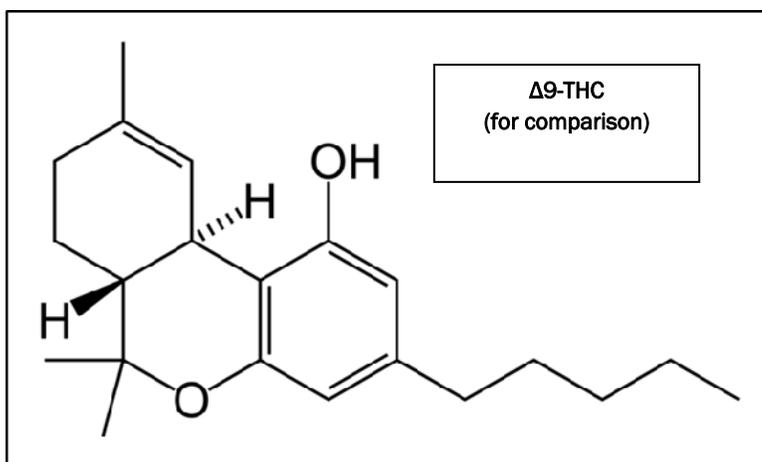
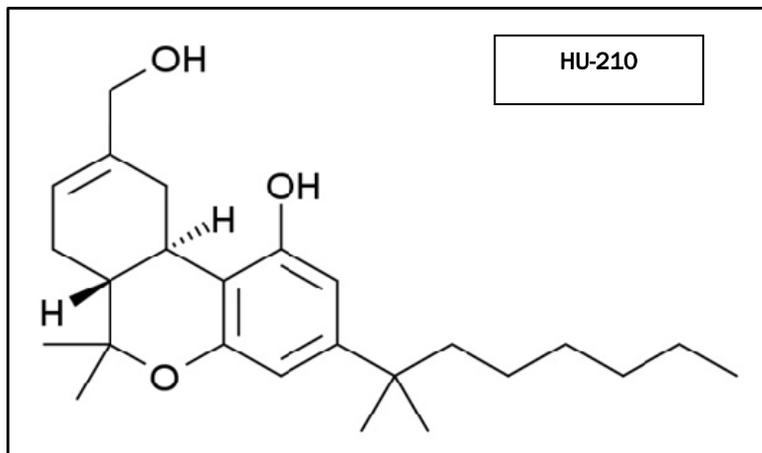
CP 47,497 has a molecular mass of 318.49 and bears the IU-PAC name, 2-[(1R,3S)-3-hydroxycyclohexyl]-5-(2-methyloctan-2-yl)phenol. CP 47,497 was developed by Pfizer in the 1980's and is reported to be a potent CB<sub>1</sub> agonist. CP 47,497 is not currently scheduled in the United States.



### HU-210

HU-210 has a molecular mass of 386.57 and bears the IU-PAC name, (6aR,10aR)-9-(Hydroxymethyl)-6,6-dimethyl-3-(2-methyloctan-2-yl)-6a,7,10,10a-tetrahydrobenzo [c]chromen-1-ol. Noteworthy is the extreme similarity to Δ<sup>9</sup>-THC, differing only in the alkyl group, an additional hydroxyl group, and the position of the double bond, which is analogous to Δ<sup>8</sup>-THC. HU-210 was first synthesized by a group at Hebrew University (thus the "HU" designation) led by Professor Raphael Mechoulam. In mice HU-210 decreased overall activity, produced analgesia, decreased body temperature, and produced catalepsy. In in-vitro studies, HU-210 bound both the CB<sub>1</sub> and CB<sub>2</sub> receptors. HU-210 is reported to be 100 – 800 times more potent than THC with an extended duration of action. HU-210 is a schedule I controlled substance in the United States.

## DRUGS IN THE NEWS (CONTINUED)



the trend continues. If it does, laboratories will need to gain access to standards for these compounds and to develop assays to detect these substances, which in some incidences are many times more potent than Δ9-THC.

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CP 47,497, U.S. Department of Justice Drug Enforcement Administration, Office of Diversion Control, [http://www.deadiversion.usdoj.gov/drugs\\_concern/spice/spice\\_cp47497.htm](http://www.deadiversion.usdoj.gov/drugs_concern/spice/spice_cp47497.htm) Accessed 4/20/10

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### Legality

For the most part, K2, Spice and related products are not illegal in the United States based on their stated ingredients. Their continued legal status will depend, in part, on whether they are found to universally contain synthetic cannabinoids, whether those substances are controlled, as is HU-210, and whether any of the other included cannabinoids will be deemed to fall under the Federal Analog Act, which is a rather confusing document in its own right.

