ForensicAsia

THE ASIAN FORENSIC SCIENCES NETWORK NEWSLETTER | INAUGURAL ISSUE 2009

AFSN Interim President's Address

With the advent of the internet and globalised trade, information, people and goods move across borders quickly. Many issues have taken on an international dimension. Events that occur in one part of the world quickly spread to other areas, such as the H1N1 outbreak, the ongoing financial crisis. Criminal activities that once were more or less geographically limited now infiltrate different societies and far-flung jurisdictions. Examples can be found in illicit drug trafficking, cybercrime, terrorism and paedophilia-related crimes. Natural disasters (e.g. Indian Ocean tsunami in 2004) and man-made disasters (e.g. air transportation accidents) frequently involve citizens of many nationalities. Serial killers can and do operate across jurisdictions.

Further, as the world becomes more aware of the role of sciences in solving crime and justice, and regardless as to whether we like the additional exposure of *CSI* on television or *Crime Channel* on cable, the perceived reality is that scientists can get to the 'truth' much more quickly and definitively. The expectations of the public, law enforcement and judicial systems on forensic sciences and its practitioners have increased.

These challenges make it imperative for the forensic science community to work more closely together, to collaborate and share experiences, to develop best practices and build stronger and sustainable scientific and organisational systems that provide robustness and integrity for the work that we do.

While there have been several areas of ongoing co-operation between different forensic laboratories, these have been generally limited in scope. *DrugNetAsia*, a regional publication was conceived and published annually, following a regional meeting of heads of Drug Testing Laboratories in South East Asia in 1999, under the auspices of the UNDCP. Following the 2004 Tsunami, a forensic DNA symposium was held in 2006 in Singapore and subsequently a DNA profiling working group was formed to enable information-sharing amongst practitioners.

Numerous forensic science networks have been established in various parts of the world, such as the American Society of Crime Laboratory Directors (ASCLD), Senior Managers of Australian and New Zealand Forensic Laboratories (SMANZFL), European Network of Forensic Science Institutes (ENFSI) and Academia Iberoamericana De Criminalistica y Estudios Forenses (AICEF).

With the encouragement of United Nations Office on Drugs and Crime, in the person of Dr Barbara Remberg, and the guidance of Prof Jose Lorente, International Liaison Officer of AICEF, representatives of six forensic institutes met in October 2008 to deliberate on the formation of a regional forensic science network. The meeting gave birth to the ASIAN FORENSIC SCIENCES NETWORK (AFSN), which will henceforth serve as a collective representation for the forensic sciences community in Asia.

The Network purposes itself to provide a forum for forensic science institutes in Asia to discuss issues relating to forensic services, work towards enhancing the quality of forensic services in member countries and establish links with other regional networks in the global forensic community.

The Forerunner Group Meeting in October 2008

This new beginning is but the first step in forging a stronger forensic sciences community in Asia. Already, we have seen encouraging signs of growing membership and interest in the Network. It will take many hands and strong commitment from all its members. Even though the challenges are foreboding, I am confident that with the good start and strong foundations being laid, the Network will grow from strength to strength, as forensic science practitioners are people who bring passion and purpose into their work everyday.

Dr Paul Chui
President, AFSN Interim Board

AFSN Interim Board Members

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Dr Paul Chui, Health Sciences Authority, Singapore

Vice-President:
Mr Primulapathi Jaya, KIMIA MALAYSIA, Malaysia

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Ms Cheong Poh-Yee, Department of Scientific Services, Brunei Darussalam

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Dr Kraisorn Ammawat, The Central Institute of Forensic Science, Thailand
Dr Nguyen Van Ha, Vietnam Forensic Science Institute, Vietnam

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Editorial Committee

For enquiries, feedback or contribution of articles, please email to hsa_asg@hsa.gov.sg.

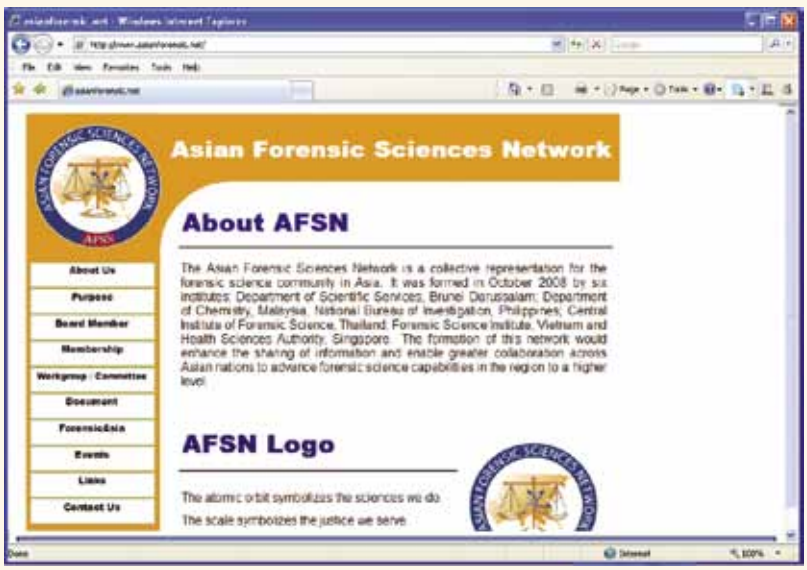
Editor's Address

DrugNetAsia was first published in 2000 with the scope of sharing illicit drug related information by the drug testing laboratories in the region. It was an annual publication and a total of 7 newsletters were possible only because of the commitment and overwhelming support from the many drug testing laboratories in the region. A very big "Thank You" to all of you!

During the Forerunner Group Meeting in October 2008 which saw the formation of AFSN, it was decided to expand the information presented in the *DrugNetAsia* newsletter to include articles from all fields of forensic science. As a result, it gives me great pleasure to announce that the *DrugNetAsia* newsletter will be officially known as *ForensicAsia*. It has truly been a very exciting journey to see and guide the metamorphosis of *DrugNetAsia* to *ForensicAsia*. We hope that you will enjoy reading the articles and continue to support this publication. Happy reading!

Dr Angeline Yap
Editor

AFSN Website: www.asianforensic.net



Congratulations to the Asian Forensic Scientists

Prof Jose A. Lorente
International Liaison Officer & Past President, AICEF

It is my greatest honour to have the possibility to congratulate all my Asian colleagues in the forensic field for the creation of the AFSN.

Most of what we have today, or at least the most important steps, were taken last October 2008, when a group of forensic scientists from a number of Asian countries met in Singapore for a meeting co-hosted by the Health Sciences Authority (HSA) of Singapore, KIMIA MALAYSIA and the UNODC (United Nations Office for Drugs and Crime).

The goal of that meeting was to explore the possibility of creating an Asian network of forensic science institutions, similar to the ones existing in Europe (ENFSI), Latin America (AICEF), the USA (ASCLD), and Australia & New Zealand (SMANZFL).

I, as the International Liaison Officer and Past President of the AICEF, was specially invited to the above mentioned meeting. My role at that meeting was to explain how the AICEF started, and how we managed to get together more than 20 countries from Latin America, plus the European countries of Spain and Portugal into the AICEF. Spain and Portugal were included in the AICEF because of the well known historical reasons since Spain and Portugal has a long common history shared with Latin America and are very similar in terms of culture and languages (Spanish & Portuguese).

However, despite all the common history and languages, there are relevant differences among the countries in Latin America; there are large, federal countries (Brasil and Mexico, for instance), and smaller countries (in this case, Panama or Uruguay are good examples). There are also many differences regarding forensic science and criminalistics, legal systems, crime prosecution, etc., and therefore it was a real challenge to have all the different forensic institutions working together. This is why the AICEF was a relatively good example for the creation of an Asian Network in Forensic Sciences.

During the Singapore meeting I did realize, almost immediately, that despite all existing difficulties, starting with the different local languages and the need to use English as the official language, the aim of all the Asian colleagues was to get started as soon as possible and have a regional forensic science network.

After agreeing in a number of common basic bylaws and statutes, the name of Asian Forensic Sciences Network (AFSN) was chosen, and the AFSN started its history. I have no doubt that in a few years the AFSN will become a reference in the development of forensic science practice in Asia, and will also be a reference regarding good professional practice, quality and accreditation.

Nowadays, in the 21st century, it is not possible to consider our forensic work as a national or regional isolated one as crime is becoming more global and international and we need common tools and cooperation to fight against it. As a network, the AFSN will play an important role in helping to share scientific information and techniques, facilitating technical cooperation among countries and setting guidelines regarding operational procedures, quality management, or accreditation.

There is no doubt in my mind regarding the key roles that AFSN will assume from now on and the many benefits that AFSN will have for the forensic community. Even more, and as always in our field, forensic means “justice”: the better forensic system we have, the better we can serve our justice systems in our countries, and this is good for everyone.

On the 12th of November 2009, the AFSN will be born officially, and it will be my greatest honour to witness this important event in Kuala Lumpur: my warmest congratulations to all my Asian colleagues in the challenging world of forensic sciences.

From Senior Managers Australian and New Zealand Forensic Laboratories

Prof Ross Vining
Chair, SMANZFL

The Senior Managers of Australia and New Zealand Forensic Laboratories (SMANZFL) are delighted to have the opportunity to contribute to the first edition of *ForensicAsia*. This publication is a very good indication of the strengthening ties within the Asian Forensic Sciences Network (AFSN).

SMANZFL had the pleasure of hosting two AFSN members, Dr Paul Chui (President – Interim Board) and Ms Cheong Poh-Yee (International Liaison Officer – Interim Board) at our annual meeting in Sydney in November last year. It was an ideal opportunity to learn more about AFSN and SMANZFL looks forward to future cooperation and collaboration between the two networks. This can take many forms and one area in which SMANZFL is keen to foster a closer working relationship is between our respective scientific and technical working groups.

