行政院國家科學委員會專題研究計畫 期末報告

烏胺酸去羧化蝟、抑蝟與抑蝟抑制蛋白在計畫性細胞凋亡中所扮演之角色及其機制之探討與抑癌之應用(第 3 年)

計 畫 類 別 ：個別型
計 畫 編 號 ：NSC 99-2314-B-040-002-MY3
執 行 期 間 ：101 年 08 月 01 日至 102 年 07 月 31 日
執 行 單 位 ：中山醫學大學微生物免疫研究所

計 畫 主 持 人：劉光耀
共 同 主 持 人：楊忠諺、楊忠諺、楊忠諺

報 告 附 件 ：出席國際會議研究心得報告及發表論文

公 開 資 訊 ：本計畫涉及專利或其他智慧財產權，2 年後可公開查詢

中 華 民 國 102 年 10 月 29 日

中 文 摘 要 ： 本研究尋找抑制鳥胺酸脫羧酶有效策略，自天然物與合成奈米產物達到抑制鳥胺酸脫羧酶，進而應用於抑癌作用。研究成果已發表於 PLoS ONE 國際雜誌，並申請專利應用抑酶胜肽抑制腫瘤促進因子。

中文關鍵詞： 鳥胺酸去羧化酶, 抑癌

英 文 摘 要 ：

英文關鍵詞： ornithine decarboxylase, tumor suppression

鳥胺酸去羧化酶、抑酶與抑酶抑制蛋白在計畫性細胞凋亡中所扮演之角色及其機制之探討與抑癌之應用

黃酮類與奈米癌胜肽抑制鳥胺酸脫羧酶對抗血癌及造成免疫細胞凋亡機制

ABSTRACT

本研究尋找抑制鳥胺酸脫羧酶有效策略，自天然物與合成奈米產物達到抑制鳥胺酸脫羧酶，進而應用於抑癌作用。研究成果已發表於 PLoS ONE 國際雜誌，並申請專利應用抑酶胜肽抑制腫瘤促進因子。

MATERIALS AND METHODS

Preparation of water-dispersible gold nanoparticles

The preparation of the water-dispersible gold nanoparticles followed the standard citrate-reduction method. A 20 mL of 1.0 mM $HAuCl_4 \cdot 3H_2O$ was transferred to a 50 ml conical flask for heating and stirred vigorously. When the solution has nearly come to the boil, 2 ml of 1% sodium citrate was quickly added. Heating continued for another 15 minutes after which the solution was removed from the heater.

Conjugation of gold nanoparticles and proteins

Two kinds of proteins were used for the conjugation. In brief, the protein solution (200 μL) was diluted by adding 400 μL of de-ionized water, then the resultant solution was added into the gold nanoparticle sol (400 μL), the color of the solution turned to purple immediately.

Cell culture and treatment

The human promyelocytic leukemia HL-60 and humanacute T cell leukemia. Jurkat cell lines were grown in RPMI 1640 medium supplemented with 10% fetal bovine serum (FBS) at a temperature of 37℃ under a humidified and 5% CO_2 environment. Chrysin, baicalein, Myricetin, N-acetylcysteine (NAC), 2'-7'-dichlorofluoroscein diacetate (DCFH-DA), and rhodamine 123 were purchased from Sigma-Aldrich (St. Louis, MO).

Cell viability and acridine orange staining assay

Cells (2 x 10^6/ml) were seeded into 60-mm Petri dishes and incubated at 37 8C. The cells were harvested after treatment with rottlerin. The viable cells were counted using the trypan blue exclusion method. Cell suspension was mixed on a slide with an equal volume of acridine orange solution (10 Ag/ ml). Green fluorescence was detected between 500 and 525 nm through using a fluorescent microscope (Zeiss, Oberkochen, Germany). Bright-staining condensed chromatin was detected in apoptotic cells (Liu et al., 1998).

Transfection

Parental HL-60 and Jurkat cells were transfected with WT-ODC (overexpressing ODC) and m-ODC (empty vector) plasmids according to calcium phosphate-mediated transfections, respectively. Stably transfected cells were selected with the antibiotic G418 (400 μg/ml). Three weeks later,

isolated G418-resistant clones were individually analyzed for expression of ornithine decarboxylase. The ODC expressions of individual clones were examined by immunoblotting.and enzyme activity assay.

DNA fragmentation assay

Cells were harvested and lysed overnight in a digestion buffer (0.5% sarkosyl, 0.5 mg/mL proteinase K, 50 mM Tris–HCl, pH 8.0 and 10 mMEDTA) at 55◦C. Subsequently, cells were treated with 0.5 µg/mL RNase A for 2 h. The genomic DNA was extracted by phenol/ chloroform/isoamyl alcohol extraction and analyzed by gel electrophoresis using 2% agarose.

Immunoblotting

To purify the total proteins, cells were harvested and lysed in cold lysis buffer (10% v/v glycerol, 1% v/v Triton X-100, 1 mM sodium orthovanadate, 1 mM EGTA, 10 mM NaF, 1 mM sodium pyrophosphate, 20 mM Tris, pH 7.9, 100 µM β-glycerophosphate, 137 mM NaCl, 5 mM EDTA, 1 mM PMSF, 10 µg/mL aprotinin, and 10 µg/mL leupeptin), homogenized, centrifuged, and then the supernatant was boiled in a loading buffer with an aliquot corresponding to

50µg of protein separated by SDS-PAGE. After blotting, polyvinylidene difluoride (PVDF)membranes were incubated with anti-caspase-3 (rabbit polyclonal, Santa Cruz Biotechnology, Santa Cruz, CA), caspase-9 (rabbit polyclonal, Santa Cruz Biotechnology, Santa Cruz, CA), Bcl-xL (mouse monoclonal, Santa Cruz Biotechnology, Santa Cruz, CA), Bax (mouse monoclonal, Santa Cruz Biotechnology, Santa Cruz, CA), Cyclin D_1 (mouse monoclonal, Santa Cruz Biotechnology, Santa Cruz, CA), Cyclin A (mouse monoclonal, Thermo Scientific, Fremont, CA), PARP (mouse monoclonal, Santa Cruz Biotechnology, Santa Cruz, CA), Apaf-1 (mouse monoclonal, Santa Cruz Biotechnology, Santa Cruz, CA) or Actin (mouse monoclonal, Santa Cruz Biotechnology, Santa Cruz, CA) antibodies for 6 h, and the secondary antibody labeled with horseradish–peroxidase was incubated for

1 h. The antigen–antibody complexes were visualized by enhanced chemiluminescence.

