~民生學院校慶系列學術活動~

110學年度
天然物與健康科技研討會

2022 Conference on Natural Products and Health Technology

2022 / 05 · 19 THU.

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

會議地點：長庚科技大學 演藝廳
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

─民生學院校慶系列學術活動─
110 學年度 天然物與健康科技研討會
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近年來，藥物研發在改善人類生活品質上扮演極重要角色，而生物科技產業的蓬勃發展，使得其技術運用於藥物研發上已是全球發展的趨勢。目前政府已於 2015 年起計畫打造臺灣成為「亞太特色藥業專業重鎮」，表示特色新藥是臺灣可以聚焦之利基。因此，生技產業於藥物研發人才的需求非常殷切，希望能透過學界、醫界及產業界資源整合，始能達成以臨床使用為宗旨的研發，並使技術及人才生根讓臺灣走向國際。台灣四面臨海且有高山、森林等多種自然資源造就生物多樣性，這些豐富的生態多樣性是天然藥物開發的重要利器。近年來越來越多的醫學研究人員從大自然中探尋尚未開發的藥物資源，進而從中發現新的治療和治癒人類疾病潛力的新型化學物質。本次會議將邀請天然藥物學界的專家學者進行專題演講，期望藉此與具經驗講者交流互動，討論未來可能合作模式，以促進並提升本校於中草藥之研究成果及產學合作。

- 會議時間：111 年 5 月 19 日 (星期四)
- 會議地點：Google meet 線上研討會
- 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
- 連絡人：中草藥研究中心 張祐嘉(#5221)/吳依璇(#5230)/
  陳思語(#5231)

● 活動議程：

活動議程		
時間	**活動內容**	**主持人**
09:00~09:30	報 到	
09:30~09:40	合 照	
09:30~09:40	貴 賓 致 詞 長庚科技大學 樓迎統 校長	中草藥研究中心 謝喜龍 主任
10:00~11:00	專 題 演 講 Ⅰ 國立陽明交通大學藥學系 陳日榮教授	民生學院 黃聰龍 院長
11:00~12:00	專 題 演 講 Ⅱ 國立中山大學海洋生技暨資源學系 鄭源斌教授	中草藥研究中心 謝喜龍 主任
12:00~13:10	午餐暨交流活動	
13:10~14:10	健康產業科技研究所 研究生專題報告	中草藥研究中心 張祐嘉 博士/ 吳依璇 博士
14:10~15:40	茶敘暨壁報競賽與成果展示	中草藥研究中心 張祐嘉 博士/ 吳依璇 博士
15:40~16:00	頒 獎	中草藥研究中心 張祐嘉 博士/ 吳依璇 博士
16:00	賦 歸	

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專題演講

壁報競賽與成果展示

專題演講

陳日榮教授

學歷: 高雄醫學大學 藥學研究所 藥學博士 (1997)
高雄醫學大學 天然藥物研究所 理學碩士 (1994)
中國醫藥大學 醫技系 理學士 (1989)

現職: 國立陽明交通大學 藥學系 特聘教授
國立陽明交通大學 生物藥學研究所 合聘教授
國立陽明交通大學 傳統醫藥研究所 合聘教授
國立陽明交通大學 生技醫療產業博士學位學程 合聘教授

專長: 新藥開發、轉譯醫學、 中醫藥學、 天然物化學、中草藥功能性食品、天然香粧品研發 、生藥學

研究計畫: 迄今主持生技製藥國家型科技計畫、科技部計畫、國科會計畫、農委會計畫、產學研究計畫 、醫院合作計畫 …等， 超過 80 項。

期刊論文: 迄今已發表國際知名 SCI 期刊 (F*ood Chem., J. Nat. Prod., Antioxidants, Planta Med., Phytochemistry, Int. J. Mol. Sci., Oncotarget, Autophagy, Marine Drugs*…等) 超過 280 篇，共分離 1000 多種天然化合物，包含 260 多種新化合物及分別具有抗發炎、抗癌、抗病毒、抗血小板凝集、抑制血管增生、降血糖、抗氧化、血管鬆弛、抗登革熱病毒 或抗結核菌等活性之成分，其中不乏具開發潛力之先導藥物 。

專利: 迄今已榮獲中華民國 8 項發明專利，研發『牛樟芝膠囊』、『白木香舒緩按摩膏』及『白木香修護洗髮精露』 …等產品。

經歷&榮譽:

1. 榮獲 美國 丹佛大學發布之「全球前 2%頂尖科學家 (World's Top 2% Scientists 2020)」殊榮，並同時榮登「終身科學影響力排行榜(1960～2020)」及「2020 年度科學影響力排行榜」。
2. 擔任 *Journal of Food and Drug Analysis* 副總編輯。
3. 擔任 *JFDA (Journal of Food and Drug Analysis), American Journal of Applied Chemistry, ISRN Pharmaceutics, Asian Journal of Biomedical and Pharmaceutical Sciences, Molecules*…等 16 種國際期刊編輯或編輯委員。
4. 擔任 *Food Chem., J. Nat. Prod., Planta Med., J. Agri. Food Chem., Marine Drugs, Brit. J. Pharmacol., Phytochemistry*…等 58 種國際 SCI 期刊評審委員。
5. 榮登 2009~2022 年「醫學與健康照護世界名人錄」(Marquis Who's Who in Medicine and Healthcare)。
6. 擔任衛生福利部『台灣中藥典』編修委員。
7. 榮獲 2019~2022 年度國立陽明交通大學『學術卓越』及『特聘教授』獎勵。
8. 榮獲 2021.08~2023.07 國立陽明交通大學『延攬及留住特殊優秀人才彈性薪資』獎勵 。
9. 榮獲 2020 年度國立陽明交通大學藥物科學院『教學傑出教師』獎勵。

10. 榮獲 2020 年度國立陽明交通大學『永久免接受評估教師』獎勵。
11. 榮獲 2020 年度『陽明景康教師獎』獎勵。
12. 榮獲 2011~2016 年度 科技部「大專校院特殊優秀人才彈性薪資」獎勵。
13. 榮獲 2015 年第 11 屆烏克蘭國際發明展『金牌獎』。
14. 榮獲 2011~2013 年度 教育部「大專校院頂尖人才彈性薪資」獎勵 。
15. 擔任考試院 105, 108, 110 年度公務人員高等考試命題兼閱卷委員。
16. 擔任科技部專題研究計畫複審委員及初審委員 (2005~)。

Bioactive Natural Products as Lead Compounds from Natural Resources

陳日榮 (Jih-Jung Chen)
Department of Pharmacy, School of Pharmaceutical Sciences, National Yang Ming Chiao Tung University, 112304, Taipei, Taiwan.
E-mail: jjungchen@nycu.edu.tw

Natural products, especially bioactive molecules as drug lead compounds, have attracted comprehensive attention in drug discovery and development and in health promotion. Several drugs currently used as therapeutic agents have been derived and developed from natural sources.

In the past studies, our laboratory has isolated more than 1,200 natural compounds from dozens of research materials such as Formosan plants, fungi, Chinese herbal medicines, etc. These isolated compounds contain more than 270 new compounds and many bioactive components with anti-inflammatory, anti-tuberculosis, anti-cancer, anti-platelet aggregation, anti-angiogenesis, antioxidant, anti-dengue virus, vascular relaxation, hypoglycemic, anti-acetylcholinesterase, and/or anti-tyrosinase activities, respectively. Among which there are many leading compounds with potential for development. I will take the opportunity of this conference to share the above research results with my colleagues.

Keywords: bioactive natural products, lead compounds, natural resources.

鄭源斌教授

學歷: 國立中山大學 海洋生物科技暨資源學系 博士 (2007)
高雄醫學大學 化學系 學士 (2001)

現職: 國立中山大學 海洋生物科技暨資源學系 教授

經歷: 高雄醫學大學 天然藥物研究所 教授
中央研究院 農業生物科技研究中心 博士後研究
加州大學聖地牙哥分校 SIO 博士後研究

專長: 天然物化學、有機化合物結構鑑定、色層分析、天然物生合成路徑、活性成分分析

研究計畫:
1. 越南藥用植物活性成分研究(MOST-110-2628-B-110-005-MY3)
2. 台灣原生海鞘與菟葵活性天然物研究 (MOST-108-2320-B-037-013-MY3)
3. 辜嚴倬雲植物保種中心萃取物庫建立與應用 (MOST-107-2628-B-037-001-MY3)
4. 台灣海葵與海葵共生菌活性天然物研究 II (MOST-106-2320-B-037-016)
5. 台灣海葵與海葵共生菌活性天然物研究 (MOST-103-2628-B-037-001-MY3)

期刊論文:
1. Hui-Chun Wang, Tzu-Yi Ke, Ya-Chen Ko, Jue-Jun Lin, Jui-Sheng Chang, **Yuan-Bin Cheng*** "Anti-Inflammatory Azaphilones from the Edible Alga-Derived Fungus Penicillium sclerotiorum", *Mar. Drugs* 2021, 19, 529.
2. Tzu-Jung Yu†, **Yuan-Bin Cheng†**, Li-Ching Lin, Yi-Hong Tsai, Bo-Yi Yao, Jen-Yang Tang, Fang-Rong Chang, Chia-Hung Yen, Fu Ou-Yang,* Hsueh-Wei Chang* "Physalis peruviana-Derived Physapruin A (PHA) Inhibits Breast Cancer Cell Proliferation and Induces Oxidative-Stress-Mediated Apoptosis and DNA Damage", *Antioxidants* 2021, 10, 393.
3. Yu-Chi Lin, Yi-Jen Chen, Shu-Rong Chen, Wan-Ju Lien, Hsueh-Wei Chang, Yu-Liang Yang, Chia-Ching Liaw, Jui-Hsin Su, Ching-Yeu Chen*, **Yuan-Bin Cheng*** "Targeted Isolation of Xenicane Diterpenoids from Taiwanese Soft Coral Asterospicularia laurae" *Mar. Drugs* 2021, 19, 123.
4. Shu-Rong Chen, Shih-Wei Wang, Yu-Chi Lin, Chen-Lin Yu, Juei-Yu Yen, Yih-Fung Chen*, **Yuan-Bin Cheng*** "Additional alkaloids from Zoanthus vietnamensis with neuroprotective and anti-angiogenic effects", *Bioorg. Chem.* 2021, 109, 104700.
5. Fang-Rong Chang, Shih-Wei Wang, Shu-Rong Chen, Ching-Ying Lee, Jyh-Horng Sheu, **Yuan-Bin Cheng*** "Aleuritin, a novel dinor-diterpenoid from the twigs of Aleurites moluccanus with anti-lymphangiogenic effect" *Org. Biomol. Chem.*, 2020, https://doi.org/10.1039/D0OB01527J
6. Shu-Rong Chen, Shih-Wei Wang, Jyh-Horng Sheu, Ting-Hsuan Chang, and **Yuan-Bin Cheng*** "Zoanthamine Alkaloid Derivatives from the Zoantharian Zoanthus vietnamensis with Anti-Metastatic Activity" *J. Org. Chem.* 2020, 85, http://dx.doi.org/10.1021/acs.joc.0c01731
7. Yu-Chi Lin, Jue-Jun Lin, Shu-Rong Chen, Tsong-Long Hwang, Shu-Yen Fang, Michal Korinek, Ching-Yeu Chen, Yun-Sheng Lin, Tung-Ying Wu, Ming-Hong Yen, Chih-Hsin Wang* and **Yuan-Bin Cheng*** "Clerodane Diterpenoids from Callicarpa hypoleucophylla and Their Anti-Inflammatory Activity" *Molecules* 2020, 25, 2288.