SMANZFL has proved successful in Australia and New Zealand in bringing about advances in forensic science and improvements in forensic science service delivery. This is a result of a willingness to share information between the laboratories that are members of the SMANZFL Network. We are confident that AFSN will realise the same benefits for your Network members.

SMANZFL currently holds the Chair of the International Forensic Strategic Alliance (IFSA) which is a partnership between networks in Europe (ENFSI), North America (ASCLD) and Spanish speaking countries in Europe and South America (AICEF). SMANZFL is willing to provide support and encouragement to AFSN to become a member of IFSA in due course.

SMANZFL wishes every success to AFSN and *ForensicAsia* and we look forward to developing our friendship and a productive working relationship with you.

Global Forensic Science Services, the UNODC Perspective

Dr Barbara Remberg
Laboratory and Scientific Section, UNODC

Effective drug control and crime prevention require the close collaboration of a range of institutions, services and professionals both nationally and internationally. Important components in this multidisciplinary field are the national forensic laboratories and service providers, laboratories under drug enforcement authorities, and laboratories in clinical, regulatory and university settings[1]. They provide essential support to both the rule of law and health-related programme elements of the interrelated phenomena of drugs, crime and terrorism. Also their staff constitutes an indispensable source of professional expertise providing scientific, technical advisory functions to governmental institutions.

Forensics as Part of the Criminal Justice Response

To achieve the goal of judicial integrity and independency, States need an adequately functioning legal regime and an accessible, accountable and effective criminal justice system, embedded in respect for the rule of law and human rights. This requires an evidence-based approach. Forensic science provides objective information in support of fair and transparent criminal justice systems. The information is used for court evidence to build cases on physical evidence rather than only on confession and testimony. It is also used during various stages of an investigation to provide direction, contribute to operational crime analysis, or gather intelligence. Finally, forensic data and information also enrich policy and trend analyses and risk and impact assessments for strategic interventions or broader policy formulation.

Forensic science is therefore much more than the specialized analyses and examinations carried out in a laboratory. It is an integral part of effective criminal justice systems, with forensic personnel being the strategic partner to a range of national and international counterparts.

Forensic cases often merge and cut across a broad range of transnational and organized crimes and/or criminal methodologies and can be related to trafficking in drugs, firearms and persons, to smuggling of migrants or endangered species or to the planning of crimes involving identity or economic fraud, or terrorist attacks.

The starting point for a forensic examination is usually a crime scene (scene of incident), which can be anything from a physical location, to a computer or a human body. In most cases, a single crime scene holds physical evidence from a range of different categories, e.g. drugs, fingerprints, DNA traces, fire debris, firearms, documents, electronic devices, etc.

Therefore, criminal justice systems and practitioners (including, but not limited to, forensic practitioners) need to be equipped to deal with a range of crime scenes and types of physical evidence, and apply internationally accepted best practices from the crime scene to the courtroom.

Forensic Information as Part of Intelligence Gathering, Trends Monitoring and Analyses

In addition to the operational support and guidance forensic service providers deliver to a wide range of criminal investigations, 'forensic intelligence', i.e. the systematic generation and analysis of forensic data, also contributes to the identification of new drug and crime trends and threats, for example, into the methods being used to counterfeit or forge official documents, or the types of drug products or the specific precursors being trafficked. This knowledge in turn provides an independent means to identify common source, trafficking networks and/or distribution patterns, and a basis for designing appropriate counter (or preventive) measures. These measures can take various forms, such as raising public awareness, adapting training courses or introducing new security features to better protect official documents.

However, despite the key role of forensic information, these data are not systematically gathered and reported. Laboratories typically carry out analyses for specific operational and casework purposes, and the resulting data would require some processing before being of value for trend analyses (e.g. weighting; contextualizing; etc.). In spite of this, it is recognized that laboratories hold a wealth of data and information that could be of immediate use for trend analysis and early warning mechanisms, provided that the associated data limitations concerning representativeness etc. are communicated and addressed adequately in subsequent analyses. Laboratories therefore need to be encouraged to collate their existing data and findings, and make them available for such purposes on a regular basis.

At the same time, however, there is also a need to further increase the awareness outside laboratories of the context in, and purpose for, which forensic data are generated, and that there are additional or different data and information requirements for policy and trend analyses, requiring additional resources if the full potential of forensic data is to be realized. There is therefore a need to increase the awareness among relevant decision-makers of the relevance of improved integration of forensic data, related capacity building, and the need for adequate levels of resources to enable laboratories to carry out the necessary analyses, build relevant databases and reference collections, and collaborate across borders and globally. For instance, to fully realize the potential of forensic drug intelligence, comprehensive qualitative analyses of all ingredients in a seized drug - not just the main drug of abuse - systematic quantitative analyses on purity levels and the gathering of related forensic information, such as fingerprints on packaging materials, etc. would be required.

The Need for an Integrated Forensic Science Infrastructure

Forensic services are mostly provided by laboratories. These are often part of the public sector, i.e. can be classified as governmental institutes, typically under ministries of interior or justice, but they may also be affiliated to ministries of health

(e.g. for forensic medicine, toxicology or clinical analyses, and control of pharmaceuticals), or they may be part of government analyst or customs services. In addition, certain forensic services are typically provided by other service providers: expertise in police facilities may be used to process crime scenes and perform (basic) forensic examinations (e.g. fingerprints and other marks), and universities may provide non-routine forensic services (e.g. archeology or entomology, toxicology). Finally, private laboratories and independent experts may also provide forensic services, usually on a commercial basis.

In terms of infrastructure, there may be a single forensic laboratory, or multiple forensic laboratories, e.g. a central laboratory at federal or state level, complemented by subsidiary laboratories at state, provincial, regional or local level. In some countries, different law enforcement agencies (e.g. police, gendarmerie and customs) or health and regulatory authorities (e.g. hospitals, pharmaceutical control agencies, universities) have their own laboratories. Specific narcotics or drug control laboratories may also exist as part of a national counternarcotics enforcement infrastructure.

Costly duplication of expensive equipment and dissipation of technical skills should be avoided in forensic laboratories. For criminal justice systems to fully benefit from forensic science, a coherent forensic infrastructure, integrating all existing national forensic services, is therefore essential. Where national capacity does not exist, it is good practice to explore the availability of, and reach the respective agreements with, suitable regional resources.

For the effective use and continuing development of forensic science, there is also a need to raise awareness and educate decision-makers, and the "consumers" of forensic science services, data and information (e.g. law enforcement officers, lawyers, judges and prosecutors, and policy makers) about the value, possibilities and limitations of forensic science services, as well as the resource implications of ensuring sustainable services of high quality, from the crime scene to the courtroom.

In practical terms, in order to perform their assigned tasks and ensure accurate and precise results, forensic service providers need professional staff, equipment, consumables and supplies, scientific information, and technical training. They also need adequate resources, in the form of an annual budget that allows them to maintain and upgrade equipment, provide for the continued replenishment of consumables, and invest in databases and reference collections. Adequate resources are also needed to enable the laboratory to invest in quality management systems including the regular participation in proficiency tests and validation of the analytical methods/procedures used and to develop its staff and ensure active participation in international cooperation activities (e.g. scientific society memberships, professional meeting attendance, research and publications).

In those cases where scientific and forensic capacity are to be built, it is important that this be done in a fit-for-purpose manner, commensurate to the absorption capacity and the maturity of the country's criminal justice system (i.e. it will be difficult to justify investments in high-quality forensic services if there is no legal system or rules and regulations that govern the admissibility of forensic results and physical evidence in court). It is also important to consider that building and sustaining quality forensic services require long-term commitment and investment, and cannot be met within a short period of time.

International Cooperation and Networking

Combating transnational organized crime requires international cooperation. In the forensic field, international cooperation takes different forms including, among others, international technical cooperation activities, cross-border operations, participation in forensic science associations and networks, and cooperation to exchange forensic data and in sharing common databases (e.g. ID/travel documents, fingerprints, drug or DNA profiles).

Recognition of the value to be gained through long-term collaboration and cooperation on strategic issues related to the management of forensic science laboratories and the promotion of forensic science has led to the establishment and networking of a number of regional and international associations of forensic science institutes or crime laboratory directors. They include the *American Society of Crime Laboratory Directors (ASCLD), established in 1974,* the *Senior Managers of Australian and New Zealand Forensic Laboratories (SMANZFL, 1986),* the *European Network of Forensic Science Institutes (ENFSI, 1995)* and the *Iberoamerican Academy of Forensic Sciences (Academia Iberoamericana De Criminalística y Estudios Forenses, or AICEF, 2004)*, and now the Asian Forensic Sciences Network (AFSN, 2009).

Specifically, AFSN has been established with the purpose of providing a forum for forensic science institutes in Asia for discussion on issues relating to forensic services, enhancing the quality of forensic services in Asia, establishing links with other similar networks for the promotion and advancement of forensic science, and formulating strategies relating to forensic science issues in Asia.

AFSN will give a voice to the Asian region in the international forensic community alongside ASCLD, SMANZFL, ENFSI and AICEF. Collectively, these associations contribute to the advancement of forensic sciences and the availability of sustainable and quality forensic science services in support of criminal justice systems worldwide.

From the international drug control and crime prevention point of view of the United Nations Office on Drugs and Crime (UNODC), it has been a pleasure to be able to accompany the birth of a new network. It is also a pleasure to see AFSN start out with its own newsletter (*ForensicAsia*), which builds on the successful model of the Regional Newsletter *DrugNetAsia* by extending the scope of the latter from drugs to other forensic disciplines[2]. We very much welcome and support the regular publication of *ForensicAsia* as one of the means of promoting collaboration and information sharing amongst forensic institutes in Asia, and with their stakeholders.

