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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
Environmental and Occupational Medicine,
National Taiwan University Hospital

Prof. Pau-Chung Chen

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

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

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: 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

新時代環境新議題

Current Environmental Health Issues

司儀 M.C.

葉詩帆醫師/臺大醫院環境及職業醫學部 Dr. Sherri Yeh/Department of Environmental and Occupational Medicine, NTU Hospital & 林維安醫師/臺大醫院環境及職業醫學部 Dr. Wei-An Lin/Department of Environmental and Occupational Medicine, NTU Hospital

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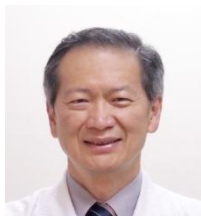
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郭育良博士

國家衛生研究院國家環境醫學研究所特聘研究員兼所長
國立台灣大學醫學院醫學系環境職業醫學科教授
國立台灣大學附設醫院環境職業醫學部主治醫師、內科部主治醫師

Yue-Liang Leon Guo, MD, MPH, PhD (Taiwan)

Distinguished Investigator and Director, National Institute of Environmental Health Sciences, National Health Research Institutes

Distinguished Professor, Department of Environmental and Occupational Medicine, National Taiwan University College of Medicine

Clinical Staff, Department of Internal Medicine and Department of Environmental and Occupational Medicine, National Taiwan University Hospital

E-mail:leonguo@nhri.org.tw

學歷 Education and Degrees

- | | |
|------|--|
| 1987 | 美國霍普金斯大學環境與職業醫學博士 Ph.D. - Johns Hopkins University, School of Hygiene and Public Health Department of Environmental Health Sciences, Division of Occupational Medicine |
| 1983 | 美國哈佛大學公共衛生碩士 M.P.H. - Harvard University, School of Public Health |
| 1982 | 國立臺灣大學醫學系醫學士 M.D. - National Taiwan University, School of Medicine |

專業經歷 Professional Appointments

- | | |
|-------------|--|
| 2007 | 國際環境流行病學會東亞分會創立者 Co-Chair, International Society of Environmental Epidemiology East Asia Chapter |
| 2000 - 2006 | 國立成功大學醫學院醫學系工業衛生科教授暨主任 Professor and Director, Environmental and Occupational Medicine, National Cheng Kung University Medical College |
| 2000 - 2004 | 中華民國環境職業醫學會理事長 President, Taiwan Environmental and Occupational Medicine Association |
| 2000 - 2002 | 亞洲職業醫學學會理事長 President, Asian Association of Occupational and Environmental Health |
| 1997 - 2001 | 中華民國公共衛生學會雜誌主編 Editor in Chief, Journal of National Public Health Association Republic of China |
| 1995 - 2006 | 國立成功大學醫學院『多氯聯苯油症中毒研究中心』主任 Director, Research Laboratory for Human Health Effects from Exposure to PCBs/PCDFs, National Cheng Kung University |
| 1989 - 1990 | 美國加州大學醫學院職業醫學科博士後研究 Fellow, Occupational Medicine, University of California, San Francisco, USA |

榮譽事項 Honors

- 臺大醫學院教學傑出獎 Excellent Teaching Award, National Taiwan University College of Medicine, 2008, 2011, 2012, 2013, 2014, 2015, 2016
- 職業安全衛生奉獻特別獎 National Occupational Safety and Health Contribution Award, Ministry of Labor 2014
- Excellent Teaching Material Award, National Taiwan University Hospital, for the book "Occupational Medicine" (in Chinese), 2014
- 拉馬其尼學院院士 Fellow, Collegium Ramazzini, Italy, 2011
- 國科會傑出研究獎生物醫學研究類 Outstanding Research Award, National Science Council, 2004, 2010
- 國立臺灣大學特聘教授 Distinguished University Professor, National Taiwan University, 2008 - present
- 台南第一高級中學傑出校友 Outstanding Alumnae of the Tainan First High School, Tainan, TAIWAN, 2000
- 中華民國十大傑出青年 Ten Outstanding Young Persons, Taiwan, R.O.C., 1996
- Robert T. Legee Award, American Industrial Hygiene Association, 1990



Dr. Kyunghee Choi (Republic of Korea)

韓國國家環境研究所所長 Director General, National Institute of Environmental Research (NIER),
Ministry of Environment, Republic of KOREA

世界衛生組織弱勢群體與環境健康合作中心主任 Director, WHO Collaborating Centre for Vulnerable
Population and Environmental Health

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Choi博士自2012年擔任韓國國家環境研究所所長，也是世界衛生組織弱勢群體與環境健康合作中心主任。她畢業於韓國梨花女子大學，並於美國雪城大學取得博士學位。她同時組織並邀請韓國政府專家代表出席參與國際會議，例如東亞國家持久性有機汙染物資訊分析培訓研討會、亞太地區弱勢群體與環境健康國際研討會和斯德哥爾摩公約有效參與審查委員會等。

Dr. Choi has been the Director General, National Institute of Environmental Research (NIER), Ministry of Environment, Republic of Korea since 2012 and also Director of the WHO Collaborating Centre for Vulnerable Population and Environmental Health. She received a BS and MS from Ewha Womans University and a PhD from Syracuse University. She has joined a number of international meetings as an organizer and invited expert representing Korean government delegates including the Workshop on Information Warehouse and Analysis Training of POPs in the East Asian Countries, International Symposium on Vulnerable Population and Environmental Health in the Asia Pacific Region, Joint Workshop of the Rotterdam and the Stockholm Convention for Effective Participation in the Review Committee's Work.

學歷 Education and Degrees

- | | |
|------|--|
| 1993 | 美國雪城大學化學博士 Ph.D. Department of Chemistry, Syracuse University, New York, USA |
| 1982 | 韓國梨花女子大學化學碩士 M. S. Department of Chemistry, Graduate School of Ewha Womans University, Rep. of Korea |
| 1980 | 韓國梨花女子大學化學系 B. S. Department of Chemistry, Ewha Womans University, Rep. of Korea |

專業經歷 Professional Appointments

- | | |
|-----------|--|
| 2015- | Member of the Effectiveness Evaluation Committee on Stockholm Convention |
| 2013-2015 | Vice President of the Conference of the Parties, Stockholm Convention (President in the Asia-Pacific region) |
| 2013-2015 | President of the Korean Society for Environmental Analysis |
| 2008-2016 | Member of the POPs Chemical Review Committee on Stockholm Convention (Vice-President) |
| 2006-2010 | National Coordinator of OECD Working Party on Existing Chemicals & GLP /Testing Guideline |
| 2005-2009 | Member of IFCS Forum Standing Committee |
| 2003-2009 | Member of the Chemical Review Committee on Rotterdam Convention |
| 2003- | Chairperson of the Information Warehouse of POPs in East Asian Countries |
| 2003- | Member of KFDA Cosmetics Evaluation Committee |

榮譽 Award and Honor

- | | |
|------|---|
| 2012 | Science and Technology Medal (Honor), Government of Republic of Korea |
| 2010 | Outstanding People of the Year for 2010 in Ewha Womans University |
| 2009 | Presidential Award in Excellence, Government of Republic of Korea |

2002	Environmental Minister Award in Excellence
1998	Presidential Award of National Institute of Environmental Research
2012	Science and Technology Medal (Honor), Government of Republic of Korea
2010	Outstanding People of the Year for 2010 in Ewha Womans University
2009	Presidential Award in Excellence, Government of Republic of Korea

論文發表 **Selective Publications (2014-present)**

1. Noh S, Kim CK, Lee JH, Kim Y, **Choi K**, Han S (2016) Physicochemical factors affecting the spatial variance of monomethylmercury in artificial reservoirs, *Environmental Pollution*, 208: 345-353
2. Shim I, **Choi K**, Hirano S (2016) Oxidative stress and cytotoxic effects of silver ion in mouse lung macrophages J774.1 cells, *Journal of Applied Toxicology*, DOI 10.1002/jat3382: 1-8
3. Kim HM, Kwon JT, Shim IS, Kwon DY, Lim YM, Kim EJ, Kim PJ, **Choi K** (2016) Inhalation Toxicity of Ethylene Glycol in Rat, *Veterinary Science and Technology*, 7(1): 1-5
4. Kwon DY, Kim HM, Kim EJ, Lim YM, Kim PJ, **Choi K**, Kwon JT (2016) Acute pulmonary toxicity and inflammation induced by combined exposure to didecylammonium chloride and ethylene glycol in rats, *The Journal of Toxicological Sciences*, 41(1): 17-24
5. Shin JH, Woo C, W SJ, Jeong J, A IJ, Hwang JK, Jo SD, Yu SD, **Choi K**, Chung HM, Suh JH, Kim SH (2015) Prevalence of avian influenza virus in wild birds before and after the HPA1 H5N8 outbreak in 2014 in South Korea, *Journal of Microbiology*, 53(7): 475-480
6. Shim I, Kim HM, Yang S, Choi M, Seo Gb, Lee BW, Yoon BI, Kim PJ, **Choi K** (2015) Inhalation of talc induces infiltration of macrophages and upregulation of manganese superoxide dismutase in rats, *International Journal of Toxicology*, DOI 10.1177/1091581815607068: 1-9
7. EOM HJ, Roca CP, Roh JY, Chatterjee N, Jeong JS, Shim I, Kim HM, Kim PJ, **Choi K**, Giralt F, Choi J (2015) A systems toxicology approach on the mechanism of uptake and toxicity of MWCNT in *Caenorhabditis elegans*, *Chemico-Biological Interactions*, 239: 153-163
8. Kwon DY, Kim EJ, Kwon JT, Lee DH, Park SY, Kim HM, Kim PJ, **Choi K** (2015) Ethyleneglycol potentiated DDAC toxicity in human bronchial epithelial cells, *Mol Cell Toxicol*, 11: 161-166
9. Park SY, Chung j, Colman BP, Matson CW, Kim Y, Lee BC, Kim PJ, **Choi K**, Choi J (2015) Ecotoxicity of bare and coated silver nanoparticles in the aquatic midge, *Chironomus raparius*, *Environmental Toxicology and Chemistry*, 34(9): 2023-2032
10. Kwon JT, Kim HM, Kim PH, **Choi K** (2014) Didecyltrimethylammonium chloride induces oxidative stress and inhibits cell growth in lung epithelial cells, *Mol Cell Toxicol*, 10: 41-45
11. Lee BC, Kim J, Cho JG, Lee JW, Duong CN, Bae Eunjo, Yi J, Eom IC, **Choi K**, Kim PJ, Yoon J (2014) Effects of ionization on the toxicity of silver nanoparticles to Japanese medaka (*Oryzias latipes*) embryo, *Journal of Environmental Science and Health-Part A*, 49: 287-293
12. Lee JW, Kim JE, Shin YJ, Ryu JS, Eom IC, Lee JS, Kim YH, Kim PJ, **Choi K**, Lee BC (2014) Serum and ultrastructure responses of common carp (*Cyprinus carpio* L.) during long-term exposure to zinc oxide nanoparticles, *Ecotoxicology and Environmental Safety*, 104: 9-17
13. Chatterjee N, Yanga J, Kim HM, Jo E, Kim PJ, **Choi K**, Choi J (2014) Potential Toxicity of Differential Functionalized Multiwalled Carbon Nanotubes (MWCNT) in Human Cell Line (BEAS2B) and *Caenorhabditis elegans*, *Journal of Environmental Science and Health-Part A*, 77: 1399-1408
14. Hong JS, Kim S, Lee SH, Jo E, Lee B, Yoon J, Eom IC, Kim HM, Kim PJ, **Choi K**, Lee MY, Seo YR, Kim Y, Lee Y, Cho J, Park K (2014) Combined repeated-dose toxicity study of silver nanoparticles with the reproduction/developmental toxicity screening test, *Nanotoxicology*, 8(4): 349-362
15. Kim J, Seo JK, Yoon H, Kim PJ, **Choi K** (2014) Combined effects of the Cyanobacterial toxin microcystin-LR and environmental factors on life-history traits of indigenous cladoceran *Moina macrocarpa*, *Environmental Toxicology and Chemistry*, 33(11): 2560-2565