經歷&榮譽:

1. 2021 科技部 優秀年輕學者研究計畫
2. 2020 台灣創新技術博覽會發明競賽金牌獎
3. 2019 指導專題生榮獲 科技部 大專學生研究創作獎
4. 2018 科技部 吳大猷先生紀念獎
5. 2018 科技部 優秀年輕學者研究計畫
6. 2014 科技部 優秀年輕學者研究計畫

Natural Product Research on Zoanthid and Marine Microorganism

鄭源斌 (Yuan-Bin Cheng)
Department of Marine Biotechnology and Resources, National Sun Yat-sen University,
Kaohsiung 804351, Taiwan
E-mail: jmb@mail.nsysu.edu.tw

Marine invertebrates are important sources of bioactive natural products with unique carbon skeletons. Natural Products derived from zoanthids demonstrate anticancer, antiviral, anti-neuroinflammation, and anti-osteoporosis activities. According to those findings, zoanthids are considered to have many medicinal properties and health benefits. Our study focuses on natural product identification and bioactivity evaluation of Taiwanese indigenous zoanthids. In the chemical investigation of the genus *Zoanthus*, two novels, 52 new and eight known zoanthamine-type alkaloids were isolated and identified. In the research of the genus *Palythoa*, eight new and 29 known secondary metabolites were obtained. The structures of all isolated components were elucidated by spectroscopic data (IR, MS, NMR, and UV), especially 2D NMR analyses (COSY, HMBC, HSQC, and NOESY). The absolute configuration of a few new compounds was further confirmed by an X-ray single crystallographic analysis using a mirror Cu-Kα radiation. With respect to bioactivity, the antiviral, anti-inflammatory, and antimetastatic activities of isolated compounds were evaluated. In addition, the structure-activity relationships between the isolated marine natural products and related activities are discussed.

The marine microorganism was regarded as an alternative source of lead compounds because numerous reports stated marine microorganism produces unique metabolites with diverse bioactivities. Our latest natural product investigation focused on endophytes from marine macroalgae. A series of azaphilones were isolated from the algae-derived fungus *Penicillium sclerotiorum*. Those polyketide metabolites were evaluated for cytotoxic, anti-inflammatory, and anti-fibrosis activities. 8a-epi-Hypocrellone A showed selective toxicity toward neuroblastoma cell line SH-SY5Y, and inhibited the TNF-α-induced NFκB phosphorylation but did not change the NFκB activity. 8a-epi-eupenicilazaphilone C and sclerotiorin respectively promoted and inhibited SMAD-mediated transcriptional activities stimulated by TGF-β. Our current findings showed that azaphilones could be a new target for anti-inflammatory research.

Keywords: *Zoanthus*, *Palythoa*, endophytes.

壁報競賽與成果展示

中草藥研究中心與食品暨化妝品安全研究中心

成果壁報展示

編號	作者群	題目
A-01	Yu-Li Chen, Kuei-Hung Lai, Yu-Chia Chang, Yu Fang, Pei-yu Chao, and Tsong-long Hwang	*Lophatherum gracile* Brongn. is a Potent Herbal Medicine for COVID-19
A-02	Chien Yu Hsiao	Methoxylated Isoflavones are Effective to Target the Skin and Alleviate Psoriasiform Lesion via Topical Application
A-03	Yin-Chen Chen, Ssu-Yu Chen, Shu-Ching Hsu and Hsi-Lung Hsieh	The Anti-Inflammatory Effects of *Portulaca oleracea* via Inhibiting IL-1β-Induced MMP-9 Expression in Brain Microvascular Endothelial Cells
A-04	Chiang-Wen Lee, Miao-Ching Chi, Yao-Chang Chiang, and Ju-Fang Liu	Naringenin Induces ROS-Mediated ER Stress, Autophagy, and Apoptosis in Human Osteosarcoma Cell Lines
A-05	Shang-Lang Huang, and Nian-Kang Sun	Curcumin Inhibiting NF-κB Activity by Upregulating SNIP1 Overcomes Paclitaxel Resistance in Ovarian Carcinoma Cells
A-06	Hsi-Lung Hsieh, Ming- Chin Yu and Ming-Ming Tsai	To Evaluate the Protective Effect of Chinese Herbal Medicines on the Inflammatory Response of Human Gastric Epithelial Cells
A-07	Yi-Hsuan Lu, Hsi-Lung Hsieh and Wen-Chung Huang	Taraxeryl Acetate from *Lophatherum gracilie* Alleviates Inflammatory Effects in Macrophages and Tracheal Epithelial Cells

中草藥研究中心與食品暨化妝品安全研究中心

成果壁報展示

編號	作者群	題目
A-08	Ya-Min Shih, Chieh-Wen Chan, Tong-Hong Wang, Chin-Chuan Chen, Chi-Yuan Chen	Anticancer Activity of Sulforaphane in Lung Cancer Cells
A-09	Wen-Chung Huang, Chian-Jiun Liou, Sindy Hu, Shu-Ju Wu	Urolithin A Inactivation of TLR3/TRIF Signaling to Block the NF-κB/STAT1 Axis Reduces Inflammation and Enhances Antioxidant Defense in Poly(I:C)-Induced RAW264.7 Cells
A-10	Ching-Chieh Yang, Yung-Cheng Lai, and Ching-Yi Cheng	Evaluation of the Efficacy of Different *Lonicera japonica* Thunberg Extracts and Their Active Molecules on Human HaCaT Cells.
A-11	Wen-Huei Lin	Consumer Health Behavior and the COVID-19 pandemic: Behavioral Preventive Measures and the use of Chinese Herbal Products Among the Public in Response to Covid-19 in Taiwan
A-12	Sui-Qing Huang, Yu-Tsung Lee, Fei-Hsiu Hsu, Zhe-Jia Hu, Chun-Hui Chiu and Li-Heng Pao	Enhancing the Value-added Service on Food Safety Testing Laboratory- Establishing the Analytical Platform of Sterols and Triterpenoids
A-13	Ching-Yun Hsu, Jia-You Fang and Tzu-Wei Lin	The Development of Conjugated Linoleic Acid-Loaded Nanocarriers for Lipid Lowering
A-14	Chun-Hsun Huang	Efficacy of Saponin from Wild Bitter Gourd on Atopic Dermatitis and the Accompanied Bacterial Infection

化妝品應用系學生專題成果壁報展示

編號	作者群	題目
B-01	黃俊薰、吳姵臻、謝欣吟、徐曉慈、林玹瀅	咖啡渣洗面乳之功效初探
B-02	陳姿吟、高雅紋、林映廷、陳映錡、陳品惟、杜宜潔、吳若甄	仿真美觀手甲片製作
B-03	史昀平、卓鈺欣、李婉琛、李品靜、林志軒	初探形象缺失者的美容心理
B-04	史昀平、許芳齊、林淳婷、臧齊、郭珈瑄、邱歆如	黑帝斯&波澀芬-希臘神話整體造型
B-05	許孟娟、陳佳萱、陳姿穎、黃璽玹、湯孟潔、黃致媛、徐嘉妤	鶯歌蝶舞－森林系造型設計創作結合
B-06	李宏中、楊至佳、楊淳雅、趙庭佑、楊庭寧、李詩晴	探索不同白光 LED 頻譜對於膚色與市售彩妝色呈現與使用者主觀感受的影響
B-07	林志鴻、張怡雯、黃詩閔、林君穎、楊于萱	STNAIL 微型創業美甲店
B-08	吳秋燕、李欣宜、李宜珊、張娟娟、張凱茵	精油商店服務品質滿意度與重要性之探討
B-09	陳姿吟、陳姿吟、邱雅淇、張丞君、范晴雅、禹佩廷	仿真醫療骨架模型於鏡像還原之應用
B-10	咎世偉、林傳福、許琇涵、連文綺、姚瑜婷、段辛儒、洪嘉欣、洪子璇	以 IPA 模式探討消費者對於天然化妝品認知調查
B-11	吳秋燕、張馨之、潘胤熏、簡敏如、曾慶語、曾于瑄、張綸筠、王岳華	美容醫學消費者行為之探討
B-12	林志鴻、林傳福、蘇筱洁、林孟琪、賴亭廷、鄭伊筑	彈珠按摩皂

化妝品應用系學生專題成果壁報展示

編號	作者群	題目
B-13	李宏中、吳碩和、許雯萍、郭奕汝、彭鈺茹、黃敬庭	數位影像編修於臉部妝容喜好度之研究
B-14	黃俊薰、劉雅禎、鐘偵慈、陳美如、陳慧琳、吳皓云、吳馥安	以香水調製初探原創故事愛葛莎莊園-女巫、神獸、樹洞之角色
B-15	吳秋燕、廖妤甄、林晏慈、張竹晶、曾于珊、蔡綺芳、陳孟蓓	校內實習商店-紓壓小棧行銷與推廣之探討
B-16	趙俊彥、林昱廷、黃渝萱、林晴潔、侯芊妤、賀湘婷	特效傷妝研究-以陸劇法醫秦明片段為例
B-17	陳姿吟、陳孝潔、楊子嫻、巫昀珊、林佳瑢、呂沂沛	指甲矯正-以嵌甲矯正器為例
B-18	黃俊薰、賴子綾、劉淮瑄、潘姿璇、趙怡君、邱郁珊	紫甘藍浸泡萃取液應用於香水製作之初探
B-19	吳秋燕、徐鈺詞、張寶文、章庭瑄、郭庭安	穴位按摩對改善女性經期不適之成效探討
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探討不同金銀花初萃物與其活性分子對皮膚細胞生物活性效果評估

楊靖婕[1], 賴永程[1], 鄭靜宜[1,2,3,4,*]

[1] 長庚科技大學健康產業科技研究所

[2] 長庚科技大學中草藥研究中心

[3] 食品暨化妝品安全研究中心

[4] 長庚醫療財團法人林口長庚紀念醫院肺感染及免疫科

皮膚是人體最大的器官，除了調節體溫以及偵測感覺，最主要的功能是保護人體免於外在的刺激。細胞的自噬作用正常運作是維持皮膚健康的狀態，在許多發炎性皮膚疾病中，其自噬作用功能是失調的。 *Lonicera japonica* Thunberg (LJ) 稱金銀花，在傳統醫木犀草苷學用於清熱解毒、通經活絡、治療皮膚發疹、瘡癰腫毒等。 LJ 在現代藥理研究發現具有抗菌、抗病毒、抗發炎、抗氧化、抗過敏等多種功效，主要是因為含有豐富的綠原酸 (3-CQA) 和類黃酮 (Flavonoids)。目前 LJ 對皮膚疾病上的研究很少。因此，本研究以腫瘤壞死因子 (TNF-α) 誘導皮膚角質形成細胞 (HaCaT cells) 發炎反應及引起自噬作用失調，探討 LJ 六種不同萃取層以及四種活性分子：綠原酸 (3-CQA)、新綠原酸 (4-CQA)、隱綠原酸 (5-CQA)、木犀草苷 (CYN) 之抗發炎效果及其藥理機制。由初步結果發現，萃取層 LJ-50%E、 LJ-H_2O、 LJ-SH、 LJ-SM (30 ng/ml) 和四種活性分子在 50 μM 濃度下皆有顯著性地抑制 TNF-α 誘導 COX- 2 的表現及 PGE2 的含量，而四種純化物皆有抑制 IL-1β 及 IL-8 發炎細胞激素的含量及 p62 自噬蛋白的累積。另外，自噬作失調主要受 PI3K/Akt/mTOR 及 JNK1/2 路徑調控，而 JNK1/2/c-Jun 及 NF-κB (p65) 路徑參與 COX-2 表現。四種純化物皆顯著性抑制以上路徑的活化，進而減少 TNF-α 誘導發炎反應及改善失常的自噬作用。其中消炎效果以極性高的萃取層 (LJ-SM) 及 3-CQA 為最好。未來利用皮膚發炎動物模組驗證細胞實驗的結果，期許 LJ 中四種純化物可被開發利用於皮膚消炎用藥。

關鍵字:金銀花、綠原酸、抗發炎、自噬作用

To explore the evaluation of the biological activity of different *Lonicera japonica* Thunberg extracts and their active molecules on skin cells

Ching-Chieh Yang [1], Yung-Cheng Lai [1], Ching-Yi Cheng [1, 2, 3, 4, *]

[1.] Graduate Institute of Health Industry Technology, Chang Gung University of Science and Technology, Taoyuan, Taiwan [2.] Research Center for Chinese Herbal Medicine, Chang Gung University of Science and Technology, Taoyuan, Taiwan [3.] Research Center for Food and Cosmetic Safety, Chang Gung University of Science and Technology, Taoyuan, Taiwan [4.] Department of Pulmonary Infection and Immunology, Chang Gung Memorial Hospital at Linkou, Taoyuan, Taiwan

The skin is the largest organ of the human body. In addition to regulating body temperature and detecting sensations, its main function is to protect the human body from external stimuli. Cellular autophagy is responsible for maintaining a healthy state of the skin, and its autophagy function is dysregulated in many inflammatory skin diseases. In traditional medicine, *Lonicera japonica* Thunberg (LJ) is used to clear heat and detoxify, clear the meridians, activate collaterals, and treat skin rashes, sores, carbuncles, and swollen toxins. It has been reported that LJ has antibacterial, antiviral, anti-inflammatory, anti-oxidative, and anti-allergic, mainly because it is rich in chlorogenic acid (3-CQA) and flavonoids. There is currently very little research on skin diseases treatment with LJ. Therefore, in this study, tumor necrosis factor (TNF-α) was used to induce skin keratinocyte (HaCaT cells) inflammation and cause autophagy dysregulation, and explore the anti-inflammatory effects and pharmacological mechanisms of six different extract layers and four active molecules of LJ: chlorogenic acid (3-CQA), neochlorogenic acid (4-CQA), cryptochlorogenic acid (5-CQA), and luteolin (CYN).