These are encouraging developments and we hope that, in the context also of UNODC's aims to enhance scientific and forensic capacity, this model will be copied in other regions that have limited, or no, forensic cooperation and networking.

We would also like to add our appreciation of the efforts of the AFSN Interim Board and its Interim Secretary who in great personal efforts have driven and facilitated the process that culminated in the inauguration of AFSN in November 2009.

We wish AFSN and its newsletter *ForensicAsia* every success, and a bright and active future.

Footnotes:

1. *The term "forensic service provider" will be used throughout to refer to any institution or facility that provides scientific support in the context of national drug control and crime prevention governance frameworks, irrespective of its affiliation.*

2. *DrugNetAsia was established as the organ of a UNODC (then: UNDCP) meeting of Heads of Drug Testing Laboratories in Southeast Asia in 1999.*

Department of Chemistry Malaysia

Mr Primulapathi Jaya
KIMIA MALAYSIA, Malaysia

History and Background

The Department of Chemistry Malaysia or KIMIA MALAYSIA as it is commonly known is a Federal Government agency under the Ministry of Science, Technology and Innovations. It has its beginnings in the establishment of the Analytical Laboratory of the Straits Settlement at Penang in 1909.

Penang Laboratory in the 1930's

Forensic Laboratory in the 1960's

The new laboratory building at Petaling Jaya at 2000

KIMIA MALAYSIA channels its services through its Headquarters in Petaling Jaya, Selangor as well as via its State Laboratories. The Department comprised four core Divisions – Forensic, Environmental Health, Industry and Trade Tariff Classification, Research and Quality Assurance and 10 State Laboratories spread over the country. The laboratories of the department are equipped with an array of modern analytical instrumentation such as GC, HPLC, GC-MS, FTIR, SEM, LC-MS-MS, XRD and CE.

This year the laboratory celebrates its centenary and to commemorate this historic milestone a grand open day was held in June and an international symposium, The International Symposium on Forensic Science and Environmental Heath is scheduled on 10-11 November 2009.

Major Milestones of Department of Chemistry

1909 : Establishment of the Straits Settlement Analytical Laboratory at Penang
1946 : Laboratory set up at Kuala Lumpur
1957 : New Headquarters Laboratory opened in Petaling Jaya
1992 : New Forensic Laboratory building at the Petaling Jaya Headquarters
1994 : Start of DNA profiling for casework; Implementation and accreditation to ISO Guide 25 Quality System
1996 : Use of PCR-STR for casework
1997 : Registration to MS/ISO 9002
2000 : New laboratory building at HQ and branches
2003 : Certification to OHSAS 18001
2005 : Forensic Division at HQ accredited by ASCLD/LAB
2009 : 100 years old !

The Forensic Division

KIMIA MALAYSIA is the main provider of forensic analytical services in Malaysia to law enforcement agencies in support of the nation's criminal justice system through the laboratories of its five Sections: Serology/DNA, Narcotics, Documents, Criminalistics and Toxicology. The forensic experts are required to investigate crime scenes, analyse evidence and conducts research in laboratories, obtain DNA profiles and become independent expert witnesses in the courtroom. The experts deal with cases relating to controlled substances, clandestine drug laboratories, toxicology, forged documents, rape, murder, arson/explosion, pirated optical discs and high profile thefts/robbery.

The services in forensic science are benchmarked against leading forensic laboratories worldwide through accreditation and consistent compliance to ASCLD/LAB, an internationally acclaimed standards for its commitment to quality, impartiality and professionalism. The Forensic Division at the Headquarters was accredited to the ASCLD/LAB in October 2005 in the disciplines of Controlled Substances, Toxicology, Trace Evidence, Biology, Firearms/Toolmarks and Questioned Documents. The Headquarters forensic laboratory has a staff of about 130 and the main clients are the national law enforcement agencies such as the Royal Malaysian Police, Malaysian Anti-Corruption Commission, Road Transport Department and others.

Besides providing scientific and consultancy services, priority is also given on providing the necessary training and exposure in tune with the development in forensic science worldwide to staff of the Forensic Division. Over the past years we have also provided training in the forensic disciplines to several regional forensic laboratories.

Section	2008	
	Cases	Samples
Narcotics	24,798	235,685
Serology/DNA	3,498	28,597
Criminalistics	3,569	32,973
Toxicology	14,003	128,731
Document Examination	292	15,567
Total	**46,160**	**441,553**

No. of cases/samples in 2008 (nation-wide)

The Environmental Health Division

Everyone has the right to having clean water for daily use, breathing clean and pleasant air and getting food that is safe for consumption. KIMIA MALAYSIA is one of the bodies involved in protecting the safety and well-being of the Malaysians in these aspects of environmental health. Analytical services in the field of environmental health help in the handling of many issues related to the quality of the environment, food, air and biotech products. The Environmental Health Division through its Environment, Food, Water, and Biotechnology Sections provides analytical services to other national government agencies in ensuring:

- food safety
- drinking water safety
- environmental protection
- biosafety
- bio-authenticity of food products

The Industry Trade Tariff Classification Division

The Industry and Trade Tariff Classification services of KIMIA MALAYSIA supports the various authorities in enforcing relevant laws and regulations, protecting Government revenues, safeguarding consumer interests and ensuring the safety of workers. KIMIA MALAYSIA provides analytical and advisory services to various government agencies to support the enforcement of laws, as well as for programmes relating to protection of government revenue, safeguarding consumer interests and ensuring the safety of workers.

The Research and Quality Assurance Division

By undertaking research and quality assurance activities, KIMIA MALAYSIA is able to strengthen operational and innovative delivery to clients. Our focus is on research that can give scientific solutions to meet the needs of our clients while adherence to standards requirements enables us to provide quality assurance. KIMIA MALAYSIA continues in its core activities of developing and propagating new methodologies to address issues that are of current interest or to adapt to the expected enforcement of regulatory condition that may be expected to be enforced in the future. This Division enhances the quality of laboratory services by:

- undertaking research in analytical method development
- providing specialized testing using high-end instrumentation
- strengthening the implementation of ISO 9001:2000 and ISO/IEC 17025:2005 quality management systems
- coordinating programmes to comply with the technical requirements of ISO 17025, especially in ensuring traceability of measurement of methods, through the provision of certified reference materials, calibration of analytical instruments, and proficiency tests.

The Central Institute of Forensic Science, Thailand

Police Major General Chumsak Prugsapong
The Central Institute of Forensic Science, Thailand

Modern forensic sciences in Thailand started in the last quarter of the nineteenth century with varying speed of progress among different scientific disciplines: pathology, biology, toxicology, criminalistics, questioned documents, forensic odontology, anthropology, psychiatry, jurisprudence and other fields such as engineering, geology and microscopy. Forensic scientists from each of their respective disciplines apply quality standards and scientific principles to provide scientific findings and present expert testimonies in court. The Royal Thai Government and the Thai Judicial System accept and embrace the application of forensic sciences as an important part of the Thai justice system.

To establish an internationally accepted quality assured forensic science services and to provide an effective check and balance system, the Ministry of Justice established The Central Institute of Forensic Science (CIFS) in October of 2002 with a three-prong mission:

- To help develop and ensure that an internationally accepted standard is adopted and practised across all Thai forensic science disciplines.
- To develop and maintain all necessary forensic sciences services to support the Thai Judicial System.
- To support and assist in special assignments requested by the Royal Thai Government.

In order to function as a leading forensic science services unit, the CIFS has 3 major bureaus:

1. **The Bureau of Secretary** provides administrative support with its functioning units such as budget, human resource management, logistics, welfare, public relations, IT, etc
2. **The Bureau of Forensic Sciences Services** currently comprises 10 functional units:
   (a) *Crime Scene Investigation Unit* - The unit is responsible for developing competent crime scene investigators who follow quality standards and protocols for crime scene management and investigation. This unit is also responsible for receiving submissions of physical evidence ensuring proper chain of custody and delivering the specimens to the appropriate laboratory for analysis.
   (b) *Missing Person Identification Centre* – The CIFS started this centre in response to the many cases of missing loved ones as well as the need for forensic identification of unidentified bodies or human remains. The forensic scientists attached to this center have to be competent in both forensic anthropology and odontology.
   (c) *DNA "Fingerprint" Profiling Unit* – Serological forensic evidence comes in many forms, the newest and probably most powerful is the DNA technology which marked a quantum leap in discriminatory power. The unit has recruited several forensic scientists who are competent in the procedure and protocols for DNA profiling as well as expert interpretation.
   (d) *Toxicology and Chemical Unit* – The forensic toxicologists are responsible for the detection and quantitation of poisons in tissues and body fluids obtained at autopsy, and in the blood, urine, gastric material or any other body fluid of a patient. Their scientific findings will help in determining the cause of death or any other criminal offence.
   (e) *Firearm, Ballistic and Physical Evidence Unit* – The unit examines fired ammunition recovered from the scene or from the body of a victim, to determine if it could have been fired by a suspect firearm. The exhibits are also examined for trace evidence. This unit emphasizes the use of non-destructive techniques. As part of the quality system, complementary methods and different types of equipment are used for confirming the identity of substances.
   (f) *Questioned Document Unit* – The document examiner examines fraudulent and tampered documents, and counterfeits. Its scope include the examination of questioned handwriting, typescripts, stamped impressions, trademarks, banknotes, photocopied and printed materials, travel documents, and any other document pertaining to government cases.
   (g) *Automated Fingerprint and Palmprint Identification Centre* – Specialists from this unit identify and compare fingerprints and palmprints with the assistance of computers. This unit supports and shares its knowledge in the fingerprinting field with the other departments in the Ministry of Justice or any related organization.
   (h) *Forensic Medicine Clinic* – This unit examines individuals (victims, suspects) who are related to criminal cases and conducts injury or wound assessments. The unit also obtains biological evidence from these individuals for laboratory testing and medical opinion reporting.
   (i) *Forensic Psychiatry Unit* – This unit provides assessment and diagnosis of defendant psychological conditions. It determines the level and type of psychological deficiency for court consideration.
   (j) *Forensic Pathology Unit* – The forensic pathologists and forensic scientists from the CSI unit jointly conduct postmortem examination. The tissue and organ samples sampled during autopsy are analyzed in the pathology laboratory.
3. **The Bureau of Forensic Sciences Standard** aim to establish an internationally accepted quality assurance system in the CIFS and extend the good practices of a quality management system to the whole Kingdom of Thailand. CIFS has successfully implemented this system through its development and certification by ISO 9001:2000 and the current upgrade to ISO 9001:2008.

