



長庚學校財團法人
長庚科技大學
CHANG GUNG UNIVERSITY OF SCIENCE AND TECHNOLOGY



中草藥研究中心
Research Center for Chinese Herbal Medicine

~民生學院校慶系列學術活動~

112 學年度 中醫藥與健康科技研討會

*2024 Conference on Traditional
Medicine and Health Technology*

長庚科技大學 國際會議廳(二)

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16

2024

主辦單位 | 中草藥研究中心

協辦單位 | 食品暨化妝品安全研究中心
健康產業科技研究所



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-民生學院校慶系列活動-
112 學年度中醫藥與健康科技研討會
2024 Conference on Traditional Medicine and Health Technology
研討會議程

時間 TIME	主題 TOPICS	演講人 SPEAKERS
09：00～09：30	報到	
09：30～09：40	開幕典禮，貴賓致辭	
09：40～09：50	大會合照	
主持人：長庚科技大學 中草藥研究中心 張傳馨 助理研究員		
09：50～10：20	The Effect and Mechanism of the Novel Chinese Medicine Therapy (GB-2) for the Potential Prophylaxis of COVID-19	嘉義長庚醫院 吳清源 副教授
10：20～10：50	Innovative Uses of Traditional Chinese Medicine in Scar Prevention Explored Through Bioinformatics	基隆長庚醫院 葉沅杰 助理教授
主持人：長庚科技大學 食品暨化妝品安全研究中心 李昱宗 副助理研究員		
10：50～11：50	超濃縮短講競賽	
11：50～13：00	午餐	
主持人：長庚科技大學 中草藥研究中心 張祐嘉 助理研究員		
13：00～13：30	Combining Basic Research and Clinical Experience to Develop New TCM Products- Taking Chang Gung Health Drink as An Example	林口長庚醫院 黃澤宏 教授
13：30～14：00	Chinese Herbal Medicine Network (CMN), a Platform to Decipher Traditional Chinese Medicine from Real-World Data to Bench Studies	林口長庚醫院 陳星諭 教授
14：00～14：30	Utilization of Complementary and Alternative Medicine among Taiwanese Patients with Pre-End-Stage Renal Disease: A Cross-Sectional Study	高雄長庚醫院 蔡明諺 副教授
主持人：長庚科技大學 食品暨化妝品安全研究中心 邱群惠 副研究員		
14：30～15：30	口頭報告競賽	
15：30～16：00	茶敘/壁報展示及研究中心成果發表	
16：00～16：30	頒獎	
16：30	賦歸	

主辦單位：中草藥研究中心；協辦單位：食品暨化妝品安全研究中心/健康產業科技研究所

專題演講

-民生學院校慶系列學術活動- 112 學年度中醫藥與健康科技研討會 Conference on Traditional Medicine and Health Technology

主持人簡歷

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新光吳火獅紀念醫院腫瘤治療科-博士後研究員
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研究專長領域

腫瘤免疫學、新藥研發、毒理學、轉譯醫學、精神免疫學、疾病風險評估

重要論文發表

1. Chien, C. C., **Chang, C. H.**, Ting, H. M. (2024) A novel lectin receptor kinase gene, AtG-LecRK-I. 2, enhances bacterial pathogen resistance through regulation of stomatal immunity in Arabidopsis. *Plant Science* 18, 112071.
2. Lee, T. H., Chen, J. L., **Chang, C. H.**, Tsai, M. M., Tseng, H. C., Chang, Y. C., Hsieh, H. L. (2024) A Brain-Protective Sterol from Soft Coral Inhibits Lipopolysaccharide-Induced Matrix Metalloproteinase-9-Mediated Astrocytic Migration. *Biomedicines* 19, 12(1), 226.
3. Hwang, T. L., **Chang, C. H.** (2023) Oridonin enhances cytotoxic activity of natural killer cells against lung cancer. *Int Immunopharmacol.* 20, 122, 110669.
4. Chen, Y. X., **Chang, C. H.**, Li, C. W., Chen, J. J., Shih, T. L. (2023) Design, synthesis and evaluation of 1,2,3-triazole-based benzenesulfonamide and flavonol hybrid molecules as anticancer agents. *J. Chin. Chem. Soc.* 70(10), 1924-1936.
5. **Chang, C. H.**, Chang, Y. C. (2022) Comparing the Therapeutic Efficacies of Lung Cancer: Network Meta-Analysis Approaches. *Int. J. Environ. Res. Public. Health*, 19(21), 14324.

重要獲獎或其他

- 中華民國斐陶斐榮譽學會 97 年榮譽會員

演講者

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Chinese Medicine, Cellular oncology, Cell Signaling, Cell Biology



The effect and mechanism of the Novel Chinese medicine therapy (GB-2) for the potential prophylaxis of COVID-19

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The COVID-19 pandemic has infected over a billion people and caused more than millions deaths worldwide. SARS-CoV-2, the virus responsible for COVID-19, enters human cells through an interaction between its spike glycoprotein and the angiotensin-converting enzyme 2 (ACE2) and transmembrane protease, serine 2 (TMPRSS2) receptors, which are abundantly expressed in the oral mucosa. Although most anti-COVID-19 vaccines target the spike glycoprotein, some variants of concern (VOCs) have reduced the effectiveness of these vaccines. An alternative strategy is to decrease the expression of ACE2 and TMPRSS2 on human cells, which could be effective against both non-mutated and mutated SARS-CoV-2 strains. GB-2 oral protection solution, derived from a Taiwanese herbal formula, has been shown to reduce ACE2 and TMPRSS2 protein expression in vitro and in vivo without cytotoxic or adverse effects. Additionally, GB-2 can abolish the interaction between human ACE2 and the spike protein of both the Wuhan type and VOCs. In a clinical trial, GB-2 significantly inhibited ACE2 and TMPRSS2 expression in human oral mucosa cells without side effects through oral washing. GB-2 is the first research-proven anti-COVID-19 oral protection solution that is all-natural, highly effective, topically applied, safe, and well-accepted. The potential commercial profit generated by GB-2 is expected to be substantial, given the ongoing need for epidemic prevention measures. As an innovative approach to combating SARS-CoV-2 infection, GB-2 represents a promising alternative to current vaccination strategies and warrants further investigation.

Keywords: SARS-CoV-2; spike protein; ACE2; omicron variant; mouth washing; TMPRSS2

演講者

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Herbal medicine, Immunology, Dermatology, Oncology, Pediatrics



Innovative Uses of Traditional Chinese Medicine in Scar Prevention Explored Through Bioinformatics

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In the era of big data and precision medicine, employing bioinformatics to identify specific Traditional Chinese Medicines (TCMs) for targeted disease treatment is increasingly popular. This study builds on previous research to explore the potential of bioinformatics in identifying TCMs effective against scarring. It proposes that topical TCM formulations can be optimized based on their efficacy in different scar regions, which display unique pathological features. Despite the ongoing positive feedback loop within hypertrophic scar/keloid tissues, the synergistic molecular interactions between the peripheral (P) and central (C) scar areas are not well understood. These regions are clinically and pathologically distinct, with preliminary data suggesting varied TCM drug sensitivities. To substantiate our theories, we utilized *ex vivo* and *in vivo* models to dissect the molecular basis of scar variability and the therapeutic impact of TCMs. Early results indicate that the selected TCMs have distinct anti-scar properties across different models, supporting this method as a more precise strategy for developing novel anti-scar TCM formulations.

Keywords: bioinformatics; traditional Chinese medicine; keloid; hypertrophic scar; EN-1; asporin

-民生學院校慶系列學術活動- 112 學年度中醫藥與健康科技研討會 Conference on Traditional Medicine and Health Technology

主持人簡歷

——張祐嘉——



相關工作經驗

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長庚科技大學中草藥研究中心 博士後研究員
風行海洋(股)有限公司 Raise 計畫研究員
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研究專長領域

天然藥物化學、活性成分分離分析與結構鑑定、藥物/保健品/妝品原料開發、萃取製成設計

重要論文發表

1. Kuo, F. W., **Chang, Y. C.**, Li, H. H. (2022) Water-insoluble black pigment released from the octocoral *Sinularia flexibilis*. *Appl. Sci.* 2022, 12(16), 8012.
2. Phan, G. H., Tsai, Y. C., Liu, Y. H., Fang, L. S., Wen, Z. H., Hwang, T. L., **Chang, Y. C.***, Sung, P.-J.* (2021) Sterol constituents from a cultured octocoral *Sinularia sandensis* (Verseveldt 1977). *J. Mol. Struct.*, 1246, 131175.
3. **Chang, Y. C.**, Chiang, C. C., Chang, Y. S., Chen, J. J., Wang, W. H., Fang, L. S., Chung, H. M., Hwang, T. L., Sung, P. J. (2020) Novel Caryophyllane-Related Sesquiterpenoids with Anti-Inflammatory Activity from *Rumphella antipathes* (Linnaeus, 1758) *Mar. Drugs*, 18, 554.
4. **Chang, Y. C.**; Lai, K. H.; Kumar, S.; Chen, P. J.; Wu, Y. H.; Lai, C. L.; Hsieh, H. L.; Sung, P. J.; Hwang, T. L. (2020) 1H NMR-based isolation of anti-inflammatory 9,11-secosteroids from the octocoral *Sinularia leptoclados*. *Mar. Drugs*, 18(5), 271.