韓國國家環境研究所 (NIER) 的環境健康研究發展和前景

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世界衛生組織弱勢群體與環境健康合作中心主任

有明顯的證據表明，我們所生活的世界正面臨嚴重的環境挑戰，其中環境衛生已成為與人類日常生活密切相關的核心問題。認知到環境衛生的重要性，國家環境研究所 (NIER) 在促進環境衛生方面率先於韓國、亞太地區和國際發展了廣泛的環境衛生研究計畫。此外，NIER 還支持制定基於科學證據的環境政策，包括 1) 世界上第一的「環境衛生法」；2) 化學品註冊和評估法” ，3) 國家環境衛生行動計劃。

為了確定國家層面的環境衛生狀況，NIER 從 2009 年開始進行了為期三年的韓國環境健康調查，作為全國監測，並將其結果作為國家統計數據公佈。2015 年，針對 5,500 名 3 歲以上的韓國人發起了第三階段調查，分析 26 種環境危害 (包括鉛、汞和雙酚 A) 的暴露情況。

再者，NIER 進行了各種研究以了解兒童、孕婦和老年人等弱勢群體的健康影響。2015 年，兒童環境健康出生世代研究 (Ko-CHENS) 新啟動追蹤自胎兒至青少年時期的環境危害暴露和健康影響，為期 22 年 (2015-2036 年) ，招募 6,000 名孕婦。對於老年族群，已經多次進行小組研究，以觀察 2011 年以來城市和農村地區的同一組老年參與者，確定他們的環境暴露和健康影響。此外，我們監測和調查了有環境疑慮區域 (如工業園區和礦區) 居民的健康影響和暴露程度。

關於化學品及其風險評估，NIER 開展了 1) 家用化學品中有害物質的危害和風險評估；2) 有害物質的毒性評估，包括奈米材料和內分泌干擾化學品；3) 使用穩定同位素的污染源追蹤研究，以及 4) 來自環境中的食品污染物的風險評估。

野生動物傳播的人畜共通傳染病研究也已經積極地進行，建立來自野生鳥類的高致病性病毒和 4 種主要感染疾病 (結核病，布魯氏菌病，狂犬病和血小板減少綜合症) 的監測系統 - 在野生哺乳動物如麋鹿，野豬和浣熊。2015 年，新建立了動物生物安全 3 級 (ABL3) - 國家野生動物疾病研究中心，以發展高危害性人畜共通疾病研究。

自 2014 年以來，NIER 被指定為世界衛生組織弱勢群體與環境健康合作中心，並積極與其他國家和全球組織建立國際合作，包括國際研討會，論壇和培訓計劃以及與其他國家的合作研究包括日本國立環境研究所，蒙古公共衛生研究所和美國國家野生動物保健中心。

為了成為世界上最好的環境機構之一，NIER 致力於改善環境健康，為所有人創造更好的環境，在韓國、亞太地區和全球建立更強大的研究與合作。

Progress and Perspectives of Environmental Health Research in NIER, Korea

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There has been distinct evidence that the world we live in is facing grave environmental challenges, among which environmental health has emerged as a core issue closely linked to daily life of human being. Acknowledging the importance of environmental health, the National Institute of Environmental Research (NIER) has made progress in promoting environmental health, taking the lead in developing a wide range of environmental health research projects at the national, regional and global level. In addition, NIER has supported the development of environmental policy based on scientific evidence including 1) Environmental Health Act for the first time in the world; 2) Act on the Registration and Evaluation of Chemicals and 3) National Environmental Health Action Plan.

To identify the environmental health status at the national level, NIER has conducted the three-year Korean Environmental Health Survey since 2009 as a nationwide monitoring and published its results as national statistics. In 2015, its 3rd stage survey was launched targeting 5,500 Koreans age over 3 to analyze the exposure to 26 environmental hazards including lead, mercury and bisphenol A.

In addition, NIER has carried out a variety of research to identify health impacts on vulnerable populations such as children, pregnant women and the elderly. In 2015, the Children's Environmental Health Birth Cohort Study (Ko-CHENS) was newly initiated to track exposure to and health impacts of environmental hazards from fetus to adolescents for 22 years (2015-2036), recruiting 6,000 pregnant women. For elderly populations, the panel study has been repeatedly conducted to observe the same group of elderly participants from urban and rural areas since 2011 to identify their environmental exposures and health impacts. Moreover, we monitored and investigated exposure levels and its health impacts on residents in areas of environmental concern such as industrial complexes and mining areas.

With regards to chemicals and its risk assessment, NIER has conducted 1) hazard and risk assessment of harmful substances contained in household chemical products; 2) Toxicity assessment of harmful substances including nano-materials and endocrine disrupting chemicals; 3) Research on pollutant source tracing using stable isotopes and 4) Risk assessment of food contaminants from environmental pollution.

Wild animal-borne zoonoses research has been also actively performed with the establishment of a surveillance system for highly pathogenic viruses from wild birds and infection of 4 major diseases - tuberculosis, brucella, rabies and thrombocytopenia syndrome - in wild mammals such as elks, wild boars and raccoons. In 2015, Animal Bio-safety Level 3 (ABL3) - national wild animal disease research center - was newly completed to develop high risk zoonoses research.

In line with national research projects, NIER was designated as the WHO Collaborating Centre for Vulnerable Population and Environmental Health since 2014 and has actively established international cooperation with other countries and global organizations, which includes international symposiums, forums and training programs and collaborative research with other countries including Japan (National Institute for Environmental Studies), Mongolia (Public Health Institute) and the U.S (National Wildlife Health Center).

With the goal to become one of the world's best environmental institutions, NIER is committed to improving environmental health and creating a better environment for all with strengthening more robust research and cooperation at the national, regional and global level.



遠山千春教授 **Prof. Chiharu Tohyama (Japan)**

HESTIC機構主席；東京大學榮譽教授；筑波大學、北京大學公共衛生學院、中國醫藥大學客座教授

Chief, HESTIC (Health, Environment, Science, and Technology International Consultant); Emeritus Professor, The University of Tokyo; Visiting Professor, University of Tsukuba, Beijing University School of Public Health, China Medical University

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遠山千春教授目前是HESTIC機構主席，同時亦擔任東京大學、筑波大學、北京大學公共衛生學院、中國醫藥大學等大學客座教授。他擁有傑出的學術成就，並提供國內外民間或政府單位專業諮詢服務。Prof. Tohyama is Chief of HESTIC (Health, Environment, Science, and Technology International Consultant), also Emeritus Professor of University of Tokyo, Visiting Professor of University of Tsukuba, Beijing University School of Public Health and China Medical University. He has outstanding academic achievement and contributes his professionals to governments and organizations worldwide.

專業服務和活動 Professional Service and Activity

- 2015- 日本醫學會執行委員 Executive Board Member, The Japanese Association of Medical Sciences
 - 2005- 日本學術振興會研究評估委員 JSPS Research Evaluation Committees
 - 2003- 日本首相辦公室食品安全委員會委員會專家 Expert Committee to the Food Safety Commission, the Premier's Office
 - 2000- 日本環境省專家委員 Expert Committees to the Ministry of the Environment
 - 2004 世界衛生組織戴奧辛毒性當量臨時委員 Temporary Advisor for the WHO meeting on dioxin TEFs
-

學歷 Education and Degrees

- 1984 東京大學醫學博士 D. Med.Sci., Medical Sciences, University of Tokyo
 - 1981 羅徹斯特大學毒理學博士 Ph.D., Toxicology, University of Rochester
 - 1972 東京大學健康科學學士 B. Health Sci., Health Sciences, University of Tokyo
-

專業經歷 Professional Appointments

- 2005 東京大學醫學院教授 Professor, Graduate School of Medicine, The University of Tokyo
 - 2000-2004 筑波大學兼任教授 Adjunct Professor, Graduate School of Human Integrated Sciences, University of Tsukuba
 - 1994-2004 筑波大學生命環境科學研究所所長 Director, Environmental Health Sciences Division, National Institute for Environmental Studies, Tsukuba
-

科學組織會員 Society Memberships

- 日本衛生學會主席 President, Japanese Society for Hygiene (2012-2015)
- 美國毒理學會期刊副主編 Associate Editor to Toxicological Sciences, Society of Toxicology, USA (2005-2015)
- 日本毒性學會理事 Japanese Society of Toxicology (Council member)
- 日本環境內分泌干擾物學會執行委員 Japanese Society of Environmental Endocrine Disruptors (Executive Board member)
- 日本公共衛生學會 Japanese Society of Public Health

編輯 Editors

Associate Editor, Toxicol. Sci.; Scientific Reports

Editorial Board, Industrial Health

Editorial Board, Journal of Toxicological Sciences

榮譽 Honor

2015 日本毒理學成就獎 The Japanese Society of Toxicology Achievement Award

2010 日本衛生學會傑出成就獎 The Japanese Society of Hygiene, Distinguished Achievement Award

2008 日本風險分析學會傑出成就獎 The Japanese Society of Risk Analysis, Distinguished Achievement Award

論文發表 Publications (2015-present)

1. Ameny HZ, Tohyama C, Ohsako S, Dioxin induces Ahr-dependent robust DNA demethylation of the Cyp1a1 promoter via Tdg in the mouse liver, *Sci Rep* 7;6:34989, 2016
2. Yoshioka W, Kawaguchi T, Nishimura N, Akagi T, Fujisawa N, Yanagisawa H, Matsumura F, Tohyama C, Polyuria-associated hydronephrosis induced by xenobiotic chemical exposure in mice, *Am J Physiol Renal Physiol* 1;311(4):F752-F762, 2016
3. Sano K, Isobe T, Yang J, Win-Shwe TT, Yoshikane M, Nakayama SF, Kawashima T, Suzuki G, Hashimoto S, Nohara K, Tohyama C, Maekawa F, In utero and Lactational Exposure to Acetamiprid Induces Abnormalities in Socio-Sexual and Anxiety-Related Behaviors of Male Mice, *Front Neurosci* 3;10:228, 2016
4. Kimura E, Ding Y, Tohyama C, AhR signaling activation disrupts migration and dendritic growth of olfactory interneurons in the developing mouse, *Sci Rep* 20;6:26386, 2016
5. Kimura E, Endo T, Yoshioka W, Ding Y, Ujita W, Kakeyama M, Tohyama C, In utero and lactational dioxin exposure induces Sema3b and Sema3g gene expression in the developing mouse brain, *Biochem Biophys Res Commun*, 22;476(2):108-13, 2016
6. Kimura E, Matsuyoshi C, Miyazaki W, Benner S, Hosokawa M, Yokoyama K, Kakeyama M, Tohyama C, Prenatal exposure to bisphenol A impacts neuronal morphology in the hippocampal CA1 region in developing and aged mice, *Arch Toxicol* 90(3):691-700, 2016
7. Aung KH, Kyi-Tha-Thu C, Sano K, Nakamura K, Tanoue A, Nohara K, Kakeyama M, Tohyama C, Tsukahara S, Maekawa F, Prenatal Exposure to Arsenic Impairs Behavioral Flexibility and Cortical Structure in Mice, *Front Neurosci* 31;10:137, 2016
8. Ling W, Endo T, Kubo K, Nakajima K, Kakeyama M, Tohyama C, In Utero Bisphenol A Exposure Induces Abnormal Neuronal Migration in the Cerebral Cortex of Mice, *Front Endocrinol (Lausanne)* 1;7:7, 2016
9. Kimura E, Kubo K, Matsuyoshi C, Benner S, Hosokawa M, Endo T, Ling W, Kohda M, Yokoyama K, Nakajima K, Kakeyama M, Tohyama C, Developmental origin of abnormal dendritic growth in the mouse brain induced by in utero disruption of aryl hydrocarbon receptor signaling, *Neurotoxicol Teratol* 52(Pt A):42-50, 2015
10. Ishii K, Kubo K, Endo T, Yoshida K, Benner S, Ito Y, Aizawa H, Aramaki M, Yamanaka A, Tanaka K, Takata N, Tanaka KF, Mimura M, Tohyama C, Kakeyama M, Nakajima K, Neuronal Heterotopias Affect the Activities of Distant Brain Areas and Lead to Behavioral Deficits, *J Neurosci* 9;35(36):12432-45, 2015
11. Benner S, Kakeyama M, Endo T, Yoshioka W, Tohyama C, Application of NeuroTrace staining in the fresh frozen brain samples to laser microdissection combined with quantitative RT-PCR analysis, *BMC Res Notes* 20;8:252, 2015