### Summary

The use of clandestine synthetic cannabinoids in the guise of herbal preparations appears to be an increasing problem, especially among teens. Only time will tell if

### References

Fake Weed, Real Drug: K2 Causing Hallucinations in Teens. Fox News, Thursday, March 04, 2010

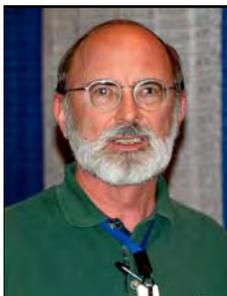
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*The opinions expressed herein are solely the opinions of the author and do not necessarily reflect the opinions of the Society of Forensic Toxicologists, Inc.*



CASE NOTES

Section Editor, Matthew Barnhill, Ph.D., DABFT

Send interesting "Case Notes" to Section Editor, Matthew Barnhill (mbarnhilljr@worldnet.att.net)

AN UNUSUALLY HIGH POST-MORTEM CONCENTRATION OF MORPHINE

Submitted by: Mark Lichtenwalner, Ph.D., Karen Sgarlata, M.S., Robert Stoppacher, M.D., Center for Forensic Sciences, Health Department, Onondaga County, NY

The Onondaga County Health Department was recently involved with a post-mortem case with an extremely high concentration of free (unconjugated) morphine. The case involved the death of a 43 year old female with a medical history significant for a recurrent skull base tumor (acoustic neuroma) with multiple associated surgical procedures/ complications as well as clinical depression. She was found deceased in a secured hotel room after last being known alive 3 days prior. A pill organizer was present in the decedent's purse and a single tablet (morphine IR 15 mg; Ethex Corp.) was found on the floor of the hotel room next to the bed. Autopsy examination did not reveal an anatomic cause of death. There was no gross or microscopic pathology of the kidneys or liver. There was evidence of recent surgical intervention with a Baha screw device in the left postauricular region with an associated healing surgical wound. There was no internal brain infection or hemorrhage. The gastric contents consisted of 200 cc. of dark liquid with small, white granules suggestive of pill residue, but no intact pills.

Samples collected during autopsy included central blood, peripheral blood, urine, vitreous fluid, liver, and gastric contents. Samples were tested for volatiles, carbon monoxide, ethylene glycol, and drugs using immunoassay and GC/MS for alkaline and weakly acidic/neutral compounds. The blood sample was negative for volatiles, carbon monoxide, and ethylene glycol. Immunochemical assay gave a positive response for opiates and benzodiazepines. Drugs identified by GC/MS included acetaminophen, citalopram, desmethylcitalopram, codeine, diphenhydramine, hydrocodone, hydromorphone, lorazepam, morphine, and oxycodone. Quantitative results utilizing GC/MS are listed in the table below. Based upon these results, the cause of death was certified as multiple drug intoxication, and the manner was suicide.

The concentrations and distribution of citalopram and oxycodone are consistent with chronic therapeutic intake. The concentrations of lorazepam and diphenhydramine in blood are clearly elevated; this is supported by

the diphenhydramine liver concentration. The concentration of morphine is incredibly high in both blood and liver; far greater than has been previously reported in the literature.<sup>1,2,3</sup> We speculate that the codeine (~0.1% of the concentration of morphine) is due to trace contamination in the pharmaceutical product.<sup>4</sup>

References:

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	Peripheral Blood	Central Blood	Liver	Urine	Gastric contents
<b>Acetaminophen</b>	positive	NT	positive	positive	NT
<b>Citalopram</b>	positive	0.12 mg/L	3.4 mg/kg	NT	NT
<b>Desmethylcitalopram</b>	positive	positive	3.6 mg/kg	NT	NT
<b>Codeine</b>	<0.05 mg/L	NT	0.07 mg/kg	negative	NT
<b>Diphenhydramine</b>	positive	~0.6 mg/L	10.3 mg/kg	NT	NT
<b>Hydrocodone</b>	negative	NT	negative	positive	NT
<b>Hydromorphone</b>	negative	NT	negative	positive	NT
<b>Lorazepam</b>	positive	~0.8 mg/L	6.5 mg/kg	positive	NT
<b>Morphine (free)</b>	43.6 mg/L	NT	136 mg/kg	NT	438 mg (total)
<b>Morphine (total)</b>	59.1 mg/L	NT	171 mg/kg	positive	NT
<b>Oxycodone</b>	0.05 mg/L	NT	0.14 mg/kg	positive	NT
<i>NT = not tested</i>					

## SPECIAL REPORT

## CLASSICAL COLOR TESTS FOR TODAY'S TOXICOLOGY LAB

Submitted by: Theodore J. Siek, Ph. D., DABFT

Many toxicology laboratories have abandoned nearly all chemical based screening tests because such tests are considered "non-specific." But nearly all screening tests by immunoassay techniques have some degree of non-specificity. Three easy to use color tests which streamline efforts for laboratories involved in general screening tests to rule in or rule out classes of drugs and toxins are described below. The specificities in chemical structure are defined, thereby satisfying the need for knowing what a positive test implies.