重要獲獎或其他

1. 2023 第二十屆國家新創獎學研新創生技製藥與精準醫療組「開發臺灣原生種藥用植物臺灣白及作為治療高血糖的植物藥物」
2. 2022 台灣創新技術博覽會發明競賽銀獎
3. 2021 中山醫學大學110學年度的生物醫學系學術類傑出系友獎
4. 2017 第二十屆莫斯科阿基米德國際發明展金牌及大會特別獎「Crystal Ocean」
5. 2016 第十三屆國家新創獎農業及食品生技組「人工繁殖台灣軟珊瑚發展藥妝產品(珊瑚晶粹)」

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■ Expertise

Chinese medicine, Acupuncture, The integration of modern and traditional
medicine to preserve one's health.





Combining basic research and clinical experience to develop new TCM products- Taking Chang Gung Health Drink as an example

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The pathogenesis of fatty liver disease was recognized to be mediated by multiple-hit mechanisms, such as alcohol/fatty acids metabolic abnormality, hepatic steatosis, mitochondrial dysfunction in hepatocytes, oxidative stress, inflammasome formation, hepatic immunity-mediated inflammation and liver fibrogenesis. Despite extensive studies of alcoholic/nonalcoholic steatohepatitis are well-established, there is no an accepted therapeutic strategy to halt or reverse this process in human. Chang-Gung health formula (CGW3) is the herbal formula, which had the multiple functions, included liver protection, anti-inflammation and enhancement of renal function according to traditional Chinese medicine prescription. Our preliminary results show that compared with the Lieber-DeCarli Regular Control feed mice group, mice which were fed with the Lieber-DeCarli liquid alcohol diet presented (1) the body weight decreased significantly, (2) the mortality increased, (3) liver lesions occurred, such as the generation of fat-like deposits vacuoles and inflammation, (4) thinning of the intestinal wall and destruction of villous tissue, and (5) increased blood alcohol concentration.

Keywords: Chang Gung Health Drink; liver protection; anti-inflammation; renal function

演講者

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■ Expertise

Evidence-based medicine on the traditional Chinese medicine, Network/system pharmacology, translation medicine



Chinese herbal medicine network (CMN), a platform to decipher traditional Chinese medicine from real-world data to bench studies

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In the complex realm of traditional Chinese medicine (TCM), practitioners have access to a vast array of prescriptions composed of numerous herbal combinations. The challenge of navigating this extensive array to identify core prescriptions that are effective across various diseases has prompted the need for advanced computational techniques due to the large size of the available datasets. Our research team has harnessed these technologies to focus on the treatment of common skin and gynecological conditions, enabling the identification of effective treatment maps and core prescriptions for ailments such as chronic eczema, urticaria, atopic dermatitis, acne, menopausal syndrome, primary dysmenorrhea, endometriosis, and premenstrual syndrome. These findings have been recognized in significant journals of alternative medicine.

The efficacy of these core prescriptions was further validated through clinical trials, which not only confirmed their effectiveness but also provided insights into their potential impacts, including the reduction in steroid usage for atopic dermatitis. This reduction underscores TCM's potential to alter conventional treatment paradigms, especially in dermatological applications. Our research expanded under the auspices of multi-year projects funded by the Ministry of Science and Technology. These projects include studies such as "The Mechanistic Study of Astragalus in Treating Diabetic Nephropathy Podocyte Pathology," "Innovative Big Data TCM Treatment Maps"—a platform for analyzing massive TCM prescription data from Taiwan's National Health Insurance Database—and a project focused on improving fatty liver conditions through the modulation of fat metabolism with herbal medicine. These studies applied

sophisticated analytical techniques to investigate major diseases like diabetic kidney disease, renal failure, metabolic diseases, and cancer.

Over 20 research papers have been produced, delving into various aspects such as the long-term effects of TCM on diabetic nephropathy, network analysis of herbal medicines, and the effectiveness of nutritional therapy in pre-renal failure diabetic nephropathy patients. These studies have shown that core prescriptions often offer a better prognosis than non-core alternatives. Further, by integrating with other medical specialties, our team has been able to conduct comprehensive analyses of TCM's role in treating and understanding kidney disease, cancer, and metabolic disorders. This interdisciplinary approach aims to foster a deeper, integrated understanding of how herbal medicine can be effectively utilized in both clinical and laboratory settings, pushing the boundaries of traditional and modern medical practices.

Keywords: central nervous system; matrix metalloproteinase-9; resveratrol

演講者

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Complementary and Integrative Medicine, Oncology, Nephrology, Geriatric
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Utilization of Complementary and Alternative Medicine among Taiwanese Patients with Pre-End-Stage Renal Disease: A Cross-Sectional Study

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Background: Complementary and alternative medicine (CAM) is frequently used in the general population, yet only limited data are available regarding the prevalence of these medications in patients with chronic kidney disease (CKD). Hence, our study aimed to explore the prevalence and types of CAM in Taiwanese patients with CKD. **Methods:** A cross-sectional questionnaire survey was conducted by face-to-face interview of 275 pre-dialysis patients without dialysis treatment or kidney transplant at an outpatient nephrology clinic in Taiwan from March 2021 to June 2023. The study outcomes were the prevalence of CAM, CAM types, reasons for using CAM, and sources of information about CAM. **Result:** Overall, 128 patients (46.5%) were using CAM, but no significant differences from non-CAM users in the various CKD stages ($p = 0.156$) were found. CAM usage was high in the age range of 20-60 years and duration of CKD ≤ 5 years ($p < 0.05$). The most commonly used type of CAM was nutritional approaches (79.7%), followed by other complementary health approaches (26.6%). The most commonly utilized modalities of CAM were vitamins and minerals (38.3%), and only 27.1% of patients disclosed their CAM use to their physicians. The most common sources of information about CAM were family and friends, cited by 66% of the participants. Health promotion and a proactive attitude were reported by 40% of users as the reasons for using CAM. **Conclusions:** The present study provides data on the CAM usage among CKD patients and adds to the increasing evidence on CAM use. Because some of these practices have safety concerns, better education from healthcare providers on the risks and benefits of CAM therapy is needed by CKD patients.

Keywords: Complementary and alternative medicine; Chronic kidney disease; Cross-sectional study; Dietary supplements; Taiwan

壁報論文
摘要

壁報論文目錄

No.	Authors	Title
S-01	Chia-Hsin Hsu, Tong-Hong Wang, Chin-Chuan Chen, Chi-Yuan Chen	Biomimetic nanocarrier encapsulation of natural compounds for lung cancer therapy
S-02	Pei-Chia Chiu, Shu-Hsien Tsai, Chin-Hsuan Fan, Pei-Chi Chang, Chia-Hsin Chang, Cheng-Pei Chung, Ming-Yi Lee	Macroalgae Seaweed- <i>Sarcodia</i> , <i>Ulva</i> after breaking the cell wall protein characterization and food processing application
S-03	Chen-Ying Wang, Ching-Yun Hsu, Huei-Tzu Chien, Tsong-Long Hwang, Wei-Han Chang	Exploring the impact of different food textures and volumes on swallowing safety for stroke patients with dysphagia
S-04	Ling Hu, Ming-Yi-Lee	Anti-inflammatory activity of <i>Rhinacanthus nasutus</i> leaves and the LC-MS analysis of active fraction
S-05	Hsin-Yu Chen, Hui-Ching Tseng, Hsi-Lung Hsieh	To evaluate the anti-neuroinflammation effect and mechanism of natural production in the mouse neuroblastoma cell Neuro-2a inflammation model
S-06	Jing-Ren Chang, Shu-Ju Wu	Guava leaves polyphenols alleviate obesity and systemic metabolic diseases
S-07	Jia-Yun Li, Yu-Chia Chan, Ming-Yi Lee, Cheng-Pei Chung	Chemical composition and modulatory effects on adipogenesis in 3T3-L1 pre-adipocytes of <i>Polygonum hydropiper</i>
S-08	Fei-Hsiu Hsu, Li-Heng Pao, Wen-Chang Huang, Chun-Hui Chiu	Establishment of analysis method for isoflavones and soyasaponins content in soy products using liquid chromatography tandem mass spectrometry
S-09	Ting-Ning Yang, Wen-Chung Huang	The active ingredient of <i>Garcinia cambogia</i> attenuate metabolic dysfunction-associated steatotic liver disease by modulating lipid metabolism and gut microbiota
S-10	Yu-Li Chen, Yuan-Chen Wang, Tsong-Long Hwang	A potential coumarin-riched extract of <i>Angelica dahurica</i> for COVID-19
S-11	Hui-Ching Tseng, Jia-Ci Chang, Hsi-Lung Hsieh	Sophoraflavanone G, a natural brain protective compound, attenuates TNF- α -induced MMP-9-mediated events in brain microvascular endothelial cells
S-12	Chien-Yu Hsiao	Enhancement of transdermal delivery of arbutin by picosecond laser

