

## Curriculum Vitae

<b>A、Personal Data 個人資料</b>	
English Name	<b>Wen-Ling Shih</b> 施玟玲
<b>B、Present Job Information 現職資料</b>	
Institution	National Pingtung University of Science and Technology 國立屏東科技大學
Department	Department of Biological Science & Technology 生物科技系
Position	Professor 教授
Period	2011/08~present 2011/08~迄今
Office Address	1, Hseuh Fu Rd. Nei Pu, Pingtung, Taiwan 屏東縣內埔鄉學府路 1 號
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<b>C、Highest Education and Specialized Field 最高學歷及專長</b>	
Period	1996/08~2001/07
Degree	Ph. D. 博士
School Name	National Taiwan University, Graduate Institute of Microbiology 國立台灣大學微生物學研究所
Specialized Field	Signal transduction, Apoptosis, Cancer Biology, Essential Oil Study, Bioactivity evaluation, Liposome technique, Cosmetics development 訊息傳遞、細胞凋亡、癌症生物學、精油研究、生物活性評估、微脂 體技術、妝品開發
<b>D、Working Experience 經歷</b>	
1. <b>2001/08~2003/07</b> Assistant Professor, Department of Nursing, Tzu-Hui Institute of Technology <b>2001/08~2003/07</b> 慈惠醫護管理專科學校護理科助理教授	
2. <b>2003/08~2006/04</b> Assistant Professor, Graduate Institute and Department of Life Science,	

**Tzu-Chi University**

2003/08~2006/04 慈濟大學生命科學系助理教授

3. 2006/05~2008/07 Associate Professor, Graduate Institute and Department of Life Science, Tzu-Chi University

2006/05~2008/07 慈濟大學生命科學系副教授

4. 2008/08~20011/07 Associate Professor, Graduate Institute of Biotechnology, National Pingtung University of Science and Technology

2008/08~20011/07 屏東科技大學生物科技研究所副教授

5. 2011/08~present Professor, Department of Biological Science and Technology, National Pingtung University of Science and Technology

2011/08~present 屏東科技大學生物科技系教授

**E、Honor and Awards 學術榮譽**

1. 1999/04 Outstanding Poster Award at the 4<sup>th</sup> Taiwan Joint Cancer Conference.  
1999/04 第四屆台灣癌症學術聯合年會傑出壁報獎
2. 2001/06 Outstanding Paper Award from the College of Medicine, National Taiwan University.  
2001/06 國立台灣大學醫學院傑出論文壁報獎
3. 2004/08 Outstanding Paper Award from Liver Disease Prevention and the Treatment Research Foundation.  
2004/08 財團法人肝病防治學術基金會優秀論文獎
4. 2005 Dr. Wu Da-You Memorial Award from the National Science Council.  
2005 國科會(現科技部)吳大猷紀念獎
5. Outstanding Paper Award from Tzu-Chi University in 2004–2007.  
2004-2007 慈濟大學優秀論文獎
6. 2006/03 Outstanding Poster Awards by the 21<sup>st</sup> Joint Annual Conference of Biomedical Sciences.  
2006/03 第 21 屆生物醫學聯合學術年會優秀壁報論文獎
7. 2008/03 Outstanding Poster Awards by the 23<sup>rd</sup> Joint Annual Conference of Biomedical Sciences.

2008/03 第 23 屆生物醫學聯合學術年會優秀壁報論文獎

8. Outstanding Paper Award from National Pingtung University of Science and Technology in 2009–2018.

2009–2018 國立屏東科技大學學術論文發表獎勵

9. 2013-2017 Special talents rewards by Ministry of Science and Technology

2013-2017 科技部獎勵大專校院特殊優秀人才

10. 2015 年教師研發成果競賽生醫保健類特優

2015 Outstanding Awards of R&D Competition by National Pingtung University of Science and Technology

11. 2016 年教師研發成果競賽生醫保健類優良

2016 Outstanding Awards of R&D Competition by National Pingtung University of Science and Technology

12. 2016 Taipei International Invention Show and Technomart Bronze Medal Award

2016 台北國際發明暨技術交易展銅牌獎

13. 2016 International Invention Design Competition (Hong Kong) Gold Medal and Special Award

2016 香港創新科技國際發明展金牌獎及特別獎

#### **F、Patents 專利**

1. 一種化合物用於製備預防 B 型肝炎藥物的用途 (I477277)