Sub-G1 fraction analysis

For apoptotic sub-G1 analysis, 1 ×10^6 cells were harvested and washed with PBS, resuspended in 0.2 ml of PBS and fixed in 0.8 ml of ice-cold 99 % ethanol at −20 ℃ for overnight. The cell pellets were collected by centrifugation, resuspended in 1 ml of hypotonic buffer (0.5 % Triton X-100 in PBS and 0.5 µg/ml RNase A), and incubated at 37 ℃ for 30 min. Then, 1 ml of PI solution (50 µg/ml) was added and the mixture was allowed to stand on ice for 30 min. The nuclei were analyzed in a FACSCAN laser flow cytometer (Becton Dickenson, San Jose, CA). For means of annexin V binding assay, cells that exhibiting high staining intensity with annexin V were regarded as being apoptotic. 1 × 10^6 cells were pelleted, resuspended in 200 µl of Hepes-buffered saline, and 10 µl of FITC-labelled enhanced annexin V and 100 ng of PI were added. Upon incubation for 15 min at room temperature in the dark, samples were brought to 1 ml with PBS. Analysis was done by FACSCAN laser flow cytometer. Data were acquired and analyzed by using with WinMDI software.

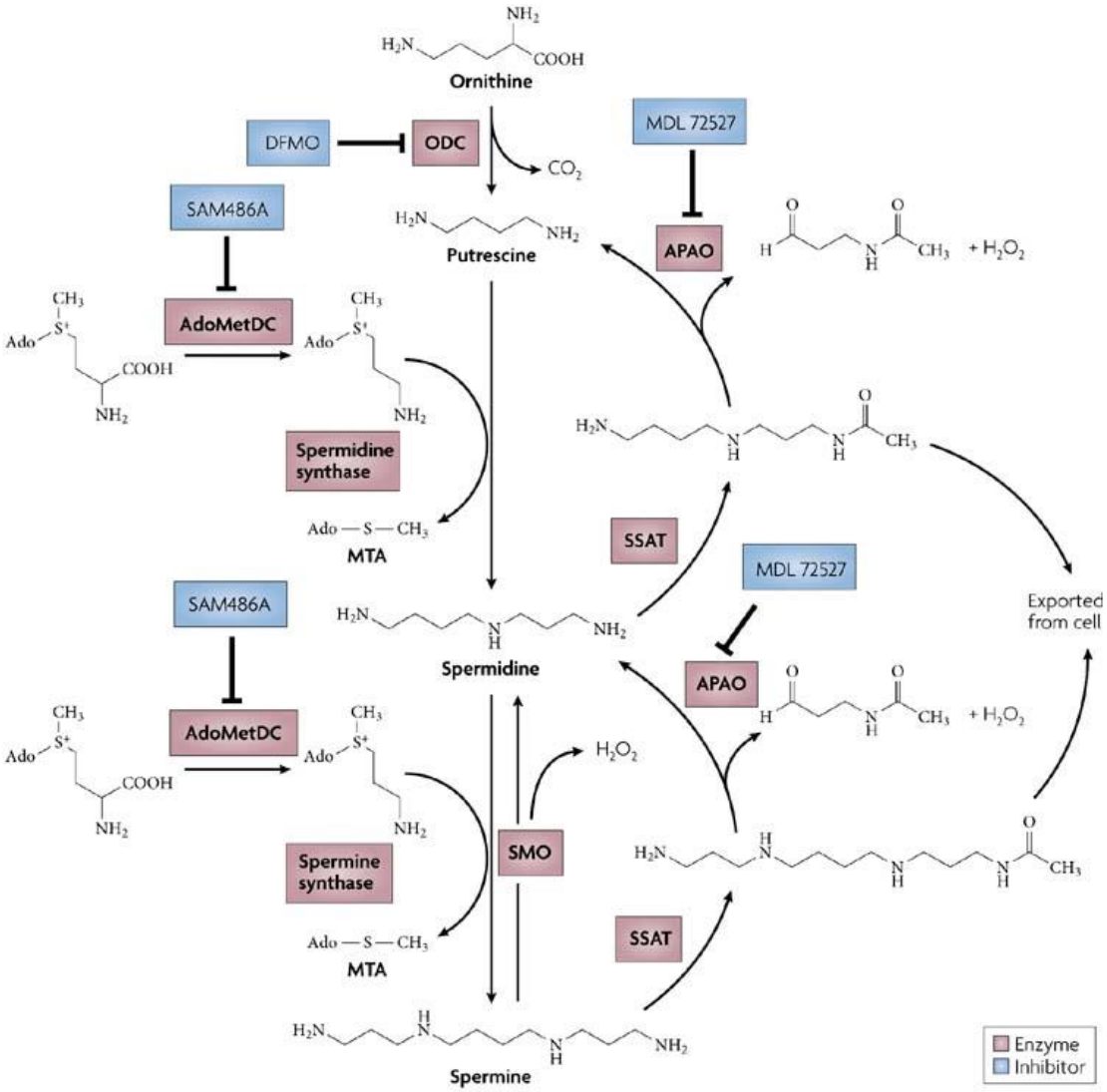
Detection of intracellular ROS

Intracellular oxidative stress was assayed by measuring intracellular oxidation of 2', 7'-dichlorofluorescin (DCFH) (Carter et al., 1994; Amer et al., 2003). The substrate is DCFH-DA, which easily diffuses into the cell and is then deacetylated by cellular esterases to the more hydrophilic, nonfluorescent DCFH. ROS generation in the cell oxidizes DCFH to the fluorescent 2', 7'-dichlorofluorescein (DCF). DCF fluorescence was measured in a flow cytometer using the WinMDI software. In each study, 10,000 events (cells) were counted.

Analysis of the mitochondrial membrane potential (Δψ m)

The Δψm was monitored by fluorescence of rhodamine 123 (Liu et al., 2005). Cells were incubated with 10 µM rhodamine 123 for 10 min. Finally, cells were detached and fluorescence was measured in a flow cytometer. In each study, 10,000 events (cells) were counted. Data were acquired and analyzed using WinMDI software.

Results



圖一、ODC 是催化多元胺生成速率決定步驟的關鍵酵素。將其受質鳥胺酸反應成產物腐胺(putrescine)，再透過其他酵素催化合成亞精胺 (spermidine) 及精胺(spermine)。(Robert, et. al., 2007)

