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► 高雄醫學大學 114 年度青年傑出研究獎

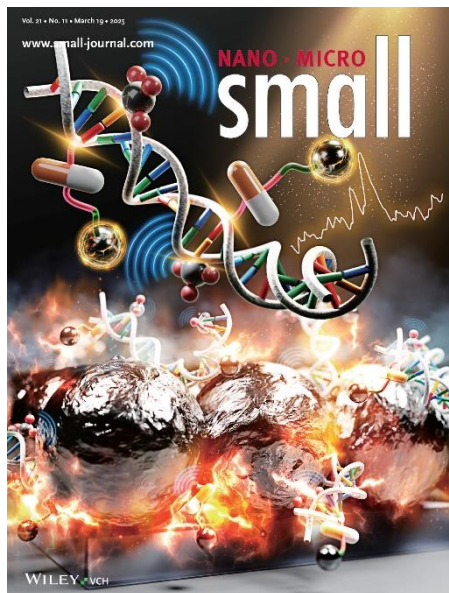
► 高雄醫學大學 114 年度研究績優教師

-優秀論文獎

► 高雄醫學大學 114 年度

-研究成果績優獎年輕教師組

創新奈米生醫實驗室運用尖端奈米技術開發新穎性策略應用於解決當代醫學難題。今年，我們成功開發胺基酸修飾的氧化銅電極用於酮體代謝物的檢測(*Langmuir*, 2025)。也利用催化性奈米材料開發可供應氧氣與一氧化氮的傷口藥物(*ACS Appl. Bio Mater.*, 2025)。此外，我與岡本老師合作所完成的微脂體誘導膜交換技術也被發表在指標性期刊(*Nano Today*, 2025)，並沿用該技術與葉晨聖老師合作開發電活性膜包覆奈米粒子用於腫瘤治療(*Nat. Commun.*, 2025)，該研究採用我們獨家的電活性囊泡，我們也持續合作利用電活性膜增強奈米粒子進行細胞凋亡的偵測(*Adv. Mater.*, 2025)，相關技術也獲選 2025 未來科技獎。值得一提的是，我們也利用微脂體誘導膜交換技術產生乳癌標靶囊泡並展現出色的腫瘤標靶性，並以此為一個全新的起點開發更多種類之腫瘤標靶性囊泡用於增強現今標靶治療的療效。除此之外，我也與系上陳嘉祥老師合作開發聚集增強螢光淬滅的細菌檢測技術(*J. Mater. Chem. B*, 2024)，目前該技術已取得美國臨時案專利並與進行產學處的 Spark 計畫。另外我也主導與簡儀欣老師合作開發可精準富集目標基因片段並結合基因加合奈米銀進行基因的甲基化偵測，該成果已發表在 *Small* (2025) 並選為當期封面。未來我會持續研發新世代奈米藥物與疾病檢測方法，並為我國相關產業的發展與應用貢獻一份心力。





【具體成果】

● 獲獎

1. 高雄醫學大學 114 年度 青年傑出研究獎
2. 高雄醫學大學 114 年度 研究績優教師-優秀論文獎
3. 高雄醫學大學 114 年度 研究績優教師-研究成果績優獎年輕教師組
4. 國科會 2025 未來科技獎 讓癌細胞自滅的黑科技！「癌細胞斷電」技術
(共同主持人)

● 114 年度代表性論文

1. *Journal of Materials Chemistry B*, **2024**, 12, 10028-10040.
2. *Small*, **2025**, 2407517. (selected as the front cover)
3. *Nano Today*, **2025**, 102630.
4. *Advanced Materials*, **2025**, 2417950.
5. *Nature Communications*, **2025**, 16, 3253.
6. *ACS Applied Bio Materials*, **2025**, 8, 7616-7627.
7. *Langmuir*, **2025**, 19, 12022-12029. (selected as the supplementary cover)

● 國際合作

1. 與 Akihiro Okamoto 教授(National Institute for Materials Science, Japan)的學術合作。
2. 與 Oh Seok Kwon 教授(Sungkyunkwan University, Korea)的學術合作。

● 產學專利申請

1. 微脂體融合誘導腫瘤標靶性囊泡的生產與其應用。(PCT 申請中)
2. 奈米石墨烯嵌入聚合物體進行聚集誘導螢光減弱介導的病原體檢測應用。
(PCT 申請中)
3. 透過奈米銀加合物促進表面增強拉曼散射精確檢測磁分離腫瘤抑制基因的甲基化程度。(PCT 申請中)