A prepared compound for hepatitis B prevention

2. 用以抑菌之醫藥組合物及其用途 (I498336)

Medicinal combination for inhibiting bacteria and use thereof

3. 精油組合物應用於製備抗菌劑的用途 (領證中)

Essential oil combination for antibacterial application

#### **G、Technology transfer 技術移轉**

1. 高抗氧化活性精油製備及潤唇膏研製技術

High antioxidant essential oil preparation and Lip balm product technology

2. 山苦瓜預防 B 型肝炎萃取物製備

*Momordica charantia* extracts for Hepatitis B virus prevention

3. 山苦瓜護肝萃取物製備

## H · Publication

1. Lin Ping-Yuan, Liu Hung-Jen, Lai Meng-Jiun, Yu Feng-Ling, Hsu Hsue-Yin, Lee Jeng-Woei, **Wen-Ling Shih**\*. Avian Reovirus activates a novel proapoptotic signal by linking Src to p53. **Apoptosis**, **11:2179-2193**, December 2006.
2. Hsin Y. Lin, Sue T. Chuang, Yu T. Chen, **Wen L. Shih**, Ching D. Chang, Hung J. Liu. ARV-induced apoptosis related to tissue injury. **Avian Pathology**, **36(2):155-159**, April 2007.
3. Julius L.C. Chulu, Long H. Lee, Ya C. Lee, Shu H. Liao, Feng L. Lin, **Wen L. Shih**\*, Hung J. Liu\*. Apoptosis induction by avian reovirus through p53 and mitochondria-mediated pathway. **Biochemical and Biophysical Research Communications**, **356(3):529-535**, May 2007.
4. Jeng-Woei Lee, Kuei-Fang Lee, Hsue-Yin Hsu, Lee-Ping Hsu, **Wen-Ling Shih**, Yi-Chih Chu, Wei-Ting Hsiao, Po-Fan Liu. Protein expression and intracellular localization of prostate apoptosis response-4 (Par-4) are associated with apoptosis induction in nasopharyngeal carcinoma cell lines. **Cancer Letters**, **257(2):252-262**, November 2007.
5. Hung-Jen Liu, Ping-Yuan Lin, Ling-Rung Wang, Hsue-Yin Hsu, Ming-Huei Liao, **Wen-Ling Shih**\*. Activation of Small GTPases RhoA and Rac1 is required for Avian Reovirus p10-induced syncytium formation. **Molecules and Cells**, **26(4):396-403**, October 2008.
6. <sup>1</sup> **Wen-Ling Shih**\*, Ming-Huei Liao, Feng-Ling Yu, Ping-Yuan Lin, Hsue-Yin Hsu, Shu-Jun Chiu. AMF/PGI transactivates the MMP-3 gene through the activation of Src-RhoA- phosphatidylinositol 3-kinase signaling to induce hepatoma cell migration. **Cancer Letters**, **270(2):202-217**, November 2008.
7. Ching-Ju Yeh, Ping-Yuan Lin, Ming-Huei Liao, Hung-Jen Liu, Jeng-Woei Lee, Shu-Jun Chiu, Hsue-Yin Hsu, **Wen-Ling Shih**\*. TNF- $\alpha$  mediates Pseudorabies Virus-induced Apoptosis *via* the Activation of p38 MAPK and JNK/SAPK Signaling. **Virology**, **381(1):55-66**, November 2008.
8. Yueh H. Lin, Long H. Lee, **Wen L. Shih**, Yu C. Hu, Hung J. Liu. Baculovirus surface display of sigmaC and sigmaB proteins of avian reovirus and immunogenicity of the displayed proteins in a mouse model.

**Vaccine, 26(50):6361-6367, November 2008.**

9. Ping-Yuan Lin, Jeng-Woei Lee, Ming-Huei Liao, Hsue-Yin Hsu, Shu-Jun Chiu, Hung-Jen Liu\*, **Wen-Ling Shih**\*. Modulation of p53 by Mitogen-activated Protein Kinase Pathways and Protein Kinase C  $\delta$  during Avian Reovirus S1133-induced Apoptosis.

**Virology, 385:323-334, January 2009.**

10. Chi-Hung Lin, **Wen-Ling Shih**, Feng-Lang Lin, Yao-Ching Hsieh, Yur-Ren Kuo, Ming-Huei Liao, Hung-Jeng Liu. Bovine ephemeral fever virus-induced apoptosis requires virus gene expression and activation of Fas and mitochondrial signaling pathway.