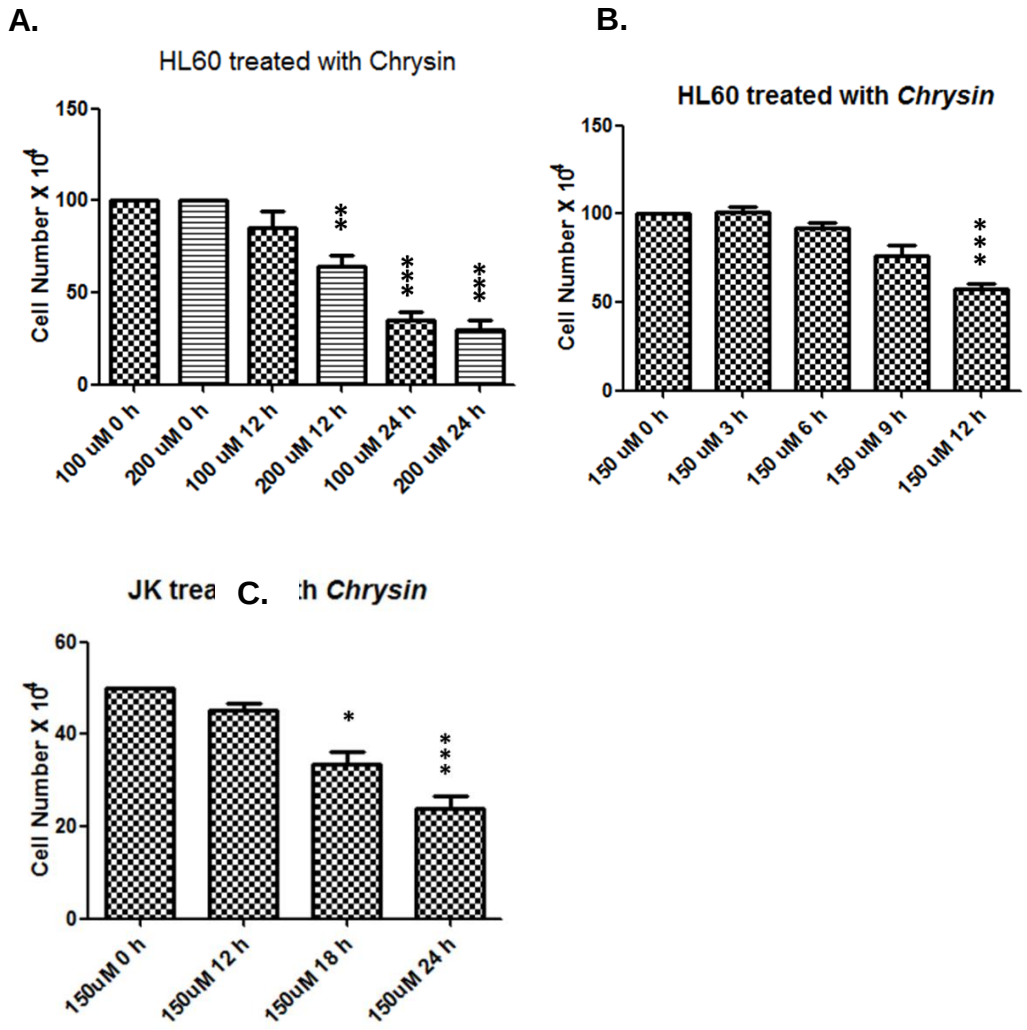


FIG 2. Chrysin-promoted apoptosis of HL-60 and Jurkat cells. (A) The HL60 cells were treated with 100, and 200 µM Chrysin for 24 h and (B) 200 µM for 12h. Cell viability was determined by trypan blue exclusion assay. (C) The Jurkat cells were treated with 150 µM for 24 h. Data were representative of at least three experiments.

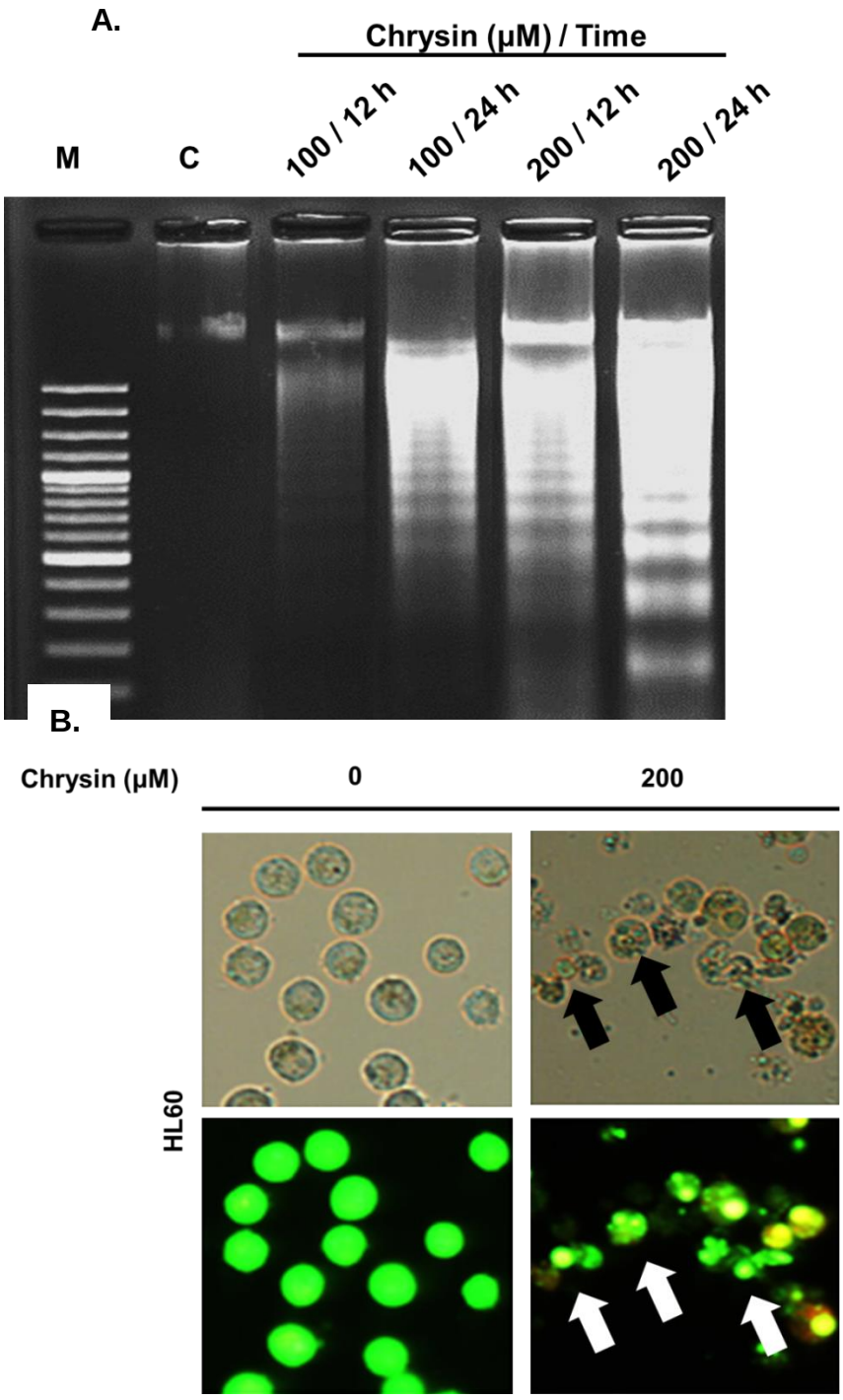


FIG 3. Chrysin induced apoptosis in HL-60 cells. (A) HL-60 cells were treated with different concentrations (100 and 200 μM) of Chrysin for 12 h or 24 h. DNA fragmentation was detected by gel electrophoresis. M, DNA ladder marker. Data were representative of at least three experiments. (B) Cells were treated with 200 μM Chrysin for 12 h, stained with acridine orange and imaged on a fluorescent microscope. Arrows indicated an apoptotic body.