壁報論文目錄

No.	Authors	Title
S-13	Hsi-Lung Hsieh, Yu-Chia Chang, Ming-Ming Tsai	To evaluate the protective effect of <i>Lonicera japonica</i> Thunb. active constituents on human gastric inflammation-related disorders
S-14	Wen-Chung Huang, Cheng-Jun Zheng, Shu-Ju Wu	Studies on the mechanism of the Demethoxycurcumin modulate oleic acid-induced lipid accumulation in hepatocytes.
S-15	Yung-Cheng Lai, Ching-Yi Cheng	The effects of quercetin and its derivatives on the oxidative stress and fibrosis of rat renal cells induced by Angiostatin II
S-16	Ann Lin	Development of <i>Poria Cocos</i> (茯苓) based pastry for spleen health
S-17	Yu-Hsin Hsieh, Ting-Hsuan Kung, Tzu-Jung Chuang, Yu-Chia Chang	The effect of subcritical water treatment on the chemical components and α -glucosidase inhibitory activity of clove (<i>Syzygium aromaticum</i>)
S-18	Chuan-Hsin Chang, Yu-Chia Chang, Jen-Fen Fu, Ping-Chih Hsu	The effect of marine natural products on modulating Natural Killer Cells' Cytotoxicity against non-small cell lung cancer
S-19	Sui-Qing Huang, Yun-Hsuan Lin, Yu-Tsung Lee, Fei-Hsiu Hsu, Zhe-Jia Hu, Chun-Hui Chiu and Li-Heng Pao	Determination of eleven flavonoid compounds in plants by ultra performance liquid chromatography-tandem mass spectrometric
S-20	胡哲嘉、黃穗晴、徐妃秀 李昱宗、邱群惠、鮑力恒	中藥真人活命飲減緩順鉑誘導急性腎損傷
S-21	李佳芸、邱群惠、李昱宗 李明怡、鍾成沛	水蓼 (<i>Polygonum hydropiper</i>) 乙醇萃取物乙酸乙酯區分物對 3T3-L1 前脂肪細胞分化之調節作用
S-22	Li-Jen Yu, Ming-Ling Kuo	Rhodosin alleviates inflammatory responses in Activated macrophages by suppressing NLRP3 inflammasome activation
S-23	Wei-Wei Shen, Yu-Nu Wang	Effects of aromatherapy for adult migraine: A systematic review

Biomimetic nanocarrier encapsulation of natural compounds for lung cancer therapy

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Patients with lung cancer carrying EGFR mutations may undergo treatment with EGFR tyrosine kinase inhibitors (EGFR-TKIs) designed to target the specific mutation. However, the development of resistance to EGFR-TKIs poses a significant challenge in lung cancer therapy. Corylin, extracted from *Psoralea corylifolia*, demonstrates cytotoxic effects on lung cancer cells. However, it remains uncertain whether corylin exhibits anti-cancer activity against lung cancers harboring EGFR mutations, and its therapeutic efficacy is limited by low bioavailability. In this study, we propose the development of cell membrane nanoparticles embedding corylin to evaluate its potential for treating lung cancers harboring EGFR mutations. Our data indicate that lung cancer cells carrying activating EGFR mutations (H1975) are more responsive to corylin treatment than cells with wild-type EGFR (H1299). Whole-transcriptome analysis suggests that corylin affects certain key factors involved in regulating apoptosis and signaling receptor activator activity. The combination of corylin and cisplatin synergistically decreases proliferation and induces apoptosis in H1975 cells. We loaded corylin into PLGA (NP-C) nanoparticles wrapped with H1975 cell membranes (CM-NP-C) to develop biomimetic nanostructures. The established CM-NP-C has a particle size of approximately 253 nm and displays the same surface proteins as the cell membrane. CM-NP-C enhances apoptosis and suppresses EGFR activation in H1975 cells more effectively than NP-C. Coating the nanoparticles with H1975 cancer cell membranes enables CM-NP-C to selectively target H1975 cells. Our findings warrant further study of corylin and its biomimetic nanoparticle in the clinic.

Keywords: Lung cancer, Nature compounds, EGFR, Biomimetic nanocarrier

Macroalgae seaweed- *Sarcodia*, *Ulva* after breaking the cell wall protein characterization and food processing application

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In recent years, the issues of environmental protection, health, energy conservation and carbon reduction have continued to receive attention, and low-carbon plant-based foods have flourished, Macroalgae as an emerging plant-based protein that grows rapidly, undergoes photosynthesis, and has a carbon sequestration effect, it reduces the risk of warming. This study used common algae in Taiwan sea areas, choose *Ulva lactuca* and *Sarcodia suae*. The cell wall of macroalgae is thick, and this study used chemical oxidation combine with physical ultrasound extraction to improve extraction efficiency, The best extraction rate of protein after treatment is *Ulva lactuca* 13.34%; *Sarcodia suae* is 3.96%. In protein characterization analysis, the surface hydrophobicity of the broken wall *Sarcodia suae* (1.34×10^8) significantly higher than *Ulva lactuca* sample and original *Sarcodia suae*. In the free amino acid, it can be observed that the wall-broken *Ulva lactuca* significantly increased by 1.7 times. It is speculated that the wall-broken treatment will lead to protein aggregation. However, the content of polysaccharide will affect Water holding capacity (WHC) and Oil-holding capacity (OHC) of the product. According to the data, the WHC is significantly reduced after the wall is broken, that was decreased *Sarcodia suae* by 78.37% and *Ulva lactuca* by 55.03%. The content of water-soluble total sugar was increased more than 10 to 11 times compared with fresh seaweed and broken wall samples; compared to broken walls, original seaweed, *Sarcodia suae* has increased by more than 5 times; *Ulva lactuca* has increased by more than 2 times. It is estimated that the structure of polysaccharides has been damage and transformed into small molecules, and whether polysaccharide has become a small reducing sugar will be further discussed in the future. In order to confirm the change of texture, it was found that the hardness and chewiness increased by 3~7 times and 6~12 times after the wall was broken by texture analyzer. It can be found that the structure becomes more compact after the wall is broken by scanning electron microscope (SEM). In food processing, it can increase the taste and help subsequent processing to reduce the addition of chemical materials, which can be used as basic research of seaweed discuss, and realize the innovation of food development and enhance the carbon reduction benefit by scientifically quantifying data.

Keywords: Fenton's reagent, Protein Characterization, Scanning Electron Microscope, (SEM), texture analyzer

Exploring the impact of different food textures and volumes on swallowing safety for stroke patients with dysphagia

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Oropharyngeal dysphagia is a significant clinical concern. Stroke is the most common condition leading to dysphagia, and the consumption of Texture-Modified Foods (TMF) can reduce the risk of aspiration pneumonia. While international standards for grading food textures exist, their application in clinical evidence remains insufficient. This study investigates the impact of different food textures and volumes on swallowing safety in stroke patients with dysphagia. Prepare foods with different texture grades and volumes according to the Japanese Dysphagia Diet 2021 for stroke patients with dysphagia. Utilize professional rehabilitation physicians to conduct endoscopic examinations of residue in the pharynx after consumption. The endoscopic evaluation indicates a significant impact ($P < 0.05$) of different texture grades and volumes on residue in the pharynx. The results of this study can serve as a reference for applying texture grading standards in research or clinical settings.