**Apoptosis, 14:864-877, January 2009.**

11. Jeng-Woei Lee, Po-Fan Liu, Lee-Ping Hsu, Peir-Rong Chen, Chung-Hsing Chang, **Wen-Ling Shih**. EBV LMP-1 negatively regulates expression and pro-apoptotic activity of Par-4 in nasopharyngeal carcinoma cells.

**Cancer Letters, 279(2):193-201, July 2009.**

12. Xin-Gang Xu, De-Wen Tong, Ming-Tang Chiou, Yao-Ching Hsieh, **Wen-Ling Shih**, Ching-Dong Chang, Ming-Huei Liao, Yan-Ming Zhang, Hung-Jen Liu.

Baculovirus surface display of NS3 nonstructural protein of classical swine fever virus.

**Journal of Virological Methods, 159(2):259-264, August 2009.**

13. Chang CI, Chen CR, Liao YW, **Shih WL**, Cheng HL, Tzeng CY, Li JW, Kung MT.

Octanorcucurbitane triterpenoids protect against tert-butyl hydroperoxide-induced hepatotoxicity from the stems of Momordica charantia.

**Chemical and Pharmaceutical Bulletin (Tokyo), 58(2):225-259, February 2010.**

14. Chen CR, Liao YW, Wu HT, **Shih WL**, Tzeng CY, Yang SZ, Hernandez CE, Chang CI.

Triterpenoids from *Angiopteris palmiformis*.

**Chemical and Pharmaceutical Bulletin (Tokyo), 58(3):408-411, March 2010.**

15. <sup>1</sup>**Wen-Ling Shih**\*, Ming-Huei Liao, Ping-Yuan Lin, Chi-I Chang, Hsueh-Ling Cheng, Feng-Ling Yu and Jeng-Woei Lee. PI 3-kinase/Akt and STAT3 are required for the prevention of TGF- $\beta$ - induced Hep3B cell apoptosis by autocrine motility factor/phosphoglucose isomerase.

**Cancer Letters, 290(2):223-237, April 2010.**

16. Wen T. Ji, Feng L. Lin, Ying C. Wang, **Wen L. Shih**, Long H. Lee, Liu Hung J.

Intracellular cleavage of sigma A protein of avian reovirus.

**Virus Research, 149(1):71-77, April 2010.**

17. Lin PY, Liu HJ, Liao MH, Chang CD, Chang CI, Cheng HL, Lee JW, **Shih WL**\*. Activation of PI 3-kinase/Akt/NF-kappaB and Stat3 signaling by avian reovirus S1133 in the early stages of infection results in an inflammatory response and delayed apoptosis.

**Virology, 400(1):104-114, April 2010.**

18. Shu-Jun Chiu, Ching-Hui Hsaio, Ho-Hsing Tseng, Yu-Han Su, **Wen-Ling Shih**, Jeng-Woei Lee, Jennifer Qui-Yu Chuah. Rosiglitazone enhances the radiosensitivity of p53-mutant HT-29 human colorectal cancer cells.

**Biochemical and Biophysical Research Communications, 394(3):774-779, April 2010.**

19. Chiy-Rong Chen, Yun-Wen Liao, **Wen-Ling Shih**, Chih-Ying Tzeng, Hsueh-Ling Cheng, Wei-Tsung Kao, and Chi-I Chang. Triterpenoids from the Stems of Momordica charantia. **Helvetica Chimica Acta, 93, 1355-1361, July 2010.**

20. Jeng-Woei Lee, Wei-Ting Hsiao, Hsia-Yun Chen, Lee-Ping Hsu, Peir-Rong Chen, Ming-Der Lin, Shu-Jun Chiu, **Wen-Ling Shih**, Yih-Chih Hsu. Up-regulated claudin-1 expression confers resistance to cell death of nasopharyngeal carcinoma cells.

**International Journal of Cancer, 126(6):1353-1366, September 2010.**

21. Chun-Yen Chen, Chin-Yang Chang, Hung-Jen Liu, Ming-Huei Liao, Chi-I Chang, Jue-Liang Hsu, **Wen-Ling Shih**\*. Apoptosis induction in BEFV-infected Vero and MDBK cells through Src-dependent JNK activation regulates caspase-3 and mitochondria pathways.