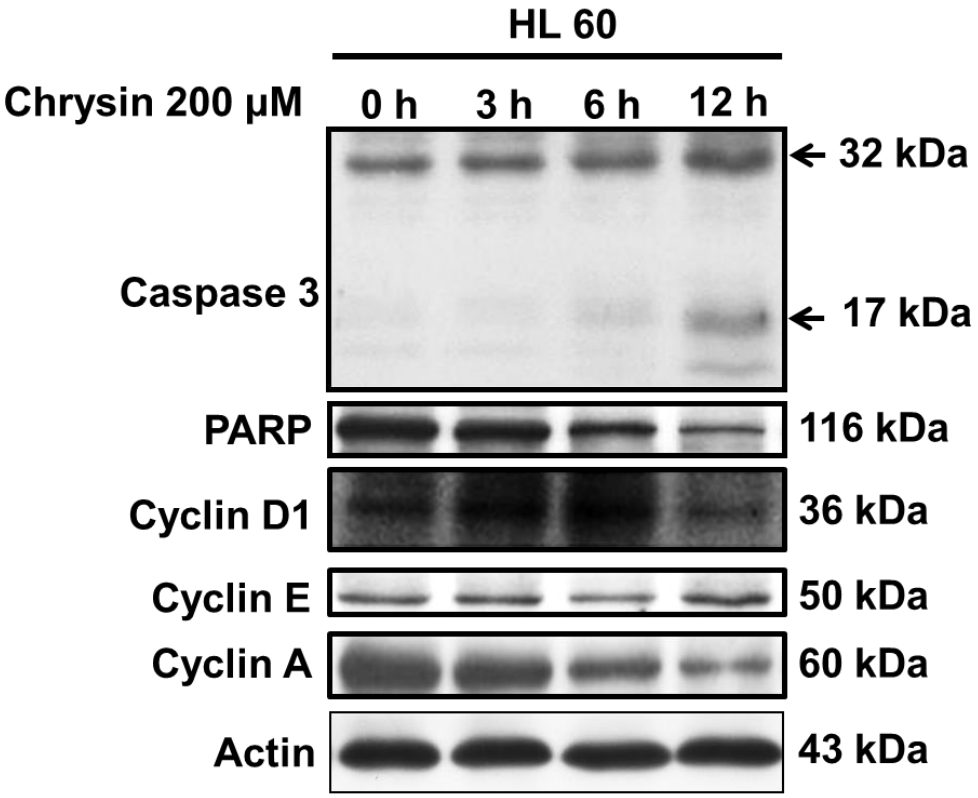


FIG 4. Effects of chrysin on the protein expression of caspase-3, PARP, CyclinD_1, Cyclin A and Cyclin E in HL-60 cells. Cells were treated with 200 μM chrysin for 0-12 h.

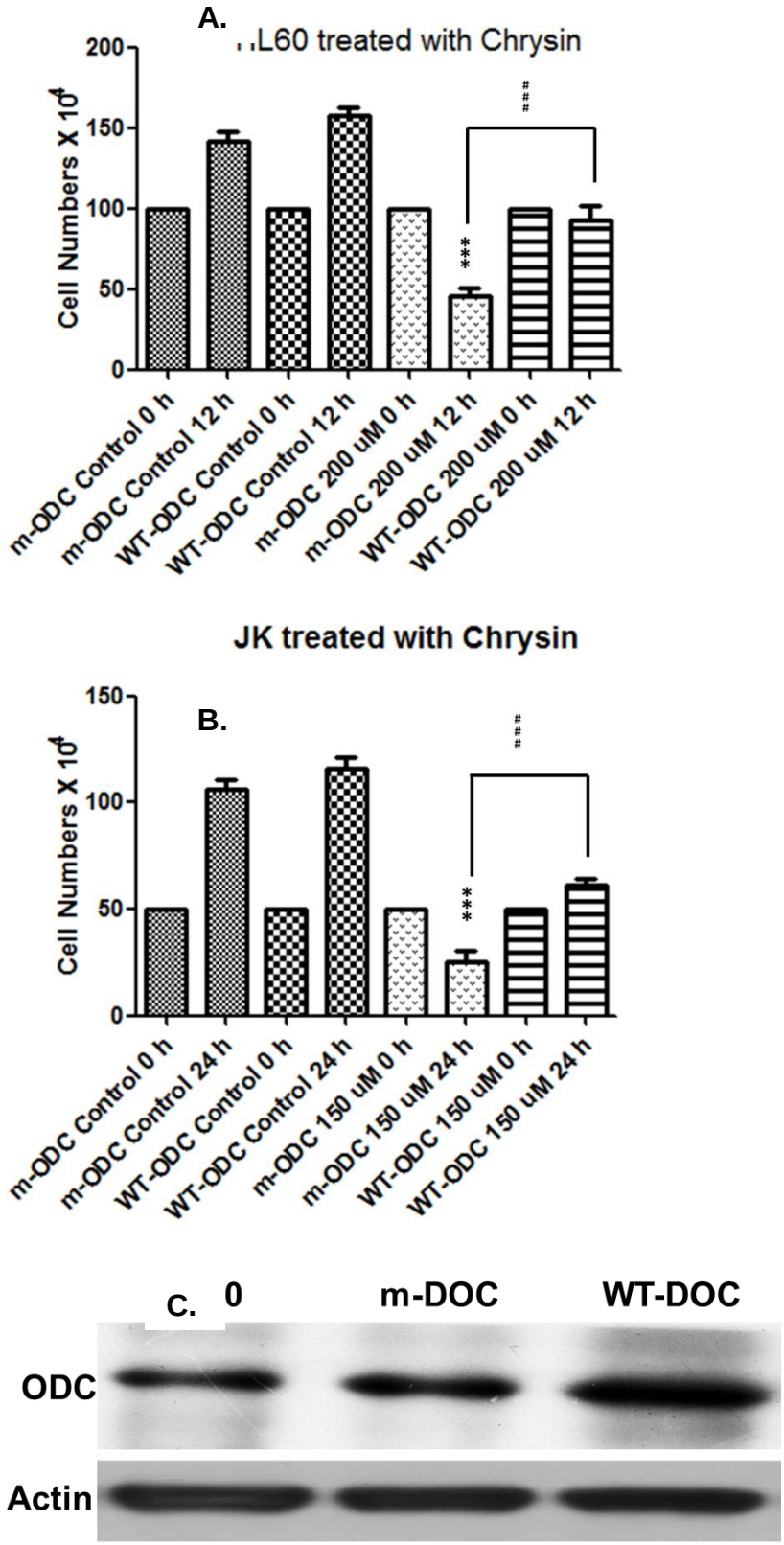
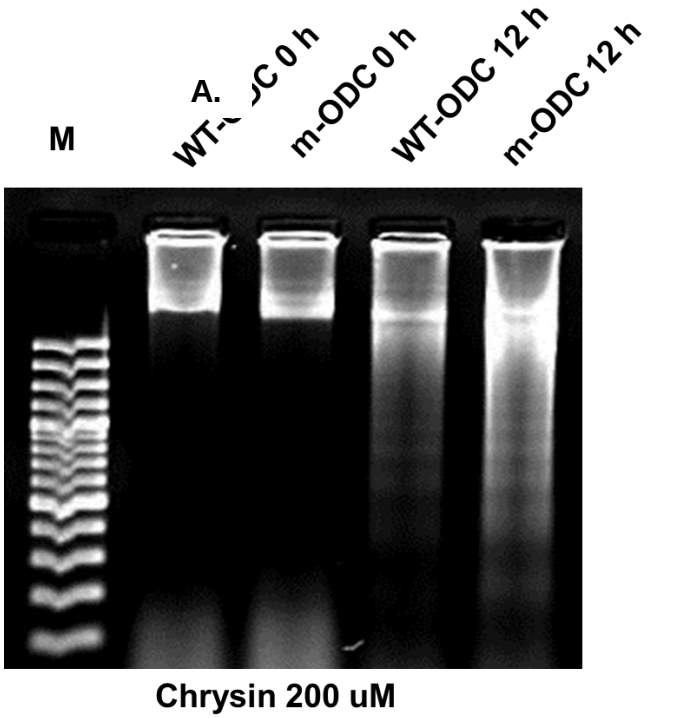


FIG 5. Overexpression of ODC prevented Chrysin-induced apoptosis.

