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大會歡迎詞

僅代表第三屆環境醫學國際研討會歡迎各位的到來，環境醫學國際研討會已經邁入第三個年頭。本次研討會特別在新竹擴大舉辦，除了新竹是文化、科技和學術中心外，近年來臺大醫院新竹分院因當地的產業結構，致力發展檢驗、環境職業醫學的臨床服務和學術研究，希望為當地居民的健康盡一份心力。同時，國家衛生研究院於去年正式成立國家環境醫學研究所(簡稱環醫所)，做為研究機構及政府之環境醫學智庫，環醫所透過實證醫學發展全面的職業醫學、環境健康、食品安全和毒理研究。透過臺大醫院新竹分院、國家衛生研究院環醫所和臺大醫院環境醫學中心三個重要環境與職業醫學的醫療和研究機構共同參與，推動整合與交流，當可促進桃竹苗以及甚至全國的環境與健康研究和發展！

本研討會秉持知識交流、增加暴露分析、臨床醫療服務和風險溝通以增進大眾的健康為目標，本屆研討會訂定三大主題：檢驗醫學與環境職業健康偵測、高科技產業與健康和新時代的健康議題。

我們邀請了來自美國、日本和韓國的貴賓，感謝您遠道而來與我們分享您寶貴的經驗！以及國內各位專家學者撥冗出席，才能促成此次各方的交流和學習。最後，對各位的參與和支持致上最深的謝意，希望研討會能給您激勵、充實和愉悅的兩天，更重要的是，研討會所討論之科學成果，可以讓全國國民活得更好、更健康。



洪冠予院長

臺大醫院新竹分院院長

臺大醫學院內科教授



郭育良所長

國衛院環醫所所長

臺大醫院環境及職業醫學部及內科部主治醫師

臺大醫學院暨職衛所教授



陳保中教授

臺大醫院環境及職業醫學部主任

臺大公衛學院教授暨職衛所所長

Welcome Message

Welcome to the 2016 International Symposium of Environmental Medicine. On behalf of the symposium organizing committee, we are honored and delighted to welcome you in Hsin-Chu, Taiwan. This year we chose Hsin-Chu as the symposium venue for it is the center of culture, technology and research. Also, National Taiwan University Hospital Hsin-Chu Branch aims to provide superior healthcare by improving environmental and occupational laboratory medicine of clinical services and research recently. Meanwhile, National Institute of Environmental Health Sciences (NIEHS) was established in 2015 for its mission as task-oriented research institution and the Government think tank as a part of National Health Research Institutes (NHRI). NIEHS includes occupational medicine, environmental health sciences, food safety and toxicology research. By the corporation of medical and research institutes as NTU Hospital Hsin-Chu Branch, NIEHS, NHRI and Environmental Medicine Collaboration Center, National Taiwan University Hospital (EMC², NTU Hospital), we'd like to improve healthcare and research in Tao-Yuan, Hsin-Chu and Miao-Li regions also nationwide.

Our aims are to enhance and exchange our knowledge of environmental medicine and improve health eventually by improving exposure science, clinical service and risk communication. There are three sessions for this year's symposium: Environmental and Occupational Laboratory Medicine, High-Tech Healthcare and Current Environmental Health Issues.

The purpose of this symposium is to learn from each other and to pursue future cooperation in this field. We also have our distinguished guests from the United States, Japan and Korea. We deeply appreciate your coming to share with us your unique experience. Finally, we'd like to thank you for your support and your attendance. Wish you find the conference stimulating, fulfilling and enjoyable. We hope the research and innovation results could help people live healthier and better.

Dr. Kuan-Yu Hung

Superintendent, National Taiwan University
Hospital Hsin-Chu Branch
Professor of Nephrology, College of
Medicine, National Taiwan University

Prof. Yue-Leon Guo

Director, National Institute of Environmental
Health Sciences, National Health Research
Institutes
Professor, Department of Public Health and
Institute of Occupational Medicine and
Industrial Hygiene, National Taiwan
University College of Public Health
Attending Physician, Department of
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Director, Department of Environmental and
Occupational Medicine, National Taiwan
University Hospital and National Taiwan
University College of Medicine
Professor, Department of Public Health and
Institute of Occupational Medicine and
Industrial Hygiene, National Taiwan
University College of Public Health

第3屆環境醫學國際研討會

2016 International Symposium of Environmental Medicine

2016 年 11 月 19 日 19 November, 2016

新竹芙洛麗飯店 Fleurli Hotel

主題 Session	檢驗醫學與環境職業健康偵測 Environmental and Occupational Laboratory Medicine	高科技產業與健康 High-Tech Healthcare
地點 Venue	3F (I 廳)	3 F (II 廳)
1300-1320	報到 Registration	
	主持人：黃耀輝副院長/臺灣大學公共衛生學院 Moderator: Prof. Yaw-Huei Hwang/Associate Dean, National Taiwan University College of Public Health	主持人：劉佳鈞所長/勞動部勞動及職業安全衛生研究所 Moderator: Dr. Chug-Chun Liu/Chairperson, Institute of Labor, Occupational safety and Health, Ministry of Labor
1320-1400	以特殊標的物確認非法海洛因之使用 Identification of Specific Analytical Markers to Confirm the Administration of Illicit Heroin 陳珮珊副教授/國立臺灣大學法醫學科暨研究所 Assoc. Prof. Pai-Shan Chen/Department and Graduate Institute of Forensic Medicine, National Taiwan University College of Medicine	職安衛與化學品管理趨勢 OSH and Chemical Management Prospective 余榮彬總經理/財團法人安全衛生技術中心 Dr. Jung-Pin Yu/President, Safety and Health Technology Center (SAHTECH)
1400-1440	從事重金屬相關作業工作者健檢之臨床檢驗意義-以勞工健康保護規則為例 Clinical Significance of Medical Examinations among Worker Exposed to Heavy Metal-Examples from Regulations of the Labor Health Protection 朱柏青醫師、蔡瑞元醫師/臺大醫院新竹分院環境及職業醫學部 Dr. Po-Ching Chu & Dr. Jui-Yuan Tsai/Department of Environmental and Occupational Medicine, National Taiwan University Hospital Hsin-Chu Branch	日夜輪班之健康影響：台灣經驗 Health Effects of Day-and-Night Rotating Shift Work : The Taiwan Experience 林育正醫師/恩主公醫院職業醫學科主任 Dr. Yu-Cheng Lin/Director, Department of Occupational Medicine, En Chu Kong Hospital
1440-1510	休息時間 Coffee Break /Poster Presentations & Discussion	
	主持人：謝文祥理事長/社團法人台灣醫事檢驗學會 Moderator: Dr. Wen-Shyang Hsieh/Taiwan Society of Laboratory Medicine	主持人：林瑜雯副教授/輔仁大學公共衛生學系 Moderator: Assoc. Prof. Yu-Wen Lin/Department of Public Health, Fu Jen Catholic University
1510-1550	醫學實驗室建立重金屬檢驗能力經驗分享 Experience Sharing in Capability Building of Heavy Metal Examination in Medical Laboratory 黃雅卿組長/林口長庚紀念醫院檢驗醫學科醫檢組 Ms. Ya-Ching Huang/Supervisor Technologist, Laboratory Medicine, Chang Gung Memorial Hospital, Linkou	奈米科技與健康 Surveillance of Health Hazards in Nanomaterials Workers: Updated Status of Nanoepidemiology 劉紹興研究員/國家衛生研究院國家環境醫學研究所 Dr. Saou-Hsing Liou/National Institute of Environmental Health Sciences, National Health Research Institutes
1550-1630	近五年重金屬檢測結果分析-新竹某區域教學醫院經驗分享 Analysis of the Heavy Metal Examination in Past 5 Years—An Experience of a Regional Teaching Hospital in Hsin-Chu 蕭雅一組長/臺大醫院新竹分院檢驗醫學部 Ms. Ya-I Hsiao/Supervisor technologist, Department of Laboratory Medicine, National Taiwan University Hospital Hsin-Chu Branch	職場社會心理危害：政策議題、研究證據與未來展望 Psychosocial Work Hazards in Taiwan: Policy Issues, Research Findings and Future Directions 鄭雅文教授/國立臺灣大學健康行為與社區科學研究所 Prof. Ya-Wen Cheng/Institute of Health Policy and Management, National Taiwan University College of Public Health