**Veterinary Research, 41(2):15, October 2010.**

22. Chiy-Rong Chen, Yun-Wen Liao, Lai Wang, Yueh-Hsiung Kuo, Hung-Jen Liu, **Wen-Ling Shih**, Hsueh-Ling Cheng, and Chi-I Chang. Cucurbitane Triterpenoids from Momordica charantia and Their Cytoprotective Activity in tert-Butyl Hydroperoxide-Induced Hepatotoxicity of HepG2 cells.

**Chemical and Pharmaceutical Bulletin (Tokyo), 58(12) 1639-1642, December 2010.**

23. Wen T. Ji, Ying C. Wang, Feng L. Lin, Ming H. Liao, **Wen L. Shih**\*, Hung J. Liu. Inhibitors of phosphatidylinositol 3-kinase and mTOR but not Akt enhance replication of bovine ephemeral fever virus.

**Veterinary Journal, 187(1):119-123, January 2011.**

24. Hong-Yin Wu, Chi-I Chang, Bo-Wei Lin, Feng-Ling Yu, Ping-Yuan Lin, Jue-Liang Hsu, Chia-Hung Yen, Ming-Huei Liao, **Wen-Ling Shih**\*. Suppression of Hepatitis B Virus X Protein-Mediated

Tumorigenic Effects by Ursolic Acid.

**Journal of Agricultural and Food Chemistry, 59(5):1713-1722, March 2011.**

**25.** Ping-Yuan Lin, Hung-Jen Liu, Ching-Dong Chang, Chi-I Chang, Jue-Liang Hsu, Ming-Huei Liao, Jeng-Woei Lee, Wen-Ling Shih\*

Avian Reovirus S1133-induced DNA Damage Signaling and Subsequent Apoptosis in Cultured Cells and in Chickens.

**Archives of Virology, 156(11):1917-1929, November 2011.**

**26.** Yun-Wen Liao, Chiy-Rong Chen, Jue-Liang Hsu, Hsueh-Ling Cheng, Wen-Ling Shih, Yueh-Hsiung Kuo, Tzou-Chi Huang, Chi-I Chang.

Sterols from the Stems of *Momordica charantia*.

**Journal of the Chinese Chemical Society, 58:893-898, December 2011.**

**27.** Chia-Hao Yeh, Shu-Hui Chen, Ding-Tzai Li, Hong-Ping Lin, Hung-Jen Huang, Chi-I Chang, Wen-Ling Shih, Chi-Liang Chern, Fong-Ku Shi, Jue-Liang Hsu\*.

Magnetic bead-based hydrophilic interaction liquid chromatography for glycopeptide enrichments.

**Journal of Chromatography A, 1224, 70-78, February 2012.**

**28.** Yun-Wen Liao, Chiy-Rong Chen, Yueh-Hsiung Kuo, Jue-Liang Hsu, Wen-Ling Shih, Hsueh-Ling Cheng, Tzou-Chi Huang and Chi-I Chang.

Cucurbitane-Type Triterpenoids from the Fruit Pulp of *Momordica Charantia*.

**Natural Product Communications, 7(12): 1575-1578, July 2012.**

**29.** Cheng CY, Shih WL, Huang WR, Chi PI, Wu MH, Liu HJ. Bovine ephemeral Fever virus uses a clathrin-mediated and dynamin 2-dependent endocytosis pathway that requires rab5 and rab7 as well as microtubules.

**Journal of Virology, 86(24):13653-61, December 2012.**

**30.** Cheng CY, Shih WL, Huang WR, Chi PI, Wu MH, Liu HJ. Bovine ephemeral Fever virus uses a clathrin-mediated and dynamin 2-dependent endocytosis pathway that requires rab5 and rab7 as well as microtubules. **Journal of Virology, 86(24):13653-13661, December, 2012.**

**31.** Yun-Wen Liao, Chiy-Rong Chenc, Jue-Liang Hsu, Yun-Sheng Lin, Hsueh-Ling Cheng, Wen-Ling Shih, Yueh-Hsiung Kuo and Chi-I Chang.

Norcucurbitane Triterpenoids from the Fruits of *Momordica charantia* var. *abbreviate*.