The preliminary results found that the extraction layers LJ-50%E, LJ-H_2O, LJ-SH, LJ-SM at 30 ng/ml, and the four active molecules at 50 μM all significantly inhibited TNF-α induced COX-2 expression and PGE2 level. Four active molecules all inhibited the content of IL-1β and IL-8 inflammatory cytokines and the accumulation of p62 autophagy protein. In addition, autophagy dysregulation is mainly regulated by PI3K/Akt/mTOR and JNK1/2 pathways, while JNK1/2/c-Jun and NF-κB (p65) pathways are involved in COX-2 expression. All four active products significantly inhibited the activation of the above pathways, thereby reducing the TNF-α-induced inflammatory response and ameliorating abnormal autophagy. The anti-inflammatory effect is best with the extraction layer with high polarity (LJ-SM) and 3-CQA. The results of cell experiments will be verified using animal skin inflammation models. We expect the four active compounds in LJ to be developed and utilized for skin anti-inflammatory drugs.

Keywords: *Lonicera japonica* Thunberg, chlorogenic acid, anti-inflammation, autophagy

探討甘草查耳酮 E 改善非酒精性脂肪肝疾病及調節脂肪肝細胞之脂質代謝作用

劉宣旻，黃文忠*
長庚科技大學健康產業科技研究所

甘草查耳酮 E是從甘草中分離出來的一種查爾酮化合物，具有抗腫瘤、抗菌和抗發炎作用，前人研究發現甘草查耳酮E 可以提高肝細胞的胰島素敏感性。然而，甘草查耳酮 E 對改善非酒精性脂肪性肝病的分子機制尚不清楚。在這項研究中，我們研究了甘草查耳酮 E 是否可以抑制 FL83B 肝細胞中的脂質堆積情形。此外，雄性 C57BL/6 小鼠用甲硫氨酸/膽鹼缺乏飲食 (MCD) 餵養，並用 10 mg/kg 甘草查耳酮 E（每週兩次）治療 4 週，觀察甘草查耳酮 E改善非酒精性脂肪肝的效應。細胞實驗利用 0.5 mM 油酸刺激 FL83B 肝臟細胞，以誘導形成脂肪肝細胞模式，並加入不同濃度的甘草查耳酮 E 24 小時，實驗結果顯示，甘草查耳酮 E 有抑制肝細胞的脂質堆積並降低脂質過氧化的情形。甘草查耳酮 E 可以降低與脂肪生成相關的轉錄因子表達，包括 SREBP1c。他還降低脂肪酸合成酶的表現，以及增加 ATGL 和 HSL 的磷酸化作用，以促進油酸誘導肝細胞的脂肪分解。此外，甘草查耳酮 E 顯著增加 sirt-1 和 AMPK 的磷酸化，並降低調節脂肪酸合成的乙醯輔酶 A 羧化酶的活性表現。動物實驗發現甘草查耳酮 E 可減少 MCD 誘導小鼠的肝臟脂肪空泡，並可減低血清 GOT 與 GPT 數值。我們的研究結果表明，甘草查耳酮 E 是一種天然產物，可有效調節脂肪肝細胞的脂質代謝並改善小鼠的非酒精脂肪肝疾病。

關鍵字: 甘草查耳酮 E，脂質生成，脂質分解，非酒精脂肪肝疾病

To explore the effect of Licochalcone E on improving non-alcoholic fatty liver disease and regulating the lipid metabolism of fatty liver cells

Xuan-Min Liu, Wen-Chung Huang *

Graduate Institute of Health Industry Technology, Chang Gung University of Science and Technology, Taoyuan City, Taiwan.

Licochalcone E is a chalcone isolated from *Glycyrrhiza uralensis*. It showed anti-tumor, antibacterial and anti-inflammatory effect. Licochalcone E also could improve insulin sensitivity in hepatocytes. However, the effects of licochalcone E on improving nonalcoholic fatty liver disease (NAFLD) is unclear. In this study we investigated whether licochalcone E could inhibit lipids accumulation in FL83B hepatocytes. Additionally, male C57BL/6 mice fed with methionine/choline-deficient (MCD) diet, and treated with 10 mg/kg licochalcone E (twice a week) for 4 weeks. Furthermore, FL83B cells were induced as fatty liver cell model by 0.5 mM oleic acid for 48 h, and treated with various concentration of licochalcone E for 24 h. The results demonstrated that licochalcone E significantly suppressed lipid accumulation and decreased lipid peroxidation in hepatocytes. Licochalcone E could decrease lipogenesis-related transcription factor expression, including sterol regulatory element-binding proteins 1c. It also reduced fatty acid synthase expression and increased adipose triglyceride lipase and the phosphorylation of hormone-sensitive lipase production for promoting lipolysis in oleic acid-induced hepytocytes. Furthermore, licochalcone E significantly increased sirt-1 and phosphorylation of AMPK, and decreased activity of acetyl-CoA carboxylase for regulating fatty acid synthesis. Licochalcone E also decreased fat vacuoles in MCD-induce mice, and reduced the levels of GOT and GPT in serum. Our results suggest that licochalcone E is a natural product that effectively regulates the lipid metabolism of fatty liver cells and ameliorates NAFLD in mice.

Keywords: Licochalcone E; Lipogenesis; Lipolysis; Non-alcoholic fatty liver disease

民生學院校慶系列學術活動
110 學年度天然物與健康科技研討會
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以科學方法量化飲食質地分級標準

詹芃萱[1]，鮑力恒[1,2,*]，邱麗玲[3,*]

[1] 長庚學校財團法人長庚科技大學健康產業科技研究所

[2] 長庚學校財團法人長庚科技大學食品暨化妝品安全研究中心

[3] 長庚科學校財團法人長庚科技大學保健營養系、中草藥研究中心、高齡暨長期照護研究中心

臺灣 65 歲以上人口數於 2018 年高達 343 萬（14.6%）而正式邁入高齡社會，因此高齡者的健康問題備受重視，尤其因進食困難引起的營養不良比例甚多，高齡者也經常抱怨食物吞咬不動且吞不下，但目前尚無牙口咬合力和食物質地的對應量表，使得食物烹飪者和主要照護員無法準確又快速地判斷餐點的硬度。因此本研究欲以編號 007 的膠體粉末製成不同硬度的標準樣品，並用含硬度感測裝置之餐具（新型專利）和食品物性分析儀先測量其硬度，測量同時也使用 IOPI 測量標準樣品時指甲反白的程度，並再測量受試者的牙口咬合力，以相對應不同硬度的 6 種食材為範例，進而提供一份可供飲食質地分類的牙口咬合力及餐具施壓力的對照量表。而由目前的結果可得知，不管是1.5或是3公分的標準樣品，在 0.33% 的時候都測不出數值，數值皆為 0，指甲輕微反白，不需出力就能壓碎，對應到的食材為中華豆花，而 3 公分的標準品且濃度在 1.83% 時，湯匙和叉子都會壓不下去，指甲完全反白，就算出再大的力量都壓不碎，對應到的食材為雞胸肉，然而因疫情的關係，還未能收到受試者的牙口咬合力值，未來還需等疫情減緩，收到數值後，才能製作出完整量表。

關鍵字: 高齡者、IDDSI、餐具、硬度值、咬合力、量表

Quantifying the grading standard of dietary texture with scientific method

Peng-Hsuan Zhan [1], Li-Heng Pao [1, 2, *] and Li-Ling Chiu [3, *]

[1]1Graduate Institute of Health Industry Technology, College of Human Ecology, Chang Gung University of Science and Technology, Taoyuan, Taiwan

[2] Research Center for Food and Cosmetic Safety, College of Human Ecology, Chang Gung University of Science and Technology, Taoyuan, Taiwan

[3] Department of Nutrition and Health Sciences, Research Center for Chinese Herbal Medicine, College of Human Ecology & Geriatric and Long-Term Care Research Center, Chang Gung University of Science and Technology, Taoyuan, Taiwan

In 2018, the number of Taiwanese people aged 65 and above reached 3.43 million (14.6%), and Taiwan officially became an aged society. Therefore, the health problems of older adults have attracted much attention. Particularly, large portions of older adults develop malnutrition due to eating difficulties, and older adults often complain about chewing and swallowing difficulties. Because there is no scale available to contrast bite force with food texture, cooks and primary caregivers thus fail to accurately and quickly determine the firmness of food in a meal. This study intended to produce standard samples of various firmness using colloidal powder No. 007. First, a tableware with hardness sensing device (utility model patent) and a texture analyzer were used to measure the firmness of these samples. The degree to which nail blanches to white was assessed with Iowa Oral Performance Instrument (IOPI) during the process. The occlusal force of patients was then measured. Six types of food materials corresponding to various firmness were used as examples to produce a food texture classification scale that contrasts occlusal force with tableware pressure. According to the results we have obtained, standard samples with a thickness of 1.5 cm or 3 cm obtained a score of 0 at a concentration of 0 .33%; such samples made the nail blanch slightly, could be crushed without apply additional force, and were comparable to the firmness of sweet tofu made by Chung Hwa Food Industrial Co. Standard samples with a thickness of 3 cm and measured at a concentration of 1.83% remained unaffected when subjected to the force generated by a spoon or a fork, made the nail blanch completely, could not be crushed no matter how much force was applied, and were comparable to the firmness of chicken breast. Due to the pandemic, this study has yet to measure the participants' occlusal force. Only when the pandemic subsides can this study obtain the required data to produce a comprehensive scale.

