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微生物及病毒研究室

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➢ 學歷

學　　校	系(所)	學　　位
國防醫學院	生命科學研究所	博士
中正大學	地震研究所	碩士
中正大學	數學系	學士

➢ 經歷

服務機關	職　　稱	期　　間
義大醫院/醫學研究部	助理研究員	2021/02 – 迄今
中正大學/通識中心	兼任助理教授	2021/02 – 2021/09
中正大學/地球與環境科學系	博士後研究員	2018/06 – 2021/1

➢ 學術專長 (選)

1. 環境微生物學
2. 微生物多樣性
3. 人體微生物菌群
4. 健康一體
5. 分子生物學
6. 微生物抗藥性
7. 環境應用微生物

➢ 研究室簡介

(一)致病性微生物在臨床上往往造成許多嚴重的問題，然而許多致病性微生物廣泛存在於各種環境中，針對環境中致病性微生物的調查與分析，可以提供臨床上感染可能物種或途徑之參考，對於臨床用藥治療上有即時參考之依據，另外，抗藥性微生物議題在臨床醫學上也是相當重要的，而抗藥性並非僅是受到醫學領域使用抗生物治療影響，更大的部分是受到在農牧漁業等過度使用抗生素所導致，使得環境中微生物更容易帶有抗藥性，對整體感染醫學是相當大的衝擊。此外，健康一體(One Health)的概念是近幾年在公共衛生領域相當重視的一門跨域科學，主要強調除了人類健康外，動物、植物及環境的健康需要一起考量，唯有透過群體健康的概念才有助於整體公共衛生的提升，尤其 2019 年底所爆發的全球性 COVID-19 大流行，就是明顯的例子之一，唯有透過整體性的分析(環境、動物、植物、人

交互作用)才可以確保公共衛生(環境致病性微生物及 One health)。(二)人體菌群資料庫分析是近幾年相當熱門的議題，被稱為人體第二大基因庫，以腸道中的菌群分析最為受到重視，尤其近幾年研究發現在帕金森氏症及阿茲海默症的病患都可以發現特殊菌群會倒置長期的長腦軸神經微量發炎，也有相關益生菌開發，故疾病與腸道菌群的分析也是本研究是重點項目之一，透過大數據與生物資訊學的分析，了解各類疾病與人體菌群組成的關聯，期望後續可做為疾病篩檢或預防之用途(Human microbiota)。(三)抗藥性基因汙染一直都是相當熱門的議題，本研究室透過環境檢測結合高通量定序技術，釐清臨床、環境甚至豢養動物間的抗藥性基因汙染議題，以及透過菌株篩選，了解之間傳播及汙染情況，本議題目前主要著重在下面幾類病原體：*E. coli*、*Salmonella*、*Aeromonas*、MRSA、*Acinetobacter baumannii*、*Klebsiella pneumoniae* 、NTM 等等(抗藥性議題)。(四)含氯化合物對於土壤及地下水的污染在台灣有許多地方被環保署列管，而在微生物中許多種類可以對含氯汙染物進行降解，因此本研究室亦針對汙染物生物整治這部分有申請環保署相關計畫進行，也透過與廠商間的合作，進行汙染物現地整治技術開發(環境應用微生物)。(五)生物多樣性是目前生態保育上相當重要的課題，而微生物多樣性被發現對於整體元素循環及環境生態有著相當重要的角色，透過微生物生態分析可以了解各種環境中的微生物組成外，亦可發現對於生態整治有利之菌種，可做為未來微生物應用之參考。因此，本研究室在環境微生物的主要研究方向為：

1. **致病性微生物(寄生蟲、細菌、病毒)的溯源分析**

   主要透過臨床上顯著從環境中感染的病原體，進行病原體檢測與調查，釐清可能傳播途徑，及其病原體毒性、基因特性及抗藥性等資訊，可做為臨床用藥上之參考，也可以提供疾病管控及預防措施之建議。

2. **環境/臨床中致病性微生物的毒力與致病性測試**

   主要利用細胞培養模式探討致病性微生物與宿主細胞交互作用時，病原菌對於宿主細胞內的發炎或免疫反應，透過這些交互作用試驗，探討環境中與臨床上致病性微生物的致病性差異。

3. **細菌抗藥性與抗藥基因汙染議題**

   主要利用分子生物學、抗生素試驗及高通量定序方法研究環境中/臨床上的致病性微生物抗藥性問題及抗藥性基因汙染議題，並著重於廢水及各類水體中抗藥性基因的汙染問題，透過高通量定序技術，進行整體環境汙染評估，以利於提供相關公共衛生政策防治之參考。