To achieve higher standards of quality, the CIFS' Toxicology and Chemical unit has successfully gained the accreditation of ISO/IEC 17025:2005 in Blood Alcohol Testing Method. This significant achievement will provide an important bench mark for all other disciplines in the CIFS.

The CIFS is confident that the organization will achieve the forensic science service accreditation either by ASCLD/LAB International or NATA within the decade.

Department of Scientific Services, Brunei Darussalam

Ms Cheong Poh-Yee
Department of Scientific Services, Brunei Darussalam

Department of Scientific Services (DSS) is the sole provider of forensic sciences services in Brunei Darussalam and is established 20 years ago in 1989. It is under the umbrella of the Ministry of Health and is one of the departments directly under the Department of Health Services. The administration and management of DSS is, therefore under the policy and regulation of Brunei Darussalam civil service.

DSS has its own two-storey building and is located in the Ministry of Health complex in the Commonwealth Drive in Bandar Seri Begawan, the capital city of Brunei Darussalam.

DSS provides 3 areas of scientific services: forensic sciences, health sciences and radiation regulatory. There are 10 laboratories in DSS; 5 of which are in the forensic sciences group namely Narcotics, Forensic Biology/DNA, Toxicology, Document Examination and Arson Laboratories.

DSS is managed by a Director who is assisted by the Heads of Laboratories. There are altogether 53 staffs in DSS with 22 in the forensic sciences group. Currently, the Director oversees both the administrative and technical issues in the forensic scientific support services in the department and she is expected to attend court and provide testimony when needed.

The organisation structure of DSS with the forensic science laboratories illustrated in the chart.

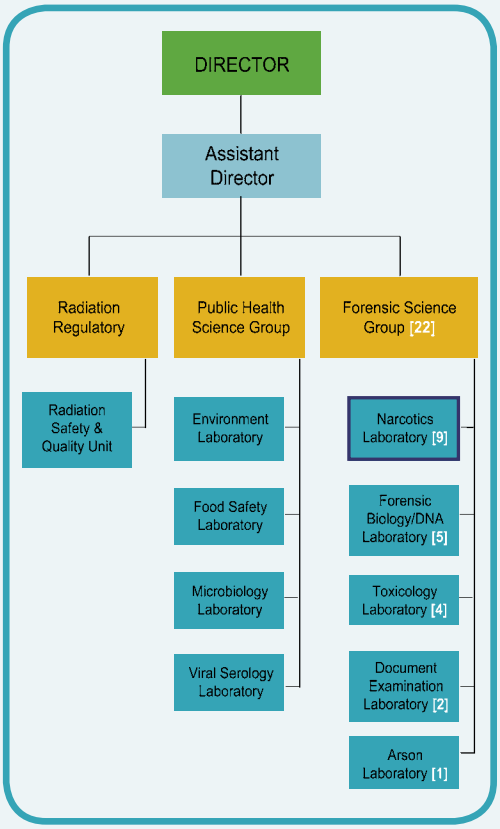
The Narcotics Laboratory is the oldest laboratory established in 1989, the Toxicology Laboratory was started in 1993, the Forensic Biology/DNA Laboratory was set up in 1995 (forensic DNA services in 2007) while Document Examination and Arson Laboratories were started in 1997.

In DSS, our testing capabilities are supported by the state-of-the-art equipment and 11 trained scientists with bachelor degrees of relevant fields, of which 6 of them have master degrees. The ranges of scientific services developed by each laboratory are established according to the demand in the nation society and limited by human resources capacity and capabilities. The testing capabilities are as listed below:

- **Narcotics Laboratory:** Illicit & Controlled Drugs analysis in exhibits, and Urine Drug testing for opiates, cannabinoids, amphetamines and benzodiazepines.
- **Forensic Biology/DNA Laboratory:** Forensic serology, nuclear DNA profiling for criminal and paternity cases.
- **Document Examination Laboratory:** Document authentication including handwriting examination, ink analysis, indented impression, document alteration and counterfeit currency.
- **Toxicology Laboratory:** Analysis of alcohol (road traffic accident cases), toluene abuse and toxicology in body fluids samples.
- **Arson Laboratory:** Testing for flammable liquids from fire scene debris.

DSS also provides some criminalistics work for other trace evidence such as glass, paint, hair, low explosives, physical match and miscellaneous samples. This group of work is handled by the Forensic Biology/DNA Laboratory scientists due to a shortage of trained scientists and also due to the fact that casework in this area has been minimal (less than 5 cases per year) ever since DSS started providing forensic DNA profiling services in 2007.

DSS is a government-based forensic science institue and its main clients are the law enforcement agencies in the country which are government departments. There is no charge for the services provided to all government departments including the police, armed forces, air forces, navy forces, Narcotics Control Bureau, Immigration Department, Custom & Excise Department, Prosecutors offices of Religious Department, Internal Security Department, Fire & Rescue Department, Hospitals, Brunei Courts of Laws and Syariah Islamic Court. However, charged services are provided to the private sectors including private law firms, private companies, general public and individuals.



The reporting scientists in DSS are expected to appear as expert witness in the Brunei Courts of Laws and the Syariah Islamic Court for the reports issued by them. All the criminal cases and the civil cases are heard in the Courts of Law comprising magistrate, intermediate and high courts while civil cases related to Islamic Law and muslims individuals are heard in the Brunei Courts of Law and the Syariah Islamic Court.

Though DSS is not an accredited institute yet, we strive to provide high quality forensic sciences services and we subscribe regularly to Collaborating Testing Services (CTS), USA for our forensic sciences proficiency testings. Our department has been preparing for American Society of Crime Laboratory Directors / Laboratory Accreditation Board (ASCLD/LAB) - International Program for accreditation and we hope to be ready in the very near future.

Health Sciences Authority, Singapore

Dr Michael Tay
Health Sciences Authority, Singapore

Organisational Structure

The Applied Sciences Group (ASG), Health Sciences Authority provides a one-stop forensic science service and consultancy to law enforcement agencies, government ministries, hospitals, private organisations and individuals for criminal investigations, death investigations and civil disputes. ASG has three divisions serving forensic needs in Singapore: the Forensic Science Division, the Illicit Drugs and Toxicology Division and the Forensic Medicine Division.

Milestones in Forensic Science in Singapore

The roots of forensic science in Singapore date to 1885 when a Government Analyst performed analysis of food, medicinal products and toxicological specimens in a small laboratory set up at Hill Street. In 1907, the nascent lab relocated to Sepoy Lines behind the College of Medicine Building (COMB) and extended its services to the whole of Malaya and Singapore. In 1909, a branch lab opened in Penang. In 1939, the Singapore lab was renamed the Department of Chemistry. Soon after the Second World War, in 1946, a second branch lab opened in Kuala Lumpur. In 1957, with the independence of Malaya from British rule, the three labs assumed full responsibilities for their respective regions.

Over the years, the Singapore lab underwent several relocations, name changes and restructurings, eventually to become part of the Applied Sciences Group in 2006. Its range of services also expanded in keeping with new technologies and new needs of the justice system. In 1988, the lab moved to its current building at Outram Road; it had four units: the Forensic Unit, the Document Examination Unit, the Toxicology Unit and the Narcotics Unit, employing a total of 10 scientists and 26 technicians. Today, the units have developed into 4 large laboratories: the Forensic Chemistry and Physics Lab, the Forensic Biology Lab, the Analytical Toxicology Lab and the Illicit Drugs Lab, more than tripling in staff strength to a total of 51 scientists and 64 technicians, providing a comprehensive range of forensic services for the administration of justice in Singapore.

The Forensic Pathology Unit was set up in the late 1960s by the late Professor Chao Tzee Cheng, widely regarded as the father of modern forensic pathology in Singapore. The late Prof Chao was instrumental in bringing forensic science and forensic medicine together in the Institute of Forensic Science and Medicine (ISFM) in 1990.

Range of Forensic Services

The **Forensic Chemistry and Physics Laboratory** (FCPL) has a very diverse work scope spanning 6 major areas of work that are fully integrated within the lab:

- Fires, explosions and counter-terrorism
- Trace evidence and chemical analysis
- Firearms, toolmarks, impressions, images, damages and physical examinations
- Document examination
- Bloodstain patterns, crime scene examinations and reconstructions
- Counterfeit drugs and involvement in Interpol-WHO's Operation Storm

FCPL's wide-ranging analytical capabilities have practical applications to industrial and commercial needs. The Lab developed and operates the Singapore Vehicle Paint Database, and also developed and produces quality-assured field test kits and evidence collection kits for the Police.