第3屆環境醫學國際研討會

2016 International Symposium of Environmental Medicine

2016 年 11 月 20 日 20 November, 2016

新竹芙洛麗飯店 Fleurli Hotel

主題 Session	新時代環境新議題 Current Environmental Health Issues		地點 Venue	3 F (II 廳)
0840-0910	報到 Registration			
0910-0930	貴賓致詞 Opening Remarks			
主持人：郭育良所長/國家衛生研究院國家環境醫學研究所 Moderator: Prof. Yue-Liang Leon Guo/Director, National Institute of Environmental Health Sciences, National Health Research Institutes				
0930-1010	Progress and Perspectives of Environmental Health Research in NIER, Korea Dr. Kyunghee Choi/National Institute of Environmental Research, Korea			
1010-1050	Developmental Neurotoxicity: Perspectives and Problems in Risk Assessment Prof. Chiharu Tohyama 遠山千春教授/Faculty of Medicine, University of Tsukuba, Japan			
1050-1110	休息時間 Coffee Break /Poster Presentations & Discussion			
主持人：詹長權副院長/臺灣大學公共衛生學院 Moderator: Prof. Chang-Chuan Chan/Associate Dean, National Taiwan University College of Public Health				
1110-1150	Ah Receptor-Mediated Disruption of the Cardiac Embryogenesis Program Prof. Alvaro Puga/University of Cincinnati College of Medicine, USA			
1150-1230	Gene-Environment Interactions in Developmental Toxicity of Dioxin Prof. Ying Xia/University of Cincinnati College of Medicine, USA			
1230-1330	午餐 Lunch	1245-1310	口頭論文發表(一) Oral Presentations & Discussion (I)	
主持人：何啟功次長/衛生福利部 Moderator: Dr. Chi-Kung Ho/Deputy Minister, Ministry of Health and Welfare				
1330-1410	將職業衛生加入建廠設計:以光電半導體產業為例 Incorporation of Occupational Health in the Process Design: Assessment of Health Risk for Exposures to Hazardous Chemicals in Optoelectronic Semiconductor Industry as an Example 吳焜裕委員/立法委員(國立臺灣大學職業醫學與工業衛生研究所教授) Prof. Kuen-Yuh Wu/Legislator, Legislative Yuan			
1410-1450	臺北市鉛水管事件分享 Lead-Based Water Pipes in Taipei 黃世傑局長/台北市政府衛生局局長(國立台灣大學醫學院名譽教授) Dr. Shier-Chieh Huang/Commissioner, Department of Health, Taipei City Government			
1450-1540	休息時間 Coffee Break	1455-1520	口頭論文發表(二) Oral Presentations & Discussion(II)	
主持人：王英偉署長/衛生福利部國民健康署 Moderator: Dr. Ying-Wei Wang/Director-General, Health Promotion Administration, Ministry of Health and Welfare				
1540-1620	呼吸道疾病之環境因子 The Roles of Environmental Factors on Asthma 郭育良所長/國家衛生研究院國家環境醫學研究所(國立臺灣大學職業醫學與工業衛生研究所教授) Prof. Yue-Liang Leon Guo/Director, National Institute of Environmental Health Sciences, National Health Research Institutes			
1620-1700	環境汙染與婦幼健康 - 台灣目前最迫切需要研究的議題是什麼? Among Environmental Factors Related to Maternal/Child Health, What Are the Most Critical Issues to Be Tackled in Taiwan? 郭保麟教授/國立成功大學醫學院婦產學科(國立成功大學醫學院附設醫院婦產部醫師) Prof. Pao-Lin Kuo/National Cheng Kung University College of Medicine			
1700-1710	海報/口頭論文頒獎 Poster/Oral Awards			

口頭報告 Oral Presentation Session

2016 年 11 月 20 日 20 November, 2016

口頭論文發表(一) Oral Presentations & Discussion (I) 1245-1310

主持人：張大元教授/中國醫藥大學公共衛生學院職業安全與衛生學系

主持人：黃柏菁助研究員/國家衛生研究院國家環境醫學研究所

Chair: Prof. Ta-Yuan Chang/Professor and Chairperson
China Medical University, College of Public Health,
Department of Occupational Safety and Health