(A) HL-60 and (B) Jurkat cells were transfected with m-ODC and WT-ODC plasmids, and then (C) cells were harvested to measure ODC protein. HL-60, Jurkat, m-ODC, and WT-ODC cells were treated with 200 μM Chrysin (Jurlat with 150μM) for 12 h

(Jurkat for 24 h).



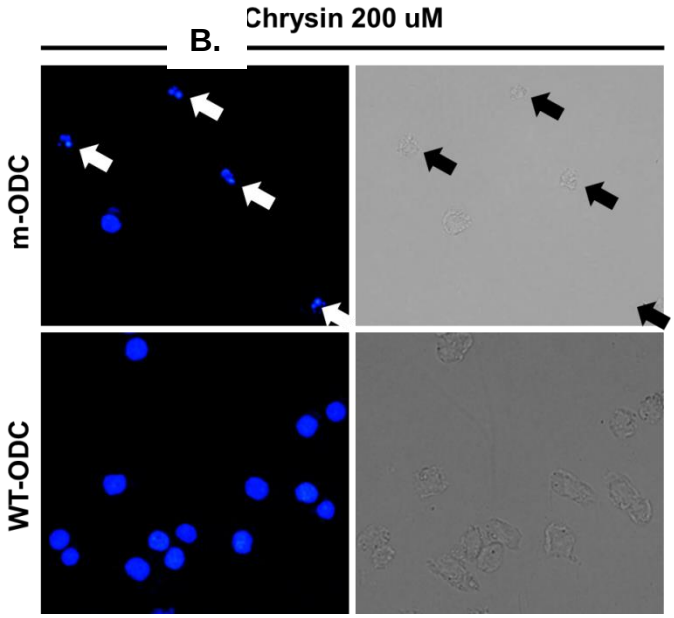


FIG 6. Overexpression of ODC prevented Chrysin-induced apoptosis in HL60 cells. (A) DNA fragmentation was analyzed by 2 % agarose gel electrophoresis and visualized by ethidium bromide staining. M, DNA ladder marker. (B) Stained with DAPI and then detected by fluorescence-microscope.

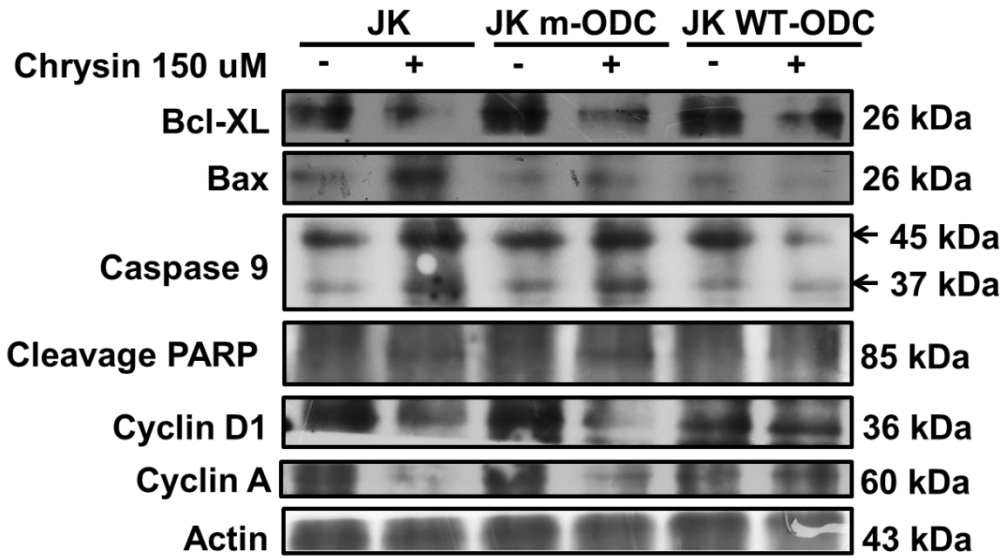


FIG 7. Overexpression of ODC reduced the cleavage of caspase-9, PARP, Bcl-xL expression and prevents cell cycle arrast in Jurkat cells. Cells were harvested, and all of the proteins were extracted for immunoblotting with specific antibodies of caspase-9, PARP, Bcl-xL, Bax, cyclin D_1 and cyclin A .

A.