Keywords: Dysphagia, Swallowing safety, Texture-modified foods

Anti-inflammatory activity of *Rhinacanthus nasutus* leaves and the LC-MS analysis of active fraction

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Rhinacanthus nasutus leaves (RN) have been proven to possess anti-inflammatory activity, but the modulatory effects on inflammation due to exercise fatigue are still not clear. In this study, RN ethanolic extract (RNE) was prepared. Partitioned ethyl acetate (EA) layer (RNE-EA) has a relatively high content of total polyphenol contents (TPCs) at 116.8 ± 0.8 gallic acid equivalent (GAE)/g. RNE-EA reduced lipopolysaccharide (LPS) induced interleukin-6 (IL-6) to 18% and nitric oxide (NO) to 19% from RAW 264.7 macrophages at 25 μ g/mL. Correlation analysis showed that the anti-inflammatory capacity was significantly positive correlated with TPCs. The RNE-EA was further isolated to give o-coumaric acid (1), epiloliolide (2) and 6-methoxy epiloliolide (3). Among them, 1 and 2 are already proven to possess anti-inflammatory activities, and 2 and 3 were isolated from RN for the first time. In addition, Further, an high-performance liquid chromatography (HPLC) analytical platform was established for quality control of partial purified anti-inflammatory fractions.

Keywords: *Rhinacanthus nasutus*, Anti-inflammatory, Interleukin-6 (IL-6)

To evaluate the anti-neuroinflammation effect and mechanism of natural products in the mouse neuroblastoma cell Neuro-2a inflammation model

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Neuroinflammation refers to a series of reactions of neurons and glial cells caused by infection, trauma, or other pathological mechanisms. The inflammation is accompanied by the production and release of various cytokines or chemokines. Studies show that chronic inflammation can lead to neuronal death, which is associated with a variety of neurological diseases such as Alzheimer's disease and Parkinson's disease. Clinical treatments for chronic inflammation are still limited to antibiotics, steroid anti-inflammatory drugs or non-steroidal anti-inflammatory analgesics, and long-term use will be accompanied by serious side effects. Therefore, this study intends to treat the mouse neuroblastoma cell line (Neuro-2a) with a pro-inflammatory factor (TNF- α) to establish a neuroinflammatory model. Next, use this model to evaluate the inhibitory effect of various natural extracts or components on TNF- α -induced inflammatory proteins' expression, thereby screening out active ingredients with anti-neuroinflammation in the brain. Moreover, the mechanisms will be further explored. The results showed that TNF- α induces the expression of several inflammation-related factors in Neuro-2a cells, including COX-2 and MMP-9. Next, we confirmed that TNF- α -induced the MMP-9 expression is mediated through activating various signaling molecules such as MAPKs (ERK1/2, p38 MAPK, and JNK1/2), mitochondrial ROS, and the transcription factors (NF- κ B and AP-1). Finally, we used this model to evaluate the anti-inflammatory effect and mechanism of various natural products. The results indicated that several natural extracts or components, including *Lonicera japonica*, *Portulaca oleracea*, *Helminthostachys zeylanica*, and *Sinularia flexibilis* can attenuate the TNF- α -induced MMP-9 expression in Neuro-2a cells. Furthermore, we found that their inhibitory mechanism is through blocking the activation of the MAPKs-NF- κ B and -AP-1 signaling pathway. Here, we demonstrated that these natural extracts and components have anti-neuroinflammatory activity. The results will provide an important reference for the development of drugs to treat the neuroinflammation disorders in the future

Keywords: Pro-inflammatory factor, Cyclooxygenase-2, Matrix metalloproteinase-9, Neuroinflammation, Natural products, Anti-inflammation

Guava leaves polyphenols alleviate obesity and systemic metabolic diseases

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The prevalence of obesity is increasing year by year, and it is considered one of the main causes of metabolic syndrome. Guava leaves are rich in phenolic compounds and previous studies have shown that Guava leaves polyphenols (GLP) has antioxidant, and reduces cholesterol and triglyceride levels effects. However, there is no research results have been published on the use of GLP in the treatment of systemic metabolic diseases. Therefore, the aim of this study is to investigate the GLP potential mechanisms of improving systemic metabolic diseases.

In vitro, normal mouse liver cell line FL83B cells are pre-stimulated with oleic acid for 72 hours to induce lipid accumulation and then treated with GLP for 24 hours, to assess GLP reduces lipid accumulation and regulates the lipids metabolism in fatty liver cells by western blot, oil red o stain, fluorescent staining, and flow cytometry. In vivo, 5 weeks of C57BL/6 mice were adapted to the environment for 2 weeks, using high-fat diet (HFD) feed to induce obesity for 4 weeks, giving GLP treatment at the doses of 10 and 30 mg/kg by I.P twice a week for 12 weeks, through western blot, biochemistry, immunohistochemistry stain, and immunofluorescence stain to assess the effects of GLP on improving obesity 、 metabolic diseases and systemic health improvements. The results showed that GLP reduced lipid synthesis, increased lipolysis, and fatty acid β -oxidation in oleic acid-induced fatty liver cells. In vivo, GLP significantly inhibited the weight gained rate caused by a high-fat diet, and improved the condition of metabolic-associated fatty liver disease (MAFLD) in obese mice. We observed that GLP reduced blood glucose concentration and promoted muscle mass by improving systemic glucose utilization and storage; moreover, GLP promoted the beigeization of white adipose tissue in obesity mice.

Keywords: Guava leaves polyphenols, FL83B cells, Obese mice, Systemic metabolic diseases, White adipose tissue beige

Chemical composition and modulatory effects on adipogenesis in 3T3-L1 pre-adipocytes of *Polygonum hydropiper*

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Literature points out that inflammation will induce fat accumulation and lead to obesity. *Polygonum hydropiper* (PH) has been used in Asia for many years to reduce inflammation, but its anti-obesity activity has not yet been evaluated. In the present study, PH ethanolic extract (PHE) was prepared, and partitioned sequentially based on polarity. Among them, 20 mg/mL ethyl acetate (EA) fraction of PHE (PHE - EA) inhibited lipase activity by 43% and significantly reduced triglyceride (TG) accumulation in differentiated 3T3-L1 preadipocytes at 100 µg/mL. Correlation analysis showed that TG inhibition rates were significantly positively correlated with the total polyphenol contents. Continuously, gallic acid (**1**), epiloliolide (**2**) and loliolide (**3**) were isolated. Among them, **2** and **3** are identified from PH for the first time, and **1** and **3** have been confirmed to possess the modulatory effects on differentiation of 3T3-L1 cells. Subsequently, high-performance liquid chromatography (HPLC) was used to establish analysis conditions and models for the above three indicative compounds, which can be used as quality control platform on the anti-obesity partial purified fraction from PH.

Keywords: *Polygonum hydropiper*, Lipase activity, 3T3-L1 Adipocytes, differentiated adipocytes, high-performance liquid chromatography (HPLC)

Establishment of analysis method for isoflavones and soyasaponins content in soy products using liquid chromatography tandem mass spectrometry

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Soybean products are rich in isoflavones and soyasaponins, which have antioxidant and cardiovascular activities. However, there are few studies on the simultaneous analysis of isoflavones and soyasaponins. The aim of this study was to establish a simultaneous analytical method for 26 isoflavones and soyasaponins using liquid chromatography tandem mass spectrometry (LC-MS/MS), with samples prepared by solid-phase extraction for sample extraction. The results show that the 26 target compounds could be analyzed within 15 minutes using the HSS T3 (100 Å, 1.8 µm, 2.1 mm × 100 mm) column with 5% methanol and 100% methanol (containing 0.01% formic acid) as mobile phases in gradient mode. The mass spectrometry parameters were detected by electrospray ionization and multiple reaction monitoring (MRM). The recovery of the target compounds, except for 8-Hydroxyglycitein, ranged from 81.9% to 131.0% when using hydrophilic-lipophilic-balanced (HLB) solid-phase extraction (SPE) cartridges for sample preparation. The detection limit (LOD) and quantification limit (LOQ) ranged from 0.1 to 20 ng/mL and 5 to 50 ng/mL, respectively. The calibration curve for isoflavones ranged from 5 to 200 ng/mL, and for soyasaponins ranged from 50 to 500 ng/mL. Moreover, the linear correlation coefficient (*r*) for all compounds were greater than 0.99. These findings have potential for future applications in soy products.