Keywords: Aged, Tableware , Hardness, Bite force, Scale

NLRP3 發炎小體抑制劑對乾癬的藥理作用

陳楷茵 [1]，黃聰龍 [1, 2, *]
[1] 長庚科技大學健康產業科技研究所
[2] 長庚大學天然藥物研究所

發炎小體在乾癬的發病機制中扮演著關鍵作用。 NLRP3 發炎小體的活化會刺激 caspase-1 相關性 interleukin (IL)-1β 和 IL-18 釋放以及 gasdermin D 誘導細胞焦亡。因此，標靶 NLRP3 發炎小體是治療乾癬的有效策略。在這項研究中，我們發現咪唑化合物 (化合物 A) 對咪喹莫特誘導造成的 IL-1β 和 IL-18 分泌及細胞焦亡產生乳酸脫氫酶 (LDH) 釋放，在脂多醣 (LPS) 處理的 THP-1 巨噬細胞具有潛在的抑製作用。化合物 A 在抑制尼日利亞菌素和尿酸晶體刺激巨噬細胞的 IL-1β、IL-18 和細胞焦亡 LDH 釋放跟咪喹莫特呈現相似結果，證明活性氧、鉀和溶酶體損傷在化合物 A 參與影響。化合物 A 減少了咪喹莫特誘導 THP-1 巨噬細胞中的細胞內 ROS 產生和 caspase-1 活化。此外，化合物 A 改善了咪喹莫特誘導乾癬小鼠的皮膚症狀。綜上，我們的研究結果表明，化合物 A 是 NLRP3 發炎小體的抑製劑，具有開發為抗乾癬藥物的潛力。

關鍵字: 凋亡蛋白酶-1; 咪喹莫特; 巨噬細胞; NLRP3 發炎小體; 乾癬

Pharmacological effect of NLRP3 inflammasome inhibitor on psoriasis

Kai-Yin Chen [1], Tsong-Long Hwang [1, 2, *]

[1] *Graduate Institute of Health Industry Technology, Chang Gung University of Science and Technology, Taoyuan33303, Taiwan*

[2] *Graduate Institute of Natural Products, College of Medicine, Chang Gung University, Taoyuan 33302, Taiwan.*

Inflammasome plays a critical role in the pathogenesis of psoriasis. Activation of NLRP3 inflammasome stimulates caspase-1 dependent interleukin (IL)-1β and IL-18 release as well as gasdermin D-mediated pyroptosis. Therefore, targeting NLRP3 inflammasome is a useful strategy to treat psoriasis. In this study, we found that an imidazole compound (compound A) had potential inhibitory effects on imiquimod-induced IL-1β and IL-18 secretion as well as pyroptotic release of lactate dehydrogenase (LDH) in lipopolysaccharide (LPS)-primed THP-1 macrophages. Similar results, compound A inhibited the release of IL-1β, IL-18, and pyroptotic LDH in nigericin- and monosodium urate-stimulated macrophages, suggesting that reactive oxygen species (ROS), potassium, and lysosome damage are involved in the effects of compound A. Compound A reduced intracellular ROS generation and caspase-1 activation in imiquimod-induced THP-1 macrophages. Furthermore, compound A ameliorated psoriasis-like skin symptoms in imiquimod-induced mice. In summary, our results demonstrated that compound A is an inhibitor of NLRP3 inflammasome and has potential to develop as anti-psoriasis drug.

Keywords: caspase-1; imiquimod; macrophage; NLRP3 inflammasome; psoriasis

軟珊瑚 *Sinularia leptoclados* 的化學成分和生物活性之研究

黃心嵐[1], 汪依璿[2], 張祐嘉[3,*], 黃聰龍[1,2,3,*]

[1] 長庚科技大學健康產業科技研究所

[2] 長庚大學天然藥物研究所

[3] 長庚科技大學中草藥研究中心

海洋天然物具有多種化學結構，是藥物開發的重要來源。在此，將研究細指型軟珊瑚 *Sinularia leptoclados* 的化學成分及其抗發炎活性。從 *S. leptoclados* 中純化分離得到三種新化合物，sinleptosterols C (**1**), 8*α*H-3*β*-hydroxy-11-acetoxy-24-methylene-9,11-secocholest-5en-9-one (**2**), 8*α*H-(24*R*)-11-acetoxy-3*β*-hydroxy-24-methyl-9,11-secocholest-5,22*E*-dien-9-one (**3**) 和五種已知化合物 8*β*H-3*β*-Hydroxy-11-acetoxy-24-methylene-9,11-secocholest-5-en-9-one (**4**), 8*β*H-(24*R*)-11-acetoxy-3*β*-hydroxy-24-methyl-9,11-secocholest-5,22*E*-dien-9-one (**5**), (24*S*)-3*β*-Hydroxy-11-acetoxy-24-methyl-9,11-secocholest-5-en-9-one (**6**), 3*β*,11-dihydroxy-9,11-secogorgost-5en-9-one (**7**) 和 3*β*,11-dihydroxy-24-methylene-9,11-secocholstan-9-one (**8**)。在這些化合物中，**3**/**5** 和 **6** 對人類嗜中性白血球中彈性蛋白酶和超氧陰離子的釋放，具有顯著的抑制作用。我們的結果表明 *S. leptoclados* 是開發 9,11-secosteroids 的良好來源。我們還發現化合物 **3**/**5** 和 **6** 可以做為潛在的嗜中性白血球炎症藥物。

關鍵字: 細指型軟珊瑚；9,11-secosteroid；人類嗜中性白血球；抗發炎

Studies on the chemical constituents and bioactivities of soft coral *Sinularia leptoclados*

Hsin-Lan Huang [1], Yi-Hsuan Wang [2], Yu-Chia Chang [3,*], Tsong-Long Hwang[1,2,3,*]

[1] *Graduate Institute of Health Industry Technology, Chang Gung University of Science and Technology, Taoyuan, Taiwan*

[2] *Graduate Institute of Biomedical Sciences and Graduate Institute of Natural Products, College of Medicine, Chang Gung University, Taoyuan 33302, Taiwan*

[3] *Research Center for Chinese Herbal Medicine, College of Human Ecology, Chang Gung University of Science and Technology, Taoyuan, Taiwan*

Marine natural products have diverse chemical structures, which are significant sources for drug discovery. Herein, the chemical ingredients of soft coral *Sinularia leptoclados* and their anti-inflammatory activity will be investigated. Three new compounds, sinleptosterols C (**1**), 8*α*H-3*β*-hydroxy-11-acetoxy-24-methylene-9,11-secocholest-5en-9-one (**2**), 8*α*H-(24*R*)-11-acetoxy-3*β*-hydroxy-24-methyl-9,11-secocholest-5,22*E*-dien-9-one (**3**), and five known compounds, 8*β*H-3*β*-Hydroxy-11-acetoxy-24-methylene-9,11-secocholest-5-en-9-one (**4**), 8*β*H-(24*R*)-11-acetoxy-3*β*-hydroxy-24-methyl-9,11-secocholest-5,22*E*-dien-9-one (**5**), (24*S*)-3*β*-Hydroxy-11-acetoxy-24-methyl-9,11-secocholest-5-en-9-one (**6**), 3*β*,11-dihydroxy-9,11-secogorgost-5en-9-one (**7**) and 3*β*,11-dihydroxy-24-methylene-9,11-secocholestan-9-one (**8**), were isolated from *S. leptoclados*.[1, 2] Among these compounds, **3**/**5** and **6** showed significantly inhibitory effect on the release of elastase and superoxide anion in actived human neutrophils. In conclusion, our results indicate that *S. leptoclados* is a good source for developing 9,11-secosteroids. We also identify that compounds **3**/**5** and **6** are potential drug discovery for neutrophilic inflammation**.**

Keywords: *Sinularia leptoclados*; 9,11-secosteroid; human neutrophil; anti-inflammation

桑皮苷C改善高脂飲食誘導肥胖小鼠的非酒精性脂肪肝疾病及調節肝臟脂質代謝

謝佩君[1], 吳淑如[2], 黃文忠[1,*]
[1]長庚科技大學健康產業科技研究所
[2]長庚科技大學保健營養系

隨著生活品質的提升，許多慢性的文明病也跟著出現，其中「肥胖症」的發病率在各國間持續地增加；而肥胖除了會導致第二型糖尿病、高血壓、心血管疾病等之外，也是非酒精性脂肪性肝病（Non-alcoholic fatty liver disease，NAFLD）的危險因子之一。NAFLD 是一種進行性肝病，不給予治療或改善就會造成非酒精性脂肪性肝炎、肝纖維化、肝硬化，甚至是肝癌。桑皮苷C（Mulberroside C，MuC）從桑樹皮和根中分離得到。先前的研究已經證實，桑皮苷具有抗肥胖、抗炎、抗氧化和改善血糖、血脂的作用；目前研究已知 MuC 具有抗病毒活性與抗血栓形成作用。在這項研究中，我們探討 MuC 是否可以改善高脂飲食（High-fat diet，HFD）誘導的肥胖小鼠的 NAFLD，並評估肝細胞中脂肪生成的調節。動物實驗設計雄性 C57BL/6 小鼠餵食正常飲食或 HFD 16 週。第四周後，小鼠腹腔注射 MuC 12 週。在另一項實驗中，用油酸（Oleic acid，OA）處理 FL83B 肝細胞以誘導脂質積累，或用 MuC 處理肝細胞，以評估 MuC 對調節肝細胞脂肪生成作用。實驗結果顯示，與 HFD 餵養的小鼠相比，MuC 具有顯降低小鼠的體重，降低肝臟重量和肝臟脂質積累並改善肝細胞脂肪變性。有趣的是，與肥胖小鼠相比，MuC 還能有效地調節腸道細菌厚壁菌門/擬桿菌門的比例。在體外細胞實驗，我們發現 MuC 減少脂質油滴的產生，並增強脂肪分解和脂肪酸 β-氧化作用。這些結果顯示，MuC 可以透過調節肝臟中脂肪生成、脂肪分解和脂肪酸β氧化的表現，以達到改善肝臟脂肪變性的情形。

關鍵字：非酒精性脂肪肝疾病、桑皮苷、FL83B 細胞、脂質代謝、腸道細菌

Mulberroside C improve non-alcoholic fatty liver disease in obese mice induced by high-fat diet and regulate liver lipid metabolism

Pei-Jun Xie [1], Shu-Ju Wu [2], Wen-Chung Huang [1,*]

[1] *Graduate Institute of Health Industry Technology, Chang Gung University of Science and Technology, Taoyuan, Taiwan*

[2] *Department of Nutrition and Health Sciences, Chang Gung University of Science and Technology, Taoyuan, Taiwan*

With the improvement of the quality of life, many chronic diseases of civilization have also appeared, among which the incidence of "obesity" has continued to increase in various countries. Obesity will not only lead to type 2 diabetes, hypertension, cardiovascular disease, but is also a risk factor for nonalcoholic fatty liver disease (NAFLD). NAFLD is a progressive liver disease that, without treatment or improvement, can lead to nonalcoholic steatohepatitis, liver fibrosis, cirrhosis, and even liver cancer. Mulberryside C (MuC) were isolated from mulberry bark and roots. Previous studies have confirmed that mulberryside has anti-obesity, anti-inflammation, anti-oxidant and improve blood sugar and blood lipid functions. MuC wea found that can promote antiviral activity and anti-thrombotic. In this study, we explored whether MuC could improve NAFLD in high-fat diet (HFD)-induced obese mice and assessed the regulation of lipogenesis in hepatocytes. Male C57BL/6 mice fed a normal diet or HFD were tested for 16 weeks. After the fourth week, mice were intraperitoneally injected with MuC for 12 weeks. In another cell experiments, FL83B cells were treated with oleic acid (OA) to induce lipid accumulation or MuC to evaluate lipogenesis. Compared with HFD-fed mice, MuC significantly reduced body weight; and decreased liver weight and hepatic lipid accumulation and improved hepatocyte steatosis. Interestingly, MuC also effectively modulated the gut bacteria Firmicutes/Bacteroidetes ratio compared to obese mice. In vitro, MuC reduced lipid oil droplet generation and enhanced lipolysis and fatty acid β-oxidation. These results suggested that MuC can improve hepatic steatosis by modulating the expressions of lipogenesis, lipolysis, and fatty acid β-oxidation in the liver.