The **Forensic Biology Lab** (FBL) comprises the DNA Profiling and the DNA Database sections. Forensic DNA profiling capability was established in 1990 for criminal and civil cases. FBL complies with the DNA Advisory Board Quality Assurance Standards for Forensic DNA Testing Laboratories. FBL's areas of service include:

- Examination of exhibits for biological fluids
- Forensic DNA profiling
- Paternity Testing
- Disaster Victim Identification

FBL manages the DNA Database which was set up in partnership with the Singapore Police Force in 2003. It uses a fully computerised robotic system coupled with FBI's Combined DNA Index System (CODIS) to establish a database for convicted offenders in Singapore based on 15 loci.

The **Illicit Drugs Laboratory** (IDL) provides analytical service to drug enforcement agencies in the analysis of controlled drugs and substances in seizures as listed in Singapore's Misuse of Drugs Act, and Poisons Act. Controlled drugs analysed include heroin, opium, cannabis, amphetamines (including "Ice" and "Ecstasy" tablets), ketamine, benzodiazepines and buprenorphine. IDL also recently set up a Clandestine Laboratory Response Team to assist the enforcement agency to handle the investigation of clandestine laboratories if one is to be discovered in Singapore.

IDL had published a newsletter *DrugNetAsia* for the sharing of information on drug trends and technical and analytical issues among regional drug testing laboratories. This newsletter is now superseded by *ForensicAsia*.

The **Analytical Toxicology Laboratory** (ATL) has two units: Drugs Abuse Testing (DAT) and Clinical and Forensic Toxicology (CFT).

DAT analyses for controlled substances in urine submitted by drug enforcement agencies in accordance to the Misuse of Drugs Act and the Misuse of Drugs (Urine Specimens and Urine Tests) Regulations.

CFT provides a comprehensive range of toxicological analyses for medico-legal purposes, such as: clinical toxicology & emergency toxicology, forensic toxicology, blood alcohol analysis, work-place testing, pre-clinical trial screening, therapeutic drug monitoring, and exhibits (tablets, capsules, etc.) for drugs and poisons screen. Emergency toxicology is catered for life-threatening cases, and toxicological screen prior to brain-death certification of potential organ donors.

The **Forensic Medicine Division** (FMD) is Singapore's national provider of forensic medical consultancy services in the examination of Coroner's cases. Our forensic pathologists attend crime scenes involving homicides and suspicious deaths, and carry out examinations in the Mortuary to determine the cause of death and to document the injuries. Autopsy findings are used in Coroner's Inquiries and criminal trials, as well as in mortality rounds, internal inquiries and in the Singapore Medical Council disciplinary hearings. FMD also acts an agent of the Registry of Births and Deaths, providing death certification services for Coroner's cases.

Accreditation

Since 1996, HSA's forensic labs have been accredited by the American Society of Crime Laboratory Directors / Laboratory Accreditation Board (ASCLD/LAB):

- Forensic Chemistry & Physics Lab (trace evidence, firearms/ toolmarks, questioned documents)
- Forensic Biology Lab (forensic biology)
- Analytical Toxicology Lab (toxicology)
- Illicit Drugs Lab (controlled substances)

The Forensic Medicine Division was accredited by the National Association of Medical Examiners (NAME) in 2005.

Identification and Quantitation of 2C-B in Ecstasy Tablets

Maimonah Sulaiman, Chee Bok Chooi & Mohd Khairul bin Kamalludin
KIMIA MALAYSIA, Malaysia

Abstract

In 2002 the drug 2C-B (4-Bromo-2,5-dimethoxyphenethylamine) was listed in the First Schedule of the Dangerous Drugs Act 1952 but was not encountered in the local drug scene until December 2005 when the first case was detected by the KIMIA MALAYSIA Perak branch laboratory. Pink tablets with "Love U" logo and blue tablets with "Toyota" logo were submitted to this laboratory. Subsequently between January and July 2006 other branch laboratories of KIMIA MALAYSIA started to receive cases of such 2C-B tablets in addition to green and blue tablets bearing the maple leaf logo. The tablets were screened by colour tests and the presence of 2C-B was confirmed by GC-MS. An HPLC method was developed to determine the amount of 2C-B in the tablets.

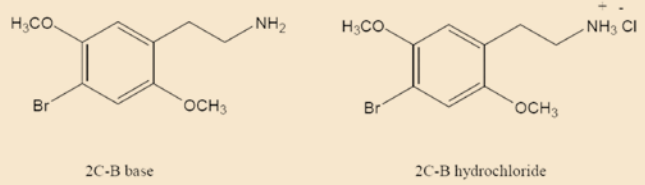


Figure 1: Structures and molecular weights of 2C-B base and hydrochloride

Screening Tests

All the 2C-B tablets encountered so far produced a positive reaction to the Marquis reagent, turning from yellow to bright green and finally dark green on prolonged standing.

Simon's test was negative as 2C-B is a primary amine.

Toyota	Love U	Maple leaf
Weight: 300-310 mg	Weight: 300-310 mg	Weight: 270-280 mg
Diameter: 9.0-9.1 mm	Diameter: 9.0-9.1 mm	Diameter: 8.0-8.1 mm
Thickness: 4.1-4.2 mm	Thickness: 4.1-4.2 mm	Thickness: 4.4-4.6 mm

Figure 2: Some of the 2C-B tablets encountered in 2006

Definitive Identification by GC-MS

2C-B in the tablets was identified definitely by GC-MS with fragmentation ions of 77, 105, 201, 215, 230 and 259.

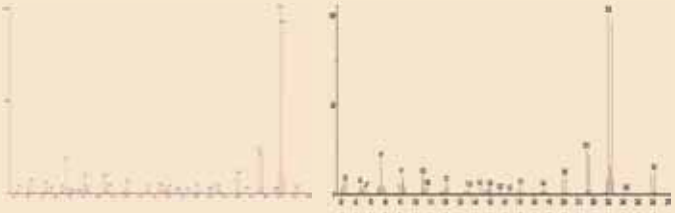


Figure 3: Mass spectrum of Lipomed 2C-B standard provided by UNODC

Figure 4: Mass spectrum of 2C-B from Ecstasy tablets

Quantitation by HPLC

2C-B in the tablets was quantitated by a validated in-house HPLC method (see Appendix). A few cases of ecstasy tablets containing 2C-B were quantitated using this procedure (Table 1). The amounts of 2C-B in these tablets (8-10 mg) were in the range which could induce the characteristic effects of this drug. In humans, 2C-B is active at doses between 4 and 30 mg; with this range the ingestion of 2C-B induces euphoria along with increased receptiveness of visual, olfactory, and tactile sensations.

Logo	No. of Tablets Analysed	Weight/Tablet (mg)	Diameter (mm)	Thickness (mm)	mg/ Tablet (2C-B as base)
Toyota, pink	800	299	9.09	3.95	9.8
Toyota, blue	7	329	9.09	4.44	8.6
Toyota, pink	900	296	9.05	3.95	8.6
Maple leaf, green	2100	272	8.01	4.87	8.2
Toyota, pink	28	296	9.04	3.94	8.6

Table 1: Quantitation results of 2C-B in some Ecstasy Tablets in 2008

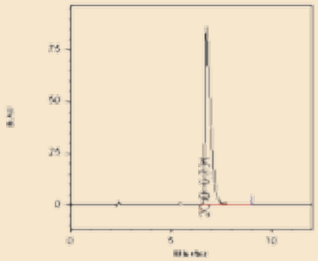


Figure 5: HPLC trace of 2C-B standard

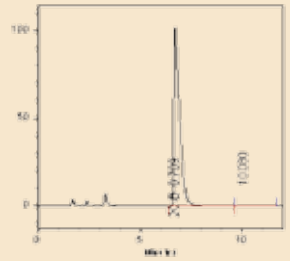


Figure 6: HPLC trace of sample

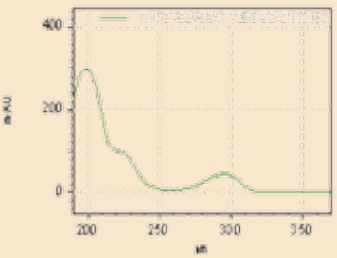


Figure 7: UV spectrum of 2C-B standard

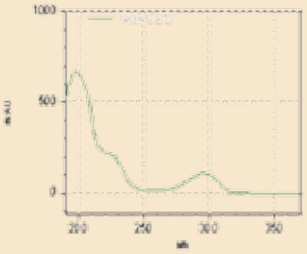


Figure 8: UV spectrum of 2C-B sample

Discussion & Conclusion

The linearity, precision and accuracy of the method are presented in the following appendix. A reversed phase HPLC method has been developed and validated for the quantitation of 2C-B in tablets. The method has proven to be simple but precise and accurate.

Acknowledgement

The authors would like to thank United Nations Office on Drugs and Crime (UNODC) for providing the Lipomed 2C-B reference standard.

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Appendix : Validation of HPLC Method

Instrumental Conditions

HPLC Equipment:
Shimadzu HPLC Class VP-Version 6.1
Column:
MOS-2 HYPERSIL, 5 µm particle size, 15 cm x 4.6 mm i.d
Detector:
DAD-UV at 293 nm
Mobile Phase:
Acetonitrile: 10mM Potassium dihydrogen phosphate (pH 3.2) – 60 : 40 (adjust pH using phosphoric acid)
Column Temperature:
40°C
Flow rate:
0.8 ml/min
Injection volume:
10 µl (Rheodyne loop injector)
Run time:
About 20 min
Quantitation:
Peak area and by external standard method

All standards and samples were dissolved in mobile phase.

Preparation of Stock Solution

2C-B hydrochloride reference standard was obtained from Lipomed (Lot 729.1B3.1; Purity = 99.3 %). 57.87 mg of 2C-B standard was weighed into 50 ml volumetric flask. The standard was dissolved and made up to volume with methanol, giving a concentration of 1.000 mg/mL of 2C-B base.