Chair: Dr. Po-Chin Huang /Assistant Investigator, NIEHS,
NHRI

時間 Time	姓名 Name	單位/職稱 Organization/ Position	主題 Topics	題目 Title
1245-1250	莊校奇 Hsiao-Chi Chuang	台北醫學大學呼吸治療學系/ 助理教授 School of Respiratory Therapy, Taipei Medical University College of Medicine/Assistant Professor	癌症與環境 Cancer and the Environment	Tumor protein p63 expression induced by zinc oxide nanoparticles in mice
1250-1255	郭錦輯 Chin-Chi Kuo	中國醫學大學附設醫院/醫師 Kidney Institute, China Medical University Hospital/Attending Physician	化學、金屬物 質與健康 Chemicals, Metals and Health	The association of early life arsenic exposure trajectory and lipid profile in adolescence: A 15-year longitudinal birth cohort study in Taiwan 嬰幼期至青少年間之無機砷暴露軌 跡與血中脂肪濃度之相關性研究
1255-1300	彭高治 Kao-Chih Peng	台灣大學職業醫學與工業衛生 研究所/研究生 Nation Taiwan University College of Public Health/ Graduate Student	健康促進 Health Promotion	Associations between Body Composition and Pulmonary Function Are Age-Dependent in Middle-Aged and Elderly Subjects
1300-1305	翁子軒 Tzu-Hsuan Wong	高雄醫學大學/博士班學生 Graduate Institute of Medicine, Kaohsiung Medical University/ Ph.D. Student	空氣汙染與健 康 Air Pollution and Health	Indeno(1,2,3-cd)pyrene, one of Polycyclic aromatic hydrocarbons in air pollutant, enhances allergic lung inflammation 空氣汙染分子 Indeno(1,2,3-cd)pyrene 的吸入將增 強過敏性肺部發炎
1305-1310	黃柏菁 Po-Chin Huang	國家環境醫學研究所, 國家衛 生研究院/助研究員 National Institute of Environmental Health Sciences, National Health Research Institutes/ Assistant Investigator	兒童環境健康 Children's Environment and Health	Does Risk of Subclinical Hepatic Injury Increased with Urinary Thiodiglycolic Acid level in Children nearby a Petrochemical Complex? 石化區附近兒童尿液中硫代二乙酸 是否增加亞臨床肝臟損傷之風險?

口頭論文發表(二) Oral Presentations & Discussion (ii) 1455-1520

主持人：吳明蒼教授/高雄醫學大學公共衛生學系
Chair: Prof. Ming-Tsang Wu/Professor, Department of Public Health, Kaohsiung Medical University

主持人：王淑麗研究員/國家衛生研究院國家環境醫學研究所
Chair: Dr. Shu-Li Wnag / Investigator, NIEHS, NHRI

時間 Time	姓名 Name	單位/職稱 Organization/ Position	主題 Topics	題目 Title
1455-1500	龔晏平 Yen-Ping Kung	台大醫院環境及職業醫學科/ 醫師 Department of Environmental and Occupational Medicine, National Taiwan University Hospital/Physician	工作環境與健康 Work Environment and Health	A Distribution of Asbestos-Related Disease in Labors in Taiwan 台灣地區勞工罹患石棉暴露相關疾病之探討
1500-1505	王麗婷 Li-Ting Wang	高雄醫學大學醫學研究所/博士後研究員 Graduate Institute of Medicine, Kaohsiung Medical University/ Postdoctoral Fellow	癌症與環境 Cancer and the Environment	Aryl hydrocarbon receptor regulates histone deacetylase 8 expression to repress tumor suppressive activity in hepatocellular carcinoma 芳烴受體調節組蛋白脫乙酰酶 8 表現去抑制抑癌基因的活性並促進肝腫瘤形成
1505-1510	林嘉俊 Kar-Chun Lim	台大醫學系/ 學生 Department of Medicine, College of Medicine, National Taiwan University/Student	工作環境與健康 Work Environment and Health	Flight Safety in Patients with Lung Diseases
1510-1515	黃淑玲 Sheila SL Huang	高雄醫學大學環境醫學研究中心/助理教授 Research Center of Environmental Medicine, Kaohsiung Medical University /Assistant Professor	倫理 Ethics	解構環境汙染之社會性：以『環境正義』析論之
1515-1520	王淑麗 Shu-Li Wnag	國家衛生研究院國家環境醫學研究所/研究員 National Institute of Environmental Health Sciences, National Health Research Institutes/Investigator	兒童環境健康 Children's Environment and Health	Phthalate exposure and Attention Deficit Hyperactivity Disorder traits in children's temperament: A 12-year follow-up study of a Taiwanese birth cohort 塑化劑暴露和兒童氣質中的過動與注意力缺乏特徵之相關性探討：出生世代之 12 年追蹤研究

檢驗醫學與環境職業健康偵測

Environmental and Occupational Laboratory Medicine

司儀 M.C.

蔡瑞元醫師/臺大醫院新竹分院環境及職業醫學部 Dr. Jui-Yuan Tsai/Department of Environmental and Occupational Medicine, NTU Hospital Hsin-Chu Branch

主持人 Moderator

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摘要-近五年重金屬檢測結果分析-新竹某區域教學醫院經驗分享 Analysis of the Heavy Metal Examination in Past 5 Years—an Experience of a Regional Teaching Hospital in Hsin-Chu23



黃耀輝教授

臺灣大學公共衛生學院副院長、公共衛生學系主任、職業醫學與工業衛生研究所教授

Prof. Yaw-Huei Hwang (Taiwan)

Professor and Associate Dean, National Taiwan University College of Public Health

學歷 Education and Degrees

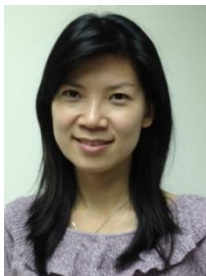
- 1989-1994 美國辛辛那提大學博士 Ph.D., University of Cincinnati
- 1986-1988 臺灣大學碩士(公共衛生) M.S., National Taiwan University
- 1980-1984 臺灣大學學士(公共衛生) B.S., National Taiwan University

專業經歷 Professional Appointments

- 臺灣大學環境保護暨職業安全衛生中心職業安全組組長 Chief, Safety Division, EPOSHC, NTU (2002 - 2013)
- 美國國家職業安全衛生研究所訪問學者 Visiting Scholar and Researcher, National Institute for Occupational Safety and Health (NIOSH) (1999-2000)
- 臺灣大學公共衛生學院副教授 Associate Professor, National Taiwan University College of Public Health (1995-2011)

研究領域 Research Interests

- 重金屬相關研究 Metal Related
 - 砷暴露 Arsenic exposure monitoring by speciation
 - 金屬暴露監測和出生世代研究 Metal exposure monitoring with birth cohort/preschooler cohort
 - 職業金屬暴露 Occupational metal exposure in microelectronic industry—ion implanter, LED
 - 環境金屬暴露 Environmental metal exposure—oral cancer & metal
- 電腦作業負荷研究 Computer Activity Monitoring
 - Software development for electronic activity monitoring
 - Evaluation of computer user's work loading with electronic activity monitoring



