

趙敏吾

Min-Wu Chao

國立中山大學醫學院

學士後醫學系 (助理教授)

College of Medicine, National Sun Yat-sen University

School of Medicine (Assistant Professor)

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Office:(IL9005)

TEL:(0)5252000 ext.(7316)

E-mail: mwchao@mail.nsysu.edu.tw

現職/ Current Position

- 國立中山大學學士後醫學系 (助理教授)
School of Medicine, College of Medicine, National Sun Yat-sen University, Taiwan (Assistant Professor)
- 國立中山大學生技醫藥研究所 (合聘助理教授)
Institute of BioPharmaceutical, College of Medicine, National Sun Yat-sen University (Jointly Appointed Assistant Professor)
- 國立中山大學精準醫學研究所 (合聘助理教授)
Institute of Precision Medicine, College of Medicine, National Sun Yat-sen University (Jointly Appointed Assistant Professor)

學歷/ Education

國立臺灣大學藥理學科暨研究所 博士

Ph.D., Department and Graduate Institute of Pharmacology, National Taiwan University

國立臺灣大學藥理學科暨研究所 碩士

MS., Department and Graduate Institute of Pharmacology, National Taiwan University

高雄醫學大學藥學系學士

BS., Pharmacy, Kaohsiung Medical University

專長/ Expertise

藥物研發與開發 Drug discovery and development

癌症生物學 Cancer biology

藥理學 Pharmacology

毒理學 Toxicology

專科執照/ Professional Certifications

藥師執照 Pharmacist

經歷/ Professional Experience

國立中山大學臨床醫學科學博士學位學程 合聘助理教授

Jointly Appointed Assistant Professor, Doctoral Program of Clinical and Experimental Medicine, College of Medicine, National Sun Yat-sen University

台灣美國柏克萊大學公衛學院國際新創加速器計畫

Taiwan-Berkeley Health Innovations Accelerator- Berkeley Public Health Program, University of California, Berkeley, USA

國立臺灣大學藥學系 博士後研究員

Post-Doctoral Fellow, School of Pharmacy, National Taiwan University,

國立臺北醫學大學癌症生物學與藥物研發博士學位學程 博士後研究員

Post-Doctoral Fellow, The Ph.D. Program for Cancer Molecular Biology and Drug Discovery, Taipei Medical University, Taipei, Taiwan

美國俄亥俄州州立大學 訪問學者

Visiting Scholar, The Ohio State University, Columbus, OH, USA

學術榮譽/ Academic Honors

- 111, 112, 113 學年度國立中山大學新進人員獎勵
- 第 21 屆國家新創獎
- 國家新創獎 2022 年度精進績獎
- 2021 科技部未來科技獎
- 國家新創獎 2021 年度精進績獎
- 第 17 屆國家新創獎
- 波士頓的國際生醫加速器 Smartlabs Innovation Challenge 獲選團隊
- 生醫新創募資媒合會議 (RESI) 第二名
- 國際生醫加速器合作計畫 NBRP Biomed Startup Challenge 獲選團隊
- 臺北醫學大學傑出博士後研究獎
- 臺北醫學大學研究論文獎
- 杜聰明博士優秀論文獎
- 科技部千里馬計畫
- New Faculty Award at National Sun Yat-sen University for the Academic Years 2022, 2023, and 2024

- The 21st National Innovation Award
- 2022 National Innovation Award Advanced Continuation Award
- 2021 Ministry of Science & Technology Future Tech Award
- 2021 National Innovation Award Advanced Continuation Award
- The 17th National Innovation Award
- SmartLabs Innovation Challenge
- RESI Conference 2nd Winner Award
- NBRP Biomed Startup Challenge
- Taipei Medical University (TMU) Outstanding Postdoctoral Award
- Taipei Medical University (TMU) Student Paper Award
- Doctoral Outstanding Research, the Tsung-Ming Tu Award
- Graduate Student Study Abroad Program (GSSAP) Scholarship

教學榮譽/ Teaching Honors

國立中山大學教學優良課程

113-1 學年度：基礎藥理學(GEAI1904)、新藥開發(GEAI1902)、癌症治療(全英, GEAI1965)

112-2 學年度：毒理學概論(GEAI1934)、美容醫學(GEAI1935)

112-1 學年度：基礎藥理學(GEAI1904)、新藥開發(GEAI1902)、聞癌色變：癌症治療(GEAI1955)

111-2 學年度：毒理學概論(GEAI1934)、美容醫學(GEAI1935)、藥物商品化(GEAI1936)

111-1 學年度：基礎藥理學(GEAI1904)、新藥開發(GEAI1902)

110-2 學年度：毒理學(IBPS508)、醫學美容與醫療科技(IBPS515)