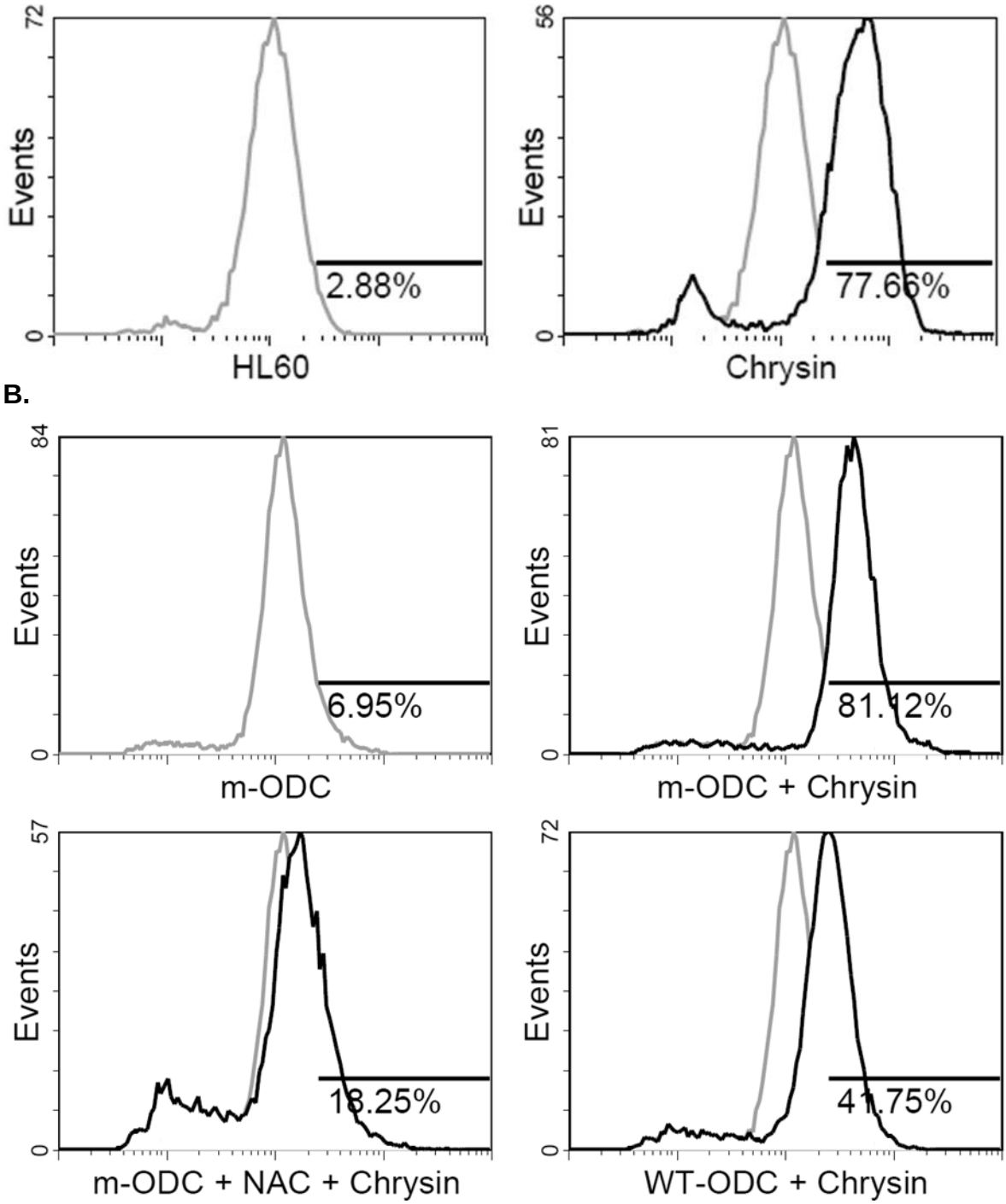


FIG 8. Overexpression of ODC decreased intracellular ROS generation. (A) Parental HL-60 cells were treated with 200μM Chrysin.(B) m-ODC cells were pretreated with 10 mM NAC for 1 h. m-ODC and WT-ODC cells were treated with Chrysin and then intracellular ROS was detected by flow cytometry by measuring fluorescence of DCF. Data were representative of at least three experiments.

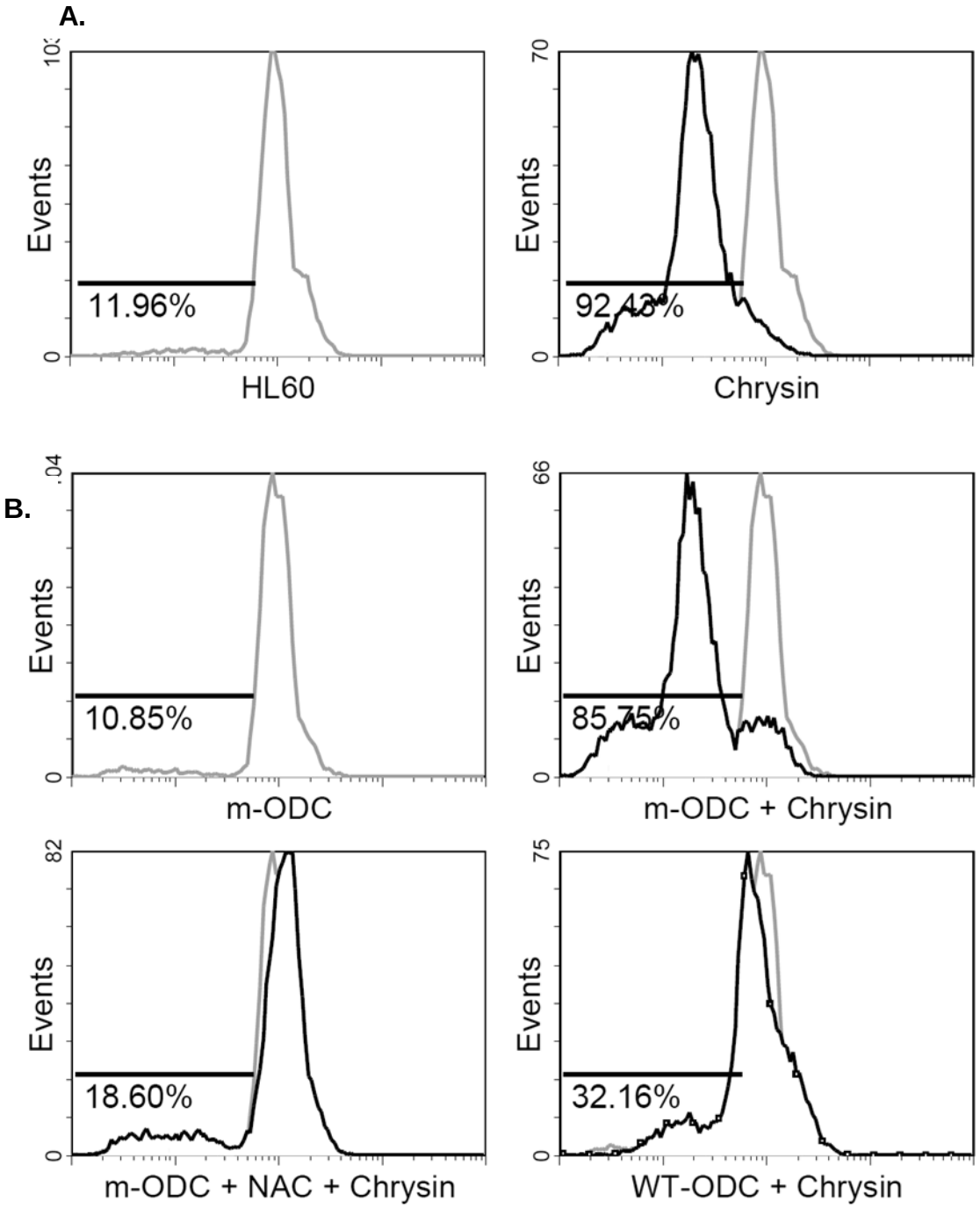


FIG 9. Overexpression of ODC decreased the loss of $\Delta\psi_m$. HL60, m-ODC and WT-ODC cells were treated with Chrysin and then $\Delta\psi_m$ were detected by flow cytometry with rhodamine 123. Data were representative of at least three experiments.