Keywords: Nonalcoholic fatty liver disease; Mulberryside; FL83B cell; Lipid metabolism; Gut bacteria

以轉麩醯胺酶改質植物蛋白建立植物蝦加工資料庫

林欣葦[1]，李明怡[2,*]
[1]長庚科技大學健康產業科技研究所
[2]長庚科技大學保健營養系

近年來，因動物性疾病、碳排放量增加而造成溫室效應的環境影響、宗教信仰及營養健康等因素，進而增加素食的需求，因此，出現許多利用蒟蒻製造的素蝦產品，但缺乏組織及纖維口感，為了使其組織及口感更接近新鮮蝦。因此，本研究主要使用食品工業界常用之植物蛋白 (大豆蛋白及豌豆蛋白) 為原料，藉由添加不同濃度(0.1 及 0.5%) 之轉麩醯胺酶 (transglutaminase；TGase)，將其反應於不同的溫度 (25 及 50℃) 和時間 (20 及 60 分鐘)，探討不同條件下蛋白質特性及質地之間的變化，將此數據建立資料庫，未來應用於植物蝦加工製造。實驗結果顯示添加 0.5% TGase，在 50℃ 下反應 60 分鐘，在表面疏水性、游離胺基酸、內部結構、彈性及硬度皆有類似新鮮蝦肉的最佳表現。當大豆蛋白及豌豆蛋白隨著 TGase 濃度、反應溫度及時間的增加，可顯著改變蛋白質結構並增加硬度及彈性，由此推斷 TGase 會增加胺基酸的鍵結使內部疏水基團外翻至外部，而減少游離胺基酸並使表面疏水性增加，在掃描式電子顯微鏡 (Scanning Electron Microscope；SEM) 觀測中可發現內部結構上的空洞變大或排列更緊密，推測是由此來增加食品的硬度及彈性。此外，在大豆蛋白質地分析中，當添加 0.5% TGase，在 50℃ 下反應，僅需反應 20 分鐘，就可以得到與反應 60 分鐘相近的結果，所以，可以縮短在食品製造時的反應時間，也可以保持食品的新鮮度。因此，在蛋白質特性及質地分析的實驗結果可建立為製造植物蝦的資料庫，並供日後製造具組織及纖維的植物蝦。

關鍵字：轉麩醯胺酶、植物蛋白、植物蝦、表面疏水性、游離胺基酸、掃描式電子顯微鏡、質地分析

The plant shrimp processing to establish a database by using transglutaminase to modify plant protein

Hsin-Wei Lin [1], Ming-Yi Lee [2, *]

[1]*Graduate Institute of Health Industry Technology, Chang Gung University of Science and Technology, Taoyuan, Taiwan.*

[2]*Department of Nutrition and Health Sciences, Chang Gung University of Science and Technology, Taoyuan, Taiwan.*

In recent years, environmental problems and health have increased the variety and demand of vegetarian food. At present, the type of vegetarian food including meat and shrimp. However, vegetarian shrimp is made from konjac, which does not have the same texture as shrimp. Therefore, this study will use different plant proteins (soy protein and pea protein) and add different transglutaminase (TGase) conditions, concentration (0.1 and 0.5%), temperature (25 and 50 ℃) and time (20 and 60 minutes) to establish a database of plant shrimp and to explore the protein profile and texture. The results show that has the best effect of surface hydrophobicity, free amino acid, internal structure, hardness and springiness which are similar to shrimp on 0.5% TGase and reacting at 50℃ for 60 minutes. When the TGase concentration, temperature and time are increase, it may be due to the increase of amino acid cross-linking, which makes the internal hydrophobic to the outside, so reducing the free amino acid and increasing the surface hydrophobicity. And using Scanning electron microscope (SEM), it was found that the internal structure to change, which is increase the hardness and springiness of the food. In addition, adding 0.5% TGase and reacting at 50 ℃ for 20 minutes the similar results to 60 minutes in texture analysis of soy protein, it can reduce the time of food processing. Therefore, the results of protein profile and texture analysis are used to establish the database of plant shrimp.

Keyword：transglutaminase, plant protein, plant shrimp, surface hydrophobicity, free amino acid, scanning electron microscope, texture analysis

檢測咀嚼能力分級之標準食品開發

鍾宜臻 [1], 鮑力恒 [1, 2, *], 邱麗玲 [3, *]

[1] 長庚學校財團法人長庚科技大學健康產業科技研究所

[2] 長庚學校財團法人長庚科技大學食品暨化妝品安全研究中心

[3] 長庚科學校財團法人長庚科技大學保健營養系、中草藥研究中心、高齡暨長期照護研究中心

目的：為了解決咀嚼或吞嚥困難的問題，現今發展出各種飲食質地的分類，及評估咀嚼功能的方法，但就目前而言沒有一個評估方式可以直接判斷民眾的牙口功能適合哪一種等級的飲食，因此本研究藉由新開發的標準食品來評估咀嚼能力，從中探討咀嚼能力與飲食質地分類之間的關係。方法：以日本的通用設計食品 Universal Design Food (UDF) 分級為基礎，製作出四種等級細篩及初篩的標準食品。(1) 確認標準食品原料並進行濃度測試及質地硬度測試 (2) 利用感官品評選出標準食品的風味 (3) 進行儲存測試並調整配方 (4) 確認評估的判定標準 (5) 標準食品測試分析。結果：(1) 已確認膠體原料，其濃度為：初篩 2.4%、容易咀嚼 4.7%、牙齦咀嚼 0.8%、舌頭壓碎 0.5% 及不需咀嚼 0.3% (2) 風味：蜂蜜口味。結論：目前已完成產品開發階段，需進一步進行儲存試驗調整品質，待確認評估標準後即可進行標準食品測試。

關鍵字: 飲食質地分類、標準食品、咀嚼評估

Developing Standard Food for Testing Chewing Ability Levels

Yi-Chen Chung [1], Li-Heng Pao [1, 2, *] and Li-Ling Chiu [3, *]

[1] *Graduate Institute of Health Industry Technology, College of Human Ecology, Chang Gung University of Science and Technology, Taoyuan, Taiwan*

[2] *Research Center for Food and Cosmetic Safety, College of Human Ecology, Chang Gung University of Science and Technology, Taoyuan, Taiwan*

[3] *Department of Nutrition and Health Sciences, Research Center for Chinese Herbal Medicine, College of Human Ecology & Geriatric and Long-Term Care Research Center, Chang Gung University of Science and Technology, Taoyuan, Taiwan*

Objective: To solve the problem of chewing difficulty or dysphagia, many methods have been developed to classify food texture and assess chewing functions. However, none of the existing assessment methods can be used to directly identify the level of food suitable for individuals with certain oral functions. Therefore, the present study used newly developed standard food to assess chewing abilities and explore the relationship between chewing abilities and food texture classification. Methods: The Japanese Universal Design Food (UDF) standard was used to prepare standard food of 4 levels of fine screening and primary screening. (1) Ingredients of the standard food were identified with concentration testing and texture hardness testing. (2) Sensory evaluation was used to determine the taste of the standard food. (3) Storage testing and formula adjustment were conducted. (4) Appraisal standards were determined. (5) Standard food was tested and analyzed. Results: (1) Colloid ingredient concentrations were confirmed to be primary screening 2.4%, easily chewable 4.7%, gum-mashable 0.8%, tongue-mashable 0.5%, and no need to chew 0.3%. (2) The taste is honey. Conclusion: The product development stage is now complete. Further storage testing and quality adjustment are required. After the appraisal standards are determined, the standard food testing can be conducted.

Keywords: Dietary texture classification, Standard food, Chewing assessment

仙鶴草長碳鏈脂肪族萃取物抑制嗜中性白血球彈性蛋白酶活性之研究

邱言純[1], 陳俞利[2],黃聰龍[1,2,3,*]

[1] 長庚科技大學健康產業科技研究所

[2] 長庚科技大學中草藥研究中心

[3] 長庚大學天然藥物研究所

嗜中性白血球是屬於先天免疫系統的成員之一。嗜中性白血球的過度活化與急性和慢性炎症性疾病有關。仙鶴草是一種中藥，用於止血、解毒、消腫。此外，仙鶴草萃取物對人類嗜中性白血球具有抗發炎作用。然而，仙鶴草的生物活性成分仍不清楚。本研究來探討仙鶴草中的生物活性成分在嗜中性白血球活性。仙鶴草萃取物是使用高壓輔助萃取和連續萃取所製備。正己烷萃取物 (AP-H) 對嗜中性白血球彈性蛋白酶 (NE) 的釋放具有最大的抑制活性，IC_{50} 為 0.79 ± 0.45 μg/ml。萃取物對 NE 釋放的抑制順序為正己烷 > 乙酸乙酯 > 酒精 > 水。此外，進一步取得富含長碳鏈脂肪族 (AP-H-2) 劃分層，結果發現對嗜中性白血球彈性蛋白酶顯示出更有效的抑製作用。目前是第一個指出仙鶴草的低極性層萃取物能有效抑制嗜中性白血球彈性蛋白酶的研究。在未來的研究中，將驗證 AP-H-2 的活性成分和分子網路圖譜，為植物藥的臨床應用提供科學支持。

關鍵字：仙鶴草、嗜中性白血球、彈性蛋白酶、長碳鏈脂肪族

An aliphatic hydrocarbons-enriched extract of *Agrimonia pilosa* Ledeb. attenuates neutrophil elastase activity

Yen-Chun Chiu [1], Yu-Li Chen [2], Tsong-Long Hwang [1, 2, 3, *]

[1] *Graduate Institute of Health Industry Technology, Chang Gung University of Science and Technology, Taoyuan 33303, Taiwan*

[2] *Research Center for Chinese Herbal Medicine, College of Human Ecology, Chang Gung University of Science and Technology, Taoyuan 33303, Taiwan*

[3] *Graduate Institute of Natural Products, College of Medicine, Chang Gung University, Taoyuan 33302, Taiwan.*

Neutrophils belong to a member of the innate immune system. Over-activation of neutrophils is involved in acute and chronic inflammatory diseases. *Agrimonia pilosa* Ledeb. (AP), a traditional Chinese medicine, is used to stop bleeding, detoxify, and reduce swelling. Besides, AP extracts have anti-inflammatory effect in human neutrophils. However, the bioactive ingredients of AP remain unclear. This study aims to investigate the anti-neutrophilic activity of bioactive components from AP. AP extracts were prepared using high pressure-assisted extraction with sequential hydrophobic solvents. The *n*-hexane extract (AP-H) had the most inhibitory activity on the release of neutrophil elastase (NE) with an IC_{50} of 0.79 ± 0.45 μg/ml. The inhibitory order of extracts on NE release is *n*-hexane > EA > EtOH > Water. Furthermore, an aliphatic hydrocarbons-enriched fraction (AP-H-2) was prepared and showed more potent inhibitory effects against neutrophil elastase. This is the first study to point out that the hydrophobic compounds of AP effectively inhibit neutrophil elastase. In the future study, the active ingredients of AP-H-2 and molecular networking will be verified to provide scientific support for clinical applications as a botanical drug.

Keywords: *Agrimonia pilosa* Ledeb., neutrophil, elastase, aliphatic hydrocarbons

甘草查耳酮 D 調節自噬改善脂肪肝細胞脂質代謝

楊惠祺, 魏巧涵, 黃文忠*
長庚科技大學健康產業科技研究所

非酒精性脂肪性肝疾病 (non-alcoholic fatty liver disease，NAFLD) 是一種由肝臟異常脂質積累引起的代謝症候群症狀。隨著脂質堆積會加重 NAFLD 的發炎，最終造成患者產生肝纖維化和肝細胞癌的現象。多項研究顯示，細胞自噬是有效改善 NAFLD 和調節肝臟脂質分解的新途徑。因此，在本研究中我們探討了甘草查耳酮 D (Licochalcone D) 是否抑制 FL83B 正常小鼠肝細胞中的脂質堆積。我們將 FL83B 細胞用 0.5 mM 油酸誘導 48 h，形成脂肪肝細胞模型，再加入不同濃度的 Licochalcone D 處理 24 h。此外，也利用雄性 C57BL/6 小鼠餵食缺乏甲硫胺酸/膽鹼飼料 (MCD)，誘導小鼠產生 NAFLD 症狀，並給予小鼠腹腔注射 5 mg/kg Licochalcone D。我們透過油紅 O 和螢光染劑 BODIPY 493/503 染色表明，Licochalcone D 顯著降低了 FL83B 細胞中過多的脂質堆積。而 Licochalcone D 也降低 SREBP-1c 產生以阻斷脂肪酸合酶的表現。Licochalcone D 治療也促進三酸甘油脂脂肪酶和荷爾蒙敏感性脂解酶的磷酸化表現，提高脂肪分解作用。此外，Licochalcone D 刺激 CPT-1 表現以活化脂肪酸 β-氧化作用，並顯著增加 Sirt1 和 AMPK 磷酸化，並降低乙醯輔酶 A 羧化酶的表達以抑制肝細胞中的脂肪酸合成。接著，我們也發現 Licochalcone D 還可增加自噬體和溶酶體的融合增加細胞自噬，從而促進脂肪吞噬作用。動物實驗顯示，Licochalcone D 可通過抑制發炎和促進自噬來減少 MCD 誘導小鼠的脂肪泡和纖維化。我們結論顯示，Licochalcone D 可通過減少脂質堆積、抑制發炎和增加自噬來改善 NAFLD。

關鍵字:自噬、甘草查耳酮 D、脂肪生成、脂肪分解、非酒精性脂肪肝

Study on the effect of Licochalcone D regulates autophagy to improve the lipid metabolism of fatty liver cells

Hui-Qi, Yang, Ciao-Han Wei, Wen-Chung Huang *

Graduate Institute of Health Industry Technology, Chang Gung University of Science and Technology , Taoyuan City, Taiwan.