陳珮珊副教授 (臺灣)

國立臺灣大學醫學院法醫學研究所

E-mail: paishanchen@ntu.edu.tw

陳珮珊博士為台灣大學法醫學研究所之副教授。博士班畢業於英國的國王學院，專長為毒物分析。他致力於濫用藥物的研究與生物樣品分析，以了解常見或新型濫用藥物之代謝物在人體類或老鼠模組下的分布與可能機轉，藉由液液相微萃取、分散型微萃取與固相微萃取平台結合毛細管或微流速液相層析質譜術，偵測生物與環境樣品中之微量濃度。

研究領域

- Develop solid phase microextraction platform for and drugs of abuse in biological samples.
 - Set up dispersive liquid-liquid microextraction method for pesticide or herbicide in environmental specimens.
 - Develop and modify the interface of capillary/micro-flow mass spectrometry.
 - Understanding the metabolism profiling of emerging drugs
 - Investigate the fatal dose of enantiomer drugs and their postmortem redistribution.
-

學歷

2007-2011 英國國王學院毒物分析博士

2005-2007 國立清華大學化學所博士候選人

2003-2005 國立清華大學化學所碩士

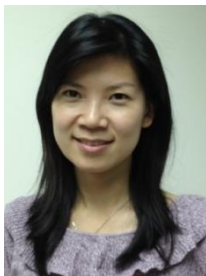
專業經歷

2016- 台灣法醫學會秘書長

2013-2016 台灣法醫學誌主編

論文發表

1. P. Chen*, S. Chen, J. Chen, W. Haung, H. Liu, P. Kong, Olivia H. Yang, Anal. Chim. Acta, 2016, Featured Article *in press*.
2. A. Maas, M. Krämer, K. Sydow, P. Chen, T. Dame, F. Musshoff, B. Diehl, B. Madea, C. Hess, Drug Test Anal, 2016 *in press*.
3. Y. Liu, P. Chen*, S. Huang*, J. AOAC Int, *in press*, 2016.
4. I. Tseng, P. Chen*, S. Huang*, Curr. Chromatogr, 2016, 3(2) 109-116.

**Associate Prof. Pai-Shan Chen (Taiwan)**

Associate Professor, Department and Graduate Institute of Forensic Medicine,
College of Medicine, National Taiwan University
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Dr. Pai-Shan Chen is Associate professor of Department and Graduate Institute of Forensic Medicine. She obtained her PhD at King's College of London in the UK. She is an expert in the analytical toxicology, from common drugs of abuse to emerging drugs. She focuses on understanding the metabolism of drugs of abuse. Besides, her research covers widely the development of liquid/solid phase microextraction method and capillary mass spectrometry.

Research Interests

- Develop solid phase microextraction platform for and drugs of abuse in biological samples.
 - Set up dispersive liquid-liquid microextraction method for pesticide or herbicide in environmental specimens.
 - Develop and modify the interface of capillary/micro-flow mass spectrometry.
 - Understanding the metabolism profiling of emerging drugs
 - Investigate the fatal dose of enantiomer drugs and their postmortem redistribution.
-

Education and Degrees

2007-2011 PhD, King's College London, UK
2005-2007 PhD candidate, National Tsing Hua University, Taiwan.
2003-2005 MS, National Tsing Hua University, Taiwan.

Professional Appointments

2016- Secretary, Taiwan Society of Forensic Medicine
2013-2016 Chief Editor of the Taiwan Journal of Forensic Medicine

Publications

1. P Chen*, S Chen, J Chen, W Haung, H Liu, P Kong, Olivia H Yang, Anal. Chim. Acta, 2016, Featured Article in press.
2. A Maas, M Krämer, K Sydow, P Chen, T Dame, F Musshoff, B Diehl, B Madea, C Hess, Drug Test Anal, 2016 in press.
3. Y Liu, P Chen*, S Huang, J AOAO Int, in press, 2016.
4. I Tseng, P Chen*, S Huang, Curr Chromatogr, 2016, 3(2) 109-116.

以特殊標的物確認非法海洛因之使用

陳珮珊副教授 (臺灣)

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海洛因在人體中被快速代謝成 6-乙醯嗎啡後再被代謝成嗎啡。由海洛因與 6-乙醯嗎啡的存在與否，來判斷受測者是否吸食海洛因。由於海洛因在人體中的代謝速率快，在血漿中，其半生期為 2-8 分鐘，主要代謝物 6-乙醯嗎啡在血漿中的半生期也僅為 10-40 分鐘，雖然 6-乙醯嗎啡所需代謝時間較海洛因長，在尿液中也只存在 2-8 小時，之後則被代謝成為嗎啡，及嗎啡-6-葡萄糖酸苷與嗎啡-3-葡萄糖酸苷。在尿液中常只見到其最終代謝物：嗎啡或嗎啡葡萄糖酸苷。由海洛因的代謝途徑得知，其迅速的代謝速率並不利海洛因濫用的查核，若服用或施打藥用二乙醯嗎啡或嗎啡，或從一般藥局取得含有生物鹼類的止痛藥或止咳感冒藥，亦會在尿液測得高量的嗎啡含量，因此，如何區別嗎啡與可待因的來源，與非法海洛因的使用，對毒物分析學家是項困難的挑戰。

本研究藉由偵測非法海洛因中之乙醯蒂巴因 (1)判定海洛因之使用，由於蒂巴因乙醯化後形成醯胺，此為海洛因合成之特有的蒂巴因乙醯化產物，應不見於藥用二乙醯嗎啡也不應存在食物中。本研究利用人類肝細胞成分模擬人體代謝反應，於體外合成此特異性雜質的可能代謝物，依此開發液相層析質譜檢測方法，並分析已知為海洛因使用者的尿液檢體。

本研究經由分析精確質量與碎片圖譜找到 12 個代謝物。此外，其一代謝物亦在真實檢體 14 件含 6-乙醯嗎啡陽性檢體中檢出 9 件，7 件嗎啡陽性而 6-乙醯嗎啡陰性的檢體中檢出 2 件。

Identification of Specific Analytical Markers to Confirm the Administration of Illicit Heroin

Asso. Prof. Pai-Shan Chen (Taiwan)

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Associate Professor of Department and Graduate Institute of Forensic Medicine, National Taiwan University College of Medicine, National Taiwan University

The consumption of food products or herbal medicines containing poppy seeds, which contain small amounts of morphine and codeine, can result in the urinary excretion of morphine and its metabolites. An important forensic problem is to identify the use of illicit “street” heroin when the defence is that the urinary morphine arises from food ingestion or codeine administration. Heroin is synthesised from the acetylation of morphine and in illicit heroin manufacture, other minor opium poppy alkaloids may be also acetylated. These minor acetylated alkaloids and/or their metabolites, may be excreted in urine following heroin drug usage. This may offer a greater degree of retrospection of drug detection compared with that of 6-monoacetylmorphine. A novel hypothesis is that the N-acetyl moiety of acetylthebaine is resistant to endogenous hydrolysis and therefore this product or, its N-acetylated metabolites, will be excreted into urine solely following the administration of illicit (“street”) heroin, i.e. this is unequivocal proof of such administration as opposed to exposure to poppy seeds, or pharmaceutical opiates.