Key words: Soybean products, Isoflavones, Soyasaponins, Liquid chromatography-tandem mass spectrometry (LC-MS/MS), Solid-phase extraction.

The active ingredient of *Garcinia cambogia* attenuate metabolic dysfunction-associated steatotic liver disease by modulating lipid metabolism and gut microbiota

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Metabolic dysfunction-associated fatty liver disease (MASLD) is the most common liver disease in the world, but there is still no drug treatment for MASLD. Previous studies have shown that *Garcinia cambogia* extract can improve hepatic steatosis in obese mice by inhibiting oxidative stress and apoptosis. NC is isolated from *Garcinia Cambogia* and has anti-inflammatory, antioxidant, and anti-tumor effects. However, it is unclear whether NC can improve MASLD in obese mice. This study aimed to evaluate the impact of NC on MASLD. We established a fatty liver cell model by inducing FL83B cells with 0.5 mM oleic acid, and treated them with different concentrations of NC to evaluate the molecular mechanism of lipid metabolism. In addition, C57BL/6 mice were fed a high-fat diet to induce obesity and then treated with NC via intraperitoneal injection. Experimental results show that NC can effectively regulate lipid metabolism in liver cells, reduce lipid accumulation, and decrease body weight and fat weight in obese mice. It also decreases liver lipid accumulation, improves hepatocyte steatosis, and thus regulates serum liver function indicators. Additionally, it affects the composition of intestinal microorganisms and intestinal permeability. Finally, we conducted transcriptomic analysis of mouse livers to explore the expression regulation of key metabolism and liver function-related genes after NC administration. Based on the above experimental results, it was found that NC can regulate lipid metabolism in fatty liver cells and improve MASLD in obese mice. Therefore, NC has the potential as a new drug for the treatment of MASLD.

Keywords: Gut microbiota, Lipogenesis, Metabolic dysfunction-associated steatotic liver disease, Obese, RNA sequencing

A potential coumarin-rich extract of *Angelica dahurica* for COVID-19

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Activated neutrophils play an important role in the pulmonary inflammation and tissue damage caused by COVID-19. Combining anti-inflammatory agents with antiviral drugs is an effective strategy for preventing and treating COVID-19. *Angelica dahurica* (AD) is a traditional Chinese medicine with both food and medicinal properties. The effects of AD on neutrophilic inflammatory responses and the SARS-CoV-2 infection remain unclear. The aim of this study is to obtain bioactivity-optimized AD extracts and identify active ingredients for COVID-19. AD extracts were obtained using solvents with different polarities. Among them, the *n*-hexane extract (AD-H) effectively inhibited superoxide anion generation and elastase release in *N*-formyl-methionyl-leucyl-phenylalanine-induced human neutrophils, with IC₅₀ values of 1.92 ± 0.66 and 4.31 ± 0.56 $\mu\text{g/ml}$, respectively. AD-H also inhibited the infection of SARS-CoV-2 pseudovirus, with an inhibition rate of $66.52 \pm 3.38\%$ at 30 $\mu\text{g/ml}$. Further activity tests and component analysis showed that imperatorin is the primary anti-inflammatory ingredient of AD-H. In summary, this study provides scientific evidence supporting the application of AD for COVID-19 by proving its potential effects against neutrophilic inflammation and SARS-CoV-2 infection.

Keywords: *Angelica dahurica*, COVID-19, Neutrophils, SARS-CoV-2

Sophoraflavanone G, a natural brain protective compound, attenuates TNF- α -induced MMP-9-mediated events in brain microvascular endothelial cells

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The regulation of matrix metalloproteinases (MMPs) is critical for physiological and pathological events in the central nervous system (CNS), the MMP-9 especially. Upregulation of MMP-9 has been demonstrated to trigger the CNS disorders, including inflammation and neurodegeneration. Thus, MMP-9 is an indicator of inflammation. The tumor necrosis factor- α (TNF- α) is an important proinflammatory cytokine, which can induce various inflammatory factors such as MMP-9 in several disorders. Several phytochemicals are believed to ameliorate inflammation-related disorders including the CNS diseases. Among them, a flavonoid compound sophoraflavanone G (SG) has been isolated from *Sophora flavescens* and possess several medicinal properties, including anti-bacterial and anti-inflammatory effects. We used mouse brain microvascular endothelial cells (bMECs) to explore the signaling mechanisms of TNF- α -induced MMP-9 expression by zymographic, RT-PCR, Western blot, immunofluorescence stain, and promoter reporter analyses. Then, we evaluate the effects of SG on TNF- α -induced MMP-9 expression in bMECs and its mechanisms. We first demonstrated that TNF- α induced MMP-9 expression in bMECs. Subsequently, TNF- α induced MMP-9 expression via TNF receptor (TNFR)-mediated activation of ERK1/2, p38 MAPK, and JNK1/2 linking to NF- κ B signaling pathway. Finally, TNF- α -upregulated MMP-9 may cause disruption of zonula occludens-1 (ZO-1) arranged integrity and this event could be attenuated by SG. These data demonstrated that SG may have brain protective activity by inhibiting these related signaling pathways of TNFR-mediated MMP-9 expression and cell tight junction disruption in brain microvascular endothelial cells.

Keywords: sophoraflavanone G, Brain microvascular endothelial cells, Matrix metalloproteinase-9, Zonula occludens-1, Brain protection

Enhancement of transdermal delivery of arbutin by picosecond laser

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The main purpose of this study is to investigate the transdermal delivery enhancement of arbutin using picosecond laser as a tool, with different laser energy pre-treatment methods on porcine skin. Animal skin was pre-treated with lasers, followed by transdermal absorption device application. Samples were taken at six fixed time points to analyze the drug penetration concentration, and calculate the penetration rate (flux) and enhancement ratio (ER) to compare the transdermal absorption capability of different laser energy levels. Optical microscopy, scanning electron microscopy, and transmission electron microscopy were utilized to observe structural differences in the treated skin. Results showed that groups treated with picosecond laser on porcine skin, with energy ranging from 200mJ to 600mJ, exhibited penetration rates of arbutin ranging from 25.38 to 62.63 times higher. Similarly, groups treated with picosecond laser on nude mice skin, with energy ranging from 200mJ to 600mJ, showed penetration rates of arbutin ranging from 45.97 to 77.24 times higher. Observation under optical microscopy and scanning electron microscopy revealed the disruption of the stratum corneum by picosecond laser, while transmission electron microscopy showed the exfoliation of the stratum corneum. This study confirms the transdermal delivery enhancement of arbutin following treatment with different picosecond laser energy.

Keywords: Picosecond laser, Transdermal delivery, Arbutin

To evaluate the protective effect of *Lonicera japonica* Thunb. active constituents on human gastric inflammation-related disorders

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Gastric inflammation-related disorders are commonly observed digestive system illnesses characterized by the activation of proinflammatory cytokines, particularly tumor necrosis factor- α (TNF- α). This results in the induction of cyclooxygenase-2 (COX-2)/prostaglandin E₂ (PGE₂) and matrix metalloproteinase-9 (MMP-9). These factors contribute to the pathogenesis of gastric inflammation disorders. We examined the preventive effects of *Lonicera japonica* Thunb. ethanol extract (Lj-EtOH) on gastric inflammation induced by TNF- α in normal GES-1 cells. The GES-1 cell line was used to establish a model that simulated the overexpression of COX-2/PGE₂ and MMP-9 proteins induced by TNF- α , to examine the anti-inflammatory properties of Lj extracts. The results indicated that Lj-EtOH exhibits significant inhibitory effects on COX-2/PGE₂ and MMP-9 activity, attenuates cell migration, and provides protection against TNF- α -induced gastric inflammation. The protective effects of Lj-EtOH are associated with the modulation of COX-2/PGE₂ and MMP-9 through activation of TNFR-ERK 1/2 signaling pathways as well as the involvement of c-Fos and nuclear factor kappa B (NF- κ B) signaling pathways. Based on our findings, Lj-EtOH exhibits a preventive effect on human gastric epithelial cells. Consequently, it may represent a novel treatment for the management of gastric inflammation.