Standard Solutions

The following concentrations of standard solutions were prepared by dilution of stock solution with mobile phase: 0.020, 0.040, 0.080, 0.120 and 0.200 mg/mL.

Linearity

For linearity study, triplicate injections of the prepared standard solutions were made and the resulting plot is shown in Figure 9.

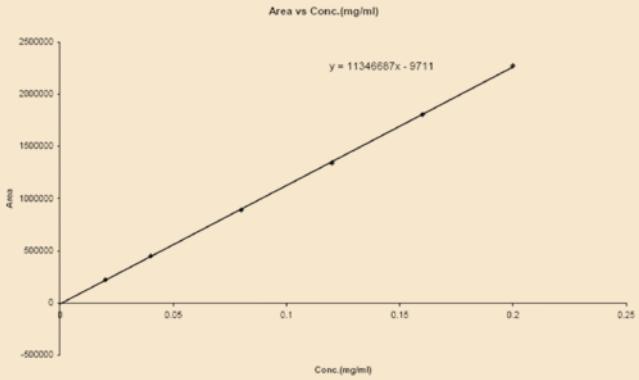


Figure 9: Calibration graph obtained with triplicate injections

The calibration graph was found to be linear from 0.020 mg/mL to at least 0.200 mg/mL. Linear regression analysis showed the correlation coefficient was better than 0.999 and the percent difference between the known concentration and the predicted concentration from the regression equation was less than ≤ 3%. A single point calibration can thus be used for routine analysis.

Precision

Several 2C-B tablets were homogenized by powdering. Ten aliquots of about 70 mg of powder were weighed into 25 mL volumetric flasks, made up to volume with the mobile phase and ultrasonicated for 5 minutes. Solutions were left to settle for one hour before being transferred to injection vials for HPLC determination. Quantitation was by peak area against the 0.120 mg/mL 2C-B standard solution.

No.	Wt (mg)	Area1	Area2	Area3	Mean A	Inj. RSD	% 2C-B
1	74.7	1388011	1388792	1388064	1388289	0.03	3.13
2	73.8	1340236	1324329	1325427	1329997	0.67	3.04
3	73.5	1322775	1316861	1313074	1317570	0.37	3.02
4	73.8	1287183	1282574	1287159	1285639	0.21	2.94
5	73.6	1330425	1332631	1318344	1327133	0.58	3.04
6	73.0	1301284	1302667	1298671	1300874	0.16	3.04
7	73.9	1328379	1336267	1326599	1300415	0.39	3.07
8	73.0	1322123	1305975	1301718	1309939	0.82	3.06
9	72.2	1305824	1308396	1302934	1305718	0.21	3.08
10	73.7	1301371	1290030	1286825	1292742	0.59	2.99
	Mean						*3.04*
	Range						*2.94 – 3.13*
	Standard	deviation					*0.053*
	Relative	standard	deviation	(%)			*1.74*

Table 2: Precision data

Accuracy

The same 2C-B tablet material used in the precision study was re-analysed using the method of standard addition. Procedure:

i. 350 mg of the powdered tablet material was weighed in a 100 mL volumetric flask and made up to volume with the mobile phase.
ii. Aliquots of 10 mL each were pipetted into five 25 mL volumetric flasks.
iii. The following volumes of the 2C-B stock solution (1.000 mg/mL) were added to the volumetric flasks: 0, 1, 2, 3, and 4 mL.
iv. The above solutions were made up to volume with the mobile phase.
v. The solutions were filtered through a 0.45 µm disposable filter syringe and triplicate injections made onto the HPLC column.
vi. The mean area obtained was plotted against the volume of 2C-B standard solutions added (see Figure 10).

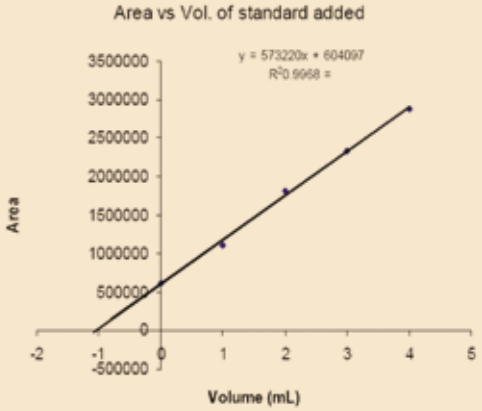


Figure 10: Calibration curve for method of standard addition

Thus, from the equation of the calibration curve, when y = 0, x = 604097/573220 mL. i.e. x = 1.0539 mL or 1.0539 mg since 1 mL is equivalent to 1.000 mg/mL. Therefore, amount of 2C-B = [1.0539/35]*100 % = **3.0 %**.

Application of Hair Reference Materials for a Proficiency Test

Sooyeun Lee, Yonghoon Park & Heesun Chung
National Institute of Scientific Investigation, Korea

Introduction

Quality assurance has become a main area in forensic toxicology because of the administrative and legal consequences of analytical results. The analytical results and related data are often submitted to court as evidence and sometimes become an issue in court due to complication and ambiguity of interpretation. Recent social changes in and around Korea, such as the introduction of a jury into the Korean legal system, internationalization of drug related crimes and the opening of the Korean legal market due to a Free Trade Agreement (FTA), all highlight the importance of quality assurance.

Interpretation of qualitative and/or quantitative results in hair drug analysis is not easy due mainly to individual differences such as hair color and growth rate. Moreover, since pharmacokinetics in hair is not fully understood, the time and severity of drug use is always questioned. From the analytical point of view, hair analysis is a microanalysis, which requires a sensitive and accurate analytical technique. In addition, hair is a solid specimen, which requires more efficient sample preparation than other biological samples such as blood and urine. Therefore, quality control in hair analysis is even more important.

For quality assurance/control, the use of reference material (RM) is indispensable. It is necessary for method development and validation, estimation of measurement uncertainty, internal or external proficiency tests, training programs and so on. According to ISO Guide 30 [1], RM is defined as a material or substance one or more of whose property values are sufficiently homogeneous and well established to be used for the calibration of an apparatus, the assessment of a measurement method, or for assigning values to materials. Furthermore, certified reference material (CRM) is a RM, accompanied by a certificate, one or more of whose property values are certified by a procedure which establishes its traceability to an accurate realization of the unit in which the property values are expressed, and for which each certified value is accompanied by an uncertainty at a stated level of confidence.

In 2008, the Narcotic Analysis Division of the National Institute of Scientific Investigation developed two types of hair RM for quality control in hair drug analysis: one hair RM prepared with a pool of authentic drug abusers' hair samples and the other prepared with drug-free hair fortified with drugs [2, 3]. The prepared RMs were distributed to each participant for a pilot proficiency test. In the current report, the results of a pilot proficiency test using the RMs are summarized.

Preparation of Hair Reference Materials

The preparation of authentic and fortified hair RMs was reported in previous studies [2, 3]. Their certified concentrations are shown in Table 1. The concentrations of methamphetamine (MA) and amphetamine (AP) in the authentic hair RM were 7.64±1.24 ng/mg and 0.54±0.07 ng/mg and those in the fortified one were 4.86±0.69 ng/mg and 4.63±0.44 ng/mg, respectively.

Analyte	Certified Concentration (ng/mg)			
	Authentic		Fortified	
	Property Concentration	*U*	Property Concentration	*U*
Methamphetamine	7.64	1.24	4.86	0.69
Amphetamine	0.54	0.07	4.63	0.44

U; expanded uncertainty (coverage factor, $k = 2$).

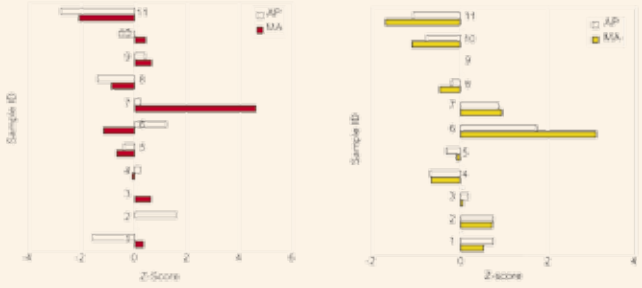
Table 1: Internal certification of authentic and fortified hair RMs

Pilot Proficiency Test

The authentic RM was distributed to eleven participants and the fortified one to ten participants in Japan, Korea, Singapore and the UK after their agreement. The quantitative results are shown in Table 2 with their sample preparation methods and analytical techniques. Their Robust Z-scores, which describe how close each individual result was to the consensus one, are displayed in Figure 1. Generally, a Z-score less than 1.0 is excellent, up to 2.0 is acceptable and greater than 3.0 is considered to be unacceptable. Most participants showed satisfactory performances except one participant in the test with the authentic hair RM and one with the fortified RM.