The baine was reacted with acetic anhydride to form acetamide and acetate derivatives and the purified products were characterised by liquid chromatography-tandem mass spectrometry (LC-MS/MS) and NMR, so that they could be used as analytical reference markers. Street’ heroin samples from police seizures were analysed by LC-MS/MS for the presence of these compounds. Urine collected from heroin addicts was analysed for the markers, also for corresponding phase 1 and phase 2 metabolites. Urine analysis using LC-MS/MS to detect the presence of these metabolites was matched against that obtained from analysis of metabolites generated in vitro using human liver microsomes.

Acetylation of thebaine resulted in the 12 major metabolites were identified in microsomal analysis. Analysis of a number of urine specimens collected from heroin addicts showed the presence of the metabolite (ATM4) and its stable conjugate in 9 of 12 samples with the presence of 6-MAM and 2 of 7 samples in which only morphine was identified. In conclusion, ATM4 appears to be an important urinary marker of illicit heroin administration, as it seems to offer greater retrospection of detection compared to 6-MAM.



朱柏青主任 (臺灣)

國立臺灣大學醫學院附設醫院新竹分院環境及職業醫學部主任

國立台灣大學醫學院環境暨職業醫學科講師

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朱柏青主任目前是臺大醫院新竹分院環境及職業醫學部主任，朱主任畢業於臺灣大學公共衛生學院職業醫學與工業衛生研究所博士，曾擔任過臺大醫院雲林分院環境及職業醫學部第一任主任，參與過多項勞動部重要計畫，包含職業傷病防治中心計畫、職業傷病管理服務中心計畫等。於研究方面，於 2008 年獲得莊逸洲基金會第一屆兩岸醫管論文獎卓越論文金獎。

研究領域

- Work-related cardiovascular disorders
 - Work-related musculoskeletal disorders
 - Medical fitness for work and Return to work
-

學歷

2003-2009 臺灣大學公共衛生學院職業醫學與工業衛生研究所博士

1993-2000 中國醫藥大學醫學系

專業經歷

2012- 中華民國環境職業醫學會秘書長 (2012-2016) 、理事 (2016-)

2011- 勞動部職業傷病防治中心主持人 (2011-2013) 、職業傷病管理服務中心主持人 (2014-)

2016- 職業醫學專科醫師甄審委員會委員

重要論文發表

1. Chu PC, Hwang JS, Wang JD, Chang YY. Estimation of the financial burden to the National Health Insurance for Patients with major cancers in Taiwan. Journal of the Formosan Medical Association 107:54-63, 2008 (SCI)
2. Chu PC, Hwang JS, Wang JD, Chang YY. Estimation of life expectancy and the expected years of life lost in patients with major cancers: Extrapolation of survival curves under high-censored rates. Value in Health 11:1102-1109, 2008 (SCI, SSCI)
3. Du CL, Wang JD, Chu PC, Guo YL. Acute expanded perlite exposure with persistent reactive airway dysfunction syndrome. Industrial Health 48:119-122, 2010 (SCI)
4. Chu PC, Fuh HR, et al. The impact of occupational health service network and reporting system in Taiwan. International Journal of Occupational and Environmental Health 19:352-62, 2013. (SCI)
5. Chu PC, Guo Leon Y, Juang JM. An epidemiologic study of acute coronary syndrome in the working population. Occupational and Environmental Medicine. 71 Suppl 1:A107, 2014. (SCI)
6. Lin KH, Chu PC, Yue Leon Guo, et al. Psychiatric disorders after occupational injury among National Health Insurance enrollees in Taiwan. Psychiatry Research 219: 645–650, 2014.(SCI)

**Dr. Po-Ching Chu (Taiwan)**

Director of Department of Environmental and Occupational Medicine, National Taiwan University Hospital, Hsin-Chu Branch
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Dr. Po-Ching Chu is the director of Department of Environmental and Occupational Medicine, National Taiwan University Hospital, Hsin-Chu Branch. He obtained his PhD degree at the Institute of Occupational Medicine and Industrial Hygiene, College of Public Health, National Taiwan University. He is also the first director of Department of Environmental and Occupational Medicine, National Taiwan University Hospital, Yun-Lin Branch. He has participated in several important projects of Ministry of Labor, including Center for Occupational Disease and Injury Services and Center of Occupational Disease and Injury Management and Service. Besides, one of his research was gotten an outstanding research paper award of the First Health Care Administration across the Taiwan Strait, YI-CHOU CHUANG foundation.

Research Interests

- Work-related cardiovascular disorders
 - Work-related musculoskeletal disorders
 - Medical fitness for work and Return to work
-

Education and Degrees

- | | |
|-----------|--|
| 2003-2009 | PhD, Institute of Occupational Medicine and Industrial Hygiene, College of Public Health, National Taiwan University, Taiwan |
| 1993-2000 | MD, China Medical University, Taiwan |
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Professional Appointments

- | | |
|-------|---|
| 2012- | Secretary-General (2012-2016) and Director(2016-), Taiwan Environmental and Occupational Medicine Association |
| 2011- | Principal investigator, Center for Occupational Disease and Injury Services (2011-2013); Principal investigator, Center of Occupational Disease and Injury Management and Service (2014-) |
| 2016- | Committee member of selection committee for specialist of Occupational Medicine |
-