發育神經毒性：風險評估的觀點和問題

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HESTIC機構主席；東京大學榮譽教授；筑波大學、北京大學公共衛生學院、中國醫藥大學客座教授

越來越多的流行病學和作用機制研究顯示產前暴露低劑量的環境化學物質影響更多的大腦功能，包括嬰兒的學習、記憶、情緒和社會性。因此，「行為和認知毒理學」是毒理學中由健康和環境的角度出發的重要研究領域。化學品（包括農藥）的風險評估分析含括了發育神經毒性在各種國際測試指南中，例如經濟合作暨發展組織(OECD)發育神經毒性研究指南(TG426)。雖然TG426專注於發育神經毒性研究，但非強制分析包括農藥在內的各種化學品的風險評估，不論是在日本或其他國家。雖然TG426相當全面，但以實驗室的結果為主，且最新版本是10年前發行。除了內少數農藥以外，發育神經毒性測試數據沒有被用於化學品的製劑安全標準（ADI / TDI）。行為測試經常因實驗條件而遭遇數據變異大的問題。目前，有利用體外(in vitro)和電腦模擬(in silico)替代測試的趨勢。

在我的演講中，我首先將解釋一系列利用嚙齒動物進行的行為測試，然後討論目前在農藥風險評估中使用TG426的一些問題，以及替代測試結果。最後，我將簡要介紹我們從發育神經毒性的新方法整合行為異常與發育中大腦微觀形態的觀察。

References: Kimura et al., Sci Rep. 2016 PMID: 27197834; Kimura et al., Biochem Biophys Res Commun. 2016. PMID: 27178212; Ling et al., Front Endocrinol. 2016. PMID: 26869994; Kimura et al., Neurotoxicol Teratol. 2015. PMID: 25804199; Benner et al., Front Neurosci. 2015. PMID: 25873851; Kimura et al., Arch Toxicol. 2016. PMID: 25804199; Benner et al., Physiol Behav. 2014. PMID: 25089814; Kakeyama et al., Arch Toxicol. 2014. PMID: 24292196; Endo et al., PLoS One. 2012. PMID: 23251380; Tse et al., Science. 2011. PMID: 21737703; Endo et al., Behav Brain Res. 2011. PMID: 21377499; Haijima et al., Neurotoxicology. 2010. PMID: 20398696

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Developmental Neurotoxicity: Perspectives and Problems in Risk Assessment

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An increasing number of epidemiologic and mechanistic studies suggested that prenatal exposure to environmental chemicals at low doses affect higher brain function, including learning and memory, emotion, and sociality in infants. Thus, 'behavioral and cognitive toxicology' is an emerging important research area in toxicology from the viewpoint of health and the environment. In risk assessment analysis of various chemicals, including pesticides, a battery of developmental neurotoxicity (DNT) tests is included in a series of the international test guidelines, such as OECD TG426. Although the TG426 is devoted to DNT, but not mandatory in risk assessment of various chemicals including pesticides, in Japan and other countries. The TG426 is comprehensive, but its implementation is extremely laborious, and the last update was 10 years ago. DNT test data have not been utilized to derive formulate safety standards (ADI/TDI) for various chemicals except for a few pesticides. Behavioral tests are often encountered with large variations of data depending on experimental conditions. Currently, there is a move towards the alternative test based on in vitro and in silico.

In my lecture, I will first explain a history of the development of a battery of behavioral tests using the rodent, and then discuss some problems on the current practice of using TG426 in pesticide risk assessment, as well as the implementation of the alternative tests. Lastly, I will briefly introduce our novel approach towards DNT from a viewpoint of integrating behavioral abnormalities with micromorphological observations in the developing brain.

References: Kimura et al., Sci Rep. 2016 PMID: 27197834; Kimura et al., Biochem Biophys Res Commun. 2016. PMID: 27178212; Ling et al., Front Endocrinol. 2016. PMID: 26869994; Kimura et al., Neurotoxicol Teratol. 2015. PMID: 25804199; Benner et al., Front Neurosci. 2015. PMID: 25873851; Kimura et al., Arch Toxicol. 2016. PMID: 25804199; Benner et al., Physiol Behav. 2014. PMID: 25089814; Kakeyama et al., Arch Toxicol. 2014. PMID: 24292196; Endo et al., PLoS One. 2012. PMID: 23251380; Tse et al., Science. 2011. PMID: 21737703; Endo et al., Behav Brain Res. 2011. PMID: 21377499; Haijima et al., Neurotoxicology. 2010. PMID: 20398696

Funding Source: This work was supported in part by a grant from Food Safety Commission, Japan (0902), JSPS Kakenhi (JP24221003), and the SRPBS of the MEXT.

Disclosure Statement: The author does not have any conflicts of financial interest to declare.



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國際環境流行病學亞太分會會長

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

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Chair, Environmental Epidemiology–Asia Chapter (ISEE-AC)

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研究領域 Research Interests

環境職業衛生、空氣污染學、風險評估 Environmental and Occupational Health, Air Pollution Control, Risk Assessment

學歷 Education and Degrees

- | | | |
|------|--------|---|
| 1990 | 哈佛大學博士 | ScD, Air Pollution Control, Harvard School of Public Health |
| 1987 | 哈佛大學碩士 | MSc, Industrial Hygiene and Air Pollution Control, Harvard School of Public Health |
| 1982 | 臺灣大學學士 | BA, Chemistry and Biology of Public Health, National Taiwan University, College of Medicine |

專業經歷 Professional Appointments

- | | | |
|-----------|--------------------|---|
| 2007-2011 | 國立臺灣大學全球衛生中心主任 | Director of International Health Center in Taiwan, College of Public Health, National Taiwan University |
| 1999-2005 | 臺灣大學職業醫學與工業衛生研究所所長 | Director of Institute of Occupational Medicine and Industrial Hygiene, College of Public Health, National Taiwan University |
| 1997-1998 | 哈佛大學 | Takemi Fellow in International Health, Harvard University |
| 1996- | 臺灣大學職業醫學與工業衛生教授 | Professor, Institute of Occupational Medicine and Industrial Hygiene, College of Public Health, National Taiwan University |

專業服務 Society Activities

- | | | |
|-----------|---------------------|---|
| 2015-2017 | 國際環境流行病學會理事 | Councilor, International Society for Environmental Epidemiology (ISEE) |
| 2015-2016 | 國際環境流行病學亞太分會會長 | Chair Elect, International Society for Environmental Epidemiology – Asia Chapter (ISEE-AC) |
| 2014-2016 | 環太平洋大學協會全球衛生指導委員會成員 | Steering Committee Member, Association of Pacific Rim Universities (APRU) Global Health Program |
| 2009- | 臺灣風險分析學會臺灣分會會長 | Chairman, Taiwan Chapter of Society for Risk Analysis |
| 2008-2011 | 國際暴露分析研討會理事 | Councilor of International Society of Exposure Analysis (ISEA) |
| 2008-2015 | 臺灣風險分析學會會長 | President of Society for Risk Analysis in Taiwan |
| 2002- | 行政院衛生福利部預防保健委員會委員 | Member of the Comprehensive Preventive Health Care Committee, Ministry of Health, Taiwan |
| 2000- | 行政院國家永續發展委員會委員 | Member of the National Sustainable Development Committee, Executive Yuan, Taiwan |
| 1994-1997 | 環境署空氣污染技術委員會委員 | Member of Technical Committee of Air Pollution Fee, Taiwan Environmental Protection Agency |

**Prof. Alvaro Puga (USA)**

美國辛辛那提大學醫學院環境衛生學系教授 Professor Department of Environmental Health,
University of Cincinnati, College of Medicine, USA

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Alvaro Puga教授得到西班牙馬德里大學、瑞典隆德大學和普渡大學的學位，並在美國國家衛生研究院鑽研放射線對健康影響和計算機程式語言，有相當豐富的跨領域知識整合。他的研究著重在環境毒物因子作用機制，並分析在面對毒物的基因多樣性反應。特別感興趣於在解毒酶表達中具有調節作用的轉錄基因編碼。Prof. Alvaro Puga has degree in Universidad de Madrid, University of Lund and Purdue University. He then studied advanced computer programming and radiological health in NIH (National Institutes of Health). His interests are centered on the molecular mechanisms of action of these toxic environmental agents, and on the other, on the analysis of genetic diversity in the response to these agents. The genes of interest are those that code for transcription factors with a regulatory role in the expression of detoxification enzymes.

專業經歷 Professional Appointments

- | | |
|------------|--|
| 2015 | 東京大學訪問學者 Visiting Professor, Japanese Society for the Promotion of Science. The University of Tokyo, Japan |
| 2005 -2007 | 美國國家衛生研究院環境基因研究中心主任 Director, NIEHS Center for Environmental Genetics |
| 1994-1999 | 辛辛那提大學醫學院副教授(終身教職) Associate Professor (tenured), Department of Environmental Health. University of Cincinnati College of Medicine. |
| 1982-1987 | 美國國立衛生研究院口腔醫學實驗室專家 Expert, Laboratory of Oral Medicine. NIDR, NIH. |
| 1972 | 加州大學爾灣分校分子生物與分子化學博士後研究員 Postdoctoral Fellow, Department of Molecular Biology and Biochemistry. University of California, Irvine, California. |
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學歷 Education and Degrees

- | | |
|------|---|
| 1983 | 美國國家衛生研究院計算機程式語言 Computer Programming: Advanced High Languages. Foundation for Advanced Education in Sciences. National Institutes of Health. |
| 1976 | 美國國家衛生研究院放射性核素用戶的放射性健康 Radiological Health for Radionuclide Users. National Institutes of Health. |
| 1972 | 普渡大學分子生物學與物理生物學博士 Ph.D. in Molecular Biology and Biophysics. Department of Biological Sciences. Purdue University |
| 1967 | 瑞典隆德大學遺傳學研究所分子細胞遺傳學實驗室 Laboratory of Molecular Cytogenetics, Institute of Genetics. University of Lund. Sweden |
| 1966 | 西班牙馬德里大學生物學執照 Licenciante in Biology. Facultad de Ciencias Biológicas. Universidad de Madrid. Spain |
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期刊審查 Editorial Boards (Reviewer)

Analytical Biochemistry; Archives of Biochemistry and Biophysics; Biochemical Pharmacology; Biochemistry; Cancer Research; Carcinogenesis; Chemico-Biological Interactions; DNA and Cell Biology; Environmental Health Perspectives; FASEB Journal; Free Radicals in Biology and Medicine; Journal of Biological Chemistry; Journal of Virology; Journal of

Cell Science; Molecular and Cellular Biology; Molecular Carcinogenesis; Molecular Endocrinology; Molecular Pharmacology; Mutagenesis; Mutation Research; Nature; New England Journal of Medicine; Journal of Steroid Biochemistry and Molecular Biology; Nucleic Acids Research; Oncogene; Pharmacogenetics; Physiological Genomics; Science; Toxicological Sciences; Toxicology and Applied Pharmacology; Toxicology In Vitro; Virology; Xenobiotica.