Participant ID	Sample Preparation	Analytical Technique	Authentic			Fortified		
			Sample ID	MA	AP	Sample ID	MA	AP
1	Ultrasonication	GC-MS	A42	8.15	0.42	F16	4.96	4.70
2	Ultrasonication	GC-MS	A43	7.92	0.58	F17	5.03	4.70
3	Agitation	GC-MS	A47	8.33	0.50	F23	4.79	4.45
4	Agitation	GC-MS	A40	7.86	0.51	F14	4.53	4.07
5	Agitation	GC-MS	A41	7.48	0.48	F15	4.74	4.23
6	Agitation	GC-MS	A37	7.15	0.56	F11	5.87	5.13
7	Agitation	GC-MS	A38	10.93	0.51	F12	5.11	4.75
8	Agitation	GC-MS	A39	7.35	0.43	F13	4.60	4.28
9	Micropulverized extraction	HPLC-MS	A28	8.34	0.52	-	-	-
10	Liquid-liquid extraction	GC-MS	A46	8.20	0.47	F22	4.37	4.03
11	Solid-phase extraction	GC-MS	A56	6.54	0.36	F46	4.16	3.90

Table 2: Quantitative results (ng/mg) for MA and AP in authentic and fortified hair RMs



(A) Authentic RM *(B) Fortified RM*

Figure 1: Robust Z-scores for MA and AP in (A) authentic and (B) fortified hair RMs

The statistical results are summarized in Table 3. The median concentrations, 7.92 ng/mg and 0.50 ng/mg for MA and AP in the authentic RM and 4.77 ng/mg and 4.37 ng/mg in the fortified RM, were not significantly different from the certified concentrations. The Robust CV of MA and the concentration ranges of MA and AP in the authentic RM are comparatively higher than those in the fortified RM, which implies that the quantitative results in the authentic one are more dispersed than those in the fortified one. This occurrence is assumed to be due to the difference in the homogeneity between the two RMs.

RM/Analyte / Statistic	Authentic		Fortified	
	MA	AP	MA	AP
Number of results	11	11	10	10
Median	7.92	0.50	4.77	4.37
NIQR	0.65	0.05	0.36	0.44
Robust CV (%)	8.26	10.01	7.51	10.02
Minimum	6.54	0.36	4.16	3.90
Maximum	10.93	0.58	5.87	5.13
Range	4.39	0.22	1.71	1.23

NIQR: normalized inter quartile range; CV: coefficient of variation

Table 3: Summary of statistical results of the pilot proficiency test

Discussion and Conclusion

A proficiency testing program is essential in evaluating the reliability of analytical method used in a laboratory. For hair analysis, the Society of Hair Testing (SoHT) has provided a proficiency testing service annually. Also, forensic institutes in Italy and Spain have managed an external proficiency testing program (HAIRVEQ) since 2002 [4]. However, these programs are based in Europe and hence they focus more on the analysis of popular drugs in Europe such as opiates and cocaine. However, in Korea and some other Asian countries, MA is more popular and therefore hair analysis is conducted mostly on MA and AP. Considering this regional difference, the establishment of a regional proficiency testing scheme is desirable. To begin with, active involvement of participant representatives is required in the process of establishing a proficiency testing scheme.

For quality control in hair analysis, authentic hair should be used because the conditions of hair fortified with drugs cannot substitute those hair of an actual drug user. Drugs in the fortified hair may be extracted more easily than those in the authentic hair. However, since the authentic hair is possibly less homogeneous than the fortified one, the homogeneity of the former must be checked [2].

Acknowledgement

The National Institute of Scientific Investigation (NISI) in Korea was accredited as a forensic science laboratory by KOLAS, and is compliant to international quality standard ISO/IEC 17025, in 2004. Also, the NISI was designated as a provider of proficiency testing services in April 2009. Currently, the NISI provides the proficiency testing schemes of hair drug analysis and DNA profiling.

The authors thank the participants of the pilot proficiency test for their support. The prepared RMs can be provided gladly to any laboratory for their internal quality control and research purposes.

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STR - Typing of Vitreous Humor DNA for Forensic Case

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Abstract

DNA in vitreous humor was extracted for forensic work besides toxicology detection. The purpose is to overcome the problem of contamination and likely degradation of DNA in post-mortem specimens. This is the first time for forensic practice to get complete DNA profiles from vitreous humor. Vitreous humor can be considered as an alternative source of DNA to other biological specimens. This case study demonstrated the ability to obtain a complete DNA profile for extracts from vitreous humor comparable to extracts from blood. The developed sample preparation method hoped to mitigate a major problem in lack of amplifiable DNA from post-mortem specimens. This case study will hopefully be a good starting point for those who are contemplating a fresh investigation into some aspect of postmortem DNA analysis.

Introduction

Vitreous humor is a clear jelly-like (semifluid albuminous tissue) which occupies the posterior compartment of the eye. Located behind the lens, it occupies about three-quarters of the volume of the eyeball. It functions to support the retina and maintains the shape of the eyeball under normal conditions. The vitreous humor is normally used as an alternative to urine and blood specimens for postmortem determination of ethanol [1]. Vitreous humor is frequently used in forensic analysis and has been used with varying degrees of success in the estimation of the time of death [2], especially in cases where blood samples may be inappropriate or contaminated. Vitreous humor is widely used for postmortem biochemical analysis because it is more accessible to collect than cerebrospinal fluid and its composition changes more slowly after death than the composition of blood [1,3,4]. Moreover, some retinal proteins detected in the vitreous humor sample would be markers of age-related oxidative stress and biological age [5].

However, despite the wide use of blood as a valuable source of forensic evidence, blood is highly susceptible to environmental assaults. The purpose of this study was to evaluate the possible future use of vitreous humor in postmortem DNA testing.

Materials and Methods

Preparation Sample and Extraction

Samples of vitreous humor (4 ml) was centrifuged at 4,000 rpm for 15 min. The pelleted cells were collected for extraction. This step is critical as a successful DNA extraction depends on the number of cells in the pellet. The DNA IQ™ extraction kit was used for the extraction of blood sample and collected cells. The extraction procedure was according to manufacturer's instructions [6].

Quantitation of DNA

Real-Time PCR reactions were carried out using the Quantifiler™ Human DNA Quantification Kit by ABI 7000 Sequence Detection System (Applied Biosystem). The extracted vitreous humor DNA concentration was 0.32 ng/µl.

Amplification and Analysis

A 2 ng DNA template from vitreous humor extract was amplified using AmpF*l* STR® Identifiler® (Applied Biosystem) and performed according to the manufacturer's user manual by GeneAmp® PCR System 9700. DNA typing was performed by using the ABI PRISM 3100 Genetic Analyzer and analysed by GeneMapper*ID* version 3.2.

Results and Discussion

A full DNA profile was derived from the collected cells in vitreous humor and corresponded to the DNA profile from blood (Figures 1 and 2). This is the first time for a DNA postmortem testing to get complete DNA

profiles from vitreous humor. Vitreous humor can be utilised as an alternative sample to blood specimens. Our finding postulated that DNA found in vitreous humor may be contents of blood cells and vascular endothelial cells undergoing autolysis.

In cases where blood samples are unavailable or contaminated to be used for DNA testing, this case study will hopefully be a good starting point for those who are contemplating a fresh investigation into some aspect of postmortem DNA analysis. Moreover, it has become apparent that we must optimize this method for precise measurements. Developing validation methods for analysis of alternative fluids is a task for the future. However, further study of this potential association on a larger scale would be required.

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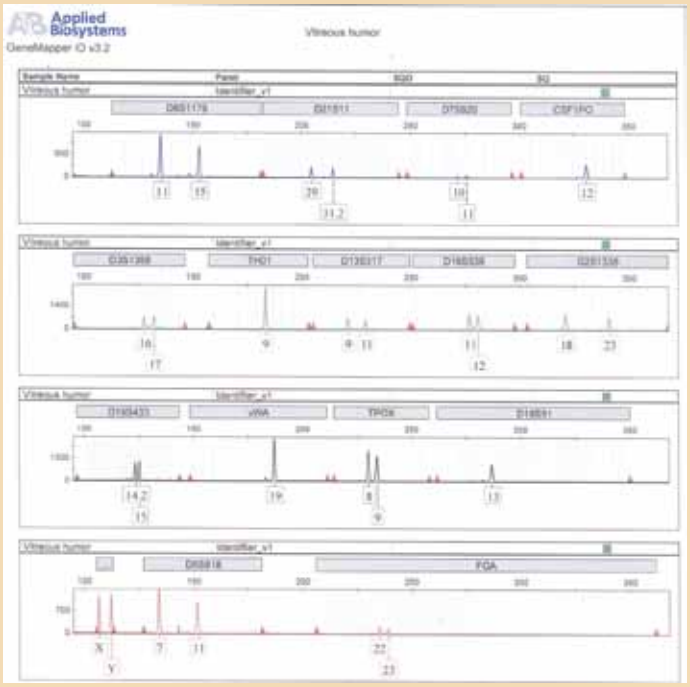

Figure 1: Full DNA profile from vitreous humor.

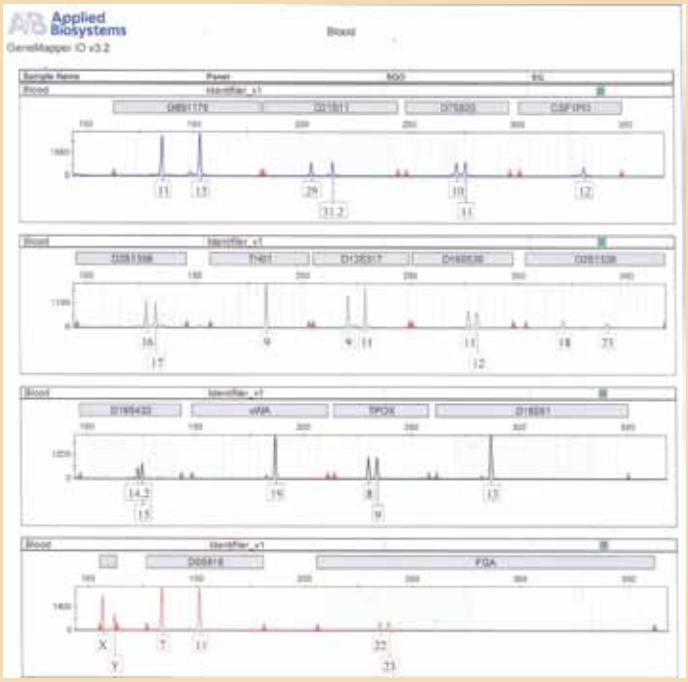

Figure 2: Full DNA profile from blood.