4. **人類微生物組分析**

   人類微生物組是人體第二大基因庫，且被認為與許多疾病或免疫調控息息相關，本研究室著重在人類腸道菌群及口腔菌群對於各類疾病的關聯性分析，透過高通量定序技術，從菌像組成及生物資訊分析，了解菌群在不同族群/疾病間是否有差異，並透過後續益生菌或抗生素使用，在動物或細胞實驗中驗證相關機制，提供不同預防或治療方式。此外，微生物並可作為相關疾病復發或誘發之參考指標，本研究團隊亦期望從菌群中找出相關菌群可作為疾病初判之生物性指標(Biomarker)。

5. **微生物多樣性**

   本研究室除了臨床致病性微生物外，針對各類環境中為生物多樣性，亦透過高通量定序技術進行探討，包含從濕地、原始林、特殊地質環境等進行菌群組成分析，並與該環境中化學元素循環進行探討，期望可提供台灣本身為生物多樣性資訊，並探討其應用價值。

6. **微生物環境整治技術開發**

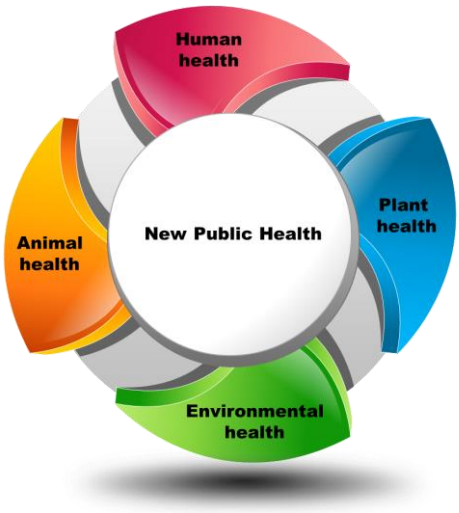
   本實驗室與中正大學地球與環境科學系合作，進行含氯污染場址生物整治技術開發，透過分子生物技術了解含氯污染場址中微生物組成其相關代謝基因，並透過菌群篩選及蛋白質分析，了解菌群對氯化物降解能力及其喜好生存條件，透過改善當地營養基質，開發現地整治技術，加速污染場址整治速率。

7. **生物氣膠研究**

空氣中除了微塵外，微生物附著在這些微塵中時有所見，其中以金黃色葡萄球菌最為常見，在圖書館等室內環境中，台灣的研究指出有許多金黃色葡萄球菌存在，且有抗藥性問題，本研究團隊針對養雞場周遭空氣進行研究亦發現耐甲氧西林金黃色葡萄球菌的存在，故針對空氣健康亦是本研究團隊的重點項目之一。

8. **One Health 相關研究**

健康一體(One Health)是一個跨領域學科整合的科學概念(下圖)，主要其最終目標是實現最佳的公共衛生與健康，而其概念是健康並非只考量單一面向，而是認知健康需要從到人、動物、植物及環境間的相互聯繫與交互作用多面向的考量，才可以提供更好的策略實現健康一體。本研究室將透過 7 類議題進行相關研究，包括(1) 臨床常見感染性病原體之健康一體研究，主要包含腹瀉性病原體(諾羅病毒、腺病毒、副溶血性弧菌、仙人掌桿菌群等)、人畜共通傳染病原體(沙門氏桿菌、產氣單胞菌、微孢子蟲)及新興性感染性病原體。(2) 老年/院感醫學常見病原體(ESKAPE pathogens)從醫療院所到安養中心整體環境研究，包含周遭可能汙染來源之生物氣膠研究。(3)手術房，術後感染症之病原體朔源分析與抗藥性分析。(4)抗藥性菌株議題，及抗藥性基因元組基因體研究。(5) QMRA 分析，以諾羅病毒、腺病毒、副溶血性弧菌為主。(6)食品安全研究，以(一)農產品、農田、農夫及灌溉用水，(二)養殖水產、養殖水、養殖周遭環境及養殖業者為健康一體的研究範疇。(7)用水安全，從水庫、自來水廠、溪流、居家用水、畜牧廢水、民生廢水、廢水處理場排放水等進行整體研究。



9. **電腦拓樸影像分析及資料分析**

本研究室與美國北卡羅萊納州立大學 Greensboro 校區應數系鍾佑民教授合作，進行相關醫學影像與大數據資料透過電腦拓樸學進行數據分析，期望透過深度學習或機器學習，進行人工智慧判斷系統之建立，並從電腦拓樸分析提供更有力之依據，協助判斷介於臨界值或較易誤判之影像進行進一步分析與探討。