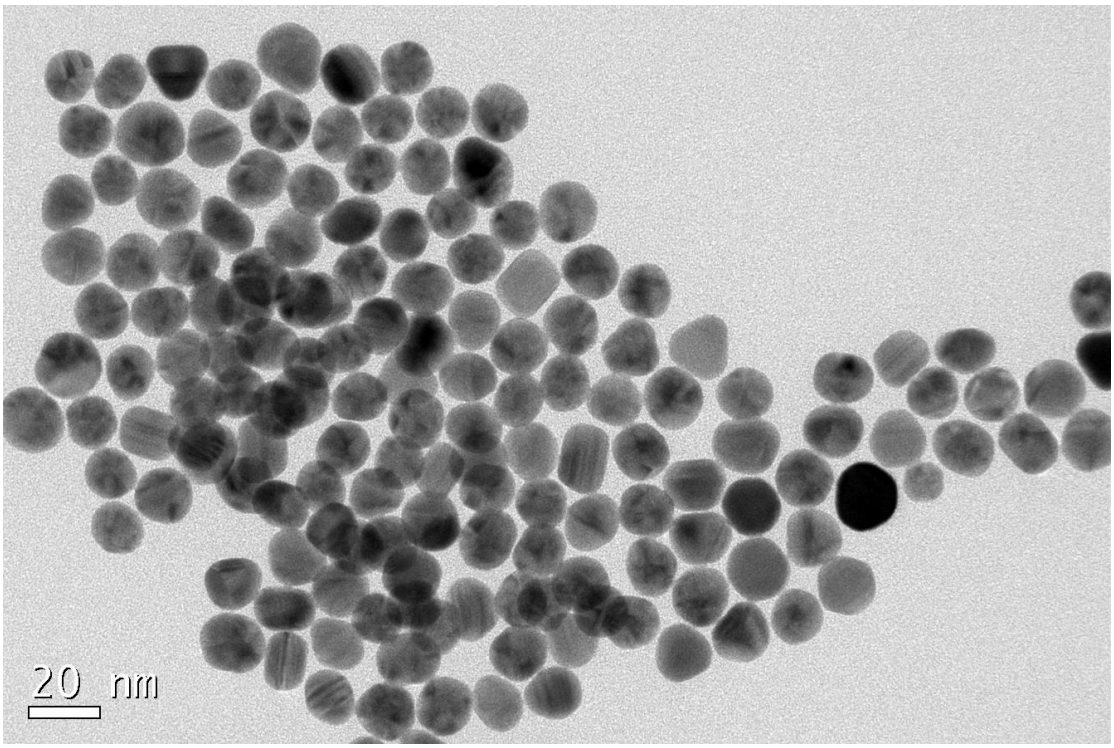


FIG 9. AZ-nanopaticles. Data were representative of at least three experiments.

出席國際學術會議心得報告

計畫編號	NSC99-2314-B-040-002-MY3 & 100-2919-I-040-001-A1
計畫名稱	A study on the roles of ornithine decarboxylase, antizyme and antizyme inhibitor involved in the programmed cell death, and the applications in tumor suppression
出國人員姓名 服務機關及職稱	劉光耀；中山醫學大學微生物免疫學研究所；教授
會議時間地點	25 – 29 November 2012 【 2012 年 11 月 25－29 日】 Bangkok International Trade & Exhibition Centre (BITEC), Bangkok, Thailand 【曼谷國際貿易展會中心 (BITEC)，曼谷，泰國】
會議名稱	(中文) 2012 亞洲和大洋洲生物化學家和分子生物學家聯合會 (FAOBMB) －生物化學和分子生物學第 13 屆國際大會--生命過程的發現－”從生物分子到系統生物學研究” (英文) 2012 Federation of Asian and Oceanian Biochemists and Molecular Biologists (FAOBMB)- 13th FAOBMB International Congress of Biochemistry and Molecular Biology-”Discovery of Life Processes: From Biomolecules to Systems Biology”
相關內容	Ornithine decarboxylase (ODC) modulates immune cell differentiation and programmed cell death

一、參加會議內容

參加第 13 屆2012 亞洲和大洋洲生物化學家和分子生物學家聯合會 (FAOBMB) －生物化學和分子生物學第13屆國際大會--生命過程的發現－”從生物分子到系統生物學研究”，大會邀請Nobel Laureate in Chemistry 2009, Ada Yonath, Israel以及Chi-Huey Wong, Taiwan演講為精彩處，前者以Ribosome translate protein動畫闡述分子機制與antibiotics如何應用在其抑制過程，我們看到大師風範，同時Prof. Ada Yonath全程參與，且對非其專長部分亦謙虛以對，其尊重專業值得效法。後者為中研院翁院長演講有關The innovation of glycoscience，其先進實驗想法與應用可為未來研究之星。

二、與會心得

此次學者發現lys-tRNA synthetase具transcription與translation雙重功能，在可見的未來將是一項重大實驗主題與研究突破重心。Stem cell研究也是重點之一，尤其中國大陸以Germ cells為題材將是非常新的領域。

三、建議

此次國內有 5~6 位學者演講，泰國主辦其參與度高，本計畫於此次攜 PostDoctor 劉奕良同行發表並觀摩，希望 2014 年 FAOBMB 將於台灣舉辦時，可增加能見度，請國家多多支持。

四、攜回資料名稱及內容

此次會議攜回會議論文集，內容包括大會演講與 oral 報告及壁報論文之題目摘要和內容。

五、其他

泰國在捷運、機場等建設已在我國之上，然其一般老百姓生活差距甚大，雖是外國旅遊避暑勝地，其人民生活落後也須改善。由於宗教與泰國皇室影響，治安相對比歐洲安全許多。另值得一提的是既使 11~12 月是泰國冬季依然揮汗如雨，雖下雨亦非常炎熱。

六、大會議程

	Grand Hall	Room I: 212-213	Room II: 214-215	Room III: 216-217	Room IV: 220-22
Monday 26 November 2012					
09:00 – 09:30	Opening Ceremony				
09:30 – 10:30	Plenary Speaker I				
11:00–12:00	Plenary Speaker II				
12:00–14:00	Lunch and Poster session				
14:00-15:00		Session A	Session B	Session C	Session J
15:30-17:10		Session A	Session B	Session C	Session G
Tuesday 27 November 2012					
09:00-10:00	FAOBMB Award Lecture				
10:30–11:30	Plenary Speaker III				
11:30-12:10	Special Invited Lecture I				
12:00–14:00	Lunch and Poster session				
13:00-14:00					BMB Thailand Meeti
14:00-15:00	Plenary Speaker IV				
15:30-17:10		Session I	Session B	Session C	Session L
Wednesday 28 November 2012					
09:00-10:00	YSA Award Presentation				
10:30–11:30	Plenary Speaker V				
11:30-12:10	Special Invited Lecture II				
12:00–14:00	Lunch and Poster session				
13:00-14:00		Biomedical Edu Network			
14:00-15:00	Plenary Speaker VI				
15:30-17:10		Session F	Session E	Session C	Biochem Edu Worksh

Thursday 29 November 2012					
09:00-10:00	Plenary Lecture VII				
10:30-12:10		Session F	Session E	Session D	Young Scientist Sess
12:10-13:30	Lunch				
13:30-14:30		Session K	Session E	Session D	Young Scientist Sess
15:00-16:30	Panel				
16:30-17:00	Awarding and Closing				