榮譽 Award and Honor

2012	Elected Fellow, Academy of Toxicological Sciences
2012	Elected Fellow, American Association for the Advancement of Science
2011	Department of Environmental Health Director's Award for Excellence in Research
2002	Member, University of Cincinnati Graduate Fellows
2002	University of Cincinnati College of Medicine Richard Akeson Award for Excellence in Teaching
1999	Zeneca Lectureship Award, Society of Toxicology.
1994	Outstanding Faculty Award, Department of Environmental Health, University of Cincinnati
1972	Fellow, National Council for Tobacco Research. Department of Immunopathology, Scripps Clinic and Research Foundation. La Jolla, CA

論文發表 Publications (2015-present)

1. Winans, B., Nagari, A., Chae, M. Ko, C.-I., Puga, A., Kraus, W.L. and Lawrence, B.P. Linking the aryl hydrocarbon receptor with altered DNA methylation patterns and developmentally induced aberrant antiviral CD8+ T cell responses. *J. Immunol.* (2015)194(9):4446-57.
2. Sánchez-Martín, F.J., Lindquist, D.M., Landero-Figueroa, J., Zhang, X., Chen, J., Cecil, K.M., Medvedovic, M. and Puga, A. Sex- and tissue-specific methylome changes in brains of mice perinatally exposed to lead. *Neurotoxicology*, 46:92-100 (2015)
3. Abiko, Y., Puga, A. and Kumagai, Y. Activation of Ah Receptor Signaling through Covalent Modification of Aromatic Hydrocarbon Quinones. *J. Toxicol. Sci.* (2015) 40(6):873-86.
4. Sánchez-Martín, F.J., Fan, Y., Carreira, V., Ovesen, J.L., VonHandorf, A., Xia, Y. and Puga, A. Longterm co-exposure to hexavalent chromium and B[a]P causes tissue-specific differential biological effects in liver and gastrointestinal tract of mice. *Toxicol. Sci.* 146(1):52-64 (2015).
5. Mongan M, Meng Q, Wang J, Kao WW, Puga A, Xia Y. Gene-environment interactions target MAP3K1 signaling in eyelid morphogenesis. *J Biol Chem.* 290(32):19770-19779 (2015).
6. Lindquist, D.M., Beckwith, T., Cecil, K.M., Sánchez-Martín, F.J., Landero-Figueroa, J., and Puga, A. Prenatal and early postnatal lead exposure in mice: neuroimaging findings. *Quant Imag Med Surg* 5:511-518 (2015).
7. Carreira, V.S., Fan, Y., Wang, Q., Zhang, X., Kurita, H., Ko, C.-I., Naticchioni, M., Jiang, M., Koch, S., Medvedovic, M., Xia, Y., Rubinstein, J., and Puga, A. Ah receptor signaling controls the expression of cardiac development and homeostasis genes. *Toxicol. Sci.* 147(2):425-35 (2015).
8. Grandjean P, Barouki R, Bellinger DC, Casteleyn L, Chadwick LH, Cordier S, Etzel RA, Gray KA, Ha EH, Junien C, Karagas M, Kawamoto T, Paige Lawrence B, Perera FP, Prins GS, Puga A, Rosenfeld CS, Sherr DH, Sly PD, Suk W, Sun Q, Toppari J, van den Hazel P, Walker CL, Heindel JJ. Life-Long Implications of Developmental Exposure to Environmental Stressors: New Perspectives. *Endocrinology*, Oct;156(10):3408-15 (2015).
9. Wang, Q., Kurita, H., Carreira, V., Ko, C.-I., Fan, Y., Zhang, X., Biesiada, J., Medvedovic, M. and Puga, A. Ah Receptor Activation by Dioxin Disrupts Activin, BMP, and WNT Signals during the Early Differentiation of Mouse Embryonic Stem Cells and Inhibits Cardiomyocyte Functions. *Toxicol. Sci.* 149 (2):346-357 (2016).
10. Carreira, V.S., Fan, Y., Kurita, H., Wang, Q., Ko, C.-I., Naticchioni, M., Jiang, M., Koch, S., Zhang, X., Biesiada, J., Medvedovic, M., Xia, Y., Rubinstein, J., and Puga, A. Disruption of Ah Receptor Signaling during Mouse Development Leads to Abnormal Cardiac Structure and Function in the Adult. *PLoS ONE* 10(11) (2016).
11. Kurita, H., Carreira, V. S., Fan, Y., Jing, M., Naticchioni, M., Koch, S., Rubinstein, J. and Puga, A. Ah Receptor Expression in Cardiomyocytes Protects Adult Female Mice from Heart Dysfunction Induced by TCDD Exposure. *Toxicology*, 355:9-20 (2016).
12. Ko, C.-I., Fan, Y., de Gannes, M., Wang, Q., Xia, Y. and Puga, A. Repression of the Aryl Hydrocarbon Receptor is Required to Maintain Mitotic Progression and Prevent Loss of Pluripotency of Embryonic Stem Cells. *Stem Cells*. 2016 Jul 4.
13. Li, Y., Xie, C., Murphy, S.K., Skaar, D.A., Nye, M.D., Vidal, A.C., Cecil, K.M., Dietrich, K.N., Puga, A., Jirtle, R.L., and Hoyo, C. Lead exposure during early human development and DNA methylation of imprinted gene regulatory elements in adulthood. *Environ Health Perspect.* 124(5):666-673 (2016).

芳香烴受體調控胚胎心臟發展程序的中斷

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我的實驗室研究心臟發育期間由芳香烴受體(Aryl Hydrocarbon Receptor, AhR)調節的基因 - 環境交互作用。暴露於有機氯芳香烴受體配體，如戴奧辛 (TCDD，註：戴奧辛類化合物以 2,3,7,8-四氯雙苯戴奧辛 2,3,7,8-Tetrachlorodibenzo-p-dioxin, TCDD 毒性當量最大)，與毒理學/適應反應相關，包括發育異常、心臟病的發病率和死亡率，但芳香烴受體與這些表型機制很大程度未確定。最近，獨立於外源配體的芳香烴受體功能(例如心臟分化過程中基因表達的調節)顯示戴奧辛對一種或多種內源性芳香烴受體功能的破壞引起的心臟毒性的可能性。我們的長期目標是描繪芳香烴受體在心臟分化中的作用，確定因戴奧辛破壞的機制，並確定它們與心臟疾病最終表型的關聯。小鼠早期心臟發育期間的芳香烴受體消融或戴奧辛暴露破壞了發育中心臟數以百計的基因和同源轉錄因子的表達，這些基因位於建立心率傳導系統的信號通路關鍵的上游。我們當前的目標是確定在芳香烴受體和發展中小鼠心臟基因之間的交互作用，和這些交互作用如何調節基因表達，以及如何在早期胚胎發育期間因暴露於戴奧辛被破壞，導致心臟功能的調節中斷和電子心臟功能障礙。

我們的研究假設是在缺乏異生素配體，芳香烴受體建立基因表達的交互作用或監管樞紐(與心臟分化調節器的關鍵網絡)。基因消除排除了芳香烴受體中樞的形成，因此，排除了兩個網絡的協調，而戴奧辛暴露破壞了它，引起立即以及持久的基因表達變化。我們利用分子生物學和計算工具的組合建立基因表達調節變化、芳香烴受體表達、戴奧辛暴露，以及隨後的表觀遺傳調節異常和最終的疾病表徵之間的關係。我們正在測試假設暴露於環境因子如戴奧辛破壞內源性芳香烴受體信號的調節，擾亂了胚胎心臟發育的控制，導致成人的長期影響。這項研究的意義在於與人類健康的相關性。人類的多態性使得基因單倍體充足而受戴奧辛影響，導致先天性心臟畸形。流行病學的關係在於母親在懷孕期間暴露於戴奧辛和多氯聯苯，導致晚年出現常見心臟病如心肌病和心房顫動。我們期望繪製出芳香烴受體表達、戴奧辛暴露與心臟病之間的連結機制。本研究由國家衛生研究院(NIH NIEHS)的 R01 ES006273 和 R01 ES024744 計畫支持。

Ah Receptor-Mediated Disruption of the Cardiac Embryogenesis Program

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My laboratory studies gene-environment interactions regulated by the aryl hydrocarbon receptor (AHR) during cardiac development. Exposure to organochlorinated AHR ligands, such as dioxin (TCDD), is associated with toxicological/adaptive outcomes, including developmental abnormalities and morbidity and mortality from cardiac disease, but the mechanisms that connect the AHR with these phenotypes remain largely unidentified. Recently, a number of endogenous AHR functions, such as the regulation of gene expression during cardiac differentiation, have been identified that are independent of exogenous ligands, suggesting the possibility that the cardiac toxicity of TCDD results from the disruption of one or more endogenous AHR functions. Our long-term goal is to characterize the role of AHR in cardiac differentiation, to identify the mechanisms responsible for its disruption by TCDD, and to determine their association with the ultimate phenotype of cardiac disease. *Ahr* ablation or TCDD exposure during early cardiogenesis in mice disrupt the expression of several hundred genes and homeobox transcription factors in the developing heart that lie genetically upstream of signaling pathways key for the conduction system that establishes heart rate. Our immediate objectives to identify the interactions established in the developing mouse heart between the AHR and these genes, how these interactions regulate gene expression, and how they are subverted by exposure to TCDD during early embryogenesis, promoting the disruption of the regulation of heart functions causing functional and electrical cardiac dysfunctions.

Our working hypothesis is that in the absence of xenobiotic ligands, the AHR establishes a gene expression interactome—or regulatory hub—that cross-talks with the key network of cardiac differentiation regulators. Gene ablation precludes the formation of the *Ahr* hub and hence, the coordination of the two networks, whereas TCDD exposure disrupts it, both causing immediate as well as long-lasting gene expression changes. We use a combination of molecular biology and computational tools to build relationships between gene expression regulatory changes, AHR expression, TCDD exposure, subsequent epigenetic dysregulation and ultimate disease phenotype. We are testing the overarching hypothesis that exposure to environmental agents like TCDD disrupts the regulation of endogenous AHR signaling and perturbs the control of embryonic cardiac development, leading to long-term effects in adults. The significance of this work lies in its relevance to human health, supported by the findings that polymorphisms in humans that result in haploin sufficiency in many of the genes affected by TCDD, cause congenital cardiac malformations epidemiologically associated with maternal exposure to dioxins and PCBs during pregnancy, presented in later years as common cardiac diseases such as cardiomyopathies and atrial fibrillation. We expect to map a strong mechanistic link between AHR expression, TCDD exposure, and cardiac disease. *This research is supported by NIH NIEHS grants R01 ES006273 and R01 ES024744.*

**Prof. Ying Xia (USA)**

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Ying Xia教授專業的免疫學基礎是她在環境衛生研究上的優勢。她的研究重點在於了解信號傳導通路在環境因子與生理細胞反應的作用。正在進行的研究使用遺傳、生物化學和分子生物學技術來解決關於信號激酶在環境毒理學、發育生物學、組織再生和癌症預防和治療領域的功能和調節機制的基本問題。Prof. Xia has solid background of immunology which is an advantage in environmental health research. Her research focuses on establishing an understanding of the role of signal transduction pathways in cell responses to physiological and environmental agents. The ongoing work employs genetic, biochemical and molecular biological techniques to address fundamental questions regarding the function and regulatory mechanisms of signaling kinases in the areas of environmental toxicology, developmental biology, tissue regeneration, and cancer prevention and treatment.