Teaching Excellence Courses at National Sun Yat-sen University

113-1: Basic Pharmacology (GEAI1904), Drug Discovery and Drug Development (GEAI1902), Cancer Therapeutics (GEAI1965)

112-2: The Basic Principle of Toxicology (GEAI1934), Aesthetic Medicine (GEAI1935)

112-1: Basic Pharmacology (GEAI1904), Drug Discovery and Drug Development (GEAI1902), Cancer Research and Therapeutics (GEAI1955)

111-2: The Basic Principle of Toxicology (GEAI1934), Aesthetic Medicine (GEAI1935), Drug Commercialization (GEAI1936)

111-1: Basic Pharmacology (GEAI1904), Drug Discovery and Drug Development (GEAI1902)

110-1: Toxic Response of Organs (IBPS508), Aesthetic Medicine and Medical Device (IBPS515)

主持研究計畫(近三年)

國科會

- 開發天然物 MYLK4 抑制劑應用於大腸直腸癌之治療 (NSTC 112-2320-B-110 -002 -MY3) (112/08/01-115/07/31)
- 研發 4E-BP1 抑制劑應用於腎臟癌及探討其機轉 (MOST 111-2320-B-110-005) (111/08/01-112/07/31)

醫院合作計畫

- 國立中山大學/高雄榮民總醫院：以 Pyk2 為標的研發新穎性抑制劑應用於神經膠質母細胞瘤 (KSVNSU-113-005) (113/1/1-113/12/31)

校際合作計畫

- 探討芸香科植物萃取物於治療眼部癌症之潛力 (114-P22) (114/1/1-114/12/31)
- 篩選木犀科植物萃取物於治療視網膜母細胞瘤 (113-P34) (113/1/1-113/12/31)

大專生研究計畫（指導教授）

- 研發 RSK2 抑制劑應用於治療轉移性胰臟癌 (113-2813-C-110-046-B) (113/07/01-114/02/28)

National Science and Technology Council

- Development and natural product targeting MYLK4 for colorectal cancer treatment (NSTC 112-2320-B-110 -002 -MY3) (112/08/01-115/07/31)
- The development and evaluation underlying mechanism of 4E-BP1 inhibitor in renal cancer (MOST 111-2320-B-110-005) (111/08/01-112/07/31)

Collaboration Project with Hospital

- National Sun Yat-sen University/Kaohsiung Veterans General Hospital: Development of novel Pyk2-targeting inhibitors for the treatment of glioblastoma (KSVNSU-113-005) (113/1/1-113/12/31)

Intercollegiate Collaboration Project

- National Sun Yat-sen University/Kaohsiung Medical University: To investigate the anti-retinoblastoma activities of Rutaceae plant extractant H75 (113-P34) (114/1/1-114/12/31)

- National Sun Yat-sen University/Kaohsiung Medical University: The screening of Oleaceae extractant in retinoblastoma treatment (113-P34) (113/1/1-113/12/31)

College Student Research Scholarship (PI)

- Development of RSK2 inhibitors for the treatment of metastatic pancreatic cancer (113-2813-C-110-046-B) (113/07/01-114/02/28)

研究成果目錄/ List of Research Outputs

- 英文期刊論文/ English Journal Articles
- Huang CC, Hsu CM, **Chao MW**, Hsu KC, Lin TE, Yen SC, Tu HJ*, Pan SL*. In silico Identification of a Novel Cdc2-like kinase 2 (CLK2) Inhibitor in Triple Negative Breast Cancer. **Protein Sci.** 2024 Jun;33(6):e5004.
- Lee S*, **Chao MW***, Wu YW, Hsu CM, Lin TE, Hsu KC, Pan SL, Lee HY. Synthesis and evaluation of potent (iso)ellipticine-based inhibitors of MYLK4 accessed via expeditious synthesis from isoquinolin-5-ol. **RSC Adv.** 2023 Oct 30;13(45):31595-31601. (*: Co-First Author)
- Chang CD*, **Chao MW***, Lee HY, Liu YT, Tu HJ, Lien ST, Lin TE, Sung TY, Yen SC, Huang SH, Hsu KC, Pan SL. In silico identification and biological evaluation of a selective MAP4K4 inhibitor against pancreatic cancer. **J Enzyme Inhib Med Chem.** 2023 Dec;38(1):2166039 (*: Co-First Author)
- Yen SC, Wu YW, Huang CC, **Chao MW**, Tu HJ, Chen LC, Lin TE, Sung TY, Tseng HJ, Chu JC, Huang WJ, Yang CR, HuangFu WC, Pan SL, Hsu KC. O-methylated flavonol as a multi-kinase inhibitor of leukemogenic kinases exhibits a potential treatment for acute myeloid leukemia. **Phytomedicine.** 2022 Mar 16;100:154061.
- Lin TE*, **Chao MW***, HuangFu WC, Tu HJ, Peng ZX, Su CJ, Sung TY, Hsieh JH, Lee CC, Yang CR, Pan SL, Hsu KC. Identification and analysis of a selective DYRK1A inhibitor. **Biomed Pharmacother.** 2022 Feb; 146:112580. (*: Co-First Author)
- Wu YW*, **Chao MW***, Tu HJ, Chen LC, Hsu KC, Liou JP, Yang CR, Yen SC, HuangFu WC, Pan SL. A novel dual HDAC and HSP90 inhibitor, MPT0G449, downregulates oncogenic pathways in human acute leukemia in vitro and in vivo. **Oncogenesis.** 2021 May 13;10(5):39. (*: Co-First Author)
- Liu YM*, Tu HJ*, Wu CH*, Lai MJ, Yu SC, **Chao MW**, Wu YW, Teng CM, Pan SL, Liou JP. Ring-opening of five-membered heterocycles conjugated 4-isopropylresorcinol scaffold-based benzamides as HSP90 inhibitors suppressing tumor growth in vitro and in vivo. **Eur J Med Chem.** 2021 Jul 5;219:113428.
- **Chao MW***, Lin Tony*, HuangFu WC, Chang CD, Tu HJ, Chen LC, Yen SC, Sung TY, Huang WJ, Yang CR, Pan SL, Hsu KC. Identification of a dual TAOK1 and MAP4K5 inhibitor using a structure-based virtual screening approach. **J**