➢ 研究室成員 (研究助理請標明)

1. 李堃慈(研究助理)
2. 盧儀婷(研究助理)
3. 陳育玟(研究助理)

➢ 實驗室設備與研究技術 (選)

1. 離心機
2. 恆溫循環水浴槽
3. 乾浴槽
4. 培養箱
5. PCR
6. qPCR
7. 水平迴轉振盪器及混合器
8. 電子天平
9. 加熱攪拌器
10. 核酸電泳槽
11. 厭氧缸
12. Nanopore MK1C sequencing machine

研究技術：細菌培養、分子基因表現檢測、聚合酶鏈鎖反應、基因 cloning、抗藥性基因分析、高通量定序技術、生物資訊分析、AI 影像分析、蛋白質體學…

➢ **近五年研究計畫**

計畫名稱	計畫主持人	補助單位	執行期間
利用第三代定序系統結合 PMA 染劑解構環境/臨床上菌群抗藥性與抗藥基因問題	陳榮盛(義大)	國科會	2022/08-2024/07
致病性微孢子蟲環境生態多樣性、臨床應用與感染風險評估之整合型研究	陳榮盛(義大)	國科會	2021/08-2023/07
鳳梨廢棄物中酵素及萃取物資源化應用及其抗氧化與細胞抗發炎能力分析	許晃慕(中正) 陳榮盛(義大)	國科會	2022/11-2023/10
虛擬病人教案訓練對國際醫學生全人醫學教育成果的探討	黃如蕙(義大) 陳榮盛(義大)	國科會	2022/08-2023/07
以多源基因體學探討廢水微生物與病毒群落對抗藥性基因豐度動態之影響及建構系統動力學模型:以抗藥性金黃色葡萄球菌為例	萬民濤(中正) 許晃慕(中正) 陳榮盛(義大)	國科會	2022/08-2023/07
結合電化學及營養物選殖生物刺激複合技術進行含氯有機物污染場址之整治效能評析	許晃慕(中正) 陳榮盛(義大) 黃世偉(正修)	環保署	2022/07-2023/06
含氯污染場址之現地微生物整治技術開發與本土菌群篩選	許晃慕(中正) 陳榮盛(義大) 黃世偉(正修)	環保署	2021/03-2022/01
含氯污染場址之微生物代謝分析與評估	許晃慕(中正) 陳榮盛(義大) 黃世偉(正修)	環保署	2020/02-2020/12

抗藥性細菌分佈及抗藥性基因組分析解構不同水體環境中抗藥性流布與污染議題	王竣令(成大) 陳榮盛(義大)	國科會	2021/08-2023/07
亞洲大學附屬醫院與長照機構間之 Azole 抗藥性煙麴黴菌 (*Aspergillus fumigatus*) 之流布與抗藥性相似性研究	林意卿(亞大) 許禺慕(中正) 陳榮盛(義大)	亞大醫院	2021/08-2022/07
腸微孢子蟲之盛行率調查	黃如蕙(義大) 陳榮盛(義大)	義大醫院	2022/02-2023/01
梗塞性腦中風病人心房顫動之有對於糞便微生物從與血液生化之影響	李剛伯(義大) 陳榮盛(義大)	義大醫院	2022/02-2023/01
居家冷氣空調中黴漿菌檢測與菌群組成分析	吳建儀(義大) 陳榮盛(義大)	義大醫院	2022/02-2023/01
大腸癌病患術後之使用口服益生菌之糞便微生物菌群變化探討	陳興保(義大) 陳榮盛(義大)	義大醫院	2022/02-2023/01
健康老化指標之內在能力與人體腸道菌相之相關性研究	黃繼賢(義大) 陳榮盛(義大)	義大醫院	2022/02-2023/01
台灣毒蛇口腔/皮膚/毒液之細菌微生物菌群調查與棲地細菌微生物關聯性分析-蛇咬傷細菌感染之治療參考	蘇泓源(義大) 陳榮盛(義大)	義大醫院	2022/02-2023/01
認知功能減退病患之腸道菌群組成與認知量表之多元統計分析	蕭柏煜(義大) 陳榮盛(義大)	義大醫院	2022/02-2023/01