Non-alcoholic fatty liver disease (NAFLD) is a metabolic syndrome caused by abnormal lipid accumulation in the liver. The lipid accumulation will aggravate the inflammation of NAFLD and eventually cause liver fibrosis and hepatocellular carcinoma in patients. Many studies have shown that autophagy is a new way to effectively improve NAFLD and regulate liver lipid decomposition. Therefore, in this study, we investigate whether Licochalcone D inhibits lipids accumulation in FL83B hepatocytes. FL83B cells induce as fatty liver cell model by 0.5 mM oleic acid for 48 h, and treat with various concentration of Licochalcone D for 24 h. Furthermore, male C57BL/6 mice feed with methionine/choline-deficient (MCD) diet to induce NAFLD, and those mice are injected intraperitoneally with 5 mg/kg Licochalcone D. Staining with Oil Red O and the fluorescent dye BODIPY 493/503 demonstrated that Licochalcone D significantly reduced excessive lipid accumulation in FL83B cells. Licochalcone D decreased sterol regulatory element-binding protein 1c to block the expression of fatty acid synthase. Licochalcone D treatment also promoted the expression of adipose triglyceride lipase and the phosphorylation level of hormone sensitive lipase to enhance the decomposition of triglycerides. In addition, Licochalcone D prpmoted CPT-1 expression to activate fatty acid β-oxidation, significantly increased Sirt1 and phosphorylation of AMPK, and decreased expression of acetyl-CoA carboxylase for suppressed fatty acid synthesis in hepatocytes. Moreover, Licochalcone D could also increase autophagosome and lysosome fusion to increase autophagy flux for promoted lipophagy effect. Licochalcone D also decreased fat vacuoles and fibrosis in MCD-induce mice via inhibited inflammation and promoted autophagy. Taken together, our results suggested that Licochalcone D could improve NAFLD by reducing lipid metabolism, inhibiting inflammation and increasing autophagy.

Keywords: Autophagy; Licochalcone D; Lipogenesis; Lipolysis; Non-alcoholic fatty liver disease

質地調整飲食塑型餐製備介入護理之家住民供餐之成效研究

許文綺[1], 鮑力恒[1,2],邱麗玲[3]

[1] 長庚科學校財團法人長庚科技大學健康產業科技研究所

[2] 長庚科學校財團法人長庚科技大學食品暨化妝品安全研究中心

[3] 長庚科學校財團法人長庚科技大學保健營養系、中草藥研究中心、高齡暨長期照護研究中心

根據衛福部的最新統計，全台 65 歲以上的住院人口當中，插鼻胃管（NG tube feeding）的人數多達 12 萬人，總比例高達 17.94%。換言之，65 歲以上住院的患者，每近 5 人就有 1 人選擇以經鼻腔灌食的方式，維持身體所需的營養。而插鼻胃管的患者，通常是因為疾病、老化導致吞嚥困難、容易嗆咳，或者經醫師評估以口進食所獲得的營養不足、大型手術或治療前需要灌食以獲得充分營養等。且經國內研究發現，台灣約有 12.8% 的 65 歲以上長者，經過評估為咀嚼吞嚥異常。亦即每 10 位高齡者，就有 1 位有輕度以上咀嚼吞嚥障礙。咀嚼吞嚥異常同時伴隨長者提升罹患吸入性肺炎風險。

根據國內外許多文獻皆顯示，使用管灌餵食除了會導致患者感到自尊受損等心理問題外，亦常造成食慾降低、胃食道逆流、感染及褥瘡等問題。而經口進食除了可以維持正常的口腔機能外，還能從進食的過程中，享受咀嚼的樂趣，因此對於個人生活品質也相當重要。

普遍機構為有效率提供質地調整飲食餐，多將餐食以流質或糊狀質地呈現，而此性狀食物常被認為在外觀呈現上難以區別食物內容、感官不佳和營養質量上較差，漸而導致食慾下降、憂鬱風險增加及餐食營養素被稀釋的問題發生，許多研究也指出影響食慾感知的信號包含視覺、氣味及味覺，經研究證實食物本身帶來的視覺感受及氣味，能夠增加對於食慾的感知，而對食慾的感知會潛在的影響食物攝入量，進而達到增加食物攝入量的可能性。

因此本研究使用食品及矽膠模型，以將添加商業配方塑型劑之不需咬細泥食填入模型中，進行食物外觀的重塑，假設給予塑形餐供應能增加視覺刺激，且促進增加食慾感知，提升機構住民的飲食攝入量並且透過問卷 (MNA-SF, SANQ-JE, DWB, GDS-15, RTMD-VAS) 一併探討研究相關成效。

關鍵字: 質地調整飲食塑型餐、咀嚼困難、吞嚥困難、營養介入、高齡、食物外觀

A study on the effectiveness of Reshaping Texture Modify Dietary (RTMD) preparation interventions for Nursing Home residents

Wen-Chi Hsu [1], Li-Heng Pao [1, 2, *], Li-Ling Chiu [3, *]

[1] *Graduate Institute of Health Industry Technology, College of Human Ecology, Chang Gung University of Science and Technology, Taoyuan, Taiwan*

[2] *Research Center for Food and Cosmetic Safety, College of Human Ecology, Chang Gung University of Science and Technology, Taoyuan, Taiwan*

[3] *Department of Nutrition and Health Sciences, Research Center for Chinese Herbal Medicine, College of Human Ecology & Geriatric and Long-Term Care Research Center, Chang Gung University of Science and Technology, Taoyuan, Taiwan*

The aging population is a challenge for the whole world, and 16.2% of Taiwan's elderly population has already exceeded the basic threshold for the development of the silver hair industry, and the demand for senior-related food is increasing. The use of the Nasogastric Tube Feeding (NG Tube) can lead to psychological problems such as loss of self-esteem and often a decrease in appetite. Eating through the mouth can maintain normal oral functions and allow one to enjoy the pleasure of chewing from the process of eating, so this is also very important to the quality of life of individuals. In order to provide Texture Modify Dietary (TMD) efficiently, most institutions generally present meals in a paste-like texture and this kind of food is considered to be one of which the content is difficult to distinguish in terms of external presentation, providing poor sensory sensation, which leads to appetite loss. Studies have shown that the visual sensation of food itself can increase the perception of appetite, which can potentially affect food intake, making it possible to increase the food intake. Therefore, in this study, food and silicone models were used to reshape the appearance of the food by filling the models with commercially formulated thickening agent that are purees, which did not require chewing. It was hypothesized that the provision of Reshaping Texture Modify Dietary, RTMD would increase visual stimulation and promote the perception of appetite, which in turn increases dietary intake in nursing home resident and the effectiveness of the study was examined together with questionnaires (MNA-SF, SANQ-JE, DWB, GDS-15, RTMD-VAS).

Keywords: Reshape Texture-Modified Dietary(RTMD)、Chewing Difficulty、Dysphagia、Nutritional Intervention、Elderly、Meal Appearance

尿石素 A 減緩視網膜色素上皮細胞的發炎反應及機制探討

徐銘隆[1,2]，黃文忠[1]，吳淑如[2*]

[1] 長庚學校財團法人長庚科技大學健康產業科技研究所

[2] 長庚學校財團法人長庚科技大學保健營養系

目前的研究指出促發炎細胞激素 interleukin (IL)-1β 會導致視網膜色素上皮細胞 (ARPE-19) 造成發炎反應，而視網膜色素上皮細胞的發炎與視網膜病變有關，如老年性黃斑部病變和糖尿病視網膜病變。石榴活性成分石榴苷 (punicalagin) 被腸道微生物代謝轉變形成尿石素 A (urolithin A)。研究證實 urolithin A 具有多種的生理活性，包括抗發炎、抗氧化和抗肥胖等作用。因此本研究擬探討尿石素 A 對發炎激素 IL-1β 引起 ARPE-19 視網膜色素上皮細胞的發炎反應及治療機制。ARPE-19 細胞使用不同濃度的 urolithin A 處理，接著使用 IL-1β 刺激 ARPE-19 細胞已進行後續實驗分析。初步結果顯示，ARPE-19 細胞經 IL-1β 誘導發炎後，發炎細胞激素 IL-6、sICAM-1 和趨化因子 IL-8、MCP-1 的分泌顯著增加，給予 urolithin A 處理後可以顯著降低發炎細胞激素及趨化因子，同時也抑制單核球附著細胞的現象。西方墨點法的結果顯示 urolithin A 顯著抑制 ERK 1/2、JNK 1/2、p38 MAPK 和 NF-kB 磷酸化，使 iNOS 和 COX-2 等發炎相關酵素的表現量降低，同時增加抗發炎蛋白 HO-1 的表現量。綜合上述的結果顯示，urolithin A 具有預防及治療視網膜病變的潛力。

關鍵字： ARPE-19 細胞、IL-1β、發炎反應、MAPK、NF-κB、尿石素 A

The protective effect of urolithin A against interleukin-1β-induced inflammation in human retinal pigment epithelial ARPE-19 cells

Ming-Lung Hsu [1, 2], Wen-Chung Huang [1], and Shu-Ju Wu [2, *]

[1] *Graduate Institute of Health Industry Technology, Chang Gung University of Science and Technology, Taoyuan City, Taiwan.*

[2] *Department of Nutrition and Health Sciences, Chang Gung University of Science and Technology, Taoyuan, Taiwan.*

Previous studies have reported that proinflammatory cytokine such as interleukin (IL)-1β cause retinal pigment epithelial (RPE) cells inflammation, leading to retinopathy, including age-related degenerative macular disease (AMD) and diabetic retinopathy (DR). The peel and pulp of *Punica granatum* contained more rich polyphenols. The active compound of *P. granatum*, punicalagin, is metabolized by intestinal microbiomes to form urolithin A (UroA). Previous studies have confirmed that UroA has a variety of physiological activities, including anti-inflammation, anti-oxidation and anti-obesity. However, the effects of UroA on reducing inflammation and improving eye disease are unclear. Thus, we aim to investigate the protective effect of UroA against IL-1β induced inflammation in ARPE-19 cells. ARPE-19 cells were treated with UroA and then stimulated with IL-1β. The results showed that IL-1β-induced secretion of the inflammatory cytokines IL-6, soluble intercellular adhesion molecule (sICAM)-1, and inflammatory chemokines IL-8, monocyte chemoattractant protein-1 (MCP)-1. Pretreatment with UroA significantly decreased IL-6, sICAM-1, IL-8 and MCP-1 secretion by enzyme-linked immunosorbent assay (ELISA). UroA also significantly decreased the levels of the inflammatory mediator inducible nitric oxide synthase (iNOS) and cyclooxygenase-2 (COX-2), and increased anti-inflammatory protein HO-1 expression. We also found that UroA could inhibit the phosphorylation of ERK 1/2, JNK 1/2 and p38 MAPK in IL-1β-induced ARPE-19 cells. UroA also suppressed p65 subunit translocate into the nucleus. Based on these findings shows UroA has the potential for the prevention and treatment of retinopathy.