Enzyme Inhib Med Chem. 2021 Dec;36(1):98-108. (*: Co-First Author)

- Hsu KC, HuangFu WC, Lin Tony, **Chao MW**, Sung TY, Chen YY, Pan SL, Lee JC, Tzou SC, Sun CM, Yang JM. A Site-Moiety Map and Virtual Screening Approach for Discovery of Novel 5-LOX Inhibitors. **Sci Rep** 2020 Jun 29;10(1):10510.
- Ojha R, Nepali K, Chen CH, Chuang KH, Wu TY, Lin TE, Hsu KC, **Chao MW**, Lai MJ, Lin MH, Huang HL, Chang CD, Pan SL, Chen MC, Liou JP. Isoindoline scaffold-based dual inhibitors of HDAC6 and HSP90 suppressing the growth of lung cancer in vitro and in vivo. **Eur J Med Chem.** 2020 Mar 15;190:112086.
- Mehndiratta S, Lin MH, Wu YW, Chen CH, Wu TY, Chuang KH, **Chao MW**, Chen YY, Pan SL, Chen MC, Liou JP. N-alkyl-hydroxybenzoyl anilide hydroxamates as dual inhibitors of HDAC and HSP90, downregulating IFN- γ induced PD-L1 expression. **Eur J Med Chem.** 2019 Sep 24;185:111725.
- Nepali K, Lin MH, **Chao MW**, Peng SJ, Hsu KC, Eight Lin T, Chen MC, Lai MJ, Pan SL, Liou JP. Amide-tethered quinoline-resorcinol conjugates as a new class of HSP90 inhibitors suppressing the growth of prostate cancer cells. **Bioorg Chem.** 2019 Oct;91:103119.
- **Chao MW**, Chang LH, Tu HJ, Chang CD, Lai MJ, Chen YY, Liou JP, Teng CM, Pan SL. Combination treatment strategy for pancreatic cancer involving the novel HDAC inhibitor MPT0E028 with a MEK inhibitor beyond K-Ras status. **Clin Epigenetics.** 2019 May 29;11(1):85.
- Tu HJ, Lin YJ, **Chao MW**, Sung TY, Wu YW, Chen YY, Lin MH, Liou JP, Pan SL, Yang CR. The anticancer effects of MPT0G211, a novel HDAC6 inhibitor, combined with chemotherapeutic agents in human acute leukemia cells. **Clin Epigenetics.** 2018 Dec 29;10(1):162.
- Lin TE, HuangFu WC, **Chao MW**, Sung TY, Chang CD, Chen YY, Hsieh JH, Tu HJ, Huang HL, Pan SL, Hsu KC. A Novel Selective JAK2 Inhibitor Identified Using Pharmacological Interactions. **Front Pharmacol.** 2018 Dec 4;9:1379.
- **Chao MW**, Huang HL, HuangFu WC, Hsu KC, Liu YM, Wu YW, Lin CF, Chen YL, Lai MJ, Lee HY, Liou JP, Teng CM, Yang CR. An oral quinoline derivative, MPT0B392, causes leukemic cells mitotic arrest and overcomes multidrug resistance of tumor cells. **Oncotarget.** 2017 Apr 25;8(17):27772-27785.
- **Chao MW***, Chen TH*, Huang HL*, Chang YW, HuangFu WC, Lee YC, Teng CM, Pan SL. Lanatoside C, a cardiac glycoside, acts through protein kinase C δ to cause apoptosis of human hepatocellular carcinoma cells. **Sci Rep.** 2017 Apr 7;7:46134. (*: Co-First Author)
- HuangFu WC, **Chao MW**, Cheng CC, Wei YC, Wu YW, Liou JP, Hsiao G, Lee YC, Yang CR. Anti-leukemia effects of the novel synthetic 1-benzylindole derivative 21-900 in vitro and in vivo. **Sci Rep.** 2017 Feb 9;7:42291.
- Wang HY, Chang YL, Cheng CC, **Chao MW**, Lin SI, Pan SL, Hsu CC, Liu TW, Cheng HC, Tseng CP, Liu SJ, Tsai HJ, Chang HY, Hsu JT. Glucocorticoids may compromise the effect of gefitinib in non-small cell lung cancer. **Oncotarget.**