The 1st Clandestine Laboratory Workshop at Health Sciences Authority

Dr Helen Panayiotou
Health Sciences Authority, Singapore

On the 26th of June 2009, the Illicit Drugs Laboratory at Health Sciences Authority (HSA) successfully conducted its first Clandestine Laboratory Workshop. The participants included officers from the Central Narcotics Bureau, the Singapore Civil Defence Force as well as officers from HSA. This workshop is of utmost importance as clandestine laboratories are increasingly becoming a menace and challenge to civil societies world wide. In South-East Asia, synthetic drugs and in particular amphetamines are increasing at an alarming rate. Methamphetamine laboratories have been reported in Cambodia, China, Hong Kong, Indonesia, Malaysia, Philippines, the Republic of Korea and Vietnam.

The topics covered in the workshop included:

- Introduction to Clandestine Laboratories including common methods of methamphetamine production and the chemicals involved;
- Hazards and dangers (chemical, physical and environmental) associated with Clandestine Laboratories;
- Site monitoring, personal protective equipment and decontamination;
- Clandestine Laboratory investigation and crime scene processing.

A mock clandestine laboratory exercise was conducted at the end of the workshop so as to offer the participants a practical "hands-on" experience.

Cannabis Case Report
PP v Gary Shih Cheng Cheuan
23rd July 2009

Mr Pg Mohd Helmy Bin Pg Rabaha
Department of Scientific Services, Brunei Darussalam

Brief Information of the Case

The defendant was charged with the possession for the purpose of trafficking of 963.73 grams of cannabis, a Class B controlled drug, contrary to Section 3A of the Misuse of Drug Act (Cap 27), Negara Brunei Darussalam and posed a possible death penalty if convicted (involving more than 500 grams of cannabis).

The exhibits were sent to the Narcotics Laboratory, Department of Scientific Services (DSS), Brunei Darussalam for analysis in 2006. The laboratory received three compressed slabs of 963.73 grams in total. The analysis conducted was fairly routine and involved a description of the physical appearance of the exhibits, weighing of the exhibits, sampling, TLC analysis and finally a qualitative analysis by GC-MS.

There were no difficulties encountered in the analysis conducted. All findings showed the exhibits (in dried plant material) to be cannabis. Physical inspection through macroscopic examination of the exhibits suggested that the three slabs were all of the same nature. Microscopic examination was not done at that time as the laboratory did not have such facility yet. TLC analysis showed the presence of the three main constituents of cannabis; namely delta-9-tetrahydrocannabinol, cannabinol and cannabidiol. The GC-MS analysis of the exhibit also showed the presence of the same three compounds. All the analyses were subjected to 5 samplings for each exhibit, giving rise to a total of 15 samplings and all showed the same results indicating the presence of cannabis.

Challenges in the Trial

- In the trial, the results and findings of the analysis were never doubted by the defence counsel.
- It was the statutory definition of cannabis in the Misuse of Drug Act (MDA) that was questioned in this case. The defending counsel raised the issue of whether the laboratory analysis could prove that cannabis resin had not been extracted and put it to the Court that the meaning of cannabis in the analysis did not comply with the meaning of cannabis in the MDA.
- Definition of cannabis under MDA was "any part of any plant of the genus cannabis from which the resin has not been extracted, by whatever name it may be designated".
- The prosecutor proved that the exhibits were of the genus cannabis but failed to prove the fact that resin had not been extracted from the plants.
- Therefore the court was left in doubt as to whether the plant materials were cannabis as defined under Section 2 of the MDA.

Conclusion of the Case

- It left the Court to decide the case with referral to Loo Keck Leong v Public Prosecutor [1992] 2 MLJ 177, Public Prosecutor v Alcontara [1993] 3 MLJ 568 and Hwa Tua Tau v Public Prosecutor [1981] 2 MLJ 49.
- The Court concluded the case that the burden is on the Prosecution to prove that (1) the plant materials were of the genus cannabis and (2) that the resin content in the plant materials was either "wholly intact" or the resin "which remained in the plant material after extraction is not so minute as to amount in reality and common sense to nothing at all and therefore harmless".
- The Court have also excluded the expert testimony on the definition of cannabis as it was plainly wrong in the context of Section 2 of Brunei MDA but more likely to refer to Section 2 of Singapore MDA.
- The Court was also left completely in the dark as to whether the analyst ever carried out any examination for the presence of resin as the prosecution did not examine the analyst on this issue.
- The Court could not completely take into account that the presence of the three constituents of cannabis (delta-9-tetrahydrocannabinol, cannabinol and cannabidiol) suggested the presence of resin as these three compounds were also found in other parts of the plant.
- Therefore the Court found no case against the defendant resulting in the acquittal of defendant.

Lessons Learnt

- DSS acknowledged the 'new' ruling by the High Court judges with respect to the analysis of plant materials suspected to be Cannabis and had introduced some improvements and changes to the SOP.
- For future cannabis cases, the analyst will provide the court with a microscopic morphology photographic evidence of the dried plant material showing the presence of resin in the dried plant materials.
- The analyst certificate will be improved to state clearly the finding of resin and the chemical constituents in the dried plant materials with concluding statement that the plant material was cannabis with "abundant and substantial resin".

Corrective Actions, Positive Outcome & Way Forward

- Post-mortem of the trial by DSS resulted in the proposal by the Narcotics Control Bureau to Attorney General Chamber to amend the definition of cannabis as have been done by our neighbouring countries, Malaysia and Singapore; of which the definition of cannabis in the MDA was redefined in 1992 and in 1993 respectively. Brunei Court had also noted in its Judgement of the shortcomings of Brunei Darussalam MDA as cited :

  "In view of this and on the advice of the DSS, my ministry proposes to amend the definition of cannabis to remove the misconception that cannabis is a controlled drug only if resin is present in that part of the plant".

  "Time, however, has stood still insofar as the definition of cannabis under Section 2 of our MDA (Cap 27) is concerned. Whilst there have been amendments to various sections in the Act since its commencement on 1 July 1978, Section 2 has remained the same".
- In addition, DSS took the opportunity and requested to amend and to update the entire schedule of the Brunei Darussalam MDA.

The atomic orbit symbolizes the sciences we do.
The scale symbolized the justice we serve.
The map symbolizes the region we represent.

Asian Forensic Sciences Network is a network of Forensic Science Institutes in Asia. Institute means an institution or laboratory or entity providing forensic science services.

Its purpose is:

- To provide a forum for forensic science institutes in Asia for discussion on issues relating to forensic services.
- To enhance the quality of forensic services in Asia through expert working groups, training, collaborative studies, proficiency tests and accreditation.
- To establish links with other similar networks for the promotion and advancement of forensic science.
- To formulate strategies relating to forensic science issues in Asia.

Workgroup / Committee

AFSN currently has the following workgroups and committee:

- DNA Workgroup
- Illicit Drugs Workgroup
- Trace Evidence Workgroup
- Quality Assurance and Standards Committee

Code of Conduct

The Code of Conduct provides a general guide for forensic practitioners employed by members of AFSN in handling and examining evidence, preparing case records and giving expert testimony in court.

1. Maintain honesty, integrity, objectivity and impartiality.
2. Treat all information from an agency or client with the appropriate confidentiality.
3. Treat all evidence with care and control to ensure their integrity.
4. Utilise appropriate methods, techniques, standards and controls that are generally accepted and current.
5. Keep detailed case examination notes on all evidence, the examinations done, the results obtained and the findings and conclusions reached for as long as is possible or at least during the currency of any relevant legal proceedings.
6. Accept full responsibility for all work done under one's supervision and which is within one's expertise.
7. Opinions should be expressed in simple, precise and unambiguous terms and distinctions made between such opinions and results of tests and examinations.
8. Reports will be signed only by the persons who have either carried out the work or have directly or indirectly supervised it.
9. Testify in court in an impartial, straightforward manner within the limits of the field of expertise or the level of competence.
10. Be prepared to reconsider and, if necessary, change one's advice, conclusions or opinion, in the light of new information or new developments in the relevant field, and inform the relevant client and employer promptly of any such changes made.
11. Carry out all duties in a professional manner.
12. No services should be rendered where the fee is dependent on the outcome of the examination.
13. Regard and respect peers.
14. Maintain professional competency by keeping abreast with advances in the discipline.

Members

1. Department of Scientific Services, Brunei Darussalam
2. National Institute of Scientific Investigation, Korea
3. Food and Drug Quality Control Center, Lao PDR
4. KIMIA MALAYSIA, Malaysia
5. Institute of Forensic Science, People's Republic of China
6. National Bureau of Investigation, Philippines
7. Health Sciences Authority, Singapore
8. The Central Institute of Forensic Science, Thailand
9. Ramathibodi Hospital, Thailand
10. Vietnam Forensic Science Institute, Vietnam

(Members as at October 2009 - listed in alphabetical order of country)

Upcoming Events

Date	Events
22 Feb – 27 Feb 2010	American Association of Forensic Science (AAFS) Annual Meeting, Seattle, Washington, USA
28 Aug – 2 Sep 2010	American Society of Questioned Document Examiners (ASQDE) Annual Meeting, Victoria, British Columbia, Canada
29 Aug – 2 Sep 2010	International Association of Forensic Toxicologists (TIAFT) Meeting, Bonn, Germany
5 Sep – 9 Sep 2010	International Symposium on the Forensic Sciences, ANZFSS, Sydney, Australia
18 Oct – 22 Oct 2010	Society of Forensic Toxicologist (SOFT) Meeting, Richmond, Virginia, USA
2 Nov – 6 Nov 2010	Clandestine Laboratory Investigating Chemists Association (CLIC) Meeting, Auckland, New Zealand