Keywords: ARPE-19 cells, IL-1β, inflammation, MAPK, NF-κB, Urolithin A

適用於製備塑型餐的通用盤餐式餐盒設計與開發研究

吳承倍[1], 鮑力恒[1,2,*], 邱麗玲[3,*]
[1]長庚學校財團法人長庚科技大學健康產業科技研究所
[2]長庚學校財團法人長庚科技大學食品暨化妝品安全研究中心
[3]長庚學校財團法人長庚科技大學保健營養系、中草藥研究中心、高齡暨長期照護研究中心

緒論: 塑型餐是一種透過攪碎、切碎、食物塑形粉進行調製及外觀塑形等烹調方式去製成的質地調整飲食，適合咀嚼吞嚥困難患者食用，然而塑型餐相對在製備上較費時，因此，本研究擬開發塑型餐之食物造型矽膠模盤餐式餐盒，用以解決製備上的問題，並且探討產品開發後滿意度分析之結果。

研究方法:在產品設計階段當中，首先為模擬備餐流程，接著以備餐流程發現的問題進行問題彙整，並根據問題點納入設計考量。產品概念設計之外觀類似於分格式便當餐盒，而餐盒配件設計分別為餐盒上蓋及可以合扣上蓋的餐盤底盒，以及餐盒內盒則包含可以固定於上蓋內層裡的食物外觀矽膠模。操作概念為將矽膠模灌入以添加塑形粉之食物泥並加熱，加熱完成後，待矽膠模中的塑型餐冷卻時固定於黃色上蓋內層上，接著將底盒蓋於上蓋，並將餐盒翻轉使上蓋朝上後，使塑型餐脫模於底盒並進行供餐。在餐盒完成開發後，測試餐盒是否符合其功能，並以產品喜好評估量表問卷，調查受試者對於產品滿意程度之結果。

初步結果:研究結果在問題彙整後指出，餐盒設計需符合「特定加熱條件」、「矽膠模內層有添加油脂的情況下」和「可一次性將所有塑型餐點脫模」這三項特點。經實驗結果發現塑型餐在備餐過程當中「特定加熱條件」較適用於 96°C/30 分鐘的這項條件，食物中心溫度不僅符合食品安全中心溫度 ≥75°C，且較不容易使塑型餐於加熱時食物泥流出來之情形。在「矽膠模內層有添加油脂的情況下」之測試結果中發現，當矽膠模在塗抹 1g 油脂於內側再注入食物泥且加熱脫模時，塑型餐外觀塑形效果良好，並透過結果得知，在有添加油脂於矽膠模的情況下，「矽膠模體積大小」及「不同類別食材」這兩項因素較不容易影響到最終塑型餐成形效果。在「可一次性將所有塑型餐點脫模」這項條件中測試餐盒後發現，上蓋內層的卡扣點設計難以使矽膠模固定於上蓋，有容易鬆脫的情況，導致無法將一次性將所有塑型餐餐點脫模，因此研究會依照目前餐盒發現的問題點進行改良，並開發第二版的餐具。

結論: 在初步研究結果當中可看到餐盒在三項設計要點當中，其中一項設計需求「可一次性將所有塑型餐點脫模」的餐盒功能未符合實驗設計，因上蓋卡扣點較不容易卡扣住材質較軟的矽膠模，因此第二版設計須在卡扣點設計進行修改，以提供可一次脫模的這項餐盒功能。

關鍵字: 塑型餐、食物塑形粉、食物矽膠模具、餐具

A Study of the Design and Development of a Universal Meal Plate Suitable for Shaping Meal Preparation

Cheng-Bei Wu [1], Li-Heng Pao [1, 2, *], Li-Ling Chiu [3, *]

[1] Graduate Institute of Health Industry Technology, College of Human Ecology, Chang Gung University of Science and Technology, Taoyuan, Taiwan. [2] Research Center for Food and Cosmetic Safety, College of Human Ecology, Chang Gung University of Science and Technology, Taoyuan, Taiwan. [3] Department of Nutrition and Health Sciences, Research Center for Chinese Herbal Medicine, College of Human Ecology & Geriatric and Long-Term Care Research Center, Chang Gung University of Science and Technology, Taoyuan, Taiwan

Shaping meal is a texture-adjusted diet made by cooking methods such as mixing, chopping, food shaping powder modulation, and appearance shaping. For patients with difficulty chewing and swallowing. However, meal preparation is time consuming. Therefore, this research intends to develop a food-appearance silicone mold partitioned lunch box suitable for shaping meal preparation to overcome the problems develop product. In the product design stage, the meal preparation process is simulated first, and then the possible problems through the meal preparation process are taken into consideration in the product design. After produced the pilot lunch box, the subject's satisfaction with the product were investigated by using the product preference evaluation scale questionnaire. The survey results pointed out that the design of the lunch box should meet three functions, namely "specific heating conditions", "the ship of meals formed after adding grease to the inner layer of the silicone mold look well", and "all the formed meals are demolded at one time". The results found that the "specific heating conditions" during the meal preparation process are more suitable for the condition of 96°C/30 minutes. In the test results of "the ship of meals formed after adding grease to the inner layer of the silicone mold look well", it was found that when 1g of grease was applied to the inside of the silicone mold, the shaped meal looked good after demolding. Lastly, for the goal of "one-time demolding of all molds", the results indicated that the design of the snap points on the inner layer of the upper cover made it difficult for the silicone mold to be fixed on the upper cover, which was easy to loosen, and the molding powder was difficult to demold at one time. Therefore, the lunch box need to be improved according to the problems found. Based on our preliminary results, the function of the lunch box that "all shaped meals can be demolded at one time" does not fulfill the purpose of the original design, Therefore, the buckle point of lunch box should be modified to match the need of demolded at one time.

Keywords: shaping meal, food shaping powder, food silicone mold, lunch box

Gypenoside XIII 減輕小鼠非酒精性脂肪肝疾病

吳亞宣[1]，鄭淑臻[2]，黃文忠[1,*]
[1] 長庚科技大學健康科技產業研究所
[2] 桃園長庚紀念醫院中醫科

肥胖是誘發心血管疾病、癌症、糖尿病和非酒精性脂肪肝的重要因素。學者們發現絞股藍萃取物可以降低小鼠的血脂、肥胖和非酒精性脂肪肝，絞股藍以純化出數種絞股藍皂甙，但不清楚這些純合物是否可以改善脂肪肝中的脂肪生合成作用。本研究將調查 gypenosides XIII (GPY XIII) 是否可以改善油酸誘導之 HepG2 脂肪肝細胞的脂質代謝。實驗使用 0.5 mM 油酸處理 HepG2 細胞 72 小時以誘導脂肪肝細胞模型。然後，將細胞暴露於各種濃度的 GPY XIII 中 48 小時以進行後續實驗分析。此外，雄性 C57BL/6 小鼠餵食甲硫氨酸/膽鹼 (MCD) 缺乏飲食，並給予 10 mg/kg GPY XIII（每週兩次），持續 4 週。我們發現 GPY XIII 可以顯著減少油酸誘導的 HepG2 細胞過多的脂質積累，GPY XIII 可以降低 Srebp1c 的表達，但與油酸處理的 HepG2 細胞相比，它並沒有顯著降低脂肪酸合成酶的表現。GPY XIII 也可增加 ATGL 表現以促進脂解途徑，增加 CPT-1 和 CPT-2 表現以促進脂肪酸 β-氧化途徑。我們還發現 GPY XIII 增加了 sirt-1 和 AMPK 的磷酸化，並降低可調節脂肪酸合成的乙醯輔酶 A 羧化酶的活性。接著在 MCD 誘導的小鼠中，可以觀察到 MCD 誘導的小鼠肝臟脂肪空泡顯著增大，GPY XIII 治療後可顯著減少肝臟組織的脂肪空泡，我們還發現 GPY XIII 具有減輕肝纖維化和增加肝組織中肝醣堆積的能力。因此，我們認為 GPY XIII 可能通過調節脂質代謝和 AMPK 途徑來改善肝脂肪變性和纖維化作用。

關鍵字: Gypenoside XIII，非酒精性脂肪肝、脂質合成、脂質分解

Gypenoside XIII alleviates nonalcoholic fatty liver disease in mice

Ya-Xuan Wu [1], Shu-Chen Cheng [2], and Wen-Chung Huang [1*]

[1] *Graduate Institute of Health Industry Technology, Chang Gung University of Science and Technology, Taoyuan City, Taiwan.*

[2] *Department of Traditional Chinese Medicine, Chang Gung Memorial Hospital, Taoyuan, Taiwan*

Obesity is an important factor that can induce cardiovascular disease, cancer, diabetes, and non-alcoholic fatty liver disease (NAFLD). Scholars found that *Gynostemma pentaphyllum* extract can reduce blood lipids, obesity and NAFLD in mice. Some gypenosides were isolated from *G. pentaphyllum*, but they did not clear whether those compounds could improve lipogenesis in fatty liver tissue. This study will investigate whether gypenosides XIII (GPY XIII) can improve the lipid metabolism in HepG2 fatty liver cells. HepG2 cells treated with 0.5 mM oleic acid (OA) for 72 h to induce a fatty liver cell model. Then, the cells were exposed to various concentrations of GPY XIII for 48 h. Furthermore, male C57BL/6 mic fed with chow or a methionine/choline-deficient (MCD) diet along with vehicle or 10 mg/kg GPY XIII (twice a week) for 4 weeks. We found that GPY XIII significantly reduced excessive lipid accumulation in oleic acid-induced HepG2 cells. GPY XIII could decrease Srebp1c expression in OA-induced hepatocytes. But it did not significantly reduce fatty acid synthase expression compared to oleic acid-treated HepG2 cells. GPY XIII could increase ATGL expression for promoting lipolysis pathway, and increased CPT-1 and CPT-2 expressions for promoting fatty acid β-oxidation pathway. We also found GPY XIII increased sirt-1 and phosphorylation of AMPK, and decreased activity of acetyl-CoA carboxylase for regulating fatty acid synthesis. Next, in MCD-induced mice, GPY XIII significantly reduced fat vacuoles in liver tissue. We also found that GPY XIII had the ability to attenuate liver fibrosis and increased glycogen accumulation in liver tissue. Hence, we thought GPY XIII may protect against hepatic steatosis and fibrosis by modulating lipid metabolism and AMPK pathway.

Keywords: GPY XIII, non-alcoholic fatty liver disease, lipogenesis, lipolysis

探討 Bacopaside II 通過活化粒線體凋亡路徑誘導人肺腺癌細胞凋亡

吳昕諭，黃文忠*
長庚科技大學健康產業科技研究所

肺癌是目前世界上最常見的癌症之一，其發病率和死亡率逐年上升。因此，開發有效、安全的抗腫瘤藥物具有重要意義。 Bacopaside II (BAII) 是從假馬齒莧中分離得到的，具有多種生物和藥理活性，如抗氧化劑、抗菌劑和抗炎作用。然而，先前的研究尚不清楚 BAII 是否能誘導肺癌細胞凋亡並抑制細胞增殖。在目前的研究中，我們發現 BAII 並不是通過誘導細胞週期停滯任何一個階段來抑制人肺癌 A549 細胞的增殖。我們的結果表明，BAII 誘導細胞核皺縮，並增加 A549 細胞中的細胞凋亡。 BAII 還降低了 A549 細胞中的粒線體膜電位，並抑制了 Bcl-2，使得粒線體釋放 cytochrome c 活化了 caspase-9 後進而活化 caspase-3 而後切割 PARP。我們還證實 BAII 可以增加 γH2AX 表達以誘導 DNA 損傷。因此，我們的研究結果表明，BAII 可能通過活化粒線體凋亡途徑增加 A549 細胞的凋亡。

關鍵字: 細胞凋亡; 假馬齒莧草 II; 肺癌;細胞週期停滯；線粒體凋亡途徑。

Bacopaside II induces apoptosis of human lung adenocarcinoma cells by activating the mitochondrial apoptotic pathway

Hsin-Yu Wu , Wen-Chung Huang *

Graduate Institute of Health Industry Technology, Chang Gung University of Science and Technology, Taoyuan City, Taiwan.