Keywords: *Lonicera japonica* Thunb., Matrix metalloproteinase-9, Tumor necrosis factor- α , Cyclooxygenase-2

Studies on the mechanism of the demethoxycurcumin modulate oleic acid-induced lipid accumulation in hepatocytes

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In recent years, due to the rapid development of urbanization, areas originally dependent on labor production have been transformed into static or sedentary lifestyles. On the other hand, many regions of Asia have increased the prevalence of obesity due to the trend towards Westernized and refined diets. Obesity has a huge impact not only on individuals, but also on the health of the society and even the entire country. The medical resource consumption caused by obesity is considerable every year. Fatty liver is one of the diseases caused by obesity. It is stored in the form of fat in the human body, especially in foods rich in refined sugar and triglycerides, which accelerates the process. The accumulated fat causes substantial damage to the liver and causes chronic inflammation of the liver. Non-alcoholic fatty liver is considered to be one of the most common chronic liver diseases in the world. According to the survey, its attack rate has reached more than 30% of the developed countries. In Asia, including other developed countries in Taiwan, the prevalence rate of NAFLD is more than 25%. In view of the health hazards caused by obesity, this article wants to explore the natural Chinese herbal extract-Demethoxycurcumin (DMC) for human liver cancer cells induced by oleic acid-induced lipid accumulation (HepG2 Cell) has the effect of improving steatosis and regulating related pathways of lipid metabolism.

Keywords: Demethoxycurcumin, HepG2 cells, lipolysis, Fatty acid β -oxidation, Energy metabolism

The effects of quercetin and its derivatives on the oxidative stress and fibrosis of rat renal cells induced by Angiostatin II

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Chronic Kidney Disease (CKD) is a severe global health problem with high economic costs regarding medical care, first aid, treatment, and more. However, CKD patients with hypertension (Hypertension, HTN) are recognized worldwide with high morbidity and mortality. The first-line therapy for controlling blood pressure in CKD is modulators of the renin–angiotensin–aldosterone system (RAAS). Quercetin (Q) belongs to plant flavonoids, which can improve kidney function and change histopathology by reducing oxidative stress. Although it has good biological activity, it has low bioavailability and rapid metabolism. Quercitrin (QI) is formed by combining Q with deoxyrhamnose; Hyperoside (HP) is formed by combining Q with lactose; Rutin (RT) is formed by combining Q with disaccharide rutanobiose. In addition to the above derivatives of Q, they are all flavonoid compounds and have good antioxidant and anti-inflammatory activities in other cells, tissues, and animal experiments. Therefore, we wanted to explore and compare their effects on Angiostatin II-induced oxidative stress and fibrosis in rat kidney cells.

The results of scavenging DPPH free radicals show that RT has the best effect, followed by Q (with 90% scavenging ability), but both QI and HP have an 80% scavenging effect after ten minutes. Based on the Real-time PCR and Western blotting results, we found that Q significantly expresses the NQO1 antioxidant enzyme with or without Angiostatin II stimulation. Q at 10 μ M substantially inhibits the expression of E-Cadherin and P-smad2/3 level induced by Angiostatin II. Secondly, QI at 10 μ M significantly inhibited Angiostatin II-induced expression of E-Cadherin; QI at 50 μ M significantly inhibited Angiostatin II-induced P-smad2/3 level. HP inhibited Angiostatin II-induced E-Cadherin and P-smad2/3 levels at 100 μ M. However, RT can only significantly inhibit Angiostatin II-induced P-smad2/3 level at 100 μ M. In an environment where Angiostatin II causes oxidative stress and fibrosis, Q's antioxidant and anti-fibrotic effects are better than those of Q derivatives.

Keywords: Quercetin derivatives, Anti-oxidation, Anti-fibrosis, Angiostatin II

Development of *Poria Cocos* (茯苓) based pastry for spleen health

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This study aims to develop spleen-invigorating pastries based on the medicinal herb *Poria cocos*, exploring their preparation methods, key operational points, and factors influencing product quality. *Poria cocos*, renowned for its dual function as both a food and a medicine in traditional Chinese medicine, has been widely utilized in traditional Chinese medicine for centuries. We investigated the taste, meridian tropism, effects, and common prescription names of *Poria cocos*, and proposed research objectives for the development of spleeninvigorating pastries. Through experiments and clinical trials, we assessed the application of *Poria cocos* in pastries, aiming to pioneer new possibilities for its culinary use and provide more choices for healthy eating. The materials used in the study include glutinous rice flour, Penglai rice flour, glutinous rice flour, *Poria cocos* powder, powdered sugar, milk, matcha powder, brown sugar, red bean paste, and sweet potato. Key operational points emphasize the even and fine pre-processing of raw materials, incremental sieving during dough making to prevent clumping and over-kneading, and uniform spreading and humidity control during filling and steaming processes. Regarding factors influencing product quality, we used sensory evaluation as the quality standard to explore the impact of the quantity of *Poria cocos* powder, glutinous rice flour, or Penglai rice flour on product taste quality. Furthermore, by investigating the influence of red bean, sweet potato, and brown sugar on filling quality, we optimized the optimal formula for the product. In summary, this study provides a comprehensive method and operational guide for the development of spleen-invigorating pastries based on *Poria cocos*, offering valuable reference and guidance for the food industry and enriching people's choices for healthy eating.

Keywords: Spleen-invigorating pastries, Sensory evaluation product, Quality health eating

The effect of subcritical water treatment on the chemical components and α -glucosidase inhibitory activity of Clove (*Syzygium aromaticum*)

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Clove (*Syzygium aromaticum* L. Myrtaceae) is a widely cultivated aromatic plant in tropical and subtropical regions, traditionally used for food preservation and possessing various pharmacological activities. Rich in phytochemicals like sesquiterpenes, monoterpenes, flavonoids, and phenolic compounds, *S. aromaticum* exhibits many pharmacological effects, including analgesic, antioxidant, anticancer, antiseptic, anti-depressant, antispasmodic, anti-inflammatory, antiviral, antifungal, and antibacterial activities. Subcritical water extraction (SWE) technology is emerging as an environmentally friendly alternative to organic solvents in chemistry, facilitating high yields of bioactive compounds from plant materials and thus playing a crucial role in natural product research. This study aimed to assess the inhibitory effect of SWE of clove against α -glucosidase enzyme using an *in vitro* assay, alongside investigating the total phenolic (TPC) and flavonoid contents (TFC) in samples extracted at different temperatures. The SWE120 demonstrated the most potent inhibitory activity (IC_{50} 4.23 $\pm$ 0.13 μ g/mL) compared to the positive control acarbose (IC_{50} 182.12 $\pm$ 1.81 μ g/mL). The SWE200 extract exhibited the highest phenolic content (34.23 $\pm$ 0.47 mg gallic acid equivalent/g) and flavonoid content (11.48 $\pm$ 0.29 mg rutin equivalent/g) compared to reflux extraction (TPC: 26.35 $\pm$ 0.08 mg gallic acid equivalent/g; TFC: 9.83 $\pm$ 0.06 mg rutin equivalent/g). In conclusion, SWE of clove extract demonstrates favorable outcomes for TPC, TFC, and α -glucosidase inhibition, highlighting its potential as an alternative extraction process worthy of further exploration.

This study was supported by grants from Chang Gung University of Science and Technology (ZRRPF3N0101).

Keywords: Clove, α -glucosidase, Subcritical water extraction

The effect of marine natural products on modulating natural killer cells' cytotoxicity against non-small cell lung cancer

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Lung cancer stands as one of the most prevalent malignancies worldwide, with over 80% of cases classified as non-small cell lung cancer (NSCLC). Currently most the chemical drug used for treatment have certain side effect. Therefore, it has attracted much attention on the development of natural anti-tumor agents. Human natural killer (NK) cells play a crucial role in defending against malignant cells. Nevertheless, within the tumor microenvironment, dysfunctional NK cells have been observed in cancer patients.

Taiwan is surrounded by the sea and is rich in marine resource. Several studies have demonstrated that steroids from the soft corals of the genus *Sinularia* exhibit anti-tumor activities against various cancer cells and anti-inflammatory effects on active human neutrophils. However, the immune-modulating capacity of the soft coral-derived sterol remains unclear. This study focuses on two novel 9,11-seco steroids (3f and p6) isolated from the soft coral *Sinularia leptoclados*, characterized by the C-9/11 oxidative cleavage of the C-ring. The primary objective of this investigation is to explore whether 3f and p6 can augment the anti-tumor activity of natural killer (NK) cells against lung cancer cells. Herein, we investigated the impact of the novel sterol compounds on NK-92MI cell activity against lung cancer cells through LDH-releasing assay. Flow cytometry and real-time PCR were utilized to examine cytotoxic factors and activating receptors on NK-92MI cells, as well as ligands on/in lung cancer cells. Our findings indicate that 3f and p6 enhanced the cytotoxic ability of NK-92MI cells against lung cancer cells. This effect was achieved by upregulating the expression of IFN- γ and activating receptors on/in NK cells as well as immune checkpoint *PD-L1* in A549 lung cancer cells. In addition, we confirmed the anti-tumor effects of 3f and NK-92MI cells in a lung cancer mouse model, revealing that both treatments effectively suppress tumor growth. Notably, the combination of 3f and NK-92MI cells treatments showed a synergistic anti-tumor effect. Our results suggest that the soft coral sterol extracts can enhance the cytotoxicity of NK cells against lung cancer cells, indicating its potential as a novel therapeutic agent for the treatment of lung cancer.