Main Publications

1. Chu PC, Hwang JS, Wang JD, Chang YY. Estimation of the financial burden to the National Health Insurance for Patients with major cancers in Taiwan. Journal of the Formosan Medical Association 107:54-63, 2008 (SCI)
2. Chu PC, Hwang JS, Wang JD, Chang YY. Estimation of life expectancy and the expected years of life lost in patients with major cancers: Extrapolation of survival curves under high-censored rates. Value in Health 11:1102-1109, 2008 (SCI, SSCI)
3. Du CL, Wang JD, Chu PC, Guo YL. Acute expanded perlite exposure with persistent reactive airway dysfunction syndrome. Industrial Health 48:119-122, 2010 (SCI)
4. Chu PC, Fuh HR, et al. The impact of occupational health service network and reporting system in Taiwan. International Journal of Occupational and Environmental Health 19:352-62, 2013. (SCI)
5. Chu PC, Guo Leon Y, Juang JM. An epidemiologic study of acute coronary syndrome in the working population. Occupational and Environmental Medicine. 71 Suppl 1:A107, 2014. (SCI)
6. Lin KH, Chu PC, Yue Leon Guo, et al. Psychiatric disorders after occupational injury among National Health Insurance enrollees in Taiwan. Psychiatry Research 219: 645–650, 2014.(SCI)

從事重金屬相關作業工作者健檢之臨床檢驗意義-以勞工健康保護規則為例

朱柏青醫師(臺灣)

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臺灣大學醫學院附設醫院新竹分院環境及職業醫學部主任

我國勞工健康保護規則中與重金屬有相關之作業類別，包含：鉛作業、四烷基鉛作業、鉍及其化合物、砷及其化合物、鎘及其化合物、錳及其化合物、乙基汞化合物、汞及其無機化合物、鎳及其化合物及銻及其化合物等。因流行病學顯示銻及其化合物等作業暴露易導致工作者之勞工健康危害，故勞動部於 2016 年 03 月 23 日增列銻及其化合物為我國法定之特殊危害健康檢查之作業類別，預計將可擴大保護更多從事重金屬相關作業工作者之職業健康。

若依據國內外文獻，一般大眾於日常生活中會接觸到鎳及其化合物的活動或情境包含使用行動電話、電子香煙、樂器、配戴金屬眼鏡、含鎳服裝、牙科治療器具等。

會接觸到鎳及其化合物的職業包括有油墨生產、火星塞製造、陶瓷、珠寶、橡膠形成、電鍍、蓄電池、硬幣製造、汽車或飛機零件製造、不銹鋼炊具製造及電子零件製造等。若依據經濟部公布的產業聚落分布圖，新竹地區與鎳及其化合物相關的產業可能包含有半導體、通訊網路、電子電機、電腦周邊、金屬及機械等，產業涵蓋很廣。

電子製造業為我國主要的經濟命脈之一，如何透過健康檢查來達到保護電子製造業的工作者是職業醫學與職業健康領域重要的議題，而與此議題相關的專業人員包含職業醫學專科醫師、職業健康服務醫師、職業健康服務護理人員、醫事檢驗人員、職業安全或職業健康人員等。因此本次演講以鎳及其化合物為例，說明從事鎳及其化合物作業工作者之健康檢查的評估原則與流程，內容包含健康檢查的類型及時間間隔、健康檢查的人力與設備需求、醫學評估之準則、醫學建議、體外暴露與體內暴露及急性之健康效應等。

臺大醫院新竹分院已新購感應耦合電漿質譜分析儀 (ICP-MS)，且醫院已於 2016 年 09 月成立環境及職業醫學部，環境醫學與職業醫學相關醫療服務、研究及健康促進業務已成為臺大醫院新竹分院的發展重點之一，因此希望能逐步提升桃竹苗地區的環境醫學與職業醫學相關研究，及提供桃竹苗地區民眾於環境醫學與職業醫學相關健康促進之服務。

Clinical Significance of Medical Examinations among Worker exposed to Heavy Metal-Examples from Regulations of the Labor Health Protection

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Director of Department of Environmental and Occupational Medicine, National Taiwan University Hospital, Hsin-Chu Branch

The work characteristics related to heavy metal are lead, tetraalkyl lead, beryllium or compounds, arsenic or compounds, cadmium or compounds, manganese or compounds, ethylmercury, mercury or compounds, nickel or compounds, and indium or compounds, based on Regulations of the Labor Health Protection in Taiwan. On 2016.03.23, Ministry of Labor announced that the workers exposed to work characteristics should receive statutory medical examination during new recruitment or when working for 1 year. The new regulation will have much influence on the health protection for workers exposed to heavy metal.

From literatures, there are multiple uses for nickel that may increase the risk of exposure to the general population, including cellular phones, electronic cigarettes, musical instruments, eye wear, garment, dental appliances. Occupations that frequently involve exposure to nickel include: ink production, spark plug manufacturing, ceramics, jewelers, rubber formation, electroplating, storage batteries, coin manufacture, auto or airplane parts, manufacture of stainless steel cooking utensils, and electrical parts manufacturers. The industry cluster related to nickel or compounds in Hsin-Chu area include semiconductor, communications networks, electronic and electrical devices, computer peripherals, metals and machinery from data of Ministry of Economic Affairs.

The electronic industry is one of major economic lifeline in Taiwan, and the issue of protecting workers' health through medical examination is crucial for occupational medicine and occupational health. There are multidisciplinary experts related to this issue, comprised of specialist of occupational medicine, occupational health physician, occupational health nurses, medical technologists, occupational safety or occupational health personnel. Therefore, the lecture will be focused on principle and process of medical examination for workers exposed to nickel or compounds. The main content will be comprised of type of medical examination, intervals between examinations, requirements for the medical examinations, occupational medical assessment criteria, medical advice, external and internal exposure, and acute and chronic effects on health.

National Taiwan University Hospital, Hsin-Chu Branch has gotten a new INDUCTIVELY COUPLED PLASMA-MASS SPECTROMETER(ICP-MS), and Department of Environmental and Occupational Medicine was established in this September. The medical services, research, and health promotion associated with environmental medicine and occupational medicine have been the development priority of this hospital. We hope that the research in the filed will be gradually promoted as well as providing better services to the general public in the area.