**Trinder's reagent for salicylates:**

Prepare 1 L of reagent by adding 40 g ferric nitrate nona hydrate and 40 g mercuric chloride to 800 mL water plus 10 mL conc. HCl; stir to dissolve the salts and make up to 1 L with deionized (DI) water. The reagent is stable for at least 2 years. Salicylates will produce a purple color on adding 1 vol of test to 3 vols of reagent.

Chemical structure producing a positive: *o*-hydroxybenzoic acid and *o*-hydroxybenzoic acid esters or amides; salicylic acid, salicylamide, methylsalicylate, diflunisal, labetalol, and phenylsalicylate. Acetylsalicylate will react if strong aq. NaOH is added for a few minutes, the solution acidified, and then treated with **Trinder's**. Parahydroxybenzoic acid and meta-hydroxybenzoic acids will not react with **Trinder's**. Some substances give colors but not purple colors and are therefore considered negative to the reaction.

Other substances and drugs reacting with **Trinder's** are antipyrine, dipyrone, pyramidon, and sodium azide. These substances are very improbable relative to salicylates. Azide gives a reaction with aq. 0.5% ferric chloride, producing a color distinguishable from the salicylate color. A positive test is nearly always salicylic acid. Suitable test specimens include dissolved tab-

lets and powders, urine, watery gastric contents, and serum, urine, and blood (centrifuge after addition of the reagent).

**FPN reagent for phenothiazines and some tricyclics:**

To 100 mL DI water add 90 mL of 60-70% perchloric acid, 135 mL of 70% nitric acid, and 15 mL of a 5% wt/vol aq. FeCl<sub>3</sub> (FPN components). This reagent may be used as is or diluted with DI water, 20% of total vol., to extend its use. Store in a brown bottle and check potency after every 6 months. Test aq. solutions by adding the prepared reagent dropwise and note the colors produced. Table 1 below indicates the screening utility.

Metabolites of the drugs react similar to parent drugs. Phenothiazine metabolites have many varying colors – blues, pinks, reds, and deep yellows, particularly with **FPN** sprayed on TLC plates.

**o-Cresole test for acetaminophen**

Add 10 mL of reagent *o*-cresole to 1 L of DI water and stand overnight

to saturate; pour off from undissolved *o*-cresole. The reacting substance is *p*-hydroxyphenol. To test for acetaminophen or phenacetin, first hydrolyze the test solution by adding 0.5 parts conc. HCl to test specimen (urine, gastric contents, or unknown) and heat for 15 min. near boiling T. Cool, and make strongly alkaline with conc. NH<sub>4</sub>OH. To 5 drops of neutralized hydrolysate add 1 mL of reagent and observe after 10 min. at room T. Exposure to aniline produces the *p*-aminophenol metabolite in urine and therefore a reaction without hydrolysis means heavy aniline exposure. The test will detect a 1 g dose of acetaminophen for 24 hr in urine. The reagent is stable for 6 months or more at room T.

The three reagents described above are stable and unailing in reactivity, screening for the most commonly used and encounter drugs. Other useful chemistry-based reagents will be presented in future additions of **Tox-Talk**.

**Table 1. FPN Reacting Substances and Colors Produced**

Drug Substance	FPN Color or Fluorescence
Acetaminophen	Yellow; brown with high conc.
Carbamazepine	Yellow to green flu. with 366 nm light
Chlordiazepoxide	Orange flu. with 366 nm light
Chlorpromazine, Promazine	Pink to Scarlet
Cimetidine	Yellow; tan at high conc.
Clomipramine, Desipramine, Imipramine, Trimipramine	Blue-green; more intense when heated
Mesoridazine	Pink; flu. with 366 nm light
Oxcarbazepine	Yellow-green flu. with 366 nm light
Perphenazine	Pinkish colors
Phenazopyridine	Orange colors
Promethazine	Pink; metabolites blue, pink and reds
Reserpine	Yellow-green flu. with 366 nm light
Sulfonamides	Red-brown after heating
Thiopropazate	Pink to red colors
Trifluoperazine	Light orange tan

JOURNAL OF  
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Bruce A. Goldberger, Ph.D., Editor

**DEADLINE  
EXTENDED TO  
AUGUST 1, 2010**

# Special Issue

## Testing and Interpretation in Sports Review, Research, and Commentary

### Special Issue Editors

Dennis Crouch, M.S., M.B.A. and Yale H. Caplan, Ph.D.

The dynamic and expanding nature of drug use in competitive and non-competitive sports warrants a review of target drugs, including steroids, and the ever-changing analytical methods evolving to accommodate use patterns. Focus is also on interpreting and understanding the complex metabolism of these agents and its role in defining drug use and the mechanisms for abuse.