研究領域 Research Interests

環境毒理學、發育生物學、免疫學 Environmental toxicology, developmental biology, immunology

學歷 Education and Degrees

- 1995-2000 加州大學聖地牙哥分校藥理及訊號傳遞博士後研究員 Post doctoral fellow, Pharmacology and Signal Transduction, University of California, San Diego, San Diego, California, USA
- 1989-1994 德州大學微生物免疫學博士 Ph.D. Microbiology and Immunology, University of Texas, Southwestern Medical Center, Dallas, Texas, USA
- 1985-1989 北京生物制品研究所免疫碩士 M.Sc. Immunology, National Vaccine and Serum Institute, Beijing, China
- 1980-1984 武漢大學病毒學學士 B.Sc. Virology, Wuhan University, Wuhan, China
-

專業服務和活動 Professional Service and Activity

- **Riewer (ad Hoc) of Peer Reviewed Journals:** Development, PNAS, Journal of Biological Chemistry, FEBS Letter, Journal of Leukocyte Biology, Apoptosis, Oncogene, Cancer Research, Plos One, Journal of Neuroscience Research, Experimental and Molecular Pathology, Journal of Cellular Biochemistry, Scientific Report, American Journal of Respiratory Cell and Molecular Biology, Environmental Health Perspectives, Toxicology, Molecular Pharmacology, European Journal of Pharmacology, Toxicological Sciences, Biochemical Pharmacology, Toxicology and Applied Pharmacology, Mutation Research, Chemical Biological Interaction, IOVS, Ophthalmic Research, Experimental Eye Research, Molecular Vision, Developmental Dynamics, Disease Models & Mechanisms
- **Reviewer (ad Hoc) of Grants:** Department of Defense (Genetic Cancer Research), Kentucky Science and Technology Foundation, The Israel Science foundation, Philip Morris Research Foundation, Ohio Cancer Research Associates, Center of Environmental Genetics, pilot projects, Cancer Center Pilot Projects, Ruth Lyons Cancer Research Projects

科學組織會員 Membership in Scientific Society

- 2000- 視覺和眼科研究學會會員 Member, Association for Research in Vision and Ophthalmology
- 2002- 美國毒理學學會會員 Member, Society of Toxicology
- 2002- 微生物學會會員 Member, Society of Microbiology
-

榮譽 Award and Honor

1996-1998 Irvington Research Institute of Immunology Post

論文發表 Publications (2014-present)

1. Ko CI, Wang Q, Fan Y, [Xia Y](#), Puga A. Pluripotency factors and Polycomb Group proteins repress aryl hydrocarbon receptor expression in murine embryonic stem cells. *Stem Cell Res.* 2014 Jan;12(1):296-308.
2. Ovesen JL, Fan Y, Chen J, Medvedovic M, [Xia Y](#), Puga A. Long-term exposure to low-concentrations of Cr(VI) induce DNA damage and disrupt the transcriptional response to benzo[a]pyrene. *Toxicology.* 2014 Feb 28;316:14-24.
3. Meng Q, Jin C, Chen Y, Chen J, Medvedovic M, [Xia Y](#). Expression of signaling components in embryonic eyelid epithelium. *PLoS One.* 2014 Feb 3;9(2).
4. Kurita H, Schneckeburger M, Ovesen JL, [Xia Y](#), Puga A. The Ah Receptor recruits IKK α to its target binding motifs to phosphorylate serine-10 in histone H3 required for transcriptional activation. *Toxicol Sci.* 2014 May;139(1):121-32.
5. Ovesen JL, Fan Y, Zhang X, Chen J, Medvedovic M, [Xia Y](#), Puga A. Formaldehyde-Assisted Isolation of Regulatory Elements (FAIRE) analysis uncovers broad changes in chromatin structure resulting from hexavalent chromium exposure. *PLoS One.* 2014 May 16;9(5).
6. Meng Q, Mongan M, Wang J, Geh E, Tang X, Zhang J, Kao W, [Xia Y](#). Epithelial sheet movement requires the cooperation of c-Jun and MAP3K1. *Developmental Biology.* 2014 Nov 1;395(1):29-37.
7. Meng Q, Mongan M, Carreira V, Kurita H, Liu C, Kao W, [Xia Y](#). Eyelid closure in embryogenesis is required for ocular adnexa development. *Investigative Ophthalmology & Visual Science.* 2014 Nov 6;55(11):7652-61.
8. Sánchez-Martín FJ, Fan Y, Carreira V, Ovesen JL, Vonhandorf A, [Xia Y](#), Puga A. Long-term Coexposure to Hexavalent Chromium and B[a]P Causes Tissue-Specific Differential Biological Effects in Liver and Gastrointestinal Tract of Mice. *Toxicol Sci.* 2015;146(1):52-64.
9. Mongan M, Meng Q, Wang J, Kao WW, Puga A, [Xia Y](#). Gene-environment interactions target MAP3K1 signaling in eyelid morphogenesis. *J Biol Chem.* 2015 Aug 7;290(32):19770-9.
10. Carreira VS, Fan Y, Wang Q, Zhang X, Kurita H, Ko CI, Naticchioni M, Jiang M, Koch S, Medvedovic M, [Xia Y](#), Rubinstein J, Puga A. Ah receptor signaling controls the expression of cardiac development and homeostasis genes. *Toxicol Sci.* 2015 Oct;147(2):425-35.
11. Yousaf R, Meng Q, Hufnagel RB, [Xia Y](#), Puligilla C, Ahmed ZM, Riazuddin S. MAP3K1 function is essential for cyto-architecture of mouse organ of Corti and survival of auditory hair cells. *Dis Model Mech.* 2015 Dec;8(12):1543-53.
12. Carreira VS, Fan Y, Kurita H, Wang Q, Ko CI, Naticchioni M, Jiang M, Koch S, Zhang X, Biesiada J, Medvedovic M, [Xia Y](#), Rubinstein J, Puga A. Disruption of Ah Receptor Signaling during Mouse Development Leads to Abnormal Cardiac Structure and Function in the Adult. *PLoS One.* 2015 Nov 10;10(11):e0142440.
13. Chen L, Peng Z, Meng Q, Mongan M, Wang J, Sartor M, Chen J, Niu L, Medvedovic M, Kao W and [Xia Y](#). Loss of I κ B kinase β promotes myofibroblast transformation and senescence through activation of the ROS-TGF β autocrine loop. *Protein Cell.* 2016 May;7(5):338-50.
14. Chen L, Mongan M, Meng Q, Wang Q, Kao W and [Xia Y](#). Corneal wound healing requires I κ B kinase β signaling in keratocytes. *PLoS One.* 2016 Mar 17;11(3).

戴奧辛基因 - 環境相互作用的發育毒性

Prof. Ying Xia (美國)

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美國辛辛那提大學醫學院環境衛生學系教授

基因和環境的複雜交互作用是造成疾病的最常見的原因，但充分了解基本原則的有效工具卻是缺乏的。我們已經利用小鼠和人類胚胎形成的眼瞼融合過程，發展遺傳小鼠模式以研究上皮型變。我們的基因、分子和生物化學研究速成 S1P-RHOa-ROCK 和 MAP3K1-JNK 信號網絡的鑑定。這個網絡透過促進肌動蛋白應力纖維(actin stress fiber)形成、細胞形狀改變、眼瞼上皮細胞遷移 扮演調節胚胎眼瞼融合關鍵作用。

我們應用這個研究基因-環境交互作用的模型，發現遺傳條件會增加暴露戴奧辛等環境毒物，如 2,3,7,8-四氯雙苯戴奧(2,3,7,8-Tetrachlorodibenzo-p-dioxin, TCDD)和多氯代聯苯 (PCB) 對眼瞼發展的敏感性。我們顯示 TCDD 暴露阻止 Map3k1^{+/+}和 Jnk1^{-/-} 胎兒的眼瞼融合，而單獨的暴露和遺傳條件都不足以影響眼瞼發展。這種戴奧辛毒性由芳香烴受體(Aryl Hydrocarbon Receptor, AHR)介導，當芳香烴受體在眼表上皮中全面或特別消融時將大部分消除。此外，毒性與 Map3k1^{+/+}和 Jnk1^{-/-} 胎兒的眼瞼上皮細胞中 JNK 活性的顯著降低相關。我們的數據顯示 TCDD-AHR 軸增強遺傳損傷而鈍化 JNK 信號。

這項研究的結果揭露了一種新的信號機制，藉由基因環境 (GxE) 交互作用影響上皮型變，並提供證據證明已存在的遺傳條件會增加胚胎/胎兒發育中戴奧辛毒性的易感性。

Gene-Environment Interactions in Developmental Toxicity of Dioxin

Prof. Ying Xia (USA)

Email: Ying.Xia@uc.edu

Professor, Department of Environmental Health, University of Cincinnati, College of Medicine

The complex interplay of gene and environment is the most common cause of developmental diseases, but effective tools to fully investigate this fundamental principle are lacking. We have developed genetic mouse models to study epithelial morphogenesis, based on eyelid fusion in embryogenesis conserved in mice and humans. Our genetic, molecular and biochemistry studies lead to the identification of a S1P-RHOa-ROCK and MAP3K1-JNK signaling network. This network plays a pivotal role in the regulation of embryonic eyelid fusion by promoting actin stress fiber formation, cell shape change and migration of the eyelid epithelial cells.

We applied this model to study gene-environment interactions and found genetic conditions that could increase the susceptibility of eyelid developmental programs to exposure of dioxin-like environmental toxicants, such as 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD) and polychlorinated biphenyl (PCB). We showed that TCDD exposure blocked eyelid fusion in *Map3k1*^{+/-} and *Jnk1*^{+/-} fetuses, whereas neither the exposure nor the genetic condition alone were sufficient to affect eyelid development. This dioxin toxicity was mediated by the Aryl hydrocarbon receptor (AHR) and largely abolished when *Ahr* was ablated either globally or specifically in the ocular surface epithelium. In addition, the toxicity was associated with a significant decrease of JNK activity in eyelid epithelial cells of *Map3k1*^{+/-} and *Jnk1*^{+/-} fetuses. Our data suggest that the TCDD-AHR axis synergizes with genetic lesions to inactivate JNK signaling.

Results of this work reveal a novel signaling mechanism through which gene-environment (GxE) interactions affect epithelial morphogenesis and provide empirical evidence that specific pre-existing genetic conditions can increase an individual's susceptibility to dioxin toxicity in embryonic/fetal development.



何啟功博士

衛生福利部政務次長

高雄醫學大學公共衛生學院教授

Dr. Chi-Kung Ho (Taiwan)

Deputy Minister, Ministry of Health and Welfare

Professor, Department of Public Health, Kaohsiung Medical University

學歷 Education and Degrees

- | | |
|-----------|--|
| 1986-1988 | 臺灣大學醫學院公共衛生研究所碩士 MSc, Public Health, Graduate Institute of Public Health, National Taiwan University, Taiwan |
| 1977-1984 | 高雄醫學大學醫學系 MD, Kaohsiung Medical University, Kaohsiung, Taiwan |

專業經歷 Professional Appointments

- | | |
|-----------|--|
| 2007-2016 | 高雄市政府衛生局局長 Director-General, Department of Health, Kaohsiung City Government |
| 2004-2008 | 中華民國環境職業醫學會理事長 President, Taiwan Environmental and Occupational Medicine Association |
| 2003-2007 | 行政院高雄屏東地區傳染病防治醫療網副指揮官 Deputy Commander, Infectious Disease Prevention Network in Kaohsiung & Pingtung Area, Executive Yuan |
| 2003 | 92 年行政院抗 SARS 有功醫護人員 Chief, SARS Taskforce of Southern Taiwan |
| 2003-2007 | 高雄醫學大學附設醫院社區醫學部主任 Director, Graduate Institute of Occupational Safety and Health, Kaohsiung Medical University |
| 2000-2007 | 高雄醫學大學職業安全衛生研究所所長 Director, Graduate Institute of Occupational Safety and Health, Kaohsiung Medical University |
| 1999-2000 | 美國哈佛大學公共衛生學院訪問學者 Visiting Scholar, Occupational Health Program, Harvard School of Public Health, Boston, USA |
| 1997-1999 | 高雄醫學大學勞工安全衛生室主任 Director, Office of Labor Safety and Health, Kaohsiung Medical University |
| 1994-2007 | 高雄醫學大學職業及環境醫學科主任 Director, Department of Occupational and Environmental Medicine, Kaohsiung Medical University |
| 1992-1997 | 高雄醫學大學附設醫院勞工安全衛生室主任 Director, Office of Labor Health and Safety, Kaohsiung Medical University Hospital |