**Natural Product Communications, 8(1): 79-81, August 2013.**

32. Ching-Dong Chang, Ping-Yuan Lin, Ming-Huei Liao, Chi-I Chang, Jue-Liang Hsu, Feng-Ling Yu, Hung-Yi Wu, **Wen-Ling Shih**\*

Suppression of apoptosis by pseudorabies virus Us3 protein kinase through the activation of PI3-K/Akt and NF- $\kappa$ B pathways.

**Research in Veterinary Science, 95(2):764-774, October, 2013.**

33. **Wen-Ling Shih**\*, Feng-Ling Yu, Ming-Huei Liao, Ching-Dong Chang, Chi-I Chang, Ping-Yuan Lin. Suppression of AMF/PGI-mediated Tumorigenic Activities by Ursolic Acid in Cultured Hepatoma Cells and in a Mouse Model.

**Molecular Carcinogenesis, 52(10):800-812, October, 2013.**

34. R. Amilia Destryana, D. Gary Young, Cole L. Woolley, Tzou-Chi Huang, Hung-Yi Wu, **Wen-Ling Shih**\*. Antioxidant and Anti-inflammation Activities of Ocotea, Copaiba and Blue Cypress Essential Oils in Vitro and in Vivo.

**Journal of the American Oil Chemists' Society, 91:1531-1542, September, 2014.**

35. **施玟玲\*** (2015年02月)。澳洲茶樹精油的生物活性 (科學發展 科技部出版)。科學發展 科技部出版。

36. Ping-Yuan Lin, Hung-Jen Liu, Ching-Dong Chang, Yo-Chia Chen, Chi-I Chang, **Wen-Ling Shih**\*. Avian reovirus S1133-induced apoptosis is associated with Bip/ GRP79-mediated Bim translocation to the endoplasmic reticulum.

**Apoptosis, 20:481-490, April, 2015.**

37. Chi-I Chang, Chiy-Rong Chen, Yo-Chia Chen, Kuei-Wen Cheng, Bo-Wei Lin, Yun-Wen Liao & **Wen-Ling Shih**\*. Suppression of Hepatitis B Virus Production and Inflammatory Response in vitro and in vivo by Mormodica charantia Compound EMCDO.

**Journal of Agricultural Science-Canadian Center of Science and Education, 7(4):112-128, April, 2015.**

38. Ping-Yuan Lin, Ching-Dong Chang, Yo-Chia Chen, **Wen-Ling Shih**\*. RhoA /ROCK1 regulates Avian Reovirus S1133- induced switch from autophagy to apoptosis.

**BMC Veterinary Research, 11:103, May, 2015.**

39. REYNETHA D.S. RAWENDRA, PING-YUAN LIN, CHING-DONG CHANG, JUE-LIANG HSU, TZOU-CHI HUANG and **WEN-LING SHIH**\*. Potentiation of Acute Promyelocytic Leukemia Cells Differentiation and Prevention of Leukemia Development in Mice by Oleanolic Acid.

**Anticancer Research, 35:6583-6590. December 2015.**



40. Jessica Renata Yoewono, Rachmawaty Octavi Purwanto, Cole L. Woolley, Ching-Dong Chang and Wen-Ling Shih\*. Antioxidant Activities and Oral Toxicity Studies of *Chamaecyparis formosensis* and *Cymbopogon nardus* Essential Oils.

**International Journal of Advanced Scientific Research and Management, 1(9):47-58, September, 2016.**

41. Ching-Dong Chang, Ping-Yuan Lin, Jue-Liang Hsu, Wen-Ling Shih\*. Ursolic acid Suppresses Hepatitis B Virus X Protein-mediated Autophagy and Chemotherapeutic Drugs Resistance.

**Anticancer Research, 36:5097-5018. December 2016.**

42. Ching-Dong Chang, Ping-Yuan Lin, Yi-Hau Wu, Chin-Huang Wu, Sheng-Tsung Luo and Wen-Ling Shih\*. 90-day Sub-chronic Oral Toxicity Analysis of *Antrodia cinnamomea* (“Niu-chang-chih”) Fruiting Body Extract in Rats.

**International Journal of Advanced Scientific Research and Management, 2(1):27-39, January, 2017.**

43. Ching-Dong Chang, Ping-Yuan Lin, Yo-Chia Chen, Han-Hsiang Huang, Wen-Ling Shih\*. Novel purification method and antibiotic activity of recombinant *Momordica charantia* MAP30.