【研究團隊】

團隊成員：李偉鵬、王文君、Shubham Singh、Pooja Aich、鄭家宜、羅定棋、徐枋宜、陳佳歆

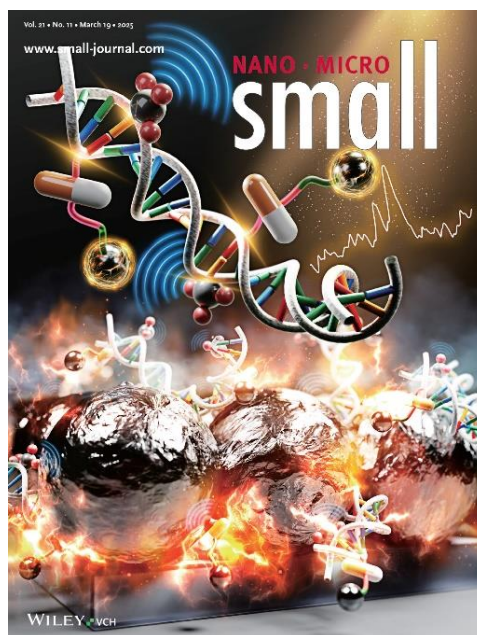
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團隊簡介：創新奈米生醫研究團隊始於 2020 年，本團隊致力於結合奈米科技與微生物電化學技術來開發新穎性醫學方法，用於解決當代具挑戰性的醫學難題，目前的發展方向包含各類疾病的治療、個人化生醫檢測與微生物電池系統等。

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The Innovative Nanomedicine Laboratory applies advanced nanotechnology to tackle contemporary medical challenges through creative material design and interdisciplinary collaboration. This year, we developed an amino acid-modified copper oxide electrode for ketone metabolite detection (*Langmuir*, 2025) and catalytic nanomaterials capable of releasing oxygen and nitric oxide to promote wound healing (*ACS Appl. Bio Mater.*, 2025). In collaboration with Prof. Akihiro Okamoto, our team established the liposome fusion-induced membrane exchange (LIME) platform for large-scale production of functional extracellular vesicles, published in *Nano Today* (2025). Building on this, we worked with Prof. Chen-Sheng Yeh to create electroactive membrane-coated nanoparticles for tumor therapy (*Nat. Commun.*, 2025) and applied similar electroactive vesicles for apoptosis detection (*Adv. Mater.*, 2025), earning the 2025 Future Tech Award. We further developed breast cancer-targeting vesicles with excellent tumor specificity, opening new avenues for next-generation targeted therapies. In parallel, we collaborated with Prof. Chia-Hsiang Chen on a fluorescence-quenching bacterial detection system (*J. Mater. Chem. B*, 2024), which received U.S. provisional patent protection and KMU Spark Program support. Together with Prof. Yi-Hsin Chien, we also reported a gene methylation detection method, featured as a *Small* (2025) cover article. Our ongoing mission is to pioneer next-generation nanomedicines and diagnostic technologies, advancing Taiwan's biomedical innovation.





【Concrete Results】

● Awards

1. Young Outstanding Research Award, Kaohsiung Medical University, 2025.
2. Excellence in Paper Award, Kaohsiung Medical University, 2025.
3. Excellence in Research Achievement Award (Young Faculty Group), Kaohsiung Medical University, 2025.
4. NSTC 2025 Future Tech Award (Co-PI)

● Representative Publications in Recent 1 Year

1. *Journal of Materials Chemistry B*, **2024**, 12, 10028-10040.
2. *Small*, **2025**, 2407517. (selected as the front cover)
3. *Nano Today*, **2025**, 102630.
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● International Collaborations

1. International collaboration with Prof. Akihiro Okamoto (National Institute for Materials Science, Japan).
2. International collaboration with Prof. Oh Seok Kwon (Sungkyunkwan University, Korea).

● Patents

1. Liposome Fusion-Induced Tumor-Targeting Vesicles Production and Its Applications (PCT)
2. Aggregation-Induced Emission Silence-Mediated Pathogen Detection Using a Rapidly Degradable Nanographenes-Embedded Polymersome (PCT)
3. Precise Methylation Detection of Magnetically Isolated Tumor Suppressor Genes by Nano Silver Adduct–Promoted Surface-Enhanced Raman Scattering (PCT)



【Research Team】

Team Member: Wei-Peng Li 、 Wen-Jyun Wang 、 Shubham Singh 、 Pooja Aich 、
Chia-Yi Cheng 、 Ting-Chi Lo 、 Fang-Yi Hsu 、 Jia-Sin Chen

<https://mao22913521.wixsite.com/kmuc-nano-lab>

Overview: The Innovative Nanomedicine Laboratory, established in 2020, integrates nanotechnologies with microbial electrochemistry to develop novel medical solutions for contemporary challenges. Our current focus includes the development of advanced treatments for various diseases, personalized biosensors, and microbial battery systems.

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