榮譽事項 Honors

- 104 年國立台灣大學公共衛生學院傑出校友 2015 Outstanding Alumnae of National Taiwan University College of Public Health
- 104 年高雄市第一屆 (公共行政類) 傑出市民 2015 1st Kaohsiung City Honorary Citizen (Public Administration)
- 103 年高雄醫學大學傑出校友 2014 Outstanding Alumnae Award of Kaohsiung Medical University
- 102 年高雄市醫師公會高杏獎 2013 Kaohsiung City Medical Association Contribution Award
- 93 年澎湖縣榮譽縣民 2004 Penhu Honorary Citizen
- 87 年衛生署三等醫療獎章 1998 Health Medal of the third order by the Department of Health, Executive Yuan
- 81 年高雄醫學大學附設中和紀念醫院職業病科優良總住院醫師 Excellent Chief Resident physician, Department of Occupational Medicine, Kaohsiung Medical University Chung-Ho Memorial Hospital
- 79 年高雄醫學大學附設中和紀念醫院內科優良住院醫師 Excellent resident physician, Department of Internal Medicine, Kaohsiung Medical University Chung-Ho Memorial Hospital



吳焜裕 教授 (臺灣)

立法院民進黨不分區立法委員

國立臺灣大學職業醫學與工業衛生教授

台灣風險分析學會會長

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吳焜裕現職為臺大教授，同時也是立法委員與台灣風險分析學會會長，畢業於北卡大學的環工博士專攻空氣汙染物模擬及分子毒理學，專長研究於蛋白質加成物與生物指標分析。其他專長包括風險評估與風險溝通。曾多次承接國衛院與食藥署的研究計畫。每年也定期組團參加國際研討會交流。近年積極倡議建構獨立可信的風險評估機關，以真正守護我國國人的健康與知情權。

研究領域

環境衛生、職業衛生、毒理學、分析化學、風險評估與風險溝通

學歷

- 1997.05 美國北卡羅萊納大學教堂山分校環境科學與工程博士(主修工業衛生與毒理學)
 - 1992.12 美國北卡羅萊納大學教堂山分校環境科學與工程碩士(主修工業衛生與空氣污染)
 - 1989.06 國立陽明大學醫學工程碩士
-

專業經歷

- 臺灣大學職業醫學與工業衛生研究所教授(2013-至今)
 - 臺灣大學職業醫學與工業衛生研究所副教授(2008-2013)
 - 國家衛生研究院環境衛生與職業醫學組副研究員(2006 - 2008)
 - 國家衛生研究院環境衛生與職業醫學組助理研究員(2001 – 2006)
 - 中國醫藥大學職業安全與衛生學系助理教授(1997-2001)
-

論文發表

今年已發表三篇期刊、另有多篇投稿中，2015年有8篇期刊文章，累計至目前已有100篇以上的期刊論文，另有研討會論文145篇以上，每年均在研討會發表最新研究進展。(更多文章可參考台大教師介紹頁面

http://coph.ntu.edu.tw/about/dean_associate?id=52bfde501d41c824ed0004c3)

榮譽

2006年Thomson Scientific Citation Laureate Award (五年一次，第二屆，共七篇文章與八人得獎)

1997年美國毒理學會風險評估專業學生論文獎第一名。

**Prof. Kuen-Yuh Wu (Taiwan)**

Professor, Department of Public Health & Institute of Occupational Medicine and Industrial Hygiene, College of Public Health, National Taiwan University

Member of Parliament, Taiwan Legislative Yuan

Chairperson, Taiwan chapter of Society of Risk Analysis

E-mail: kuenyuhwu@ntu.edu.tw

Dr. Kuen-Yuh Wu currently serves as a member of parliament in Taiwan's Legislative Yuan, professor at National Taiwan University's College of Public Health and chairperson of Taiwan chapter of Society of Risk Analysis. Dr. Wu's research at University of North Carolina-Chapel Hill focused on air pollution modeling and molecular toxicology, with a particular focus on DNA adduct and biomarker analysis. His other areas of expertise include risk assessment and communication. In recent years, he has become an advocate for establishing independent risk assessing entities to safeguard population health.

Research Interests

Environmental health, industrial hygiene, Toxicology, Analytical chemistry, Risk assessment and risk communication.

Education and Degrees

- | | |
|---------|---|
| 1997.05 | Ph.D., Molecular Toxicology, University of North Carolina at Chapel Hill |
| 1992.12 | M.S., Industrial Hygiene and Air Pollution, University of North Carolina at Chapel Hill |
| 1989.06 | M.S., Biomedical Engineering, National Yang-Ming University |
-

Professional Appointments

- Professor, Institute of Occupational Medicine and Industrial Hygiene, National Taiwan University(2013- present)
 - Associate Professor, Institute of Occupational Medicine and Industrial Hygiene, National Taiwan University(2008-2013)
 - Associate Investigator, Division of Environmental Health and Occupational Medicine, National Health Research Institutes, Taiwan (2006 -2008)
 - Assistant Principal Investigator, Division of Environmental Health and Occupational Medicine, National Health Research Institutes. (2001-2006)
 - Assistant Professor, Department of Occupational Safety and Health, China Medical College, Taichung, Taiwan (1997-2001)
-

Publications

More than 100 papers in peer reviewed journals, and more than 145 presentations in conferences.

將職業衛生加入建廠設計:以光電半導體產業為例

吳焜裕教授 (臺灣)

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國立臺灣大學公衛學院職業醫學與工業衛生研究所教授

傳統職業衛生以評估職場暴露作為改善職場工作環境之基礎，但因工廠已營運，改善職場環境並不易，對業者也易造成困擾。本研究擬以整合現有資訊建構製成健康風險評估，用於建廠前執行職場工作人員的健康風險評估，以作為建新廠的製程設計與儀器設備配置的參考，已充分保護營運後該職場工作人員的健康。因此以光電半導體產業適為例，評估長期暴露於黃光製程中所使用的化學品可能造成的健康風險。研究最初先以根據化學品分級管理來篩選出高風險的化學物質，利用 Stoffenmanager 以預測在不同情境下員工暴露濃度。如果工廠已有作業環境測定資料，將使用馬爾可夫鏈蒙地卡羅法進行貝氏統計方法估算這些化學品的事後機率分佈，再根據此結果計算出每個化學品的危害指數 (Hazard Index, HI) 或(與)致癌風險(針對致癌物)。以常用於黃光製程的有機混合物光阻劑為例，光阻劑的確切化學組成資訊有限，本研究根據現有文獻和專利中推測的潛在化合物以及揮發性有機物，主要成分有丙二醇單甲醚乙酸酯 (PGMEA)、酚醛樹脂和光活性化合物 (DNQ)、苯酚、甲酚、苯、甲苯、和二甲苯。評估結果的 HI 以及其 95HI 值上限為苯酚: 2.098 (95%: 6.59)、苯 11.08 (95%: 34.75)、甲酚: 0.2868 (95%: 0.9025)、PGMEA: 0.13 (95%: 0.2628), 甲苯: 0.02764 (95%: 0.087)、以及二甲苯: 0.01021 (95%: 0.032)。進一步使用這個方法苯致癌風險，建議管理光阻劑苯的濃度既可降低黃光製程工作人的致癌風險至可接受程度。這些結果顯示我們開發的方法將可以整合國內過去針對各種製程收集的暴露評估數據，進行健康風險評估作為未來建立新廠製程設計與設備配置的參考，以確保新廠工作人員免於暴露過量職場的有害物質。

Incorporation of Occupational Health in the Process Design: Assessment of Health Risk for Exposures to Hazardous Chemicals in Optoelectronic Semiconductor Industry as an Example

Prof. Kuen-yuh Wu (Taiwan)

Email: kuenyuhwu@ntu.edu.tw

Professor, Institute of Occupational Medicine and Industrial Hygiene, College of Public Health, National Taiwan University

Traditional occupation health frequently focuses on assessing exposures to hazardous chemicals in workplaces to suggest control measures and/or personal protect equipment to protect workers from adverse effects. However, this approach might confront with numerous obstacles to reduce exposures at workplaces. The objective of this study was to develop a method to incorporate occupational health in the process design to protect workers in advances by using the assessment of potential health risks resulting from chronic exposures to chemicals used in photolithography in the optoelectronic semiconductor industry. The Stoffenmanager software was used to model worker's exposure given the existing exposure scenarios. If personal exposure data is available, the information would be used as prior distributions to estimate the posterior exposure distributions by using the Bayesian statistics Markov Chain Monte Carlo simulation. The composition and by-products of the photoresist were cited from existing literatures and patent descriptions, including propylene glyco methyl ether acetate (PGMEA), novolac resin, photoactive compound (DNQ), phenol, cresol, benzene, toluene, and xylene. The reference concentration (RfD) and/or cancer slope factor (CSF) of each compound was re-assessed and updated when possible. The estimated exposures and RfD and/or CSF were then used to assess hazard index and/or cancer risk. The resulting HIs and their 95th percentiles for each compound was 2.098 (95%: 6.59) for phenol, 11.08 (95%: 34.75) for benzene, 0.2868 (95%: 0.9025) for cresol, 0.13 (95%: 0.2628) for PGMEA, 0.02764 (95%: 0.087) for xylene, and 0.01021 (95%: 0.032) for toluene. Phenol and benzene in particular reveal the highest HI and cancer risk, respectively. These results demonstrate that our assessment method can be applied to assess occupational health risk when a process and facility and equipment are designed. Further incorporation of the existing exposure data will improve the quality of the assessed risk to better protect workers in advances before the factory start-up.



黃世傑 局長 (臺灣)

臺北市政府衛生局 局長

國立台灣大學醫學院名譽教授

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黃世傑局長現任臺北市政府衛生局局長，畢業於臺大醫學系，並得到臺大臨床醫學研究所博士和EMBA學位。黃局長專長為小兒骨科(先天性髖關節脫臼、腦性麻痺、先天性內翻足及其他小兒骨科問題之治療、骨骼延長矯正術)、醫院管理，係台灣知名小兒骨外科權威，曾在台大醫院擔任醫師38年，並曾獲青杏醫療服務獎、雲林縣榮譽縣民、中華民國醫師公會全聯會「醫療服務傑出獎」。

研究領域

- 先天性髖關節脫臼、腦性麻痺、先天性內翻足及其他小兒骨科問題
 - 骨骼延長矯正術
 - 醫院管理
-

學歷

2004-2006 國立臺灣大學管理學院高階公共管理組碩士

1984-1989 國立臺灣大學臨床醫學研究所博士

1967-1974 國立臺灣大學醫學系

專業經歷

2010-2014 國立臺灣大學醫學院附設醫院副院長

2004-2010 國立臺灣大學醫學院附設醫院雲林分院院長

1997-2001 行政院衛生署台北醫院院長

1997-2014 國立臺灣大學醫學院骨科教授

論文發表

數百篇期刊論文、研討會論文發表。

**Prof. Shier-Chieg Huang (Taiwan)**

Commissioner of Department of Health, Taipei City Government

Professor Emeritus, National Taiwan University School of Medicine

E-mail: hsc@health.gov.tw

Dr. Shier-Chieg Huang is the Commissioner of the Taipei City Department of Health. He graduated from the National Taiwan University School of Medicine and has a doctorate and EMBA from the National Taiwan University Graduate Institute of Clinical Medicine. Commissioner Huang specializes in hospital management and pediatric orthopedics (including bone lengthening and corrective surgery and treatment for disorders such as congenital dislocation of the hip, cerebral palsy, and congenital clubfoot). He is one of the top authorities on pediatric orthopedics in Taiwan and has practiced medicine at National Taiwan University Hospital for 38 years. Commissioner Huang has received the Ching-Hsing Medical Foundation Service Award and the Outstanding Medical Service Award from the Yunlin County Veterans and Taiwan Medical Association.