**3 Biotech,7:3 (11 pages), May 2017.**

44. Ching-Dong Chang, Yi-Min Fang, Tsai-Tien Kuo, Wen-Ling Shih\*. 90-day Sub-chronic Oral toxicological assessment of *Antrodia cinnamomea* fruiting body extract in Sprague-Dawley rats.

**International Journal of Advanced Scientific Research and Management, 3(5):19-29. March 2018.**

45. Wen-Ling Shih\*, Ching-Dong Chang, Hsiu-Tsu Chen, Kuo-Kuang Fan. Antioxidant Activity and Leukemia Initiation Prevention in vitro and in vivo by N-Acetyl-L-cysteine.

**Oncology Letters, 16:2046-2052. May 2018.**

#### I. 產學合作擔任計畫主持人 Principal Investigator of Industry-Academic cooperation

2013~2018

1	牛樟芝發酵物應用於雞隻免疫調節及育成率提昇之初期研究	京冠生物科技股份有限公司	2012/11/01~2013/04/30
2	Essential Oils Extraction and Biological Activities Analysis of Taiwan Plants 【國際產學研究】	Young Living Essential Oils	2012/05/01~2014/04/30
3	回收廢油再製清潔劑	經濟部工業局	2014/07/01~2014/10/31
4	肌膚清潔劑之研發	永陞科技股份有限公司	2014/09/01~2014/12/31

5	豆類發酵物應用於免疫調節之研究	京冠生物科技股份有限公司	2014/09/01~2014/12/31
6	精油產品配方開發	茗創事業有限公司	2015/06/01~2016/05/31
7	無防腐劑抗痘保濕潔面露產品開發與功效評估 (校內企業捐款)	國立屏東科技大學	2015/06/01~2015/12/31
8	牛樟芝子實體在大鼠的 90 天亞慢性口服毒性試驗	鑫大埔生技實業股份有限公司	2015/09/01~2016/08/31 104/9/1~105/8/31
9	建立豬假性狂犬病病毒感染小鼠攻毒模式及免疫	瑞寶基因股份有限公司	2016/02/01~2017/03/01 105/2/1~106/3/1
10	牛樟芝子實體萃取液、發酵液及洛神花萃取物在皮膚細胞培養系統對傷口修復及膠原蛋白表現之影響	鑫大埔生技實業股份有限公司	2016/11/01 ~ 2017/10/31
11	牛樟芝子實體萃取液在大鼠的 90 天亞慢性口服毒性試驗	大益生技有限公司	2017/3/1~2019/2/28
12	山茶花美妝品研製	晨興油品股份有限公司	2017/4/20~2017/12/31
13	複合式萃取液對人類皮膚纖維母細胞 Detroit 551 之細胞毒性及細胞移動活性評估	頂宏生物科技股份有限公司	2017/10/1~2018/6/30
14	薑黃素脂質載體系統製備與生物活性	開物生醫有限公司	2018/3/1~2019/12/31
15	多醣萃取液對體外培養人類皮膚纖維母細胞之生長調控	頂宏生物科技股份有限公司	2018/4/20~2019/4/30
16	種籽油烘培條件對培養細胞抗氧化活性的影響	人良油品股份有限公司	2018/7/01 ~ 2020/6/30

## 研究興趣

我們的研究分成幾個主要方向部份

### 1. 精油的生物活性及精油產品開發

由於精油產品廣受大家喜愛，市面上標榜天然保健功能的精油產品琳瑯滿目，消費者並不容易判斷。實驗室透過產學研究，分析精油成分，評估精油具備的抗氧化、抗發炎及抗菌功效，並研發系列肌膚清潔用品及基礎保養品。我們已取得精油組合物活性相關專利。

### 2. 大蒜成分對血癌細胞的分化與毒殺作用

白血病是造血組織腫瘤，病人骨髓及循環中累積大量血液細胞，並向全身組織浸潤破壞，治療複雜，經常須合併或更換數種療法，儘管治療方式持續進步，仍僅有極少部分病人存活有五年以上。大蒜成份應用在白血病系統中研究不多，相關機制幾乎未被討論，而大蒜毫無疑問是人類所知延用最久，長久以來的臨床使用經驗，說明其無疑是最有藥理功效也最安全的天然藥物之一。開發新的分化誘導劑或分化幫助劑，有助於急性白血病之治療；若同時使白血病細胞進入分化及細胞自噬的活性天然物，是極具價值的研究。我們試驗大蒜精油及其含硫化合物對白血病的預防