Lung cancer is one of the most common cancers in the world, and its morbidity and mortality are increasing year by year. Therefore, it is of great significance to develop effective and safe antitumor drugs. Bacopaside II (BAII), isolated from Bacopa monnieri, possesses various biological and pharmacological activities, such as antioxidant, antibacterial, and anti-inflammatory effects. However, previous studies were unclear whether BAII could induce lung cancer cell apoptosis and inhibit cell proliferation. In the current study, we found that BAII did not inhibit the proliferation of human lung cancer A549 cells by inducing cell cycle arrest at any stage. Our results show that BAII induces nuclear shrinkage and increases apoptosis in A549 cells. BAII also decreased mitochondrial membrane potential and inhibited Bcl-2 in A549 cells, resulting in mitochondrial release of cytochrome c to activate caspase-9 and then caspase-3 to cleave PARP. We also confirmed that BAII can increase γH2AX expression to induce DNA damage. Therefore, our findings suggest that BAII may increase apoptosis in A549 cells by activating the mitochondrial apoptotic pathway.

Keywords: Apoptosis; Bacopaside II; Caspase-3; Lung cancer; Cell cycle arrest; Mitochondrial apoptotic pathway.

探討石榴素減輕肥胖引起之非酒精性脂肪肝及骨骼肌萎縮的影響

周逸榮 [1,2], 徐銘隆 [1,2], 彭蕙玲 [2], 魏巧涵 [1], 黃文忠 [1,*], 吳淑如 [2,*]

[1] 長庚科技大學健康產業科技研究所

[2] 長庚科技大學保健營養系

石榴素是從石榴中分離得到，研究指出石榴素具有抗腫瘤、抗發炎和抗氧化作用。本研究中，我們研究石榴素是否調節非酒精性脂肪肝的脂質代謝，以及石榴素是否能改善骨骼肌萎縮。 使用 0.5 mM 油酸刺激 72 小時誘導 FL83B 細胞脂質堆積，並用不同濃度的石榴素處理 24 小時。另外，C2C12 細胞分化 5 天後加入石榴素 48 小時，並在第 24 小時加入棕櫚酸誘導肌肉萎縮。雄性 C57BL/6J 小鼠餵食高脂肪飲食 16 週，並在第 5 周至第 16 週期間，每週兩次透過腹腔注射石榴素治療。結果顯示，石榴素抑制脂質堆積並降低肝細胞中的脂肪酸攝入，石榴素在油酸刺激誘導脂質堆積的 FL83B 細胞中減少脂肪生成，並增加脂肪分解與促進脂肪酸 β-氧化相關蛋白表現。其他細胞實驗發現，石榴素在棕櫚酸刺激誘導肌肉萎縮的 C2C12 細胞可增加蛋白質合成、增加肌肉分化和減少肌肉萎縮相關蛋白表現。我們的研究結果顯示，與高脂飼料餵養的小鼠相比，石榴素組顯著降低了體重和脂肪重量，此外，石榴素可減少肥胖小鼠的肝臟脂質堆積並改善肝細胞脂肪變性。肝臟蛋白質分析發現石榴素顯著減少脂肪生成，並增加肥胖小鼠肝臟中的脂肪分解和脂肪酸 β-氧化相關蛋白表現。此外，石榴素也顯著增加肥胖小鼠的腓腸肌重量並減少骨骼肌間隙，我們還發現與肥胖小鼠相比，石榴素組顯著增加了 AKT 的磷酸化，並減少了骨骼肌中 Atrogin-1 和 Myostatin 的表現。這些研究顯示，石榴素具有改善肥胖以及減緩肥胖引起的肝脂肪變性和骨骼肌萎縮作用。

關鍵字： 肝脂肪變性; 脂質合成; 肥胖; 石榴素; 骨骼肌萎縮

Explore the Punicalin reduce non-alcoholic fatty liver and skeletal muscle atrophy effect caused by obesity

Yi-Rong Zhou [1,2], Ming-Lung Hsu [1,2], Hui-Ling Peng [2], Chiao-Han Wei [1], Wen-Chung Huang [1,*], Shu-Ju Wu [2,*]

[1]*Graduate Institute of Health Industry Technology, Chang Gung University of Science and Technology, Taoyuan, Taiwan*

[2]*Department of Nutrition and Health Sciences, Chang Gung University of Science and Technology, Taoyuan, Taiwan*

Punicalin is isolated from *Punica granatum* and reported that have anti-tumor, anti-inflammation and anti-oxidation effects. Here, we investigated whether punicalin regulates lipid metabolism in nonalcoholic fatty liver disease. and whether punicalin improves skeletal muscle atrophy. FL83B cells were induced as fatty liver cell model by 0.5 mM oleic acid for 72 hr, and treated with various concentration of punicalin for 24 hr. C2C12 cells were differentiated for five days and then punicalin was added for 48 hours, and palmitic acid was added at the 24 hour to induce muscle atrophy. Male C57BL/6J mice fed normal or high-fat diet for 16 weeks before treatment with or without punicalin from week 5 to 16 by intraperitoneal injection. The results demonstrated that punicalin suppressed lipid accumulation and decreased fatty acid uptake in hepatocytes. Punicalin reduced lipogenesis, increased lipolysis and promoted fatty acid β-oxidation pathway in oleic acid-induced lipid accumulation in FL83B cells. Punicalin also increased increased myogenesis and reduced muscle atrophy pathways in palmitic acid-induced muscle atrophy in C2C12 cells. Our results demonstrated that punicalin significantly decreased body weight and fat weight compared to HFD-fed mice. In addition, punicalin decreased hepatic lipid accumulation and improved hepatocyte steatosis in HFD-induced obese mice. Punicalin could effectively reduce lipogenesis, and increase lipolysis and fatty acid β-oxidation pathway in liver of obese mice. Furthermore, punicalin significantly increased the gastrocnemius weight and reduced the skeletal muscle gap in obese mice. We also find that punicalin clearly increased the phosphorylation of AKT, and decrease Atrogin-1 and Myostatin production in the skeletal muscles compared to obese mice. These findings suggest that punicalin potentially ameliorates obesity and acts against hepatic steatosis and skeletal muscle atrophy.

Keywords: Hepatic steatosis; Lipogenesis; Obese; Punicalin; Skeletal muscle atrophy

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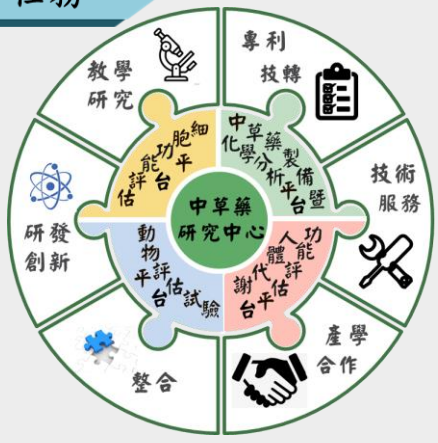

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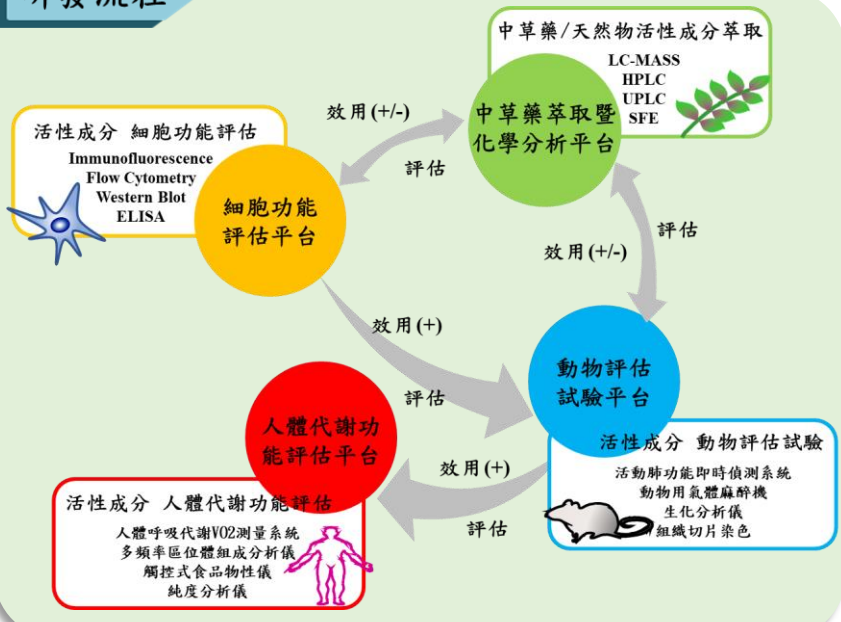

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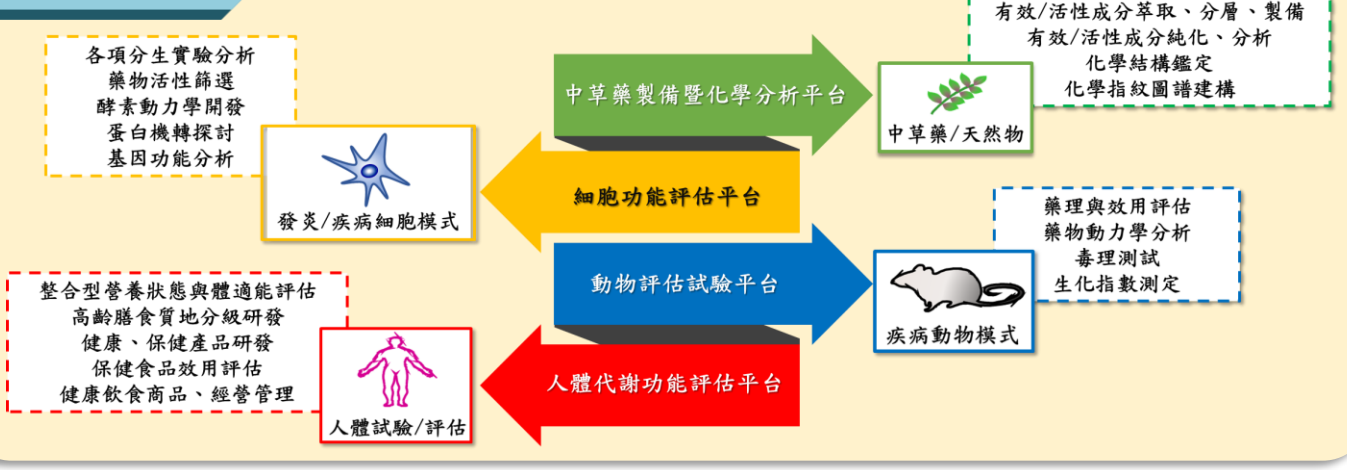

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檢驗類別

- 農產品。中草藥。保健食品。化妝品
- 生物檢體等各式產品

檢驗項目

- 一般食品組成分。 藥物/食品安定性試驗
- 羅漢果皂苷。苦瓜皂苷。人蔘皂苷。靈芝酸。山竹酮
- 薑黃素。綠原酸。辣椒素。咖啡因。防腐劑
- 微量元素/無機元素。美白成分。客製化檢測項目

33303 桃園市龜山區文化一路261號
長庚科技大學
第一教學大樓3樓
食品安全檢驗室

03-211-8999
- 邱群惠 博士 ext.5102
  chchiu@mail.cgust.edu.tw
- 李昱宗 先生 ext.5103
  ytlee@mail.cgust.edu.tw

更多服務資訊

TAF Testing Laboratory 3001

F079

TAF 認證實驗室 編號：第3001號

TFDA 認證食品檢驗實驗室 編號：第F079號


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