2016 Dec 27;7(52):85917-85928.

- Huang HL, **Chao MW**, Li YC, Chang LH, Chen CH, Chen MC, Cheng CC, Liou JP, Teng CM, Pan SL. MPT0G066, a novel anti-mitotic drug, induces JNK-independent mitotic arrest, JNK-mediated apoptosis, and potentiates antineoplastic effect of cisplatin in ovarian cancer. **Sci Rep**. 2016 Aug 16;6:31664.
- Huang HL*, **Chao MW***, Chen CC, Cheng CC, Chen MC, Lin CF, Liou JP, Teng CM, Pan SL. LTP-1, a novel antimitotic agent and Stat3 inhibitor, inhibits human pancreatic carcinomas in vitro and in vivo. **Sci Rep**. 2016 Jun 9;6:27794. (*: Co-First Author)
- Hsu EC, Kulp SK, Huang HL, Tu HJ, **Chao MW**, Tseng YC, Yang MC, Salunke SB, Sullivan NJ, Chen WC, Zhang J, Teng CM, Fu WM, Sun D, Wicha MS, Shapiro CL, Chen CS.
Integrin-linked kinase as a novel molecular switch of the IL-6-NF- κ B signaling loop in breast cancer. **Carcinogenesis**. 2016 Apr;37(4):430-442.
- Lin SY, Yeh TK, Kuo CC, Song JS, Cheng MF, Liao FY, **Chao MW**, Huang HL, Chen YL, Yang CY, Wu MH, Hsieh CL, Hsiao W, Peng YH, Wu JS, Lin LM, Sun M, Chao YS, Shih C, Wu SY, Pan SL, Hung MS, Ueng SH. Phenyl Benzenesulfonylhydrazides Exhibit Selective Indoleamine 2,3-Dioxygenase Inhibition with Potent in Vivo Pharmacodynamic Activity and Antitumor Efficacy. **J Med Chem**. 2016 Jan 14;59(1):419-30.
- **Chao MW**, Wang LT, Lai CY, Yang XM, Cheng YW, Lee KH, Pan SL, Teng CM. eIF4E binding protein 1 expression is associated with clinical survival outcomes in colorectal cancer. **Oncotarget**. 2015 Sep 15;6(27):24092-104.
- **Chao MW**, Lai MJ, Liou JP, Chang YL, Wang JC, Pan SL, Teng CM. The synergic effect of vincristine and vorinostat in leukemia in vitro and in vivo. **J Hematol Oncol**. 2015 Jul 10;8:82.
- **Chao MW**, Chen CH, Chang YL, Teng CM, Pan SL. α -Tomatine-mediated anti-cancer activity in vitro and in vivo through cell cycle- and caspase-independent pathways. **PLoS One**. 2012;7(9):e44093

● 中文期刊論文/ Chinese Journal Articles

● 研討會論文/ Conference Papers

- A promising MYLK4 Inhibitor for treating metastatic and drug-resistant colorectal cancer. **Chao MW**, Huang MM, Lee S, Hsu KC, Pan SL.
2024 ASCEPT, APFP & APSA Joint Congress (Melbourne, Australia), 2024/12
- Discovery of a novel RSK2 inhibitor for the treatment of metastatic pancreatic cancer via inflammation regulation. Chung CH, Hsu KC, Huang MM, Pan SL, **Chao MW**.

The 38th Joint Annual Conference of Biomedical Science (Taipei, Taiwan),
2024/03

- Combination treatment strategy for pancreatic cancer involving the novel HDAC inhibitor MPT0E028 with a MEK inhibitor beyond K-Ras status. **Chao MW,** Chuang LH, Liou JP, Teng CM, Pan SL.

The 15th Chinese-Taipei Society of Laboratory Animal Sciences (Taipei, Taiwan),
2018/11