**Manuscripts to be considered for publication  
in this issue should be submitted online via  
<http://mc.manuscriptcentral.com/jat>**

Please be sure to select “special issue” on the dropdown menu and indicate that your submission is for the Sports special issue in your cover letter.

**Deadline for submission: July 1, 2010**

**DEADLINE  
EXTENDED TO  
AUGUST 1, 2010**

## MEMBER NEWS

**In Memorium—Joseph Eugene Manno**  
*Submitted by Frederick Fochtman, Ph.D.*



Joe Manno died on May 4, 2010 after a 13 month battle with pancreatic cancer.

Joe will be missed by many people, first and foremost by his wonderful wife Barbara, his children, grandchildren, and by his many colleagues and friends.

Joe received his pharmacy degree and his masters degree in Pharmacology-Toxicology at Duquesne University in Pittsburgh. He went on to earn his PhD at Indiana University Medical Center under Robert Forney, Sr. While at Duquesne he was known for helping his classmates with course assignments, exam preparation, and organizing and cooking spaghetti dinners for the faculty and his fraternity. As a masters student he investigated the toxicity of Dieffenbachia and enjoyed mentoring undergraduate students who were interested in research.

While at Indiana, Joe performed seminal research on the behavioral effects of marijuana. Joe met his wife Barbara while studying for his PhD at Indiana University where she also was earning her PhD. They married while still in school and were married for 42

years. After graduation they joined the faculty at the Auburn University School of Pharmacy for a year.

Joe was subsequently recruited to the faculty of the LSU Health Sciences Center Shreveport. At LSU for 40 years prior to his retirement in 2008, Joe taught and mentored medical students, PhD students, physician assistants, and radiology students. During his LSUHSCS years he wore many hats besides that of professor, serving as assistant Dean of Graduate Studies, Director of the Division of Clinical Toxicology to name a few.

Joe will be remembered by many for his contributions to forensic toxicology as a pioneer researcher in the effects of marijuana and his publications on human psychomotor performance of marijuana and alcohol. Joe was an active member and contributor to the professional organizations in the toxicology community. He authored over 130 scientific publications and book chapters.

Joe was a Fellow of the American Academy of Forensic Sciences; Society of Forensic Toxicologists; American Academy of Clinical Toxicology, Southwestern Association of Toxicologists (President, 1983-1984), and the American Association for Clinical

Chemistry. He was an active member of the Board of Directors of the National Registry for Certified Chemists. In 2006, Joe received the R.N. Harger Award from the American Academy of Forensic Sciences, Toxicology Section, for his "Outstanding Contributions to the Field and Profession of Forensic Toxicology".

Joe was a registered pharmacist in both Louisiana and Pennsylvania. He was Diplomate of the American Board of Forensic Toxicology and Consultant to the Louisiana Poison Control Center.

Joe had a wonderful and enlightening sense of humor. He would start by providing sage advice and end up having a friend, colleague or a class in tears laughing. He would captivate his friends or a classroom of students with great stories. Joe's legacy will be carried on by many of the students that he taught and mentored. In addition to multitudes of medical students, he was very proud of his toxicology doctorate students. Among his students, Ken Ferslew, Phil Kemp, and Gary Kunsman are part of his legacy in forensic toxicology.

## SOFT MEMBERS URGED TO JOIN

A Forensic Toxicology networking group has been established on the professional networking website **LinkedIn**. To participate, go to [www.linkedin.com/home?trk=hb\\_home](http://www.linkedin.com/home?trk=hb_home). Then under Groups, type in "Forensic Toxicology" and follow instructions.

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**Future S.O.F.T. Meeting Info**

- 2010:** Richmond, VA.....Oct. 18-22, 2010.....Michelle Peace, Lisa Tarnai Moak
- 2011:** San Francisco, CA.....**Sep. 25-Oct. 1, 2011**.....Nikolas Lemos, Ann Marie Gordon  
**2011 DATE CHANGE**
- 2012:** Boston, MA.....June 30-July 6, 2012.....Michael Wagner
- 2013:** Orlando, FL.....Oct. 26-Nov. 3, 2013.....Bruce Goldberger
- 2014:** .....yet to be determined.....

**ToxTalk Deadlines for Contributions:**

- February 1** for March Issue
- May 1** for June Issue
- August 1** for September Issue
- November 1** for December Issue

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- Budget, Finance, and Audit.....
- Membership.....
- ToxTalk Co-Editors.....
- Publications (JAT Special Issue) .....
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- Meeting Resource.....
- Laboratory Guidelines.....
- Drugs & Driving.....
- Policy and Procedure.....
- SOFT Internet Web-Site.....
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- Young Forensic Toxicologists.....
- Drug Facilitated Sexual Assault.....
- Ethics.....
- Nominating.....
- MS/MS Guidelines.....
- Strategic Planning.....
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