謝文祥理事長

社團法人臺灣醫檢學會;臺北醫學大學雙和醫院醫檢部主任;臺北醫學大學醫學檢驗暨生物技術學
助理教授

President Wen-Shyang Hsieh (Taiwan)

President, Taiwan Society of Laboratory Medicine; Director, Department of Medical Laboratory Science,
Taipei Medical University - Shuang Ho Hospital; Assistant Professor, School of Medical Laboratory
Science and Biotechnology, Taipei Medical University

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學歷 Education and Degrees

- 臺北醫學大學醫學資訊研究所博士候選人 PhD candidate in Graduate Institute of Biomedical Informatics, CoMST, Taipei Medical University
- 英國國家衛生部病人安全機構(NHS/NPSA)訪問學者 Visiting Scholar, National Patient Safety Agency, UK
- 1997-1999 臺北醫學大學醫學研究所碩士 MS(MPH), Graduate Institute of Medical Science, Taipei Medical University
- 1979-1983 臺北醫學院醫事技術學系學士 BS(MT), School of Medical Laboratory Science, Taipei Medical University

現職 Current Positions

- 臺北醫學大學雙和醫院醫檢部主任 Director, Department of Medical Laboratory Science, Taipei Medical University - Shuang Ho Hospital
- 臺北醫學大學雙和醫院教學部副主任 Deputy Director, Department of Medical Education, Taipei Medical University - Shuang Ho Hospital
- 臺北醫學大學醫學檢驗暨生物技術學系助理教授 Assistant Professor, School of Medical Laboratory Science and Biotechnology, Taipei Medical University
- 國立陽明大學醫學生物技術暨檢驗學系助理教授 Assistant Professor, Department of Biotechnology and Laboratory Science in Medicine, National Yang-Ming University
- 臺灣醫檢能力試驗委員會(TSLM-PT/TAF-PTP008)執行長 Chief Executive Officer, Proficiency Testing Committee, Taiwan Society of Laboratory Medicine (TSLM)

專業經歷 Professional Appointments

- 2012-2018 社團法人臺灣醫檢學會理事長 President, Taiwan Society of Laboratory Medicine
- 2003-2009 馬偕紀念醫院總院(臺北)醫事檢驗科主任 Director, Department of Medical Laboratory Science, Taipei Mackay Memorial Hospital
- 1995-2002 馬偕紀念醫院分院(淡水)醫事檢驗科主任 Director, Department of Medical Laboratory Science, Tam Shui Mackay Memorial Hospital

專長 Skills/Accomplishments

臨床檢驗、臨床檢驗品管、實驗室管理、實驗室認證規範、醫療品質與病人安全策略、醫療決策支援系統

Wen-Shyang Hsieh is an expert in the Laboratory Management and MLS&B education and a pioneer in Clinical Quality System for Patient Safety Strategy and Laboratory Accreditation of ISO regulation. Besides, his research foci cover the spectrum of clinical issues acquired medical laboratory science.



黃雅卿醫檢師 (臺灣)

林口長庚紀念醫院檢驗醫學科醫檢組長

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黃雅卿醫檢師目前是林口長庚紀念醫院質譜試劑組的醫檢組長，她從事臨床檢驗經驗長達15年，其中在臨床生化的經驗達10年，目前主要專注於微量元素檢測及液相層析串聯質譜儀於臨床檢驗應用。

研究領域

臨床生化、質譜技術

學歷

1999-2001 國立陽明大學 微生物暨免疫學研究所 碩士

1995-1999 國立陽明大學醫事技術檢驗學系 學士

專業經歷

2014-2016 林口長庚紀念醫院檢驗醫學科 質譜試劑組醫檢組長

2005-2016 長庚大學 醫學生物技術暨檢驗學系 講師

2013-2014 林口長庚紀念醫院檢驗醫學科 質譜試劑組醫檢副組長

2012-2013 林口長庚紀念醫院檢驗醫學科 質譜試劑組 特殊醫檢師

2006-2012 林口長庚紀念醫院檢驗醫學科 生化組 特殊醫檢師

2002-2006 林口長庚紀念醫院檢驗醫學科 血清免疫組 教學醫檢師

2001-2002 恩主公醫院 檢驗醫學科 生化組醫檢師

論文發表

1. **Ya-Ching Huang**, Szu-Tah Chen, Yun-Fen Huang, Po-Yu Li, Hsiao-Chen Ning, Chia-Ni Lin. Measurement of Plasma Free Metanephrines by a Ultra-Performance Liquid Chromatography Tandem Mass Spectrometry for Diagnosis of Pheochromocytoma. J Biomed Lab Sci 2016;28(2):55-62.
2. Yun-Fen Huang, Ping-Chin Lai, **Ya-Ching Huang**, Yu-Shao Chiang, Huey-Ling You, Chia-Ni Lin, Hsiao-Chen Ning. Development of an Ultra-performance Liquid Chromatography Tandem Mass Spectrometric Method for Simultaneous Quantitating Four Immunosuppressant Drugs (tacrolimus, sirolimus, everolimus, cyclosporine). J Biomed Lab Sci 2015;27(2):61-68.
3. **Ya-Ching Huang**, Pi-Yueh Chang, Jawl-Shan Hwang, Hsiao-Chen Ning. Association of Small Dense Low-density Lipoprotein Cholesterol in Type 2 Diabetics with Coronary Artery Disease. Biomedical journal 2014;37:375-379.
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Ya-Ching Huang is the supervisor technologist of Mass and Regent Laboratory, Department of Laboratory Medicine, Chang Gung Memorial Hospital, Linkou. She has 15 years of experience in clinical laboratory, including 10 years of experience in clinical chemistry. In present, she focuses on measurement of trace elements and the application of liquid chromatography-tandem mass spectrometry in clinical laboratory.

Research Interests

Clinical Chemistry, Mass Spectrometry

Education and Degrees

1999-2001 Master, Department of Microbiology & Immunology, National Yang-Ming University

1995-1999 Bachelor, Department of Medical Biotechnology, National Yang-Ming University

Professional Appointments

- | | |
|-----------|---|
| 2014-2016 | Supervisor Technologist of Mass and Regent Laboratory, Department of Laboratory Medicine, Chang Gung Memorial Hospital, Linkou |
| 2005-2016 | Lecturer, Department of Medical Biotechnology and Laboratory Science, Chang Gung University |
| 2013-2014 | Deputy Supervisor Technologist of Mass and Regent Laboratory, Department of Laboratory Medicine, Chang Gung Memorial Hospital, Linkou |
| 2012-2013 | Special Medical Technologist of Mass and Regent Laboratory, Department of Laboratory Medicine, Chang Gung Memorial Hospital, Linkou |
| 2006-2012 | Special Medical Technologist of Clinical Chemistry, Department of Laboratory Medicine, Chang Gung Memorial Hospital, Linkou |
| 2002-2006 | Special Medical Technologist of Immunology and Serology, Department of Laboratory Medicine, Chang Gung Memorial Hospital, Linkou |
| 2001-2002 | Medical Technologist of Clinical Chemistry, Department of Laboratory Medicine, En Chu Kong Hospital |
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Publications

Please find them on previous page.