與治療的可能性，現階段透過紮實基礎研究，建立數據及參考資料，將能創造人類無盡的健康福祉。

### 3. 天然物妝品原料開發

隨著健康意識抬頭，除了功效之外，消費者選購妝品注重原料安全健康，因此，開發安全且具功效之天然物，是目前研發重點。我們已完成小葉蕨藻多醣萃取液製備及醣類組成分析，按 ISO10993-5 方法完成細胞毒性評估，並證實其抗過敏活性，將繼續進行國際化妝品原料登錄，使產業界能加以利用。

### 4. 微脂體技術

植物二次代謝物已知具強抗氧化、抗菌及抗發炎潛力，但卻有易降解及穩定性差的缺點，英國科學家 Bangham 在 1965 年發現，當磷脂質分散於水相環境中，會形成多層的中空球體微脂體，在脂質雙層結構中可包覆脂溶性物質，在內部水相區域則可包覆水溶性活性物質，加上微脂體組成與細胞膜相同，與動物細胞有高度相容性，不引起免疫反應，亦具備高度生物降解性，故安全性甚高，尤其是對疏水性、毒性較高及不穩定的活性成分而言，是理想的傳輸載體。我們利用不同磷脂質，製備包覆天然活性物之微脂體，評估其物理安定性與細胞毒性，進一步評估各種生物活性與抗菌潛力，

## Research Interests

Our research is divided into several directions

### 1. The biological activity of essential oils and essential oil product development

Essential oil had been widely used in human life since middle ages. The market is flooded with so called natural/y health and functional essential oil products, so the consumers are not easy to judge or distinguish. We executes the industry-university cooperative research project, we analyzed the essential oil biological activities, as well as commercial products development. We found the potential antioxidant, anti-inflammatory and antibacterial effects of certain essential oils, and a series of skin cleaning and skin care products were also available.

### 2. Differentiation and toxic effect of garlic extract on leukemia

Leukemia is a kind of cancer originated from hematopoietic tissue. The bone marrow and blood in the patient accumulated large amounts of immature blood cells and revealed carcinomatous infiltration. Treatment of leukemia is complex, so often need to merge or replace several kinds of therapy agents. Even if the treatment is continued in advanced, it still only a very small part of patients survive more than five years. Studies concerning on the garlic component applied in leukemia have almost never discussed so far. Undoubtedly, the garlic is one of the best well-known herb used in human history. For a long clinical experience, evidences indicated that the garlic's pharmacological effect on several aspects, such as antimicrobial activity against pathogens and fungi, as antioxidant agent, even reduce the risk of heart disease and lower cholesterol level. To develop the

new differentiation inducers and differentiation helping agent is useful in the treatment of acute leukemia. It is a highly valuable research topic that aimed to induce leukemia cells into the cell differentiation and programmed cell death. In our preliminary data suggested the garlic oil and its sulfur compounds may contain potential preventive activities on leukemia. At present, the possible benefit effects on different type of leukemia will be tested in experimental systems and model.

### **3. Natural cosmetics material development**

With the raise of health-conscious, in addition to efficacy, customers choose cosmetics focus on safety. Therefore, develop safe and functional natural raw materials is the main mission currently. We had been finished the *Caulerpa microphysa* polysaccharide extracts preparation, sugar composition identification. Furthermore, we also finished the cytotoxicity evaluation according to the ISO10993-5 method, and demonstrated the anti-allergy activity of prepared extract. We will try to register on the International Nomenclature of Cosmetic Ingredients and enable the application in industry.

### **5. Liposome technique**

It is well-known that the antioxidant, antibacterial and anti-inflammatory activities of plant secondary metabolite. However, there are degradation-labile and poor stability shortcomings. Bangham discovered in 1965, when the phospholipids are dispersed in the aqueous environment, it will be formed the multi-layer hollow liposome. Hydrophobic materials could be encapsulated inside the lipid bilayer structure of liposome, the water-soluble materials could be encapsulated inside aqueous space. The lipid composition of liposome is identical with cellular plasma membrane, thus, with highly compatible with animal cells, no immunogenic, and also high biodegradable character. It is a good transfer system for hydrophobic, unstable and toxic compounds. By usage of phospholipid combination, preparation of liposome encapsulated bioactive components, then evaluate the physical stability and cytotoxicity, further experiments will be focused on various bioactivities and antibacterial potential assessment in cell culture and in animal models.