Research Interests

- Treatment for disorders such as congenital dislocation of the hip, cerebral palsy, and congenital clubfoot
 - Bone lengthening and corrective surgery
 - Hospital management
-

Education and Degrees

1984-1989 PhD, National Taiwan University

1967-1974 MD, National Taiwan University

Professional Appointments

2010-2014 Vice-Superintendent , National Taiwan University Hospital

2004-2010 Superintendent , Yun-Lin Branch, National Taiwan University Hospital

1997-2001 Superintendent, Taipei Hospital, Ministry of Health and Welfare

1997-2014 Professor, Department of Orthopedic Surgery, National Taiwan University

Publications

Published hundreds of journal articles and conference papers.

臺北市鉛水管事件分享

黃世傑局長 (臺灣)

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臺北市政府衛生局局長

2015 年 7 月香港爆發飲水含鉛事件後，同年 10 月臺北市議員因鉛管汰換等議題提出質詢，因北市仍有約 107 公里未更換，影響戶數為 1.7 萬戶，雙北共約 157 公里、3 萬戶，即爆發鉛水管危機、媒體負面輿論，引起民眾對鉛水管產生健康疑慮與政府的重視。為維護民眾身體健康並安定民心，臺北市政府當責，由柯文哲市長責成臺北市政府衛生局啟動危機管理與風險控管。

臺北市政府衛生局以民眾健康、安全作為首要工作，透過諮詢專家學者、參考美國環境保護署建議每日容許鉛攝取量(0.0036 mg/kg/day)與美國疾病管制署建議值(孩童、孕婦及哺乳婦女<5 µg/dL，成人<10 µg/dL)及香港飲水鉛事件處理模式，啟動危機處理與風險控管，運用「平衡計分卡」四大構面(財務、顧客、內部流程及學習與成長)，及三風策略(風險評估、風險管理、風險溝通)，整合臺北市醫療院所、臺北自來水事業處、新北市及專家學者等跨局處、跨縣市、跨領域的橫向合作模式，共同建立跨域合作模式、血中鉛檢驗服務、異常個案追蹤流程等作業。於事件發生一週內啟動免費檢驗血中鉛服務機制，採以電話及網路預約方式登記，並透過多元管道宣導使資訊公開，降低民眾對鉛危害的疑慮及恐慌；臺北自來水事業處亦公布鉛管汰換作業由原 10 年提前 3 年內完成。

本事件於 2015 年 11 月 2 日至 12 月 5 日服務期間有 6,900 位民眾預約，完成受檢者計 5,479 位，分析所有受檢民眾整體血鉛濃度平均為 1.39 ug/dl，較美國疾病管制署在 2000 年調查 7,970 位民眾血中鉛濃度平均值 1.66 ug/dl 低，其中 5 人超過建議值，經家戶訪查與環境調查發現無群聚情形，已排除與鉛水管有關。

臺北市政府衛生局運用實證基礎及危機處理等策略處理此次鉛水管危機，成功化解民眾對鉛水管造成健康危害的憂慮。本局分析 2015 年 10 至 12 月間媒體輿情總計 179 則，第 1 週最高達 52 則，第 2 至 5 週逐週下降至第 5 週剩 6 則，降幅達 88.5%；預約受檢人數總計 6,900 人，第 1 週高達 4,562 人，每週下降至第 5 週剩 279 人，降幅達 93.9%，顯示成功降低民眾對鉛水事件造成健康疑慮。另以隨機抽樣並成功完成電話訪談 385 位接受血鉛檢驗服務民眾，民眾對於服務環境設施、服務態度及等候時間的滿意度，均達 90%以上，且對血鉛檢驗政策的感受滿意度也達 92.5%。

為傳承此次事件經驗，本局特別編撰發行「『鉛』錘百鍊 2105 拒鉛危害、護民健康紀實」電子書；後續也將以相關研究為基礎建立風險管理機制與環境污染大數據，因應未來環境變遷與污染問題。

Lead-Based Water Pipes in Taipei

Commissioner Shier-Chieh Huang (Taiwan)

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Department of Health, Taipei City Government

Three months after it was reported that drinking water in Hong Kong contained high levels of lead in July 2015, Taipei City officials raised questions regarding the replacement of lead-based pipes as the 157 km of pipelines in Taipei and New Taipei that have yet to be replaced (107 km in Taipei City alone) may affect a combined 30,000 households. This led to negative media reports and a public health scare. To ensure public health and ease people's minds, Mayor Ko Wen-Je tasked the Taipei City government Department of Health with crisis management and risk control.

To ensure public health and safety, the Department of Health consulted with professionals and referenced the recommended permissible daily amount of lead from the US Environmental Protection Administration (0.0036 mg/kg/day) and Centers for Disease Control and Prevention (<5 µg/dL for children and pregnant or breastfeeding women; <10 µg/dL for adults) as well as the measures taken in Hong Kong. The crisis management and risk control utilized a balanced score card of four dimensions (financial, client, internal procedure, and learning and growth) and three risk strategies (risk assessment, risk management, and risk communication). Interdepartmental and interdisciplinary horizontal cooperation between medical institutions throughout Taipei, the Taipei Water Department, New Taipei City, and experts and scholars established blood lead level testing services and follow-up procedures for abnormal cases. The free blood lead level testing services were offered within one week of the incident; appointments could be made over the phone or online. The service was advertised over multiple media outlets in order to subside any fears or doubts. The Taipei Water Department also announced that the pipelines were scheduled to be completely replaced three years ahead of schedule.

There were 6,900 appointments being made and 5,479 people being tested between November 2 and December 5, 2015. Analysis of the test results found that the average blood lead concentration was 1.39 µg/dL, lower than the 1.66 µg/dL average found by the US Centers for Disease Control and Prevention in 2000. Only five of the people tested exceeded the suggested limits; home visits and environmental surveys found that there was no proximity effect, eliminating any correlation with the lead-based water pipes.

The Department of Health handled this lead-based water pipe situation using evidence-based and crisis management strategies, successfully dissolving public anxiety over potential health risks due to the lead-based pipes. A total of 179 media stories were analyzed between October and December 2015; 52 pieces were written within the first week which gradually declined to only 6 in the fifth week, a decline of 88.5%. A total of 6,900 people made blood lead level test appointments; 4,562 people made appointments during the first week and this number declined to 279 people in the fifth week, a decrease of 93.9%. These numbers show that the public health scare was successfully mitigated. Random sampling and completion of 385 telephone interviews with people who had undergone blood lead level testing showed that over 90% of the interviewees were satisfied with the examination environment and service attitude and that 92.5% were satisfied with the blood lead level testing policy.

To share this experience, the Department of Health compiled an e-book entitled "The vicissitudes of lead: A record of the 2015 lead health crisis." A risk management mechanism and environmental pollution big data will be established based on relevant research in order to cope with future issues involving environmental changes and pollution.



王英偉博士

衛生福利部國民健康署署長

部定副教授

Dr. Ying-Wei Wang (Taiwan)

Director-General, Health Promotion Administration, Ministry of Health and Welfare

Associate Professor, School of Medicine, Tzu Chi University

學歷 Education and Degrees

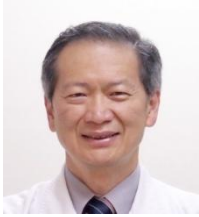
- 美國杜蘭大學公共衛生博士 Dr.P.H., School of Public Health & Tropical Medicine, Tulane University, U.S.A.
- 美國杜蘭大學公共衛生熱帶醫學碩士 M.P.H., School of Public Health & Tropical Medicine, Tulane University, U.S.A.
- 國立臺灣大學醫學士 M.D., School of Medicine, National Taiwan University, Taiwan

專業經歷 Professional Appointments

- 慈濟大學醫學系副主任 Deputy Director, School of Medicine, Tzu Chi University
- 慈濟大學人文醫學科主任 Director, Department of Medical Humanities, School of Medicine, Tzu Chi University
- 佛教慈濟綜合醫院心蓮病房主任 Director, Heart Lotus Care Ward, Buddhist Tzu Chi General Hospital
- 臺灣健康醫院學會秘書長 Secretary-general, Taiwan Society of Health Promotion Hospitals
- 亞太安寧緩和網絡(APHC)理事(台灣代表) Member of council, Asia Pacific Hospice Palliative Care Network (Taiwan)
- 慈濟大學家庭醫學科主任 Director, Department of Family Medicine, Tzu Chi University
- 慈濟大學教師發展中心主任 Director, Center for Faculty Development, Tzu Chi University
- 衛生署國民健康局副局長 Deputy Director-General, Health Promotion Administration, Ministry of Health and Welfare
- 慈濟醫院家庭醫學科主治醫師 Physician, Department of Family Medicine, Hualien Tzu Chi Hospital
- 署立臺北醫院高年科主治醫師 Physician, Department of Geriatrics and Gerontology, Taipei Hospital
- 臺大醫院家庭醫學科住院醫師 Resident, Department of Family Medicine, Hualien Tzu Chi Hospital

專長 Major Research Area

- 家庭醫學 Family Medicine
- 緩和醫療 Palliative care
- 社區醫療 Community Health
- 健康促進 Health promotion
- 醫學教育 Medical education



郭育良博士 (臺灣)

國家衛生研究院國家環境醫學研究所特聘研究員兼所長

國立台灣大學醫學院醫學系環境職業醫學科教授

國立台灣大學附設醫院環境職業醫學部主治醫師、內科部主治醫師

郭育良教授目前擔任國家衛生研究院國家環境醫學研究所特聘研究員兼所長，他同時也是臺灣大學的特聘教授，臺大醫院內科/環境職業醫學科主治醫師，不論是在研究、教學、國際學術組織都有相當傑出的表現和參與！長達二十年台灣油症患者多氯聯苯 / 多氯呋喃中毒調查的追蹤研究，郭教授為受害者提供科學性的證據並爭取醫療協助；在職業醫學的貢獻亦獲得2014年職業安全衛生奉獻特別獎；同時郭教授也是國際環境流行病學學會東亞分會創立者(International Society of Environmental Epidemiology East Asia Chapter，註：後來以規模擴大，改名為International Society of Environmental Epidemiology Asia Chapter)以及拉馬其尼學院院士(Fellow, Collegium Ramazzini)。

學歷

- 1987 美國霍普金斯大學環境與職業醫學博士
- 1983 美國哈佛大學公共衛生碩士
- 1982 國立臺灣大學醫學系醫學士

專業經歷

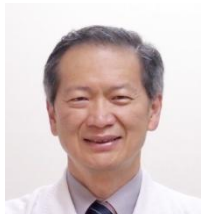
- 2007 國際環境流行病學學會東亞分會創立者
- 2002- 國際期刊 International Journal of Occupational and Environmental Health 編輯委員
- 2000 - 2006 國立成功大學醫學院醫學系工業衛生科教授暨主任
- 2000 - 2004 中華民國環境職業醫學會理事長
- 2000 - 2002 亞洲職業醫學學會理事長
- 1997 - 2001 中華民國公共衛生學會雜誌主編
- 1996- 國際期刊 Journal of Occupational Health (Japan Society for Occupational Health 編輯委員
- 1995 - 2006 國立成功大學醫學院『多氯聯苯油症中毒研究中心』主任
- 1989 - 1990 美國加州大學醫學院職業醫學科博士後研究
- 1986 - 1989 美國德州理工大學醫學中心內科住院醫師

榮譽事項

- 臺大醫學院教學傑出獎 2008, 2011-2016
- 職業安全衛生奉獻特別獎 2014
- 拉馬其尼學院院士 (Collegium Ramazzini, Italy) 2011
- 國科會傑出研究獎生物醫學研究類 2004, 2010
- 國立臺灣大學特聘教授 2008
- 台南第一高級中學傑出校友 2000
- 中華民國十大傑出青年 1996
- Robert T. Legee Award, American Industrial Hygiene Association, 1990

論文發表

超過220篇國際期刊論文發表。



Yue-Liang Leon Guo, MD, MPH, PhD (Taiwan)

Distinguished Investigator and Director, National Institute of Environmental Health Sciences, National Health Research Institutes

Distinguished Professor, Department of Environmental and Occupational Medicine, National Taiwan University College of Medicine