醫學實驗室建立重金屬檢驗能力經驗分享

黃雅卿醫事檢驗師 (臺灣)

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林口長庚紀念醫院 檢驗醫學科 醫檢組長

由於工業發達對重金屬的使用日益增多，人類可能直接或間接暴露於重金屬危害，所以建立人體血液或是尿液重金屬的檢驗是必要的。有許多設備可以用來檢測血中或尿液中的重金屬包括原子吸收光譜儀 (Atomic Absorption Spectrometry, AAS)、感應耦合電漿質譜儀 (Inductively Coupled Plasma-Mass Spectrometry, ICP-MS) 及高效能液相層析-感應耦合電漿質譜儀 (High-Performance Liquid Chromatography ICP-MS, HPLC-ICP-MS)。我將分享長庚醫院重金屬實驗室規劃及建置的經驗。為了達到與國際接軌的目的，參加ISO 15189或是美國病理學會(CAP)國際認證是最有效的方法，不但是檢驗結果可以與世界同步，同時也可以證明實驗室的能力符合標準。我也同時分享檢驗醫學科如何成為勞動部認可「勞工體格與健康檢查特定檢查項目」檢驗機構的經驗。

Experience Sharing in Capability Building of Heavy Metal Examination in Medical Laboratory

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The use of heavy metals increases due to the development of pollution-intensive industry. Human could be directly or indirectly exposed to potentially harmful heavy metals. It is very important to establish urine and blood heavy metals testing in clinical laboratory. A lot of instruments can be used to detect heavy metals in biofluids; including atomic absorption spectrometry (AAS), inductively coupled plasma-mass spectrometry (ICP-MS) and high-performance liquid chromatography ICP-MS (HPLC-ICP-MS). I will share the experience of establishing a heavy metal laboratory at Chang Gung Memorial Hospital. Apply to become accredited by either internationally recognized standard ISO15189 or CAP organization is an effective approach to achieve harmonized and can demonstrate the ability to meet predetermined criteria and standards. I will also share our experience to become the recognized heavy metal laboratory by Ministry of Labor in Taiwan.



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蕭雅一醫事檢驗師目前是臺大醫院新竹分院檢驗醫學部住院組組長，從事臨床檢驗經驗達27年，曾兼任核醫科委外經營之業務督導及檢驗科教學組長。

研究領域

- 臨床檢驗

學歷

1983-1987 國立臺灣大學 醫事技術系 學士

1987-1989 國立臺灣大學 醫事技術學研究所 碩士

專業經歷

2011-2016 國立臺灣大學醫學院附設醫院新竹分院 檢驗醫學部 組長

2008-2010 行政院衛生署新竹醫院 檢驗科 組長

論文發表

超過25篇論文發表

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Ya I. Hsiao is the the supervisor technologist of the Department of Laboratory Medicine, National Taiwan University Hospital Hsin-Chu Branch. She has 27 years of experience in clinical laboratory, and used to supervise the outsourcing work of Department of Nuclear Medicine. Besides, She was a supervisor technologist in education and training team of the Department of Laboratory Medicine, Hsin-Chu General Hospital, Department of Health.

Research Interests

Clinical examination

Education and Degrees

1983-1987 Bachelor, Department of Medical technology, National Taiwan University
1987-1989 Master, Department of Medical technology, National Taiwan University

Professional Appointments

2011-2016 Supervisor technologist of the Department of Laboratory Medicine, National Taiwan University Hospital Hsin-Chu Branch
2008-2010 Supervisor technologist of the Department of Laboratory Medicine, Hsin-Chu General Hospital, Department of Health

Publications

More than 25 papers

近五年重金屬檢測結果分析-新竹某區域教學醫院經驗分享

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臺灣「勞工健康保護規則」規範從事重金屬及相關化合物作業的勞工，定期接受健康檢查的項目，需包含特定重金屬濃度生物偵測，以評估其於作業場所之有害化學物質暴露量，而血中鉛、尿中鉛、尿中鎳、尿中無機砷、尿中鎘、血中汞、尿中汞等項目之生物偵測指標，與作業危害暴露之相關性強，故其數值可作為分級健康管理之四級判定的主要參考依據。

由於某些重金屬具毒性或致癌性，且汙染來源除了職場外，亦可能因居住環境或地下水受汙染，而導致民眾健康受到危害；且新竹地區工廠林立，故重金屬監測有其重要性。本院為經勞動部認可辦理勞工保險預防職業病健康檢查之醫療機構，藉採回溯性報表資料收集：統計2012~2015年於本院接受重金屬檢測之個案分析，希可早期發現與工作或居住環境相關的健康危害因子，進行後續治療與追蹤，俾利職業病預防工作之推展執行。

基於風險管理，我們以較健康管理標準所訂職業安全臨界值為低的生物參考區間做為異常判定基準，建議重金屬濃度超出生物參考區間者，仍應進一步探究原因，職安可適時介入，如焊接作業可改用無鉛焊錫、加裝抽氣櫃等措施，以避免受檢者持續暴露重金屬汙染環境而引發中毒，並朝創建「職業預防醫學」的方向努力。

Analysis of the Heavy Metal Examination in Past 5 Years—an Experience of a Regional Teaching Hospital in Hsin-Chu

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"Labor Health Protection Regulations" in Taiwan requests specific examination items for all laborers engaged in 27 types of tasks with special health hazards. Besides, biological detection of specific heavy metal and compounds are included in the package test items of periodic health examination for workers involved in tasks with heavy-metal exposure. The result of heavy metal testing in the human body, because of its relevance to exposure, could be used as a reference of health ranking management.

With cytotoxicity and carcinogenicity in some heavy metals, heavy-metal exposed workplaces, contaminated home environments and even groundwater might put residents under health hazards. Especially in Hsin-Chu region, the factory densely-built feature shows the importance of heavy metal examination. As a member of "List of Specified Hospitals for Physical Examination of Occupational Disease Prevention of Labor Insurance" by Ministry of Labor, we could conduct a retrospective analysis with past-5-year local epidemiology about heavy-metal detection. We try to investigate the abnormality patterns and the causes among different groups, in order to early find out possible health hazardous factors relevant to job & living environments. Long-termed treatment and follow-up could be provided, also with occupational disease prevention developed.

Based on risk management, biology reference intervals under current regulated standard were established as the determination criteria. This study suggests that further investigations into the causation be made for individuals with heavy-metal level beyond our biology reference intervals to take timely actions in occupational protection. For example, approaches to lead-free welding, installing exhaust pipe at soldering areas, etc. could prevent patients from persistent exposure to lead-polluted workplace as well as consequent lead poisoning. Occupational preventive medicine is the goal we will be striving to create and build in the future.