Keywords: Octocoral *Sinularia leptoclados*, Non-small cell lung cancer, Natural killer cell, Anti-cancer effect

Determination of eleven flavonoid compounds in plants by ultra performance liquid chromatography-tandem mass spectrometric

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Flavonoids are widely present in plants and have been shown to possess potential benefits such as antioxidant, anti-inflammatory, and anticancer properties. Consequently, the analysis and quantification of flavonoid compounds in herbal plants have become increasingly important. Ultra-performance liquid chromatography-tandem mass spectrometry (UPLC-MS/MS) is currently a commonly used tool for analyzing functional components. It is a highly sensitive and selective analytical instrument that separates flavonoid compounds in complex mixtures through columns and utilizes multiple reaction monitoring (MRM) to improve specificity and selectivity. Therefore, this study aimed to develop an analytical method for eleven flavonoids in plants using UPLC-MS/MS. The eleven flavonoids include hesperetin, hesperidin, neohesperidin, naringin, tangeretin, narirutin, apigenin, diosmetin, nobiletin, luteolin, and naringenin. The chromatographic conditions employed a BEH C18 column with a mobile phase consisting of 5% methanol and a methanol:acetonitrile (3:7) solution, both containing 0.1% formic acid. Electrospray ionization (ESI) was utilized for mass spectrometry parameters. The results showed that this method can analyze eleven flavonoid compounds within 31 minutes and exhibits good specificity, linearity ($r > 0.99$), with a limit of detection (LOD) ranging from 0.3 to 8.0 ng/mL and a limit of quantification (LOQ) ranging from 0.4 to 15.0 ng/mL. It can be applied to the analysis of plants in the future to facilitate understanding of the distribution of flavonoid compounds.

Keywords: Flavonoids, Liquid chromatography tandem mass spectrometer, Electrospray ionization

中藥真人活命飲減緩順鉑誘導急性腎損傷

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順鉑為多種癌症之第一線化療藥物，但約有三分之一使用順鉑的患者發生急性腎損傷，癌症患者為了減緩化療帶來的不適而同時服用中草藥，中草藥含多酚及黃酮等生物活性成分，可能具有減緩順鉑造成的副作用。首先在細胞實驗中使用人類近端腎小管細胞篩選中藥濃縮製劑，實驗結果顯示單獨給予真人活命飲並不會影響細胞存活率，同時給予順鉑和高、中、低劑量真人活命飲可顯著提高順鉑導致之腎臟細胞存活率，進一步使用動物模型確認其效果，C57BL/6 公鼠預先連續管餵十天真人活命飲並在第七天以腹腔注射 20mg/kg 順鉑誘導急性腎損傷，結果顯示血清中 Blood Urea Nitrogen (BUN) 值顯著下降，腎臟組織切片 H&E 染色的損傷分數顯著降低，腎臟中累積的鉑(Platinum; Pt)含量顯著減少，其機轉同樣藉由調控 MAPKs 中的 P-p38 (p38 磷酸化)和 Jnk 活化，此外還調控粒線體中 Bax 和 Bcl-2 表現，降低 Caspase-3 主導的細胞凋亡，最後以人類肺腺癌細胞株 A549 評估真人活命飲對順鉑的毒殺效果，結果顯示真人活命飲並不會影響順鉑對該癌細胞之抗癌效果。

關鍵字：順鉑、急性腎損傷、真人活命飲

水蓼 (*Polygonum hydropiper*) 乙醇萃取物乙酸乙酯區分物對 3T3-L1 前脂肪細胞分化之調節作用

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水蓼 (*Polygonum hydropiper*, PH) 被用於藥物或是食品中的香料，其活性作用包含抗炎、抗氧化、抗菌等，但目前仍不清楚水蓼對於改善肥胖之相關性。本研究自 PH 乙醇萃取物 (ethanolic extract, PHE) 乙酸乙酯 (ethyl acetate, EA) 區分物 (PHE-EA) 進行化學組成分析與活性確認，盼探尋品管指標物質。PHE-EA 中富含酚類化合物，在液相層析 (liquid chromatography, LC) 串聯質譜 (mass spectrum, MS) (LC-MS) 對酚類化合物分析發現沒食子酸 (gallic acid, GA)、異槲皮苷 (isoquercitrin)、芸香苷 (rutin)、綠原酸 (chlorogenic acid) 含量豐富。PHE-EA 經矽膠管柱流洗，次區分物中以 E 層於 25 $\mu\text{g/mL}$ 處理下可抑制 3T3-L1 前脂肪細胞 (preadipocytes) 分化後 51.5% 之三酸甘油酯 (triglyceride, TG) 堆積活性最佳，經高效 (high-performance, HP) LC (HPLC) 分析發現 GA 是當中主要成分，顯示其為 PH 中重要的指標成分之一。

關鍵字：水蓼、乙酸乙酯區分物、3T3-L1 前脂肪細胞、三酸甘油酯、指標成分

Rhodosin alleviates inflammatory responses in activated macrophages by suppressing NLRP3 inflammasome activation

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Background

The body's defense system triggers inflammation by immune cells releasing pro-inflammatory cytokines and activating inflammasomes, involving NLRP3, ASC, and caspase 1. Dysregulation of inflammasome activation is usually associated with inflammatory diseases and becomes a therapeutic target. Many flavonoids compounds can reduce macrophage inflammasome activity, contributing to anti-inflammatory effects. Rhodosin, a potent flavonoid from *Rhodiola rosea*, possesses antioxidant effects, but its anti-inflammatory effects are unclear.

Materials and Methods

In this research, THP-1 macrophages were subjected to rhodosin treatment, followed by induction with lipopolysaccharide (LPS) and ATP to evaluate the anti-inflammatory properties of rhodosin. Beyond assessing its ability to suppress the production of pro-inflammatory cytokines, such as IL-1 β , IL-6, and TNF- α , we delved into the exploration of its effects on molecules within signaling pathways. Furthermore, we examined the formation of the NLRP3 inflammasome complex to gain deeper insights into the impact of rhodosin on the inflammatory process.

Results

Our findings indicated that rhodosin effectively suppressed the secretion of IL-1 β and IL-6, potentially through the inhibition of STAT3 phosphorylation. Notably, rhodosin did not affect the expression of NF- κ B and NLRP3 inflammasome component proteins. To investigate further, we employed immunofluorescent staining to detect the assembly of the NLRP3 inflammasome and conducted a caspase-1 activity assay to evaluate its function. The results demonstrated that a significant inhibition by rhodosin on the assembly of the NLRP3 inflammasome and a concurrent reduction in caspase 1 activity.

Conclusion

In conclusion, our results suggest that rhodosin possesses the potential to serve as a therapeutic agent for inflammatory diseases.

Keywords: Rhodosin, Flavonoids, Inflammation, Inflammasome, Macrophage.

Effects of aromatherapy for adult migraine: A systematic review

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Migraine is a severe and unpredictable recurring headaches. However, there are few comprehensive studies on the effectiveness of aromatherapy for migraine management. **Purpose:** To explore the effectiveness of aromatherapy in treating migraines in adults. **Method:** electronic databases including Embase, PubMed, CINAHL and Airtiti Library were searched using "migraine" and "aromatherapy" as keywords. **Results:** Three randomized controlled trial documents were included for analysis. During migraine attacks, the application of 2cc of essential oil topically to the forehead and temporal areas resulted in lower average pain intensity in the experimental group compared to the control group within 24 hours. The difference reaches statistical significance starting from the 30th minute (MD=-1.49, $p = .0001$). Additionally, the interaction of different essential oil doses and time significantly reduced the frequency of migraine attacks ($p < 0.001$). Two hours after essential oil application, the experimental group exhibited a significantly higher rate of pain relief ($p=0.001$) compared to the control group. Furthermore, the odds of experiencing nausea, vomiting, photophobia, and phonophobia were significantly lower in the experimental group compared to the control group ($p=0.001$).