Clinical Staff, Department of Internal Medicine and Department of Environmental and Occupational Medicine, National Taiwan University Hospital

E-mail: leonguo@nhri.org.tw

Prof. Guo is Distinguished Investigator and Director, National Institute of Environmental Health Sciences, National Health Research Institutes, Taiwan. He is also Distinguished Professor in National Taiwan University College of Medicine and Clinical Staff of National Taiwan University Hospital. He has outstanding performance and participation in research, teaching and international organizations. His research on human health effects from exposure to PCBs/PCDFs influenced the governmental policy and helped victims to get medical support. He won 2014 National Occupational Safety and Health Contribution Award from Ministry of Labor, Taiwan. Also, Prof. Guo was elected as a fellow of Collegium Ramazzini and co-founder of ISEE-EAC. (International Society of Environmental Epidemiology East Asia Chapter, the Chapter changed its name officially in 2013 International Society of Environmental Epidemiology Asia Chapter)

Education and Degrees

1987	Ph.D. - Johns Hopkins University, School of Hygiene and Public Health Department of Environmental Health Sciences, Division of Occupational Medicine
1983	M.P.H. - Harvard University, School of Public Health
1982	M.D. - National Taiwan University, School of Medicine

Professional Appointments

2007	Co-Chair, International Society of Environmental Epidemiology East Asia Chapter
2000 - 2006	Professor and Director, Environmental and Occupational Medicine, National Cheng Kung University Medical College
2000 - 2004	President, Taiwan Environmental and Occupational Medicine Association
2000 - 2002	President, Asian Association of Occupational and Environmental Health
1997 - 2001	Editor in Chief, Journal of National Public Health Association Republic of China
1995 - 2006	Director, Research Laboratory for Human Health Effects from Exposure to PCBs/PCDFs, National Cheng Kung University
1989 - 1990	Fellow, Occupational Medicine, University of California, San Francisco, USA

Honors

- Excellent Teaching Award, National Taiwan University College of Medicine, 2008, 2011-2016
 - National Occupational Safety and Health Contribution Award, Ministry of Labor 2014
 - Fellow, Collegium Ramazzini, Italy, 2011
 - Outstanding Research Award, National Science Council, 2004, 2010
 - Distinguished University Professor, National Taiwan University, 2008 - present
 - Outstanding Alumnae of the Tainan First High School, Tainan, TAIWAN, 2000
 - Ten Outstanding Young Persons, Taiwan, R.O.C., 1996
 - Robert T. Legee Award, American Industrial Hygiene Association, 1990
-

Publications

More than 220 papers in peer reviewed international journals

呼吸道疾病之環境因子

郭育良教授 (臺灣)

E-mail:leonguo@nhri.org.tw

國家衛生研究院國家環境醫學研究所特聘研究員兼所長

國立台灣大學醫學院醫學系環境職業醫學科教授

國立台灣大學附設醫院環境職業醫學部主治醫師、內科部主治醫師

過去幾十年來，許多發展國家和發展中國家的氣喘盛行率一直在增加，空氣汙染對這一趨勢的貢獻尚未完全清楚。本次演講檢視了空氣汙染物和其他環境因素(包括真菌)與氣喘發生及發作的相關證據。空氣汙染物對氣喘症狀發作的影響相當明顯，且具有不同強度的關聯。某些真菌亦被報告會引起氣喘發作，但整體作用仍有待進一步探討。研究也顯示空氣汙染及真菌均可能影響肺功能。另一方面而言，空氣汙染是否會造成氣喘發病率增加則仍有許多爭議，氣喘的發作可能與早期暴露於空氣汙染物和真菌有關。最近累積的流行病學證據似乎傾向於空氣汙染可造成氣喘以及相關病症例如過敏性鼻炎和異位性皮膚炎的發生或增加。兒童早期或甚至早至妊娠期間母親暴露於空氣汙染物，易導致氣喘或過敏的發生。對於成人發作型氣喘，許多爭議仍然有待解決。主要原因是，探討成人發作型氣喘的研究比探討兒童發作型氣喘的研究少得多，並且在發病年齡之前，成人發作型氣喘有較長的潛伏期，使得流行病學研究較難進行，劑量反應關係亦不易分析。總結來說，空氣汙染和真菌對氣喘的整體影響尚不完全清楚，儘管對已知氣喘發作的影響，以及逐漸有影響氣喘發生的證據累積，未來仍需要更清楚的劑量反應分析來概括這些環境因子對氣喘的整體影響。

The Roles of Environmental Factors on Asthma

Prof. Yue-Liang Leon Guo (Taiwan)

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National Institute of Environmental Health Science

Department of Environmental and Occupational Medicine, National Taiwan University (NTU) and NTU Hospital

Graduate Institute of Occupational Medicine and Industrial Hygiene, NTU

Lifetime prevalence of asthma has been increasing in many developed and developing countries in the past few decades. It has not been clear how much contribution air pollution has exerted to this trend. This review examines evidence of asthma attacks as related to air pollutants and other environmental agents, including fungi. The contribution of asthma attacks by air pollutants is rather evident, with varied strength of association. Certain fungal agents cause asthma attack, but the overall roles remain to be delineated. Effects of air pollutants are also shown to reduce lung function. More controversies are involved while looking into the asthma incidence issues, which indicate that initiation of asthma might be related to earlier exposure to air pollutants and fungal agents. Recent cumulating evidence seems to favor a role of air pollution to asthma occurrence, as well as related conditions, such as allergic rhinitis and atopic dermatitis. Exposure to air pollutants during early childhood, or even maternal exposure during gestation was found to contribute to occurrence of asthma or atopic conditions. More controversies remain to be solved while adult-onset asthma is taken into consideration. It is because that fewer investigations have been done to address adult-onset asthma than those on child-onset asthma, and that a longer incubation period before the onset age makes it difficult to carry out epidemiologic studies and to document dose-response relationship. In conclusion, the overall effects of air pollution and fungi on asthma have not been totally clear, despite the known effects on asthma attacks, and cumulating evidence on asthma occurrence. A clearer dose-response relationship is required to summarize the overall effects of these environmental agents on asthma.



郭保麟教授 (臺灣)

國立成功大學醫學院婦產科教授

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郭保麟教授目前是成大醫學院婦產科教授，畢業於臺大醫學系，並到美國國家衛生院接受遺傳學訓練，郭教授專長和研究包括了遺傳疾病之致病機轉、胎兒先天性異常、造經功能障礙、習慣性流產，以及環境因素對生殖系統的影響。

研究領域

- Clinical genetics and prenatal diagnosis
 - Cellular, molecular, and genetic aspects of spermatogenesis and male infertility
 - Cellular, molecular, and genetic aspects of embryo implantation and recurrent miscarriage
 - Environmental impact on human reproduction
-

學歷

- | | |
|-----------|------------|
| 1977-1984 | 國立臺灣大學醫學系 |
| 1994-1996 | 美國國家衛生院研究員 |
-

專業經歷

- | | |
|-----------|--------------|
| 2003-now | 成功大學醫學院婦產科教授 |
| 2004-2009 | 成功大學醫學院婦產科主任 |
-

論文發表

超過190篇期刊論文發表。

**Prof. Pao-Lin Kuo (Taiwan)**

Professor, Department of Obstetrics and Gynecology, National Cheng-Jung University College of Medicine
E-mail:paolink@mail.ncku.edu.tw

Dr. Pao-Lin Kuo is Professor of Ob/GYN Department, National Cheng-Kung University Hospital and College of Medicine. He obtained medical degree at the National Taiwan University in Taiwan and received training in clinical genetics at Human Genome Institute, National Institute of Health (NIH), USA. He is an expert in the clinical genetics and reproductive medicine. His research foci cover human reproductive and developmental disorders.

Research Interests

- Clinical genetics and prenatal diagnosis
 - Cellular, molecular, and genetic aspects of spermatogenesis and male infertility
 - Cellular, molecular, and genetic aspects of embryo implantation and recurrent miscarriage
 - Environmental impact on human reproduction
-

Education and Degrees

1977-1984 MB, National Taiwan University
1994-1996 Research fellow, National Institute of Health (NIH)

Professional Appointments

2003-now Professor, Professor, Department of Obstetrics and Gynecology, National Cheng-Kung University College of Medicine
2004-2009 Chairman, Department of Obstetrics and Gynecology, National Cheng-Kung University College of Medicine and Hospital

Publications

More than 190 papers in peer reviewed journals.

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？

郭保麟教授 (臺灣)

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台灣數十年來，由於環境的變遷和生活方式的改變，婦女和兒童青少年疾病無論在疾病種類、分布、表現形態、盛行率各方面，都有明顯的改變。在婦女疾病方面，子宮平滑肌瘤、子宮腺肌症、子宮內膜異位症、多囊性卵巢、乳癌、子宮內膜癌、流產、不孕症等疾病，似乎都有急遽增加的趨勢。在童青少年疾病方面，過敏、氣喘、性早熟、肥胖、神經發展障礙等問題，也有增加的趨勢。

在另外一方面，高齡化及少子化是台灣社會即將要面臨的重大危機。台灣十幾年來的生育率一直在 1.0 上下徘徊，如何提高生育率是當前刻不容緩的任務。由於孩子生得少，因此更要生得好，生下來之後也要確保兒童可以健康的成長。婦女健康的問題會拖累提振生育率的努力，兒童健康的問題也會影響到長期社會整體健康及生產力。總之維持生育率(人口成長)和婦幼健康是社會永續發展的基礎。

儘管以上提到的婦女和兒童青少年疾病都與環境污染有關，而且環境污染造成的跨世代健康效應也已經有充分的證據，臨床經驗也確實感受到問題的迫切性和需求，但是上述婦女和兒童青少年疾病的流行病學數據以及所造成的影響並未沒有被確實評估。最近三年科技部申請計畫，小兒科和婦產科所提出的環境因素和婦幼相關研究計畫都不超過總計畫的 10%，通過的比例也未超出平均計畫通過率(大約 40%)。儘管其他學門(例如社會醫學) 也有婦女和兒童青少年疾病都與環境污染相關研究，但是所占比重不高。鑒於環境污染對婦幼健康以及下個世代健康之強烈影響，我們迫切需要評估環境污染對婦女和兒童青少年疾病的健康效應(包含跨世代健康效應)，並根據實證科學的結果提出因應之道。

Among Environmental Factors Related to Maternal/Child Health, What Are the Most Critical Issues to Be Tackled in Taiwan?

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Studies show that synthetic (manmade) foods as well as chemicals released into the environment have adverse effects on human health and cause disease, including subfertility and cancer. Numerous studies also demonstrated causal relationships and many possible associations between parental or childhood environmental exposures and adverse pregnancy, childhood, and adult health outcomes. In terms of the concept of “developmental origin of disease”, the importance of epigenetic changes in mediating the effects on adult phenotype and physiology arising from perturbations of the developmental environment (including parental diet) has been addressed by many epidemiologic and animal studies. Therefore, it is quintessential for the Taiwanese to evaluate environmental impact on maternal-child health, especially environmental effect on fecundity, miscarriage, pregnancy as well neonatal outcomes, given persistently low fertility rate in the past one decade.

During the past two decades, we have observed increased prevalence in various disorders of female reproductive system, including uterine leiomyoma, adenomyosis, endometriosis, polycystic ovarian disease, breast cancer, and endometrial cancer. We also observed increased prevalence of childhood obesity, eczema, asthma, precocious puberty, and various neurodevelopmental disorders. However, the health impacts of these disorders have not been evaluated by robust evidence-based studies. Among research proposals submitted for grant approval by the Committee of Maternal-Child Medicine in Ministry of Science and Technology (MoST), not more than 10% of grant belonged to the category of environmental health during the past 3 years, and the grant approval rate has been approximately 40% as a whole. Therefore, it will be urgent for the Taiwanese to evaluate the health impact of environmental contaminants on the maternal-child health. Only based on robust evidence-based studies could we propose strategy to tackle our urgent problem.