➢ 近五年研究成果

【#共同第一作者(equal contribution); *通訊作者(Corresponding author)】

1. **Jung-Sheng Chen**, Bashir Hussain, Hsin-Chi Tsai, Viji Nagarajan, Suprokash Koner, Bing-Mu Hsu (2023, Jan.) Analysis and interpretation of hot springs water, biofilms, and sediment bacterial community profiling and their metabolic potential in the area of Taiwan geothermal ecosystem. **Science of The Total Environment** (SCI, 26/279 Environmental science) (**Journal IF:10.754**) PubMed: 6181827 **本人為第一作者**
2. Suprokash Koner, **Jung-Sheng Chen**[#], Jagat Rathod, Bashir Hussain, and Bing-Mu Hsu (2022, Nov.) Unravelling the ultramafic rock-driven serpentine soil formation leading to the geo-accumulation of heavy metals: An impact on the resident microbiome, biogeochemical cycling and acclimatized eco-physiological profiles. ***Environmental Research*** (SCI, 37/279 Environmental science) (**Journal IF:8.431**) PubMed: 35810813 **本人為等同第一作者**
3. Viji Nagarajan, Hsin-Chi Tsai, **Jung-Sheng Chen**, Suprokash Koner, Rajendran Senthil Kumar, Hung-Chun Chao, and Bing-Mu Hsu (2023, Jan.) Systematic assessment of mineral distribution and diversity of microbial communities and its interactions in the Taiwan subduction zone of mud volcanoes. ***Environmental Research*** (SCI, 37/279 Environmental science) (**Journal IF:8.431**) PubMed:36228688
4. Suprokash Koner, Hsin-Chi Tsai, **Jung-Sheng Chen**[#], Bashir Hussain, Rajendran Senthil Kumar and Bing-Mu Hsu (2022, Nov.) Exploration of pristine plate-tectonic plains and mining exposure areas for indigenous microbial communities and its impact on the mineral-microbial geochemical weathering process in ultramafic setting. ***Environmental Research*** (SCI, 37/279 Environmental science) (**Journal**

IF:8.431) PubMed: 35810813 **本人為等同第一作者**

5. Chao-Ying Chen, **Jung-Sheng Chen**#, Chung-Ying Lin, Ray C. Hsiao, Ching-Shu Tsai, and Cheng-Fang Yen (2022, Oct.) Difficulties in Managing Children's Learning among Caregivers of Children with Attention-Deficit/Hyperactivity Disorder during the COVID-19 Pandemic in Taiwan: Association with Worsened Behavioral and Emotional Symptoms. ***International Journal of Environmental Research and Public Health*** (SCI/SSCI, 45/182 Public, Environmental, & Occupational Health) (**Journal IF:4.614**) **本人為等同第一作者**
6. Kang-Po Lee, **Jung-Sheng Chen**, Chih-Yuan Wang (2022, Oct.) Association between diabetes mellitus and post-stroke cognitive impairment. ***Journal of Diabetes Investigation*** (SCI, 84/146 ENDOCRINOLOGY & METABOLISM) (**Journal IF:3.681**)
7. Chin-Shiang Tsai, Ya-Lien Cheng, **Jung-Sheng Chen**, Pei-Jane Tsai, Bo-Yang Tsai, Bing-Mu Hsu, I-Hsiu Huang (2022, Oct.) Hypervirulent Clostridioides difficile RT078 lineage isolates from the river: a potential reservoir for environmental transmission. ***Journal of Microbiology, Immunology and Infection*** (SCI, 15/95 Infectious Diseases) (**IF: 10.273**)
8. Wei Liu; **Jung-Sheng Chen**; Wan Ying Gan; Wai Chuen Poon; Serene En Hui Tung; Ling Jun Lee; Ping Xu; I-Hua Chen; Mark D. Griffiths; Chung-Ying Lin (2022, Sep.) Associations of Problematic Internet Use, Weight-Related Self-Stigma, and Nomophobia with Physical Activity: Findings from Mainland China, Taiwan, and Malaysia. ***International Journal of Environmental Research and Public Health*** (SCI/SSCI, 45/182 Public, Environmental, & Occupational Health) (**Journal IF:4.614**)
9. Serene En Hui Tung, Wan Ying Gan, **Jung-Sheng Chen**, Ruckwongpatr Kamolthip, Iqbal Pramukti, Siti R. Nadhiroh, Yen-Ling Chang, Chien-Chin Lin, Amir H. Pakpour, Chung-Ying Lin, and Mark D. Griffiths (2022, Sep.) Internet-Related Instruments (Bergen Social Media Addiction Scale, Smartphone Application-Based Addiction Scale, Internet Gaming Disorder Scale-Short Form, and Nomophobia Questionnaire) and Their Associations with Distress among Malaysian University Students. ***Healthcare*** (SCI/SSCI, 35/88 HEALTH POLICY & SERVICES) (**Journal IF:3.16**)
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