Keywords: Migraine, Aromatherapy, Essential oil, Systematic review

超濃縮研究 短講競賽

-民生學院校慶系列學術活動- 112 學年度中醫藥與健康科技研討會 Conference on Traditional Medicine and Health Technology

主持人簡歷

——李昱宗——

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長庚科技大學 保健營養系 講師
長庚科技大學 食品暨化妝品安全研究中心 研究助理
財團法人食品工業發展研究所 產品及製程研發中心 副研究員
財團法人食品工業發展研究所 產品及製程研發中心 助理研究員



研究專長領域

食品科學、食品分析、澱粉科學

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1. Lai, Y. W., **Lee, Y. T.**, Cao, H., Zhang, H. L., Chen, B. H. (2023). Extraction of heterocyclic amines and polycyclic aromatic hydrocarbons from pork jerky and the effect of flavoring on formation and inhibition. *FoodChem*, 402 (15), 134291.
2. **Lee, Y. T.**, Pao, L. H., Chen, C. Y., Huang, S. Q., Kumaran, A., Chyuan, J. H., Chiu, C. H. (2022). Microwave-and ultrasound-assisted extraction of cucurbitane-type triterpenoids from *Momordica charantia* L. cultivars and their antiproliferative effect on SAS human oral cancer cells. *Foods*, 11(5), 7
3. **Lee, Y. T.**, Huang, S. Q., Lin, C. H., Pao, L. H., Chiu, C. H. (2022). Quantification of Gut Microbiota Dysbiosis-Related Organic Acids in Human Urine Using LC-MS/MS. *Molecules*, 27(17), 5363.
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5. Hung, Y. T., **Lee, Y. T.**, Inbaraj, B. S., Sridhar, K., Chen, B. H. (2021). Analysis and formation of polycyclic aromatic hydrocarbons and cholesterol oxidation products in thin slices of dried pork during processing. *FoodChem*, 353(15), 129474.

超濃縮研究短講目錄

No.	Title
C-01	Macroalgae Seaweed- <i>Sarcodia</i> , <i>Ulva</i> after breaking the cell wall protein characterization and food processing application
C-02	Biomimetic nanocarrier encapsulation of natural compounds for lung cancer therapy
C-03	Chemical composition and modulatory effects on adipogenesis in 3T3-L1 pre-adipocytes of <i>Polygonum hydropiper</i>
C-04	Establishment of analysis method for isoflavones and soyasaponins content in soy products using liquid chromatography tandem mass spectrometry
C-05	Anti-inflammatory activity of <i>Rhinacanthus nasutus</i> leaves and the LC-MS analysis of active fraction
C-06	The active ingredient of <i>Garcinia cambogia</i> attenuate metabolic dysfunction-associated steatotic liver disease by modulating lipid metabolism and gut microbiota
C-07	Exploring the impact of different food textures and volumes on swallowing safety for stroke patients with dysphagia
C-08	To evaluate the anti-neuroinflammation effect and mechanism of natural products in the mouse neuroblastoma cell Neuro-2a inflammation model
C-09	Rhodosin alleviates inflammatory responses in activated macrophages by suppressing NLRP3 inflammasome activation
C-10	Guava leaves polyphenols alleviate obesity and systemic metabolic diseases

口頭報告 競賽

-民生學院校慶系列學術活動-
112 學年度中醫藥與健康科技研討會
Conference Traditional Medicine and Health Technology

主持人簡歷

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長庚科技大學 健康產業科技研究所 助理教授

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財團法人食品工業發展研究所 產品及製程研發中心 研究員



研究專長領域

質譜分析、皂苷分析、食品分析與檢驗方法開發

重要論文發表

1. **Chiu, C. H.**, Lin, K. H., Lin, H. H., Chu, W. X., Lai, Y. C., Chao, P. Y. (2022). Analysis of Chlorogenic Acid in Sweet Potato Leaf Extracts. *Plants*, 11(15), 2063.
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3. He, J. J., **Chiu, C. H.**, Gavahian, M., Ho, C. T., Chu, Y. L. (2022). Development and application of edible coating on dried pineapple exposed to electrical blanching. *Journal of Food Processing and Preservation*, 48 (8), e16760.
4. **Chiu, C. H.**, Chiu, K. C., Yang, L. C. (2022). Amelioration of Obesity in Mice Fed a High-Fat Diet with Uronic Acid – Rich Polysaccharides Derived from Tremella fuciformis. *Polymers*, 14(8), 1514.
5. Lee, Y. T., Pao, L. H., Chen, C. Y., Huang, S. Q., Kumaran, A., Chyuan, J. H., **Chiu, C. H.** (2022). Microwave- and Ultrasound-Assisted Extraction of Cucurbitane-Type Triterpenoids from *Momordica charantia* L. Cultivars and Their Antiproliferative Effect on SAS Human Oral Cancer Cells. *Foods*, 11(5), 729.

重要獲獎或其他

臺灣公定分析科學家協會 (AOAC) 理事

口頭報告競賽

No.	Name	Title
O-01	王貞穎 Chen-Ying Wang	Exploring the impact of different food textures and volumes on swallowing safety for stroke patients with dysphagia
O-02	胡菱 Ling Hu	Anti-inflammatory activity of <i>Rhinacanthus nasutus</i> leaves and the LC-MS analysis of active fraction
O-03	徐妃秀 Fei-Hsiu Hsu	Establishment of analysis method for isoflavones and soyasaponins content in soy products using liquid chromatography tandem mass spectrometry

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長庚學校財團法人
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Research Center for Chinese Herbal Medicine



中心簡介

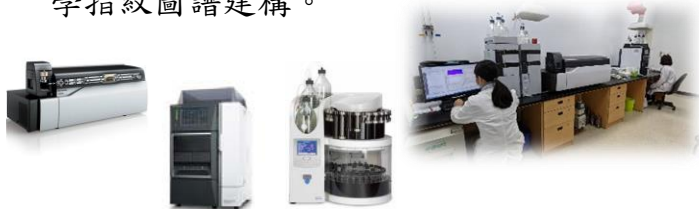
中心整合本校三系一所(護理系基礎醫學組、保健營養系、化妝品應用系及健康產業科技研究所)研究量能，結合體系學校、企業與醫院豐富資源，建立完整中草藥與天然物活性分析研究鏈，從有效成分萃取、製備、分析，到生物活性評估，進而應用於藥物、保健、保養、美容產品研發，打造兼具保健營養、美容醫學及中草藥科技等跨領域的研究中心。



四大平台

中草藥製備暨化學分析平台

- ✓ 進行並建立中草藥活性成分萃取及化學成分分析。
- ✓ 研究領域：傳統中草藥的藥理活性最適化製程開發及其有效成分純化和鑑定。
- ✓ 核心技術：有效/活性成分萃取、分層、製備、純化、分析、化學結構鑑定、化學指紋圖譜建構。



細胞功能評估平台

- ✓ 以細胞模式進行中草藥活性成分在細胞功能的影響與評估。
- ✓ 研究領域：建立神經系統疾病、心血管炎症病變、呼吸道相關疾病、皮膚疾病、癌細胞及免疫與發炎細胞的細胞模式建立。
- ✓ 核心技術：各項分生實驗分析、藥物活性篩選、酵素動力學方法開發、蛋白機轉探討、基因功能分析。



動物評估試驗平台

- ✓ 以動物模式進行中草藥活性成分在動物體內的試驗與評估
- ✓ 研究領域：免疫與發炎疾病、氣喘與過敏、代謝疾病、急性肺損傷、發炎性關節炎、乾癬及傷口癒合、異位性皮膚炎、酒精性脂肪肝與非酒精性脂肪肝、肝纖維化及肥胖等小鼠誘發模式。
- ✓ 核心技術：藥理與效用評估、藥物動力學分析、毒理測試、生化指數測定、行為模式分析。



人體代謝功能評估平台

- ✓ 以人體模式進中草藥活性成分對人體代謝的影響與評估
- ✓ 研究領域：營養狀態評估、食物感官品評、人類基礎代謝率之測量與評估及人體運動生理測量與評估。
- ✓ 核心技術：整合型營養狀態與體適能評估、高齡膳食質地分級研發、健康、保健產品研發、保健食品效用評估、健康飲食商品、經營管理



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食品暨化妝品 安全研究中心

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服務介紹

聯絡我們

食品暨化妝品安全研究中心成立之食品安全檢驗室為衛生福利部食品藥物管理署(TFDA)及全國認證基金會(TAF)雙認證實驗室，已建立7大分析平台，可提供食品、化妝品及客製化檢測服務。

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