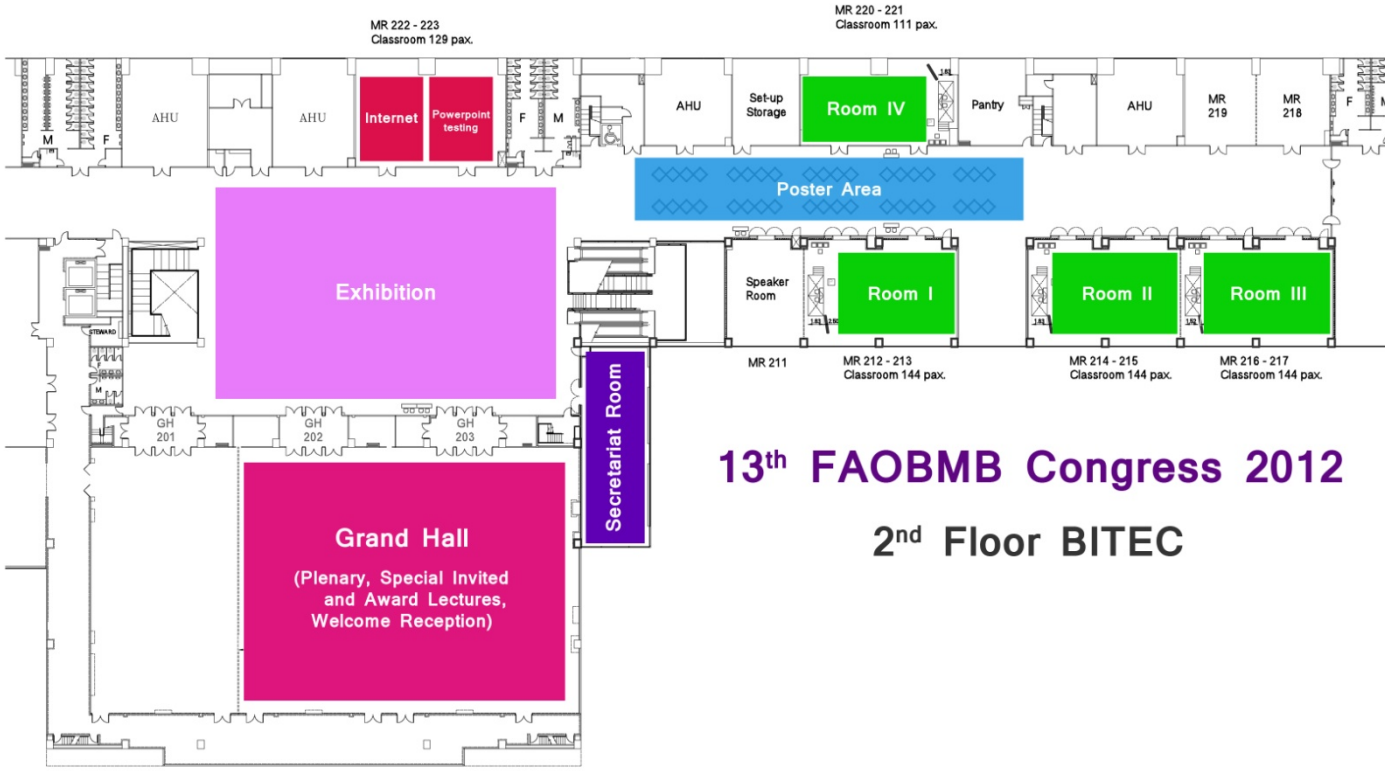
Monday 26 November 2012				
09:00-09:30	Opening Ceremony			
09:30-10:30	***Plenary Lecture I (Jisnuson Svasti Lecture)* : Ada Yonath**, Nobel Laureate in Chemistry 2009, Israel "Ribosome-cell signaling"			
10:30-11:00	Coffee/Tea Break			
11:00-12:00	***Plenary Lecture II (Osamu Hayaishi Lecture)* : Chi-Huey Wong,** Taiwan "Recent advances in glycoscience: From discovery to innovation"			
12:00-14:00	Lunch and Poster Session I			
	Session A: Gene and Genome (Room I)	***Session B: Biological Catalysis and Recognition (Room II)***	***Session C: Signaling and Cell Regulation (Room III)***	***Session J: Bionanotechnolo (Room IV)***
14:00-14:30	***IL-A-01* Ruiming Xu** "Structural basis for chaperone-histone interactions"	***IL-B-01* Paul Attwood** "The Regulation of the structure and function of pyruvate carboxylase by the allosteric activator, acetyl CoA	***IL-C-01* Masamitsu Futai** "Proton pumping ATPases in biochemistry and cell biology"	***IL-J-01* Shunichi Kuroda** "Development of *in vivo* pinpoi DDS/GDS nanocarrier bio-nanocapsules, a hybrid of virus and liposomes"
14:30-15:00	***IL-A-02* Sheila Nathan** *"Burkholderia pseudomallei* suppresses *Caenorhabditis elegans* immunity by specifically targeting a GATA transcription factor"	***IL-B-02* Pimchai Chaiyen** "Understanding and tuning the flavin reactivity of para-hydroxyphenylacetate 3-hydroxylase"	***IL-C-02* Ming Daw Tsai** "How a phosphorylation cluster regulates the activation and function of yeast checkpoint kinase Rad53"	***IL-J-02* Pakorn Kanchanawong** "Nanoscale architecture of integrin-mediated cell-matrix adhesions"
15:00-15:30	Coffee/Tea Break			
	Session A: Gene and Genome (Room I)	***Session B: Biological Catalysis and Recognition (Room II)***	***Session C: Signaling and Cell Regulation (Room III)***	***Session G: Systems Biolog and Bioinformatics (Room***
15:30-16:00	***IL-A-03* Anchalee Tassanakajon** "Molecular mechanism regulating the prophenoloxidase activating system in the shrimp *Penaeus monodon*"	***IL-B-03* Po-Huang Liang** "Protein-protein interactions (PPIs) as targets for selective chemotherapy against drug-resistant cancers and the apoptotic pathways of disrupting the PPIs"	***IL-C-03* Kazuei Igarashi** "Biochemistry of polyamines: Molecules modulating diverse cellular function in all living organisms"	***IL-G-01* Kazuki Saito** "Metabolomic systems biology plants"
16:00-16:30	***IL-A-04* Jin-Soo Kim** "Precision genome editing in cells and organisms with ZFNs and TALENs"	***IL-B-04* Hiroaki Suga** "Non-traditional peptide drug lead discovery accelerated by the RaPID system"	***IL-C-04* Tzu-Ching Meng** "Therapeutic potential of targeting protein tyrosine phosphatases for acute coronary artery disease"	***IL-G-02* Sunghoon Kim** "Human tRNA synthetases are multi-functional coordinators fo system homeostasis"
16:30-16:50	***O-A-01* Philip J. Shaw**	***O-B-01* Masatomo Maeda**	***O-C-01* Nonthaneth Nalinratana**	16:30-17:00 ***IL-G-03* Chandra Verma** "Computations reveal novel interactions in the p53 pathwa Implications for therapy"
16:50-17:10	***O-A-02* Tanit Chavalit**	***O-B-02* Danaya Pakotiprapha**	***O-C-02* Marc Kvansakul**	
17:30-20:30	Welcome Reception (all attendees) & FAOBMB Awarding (YSP-Travel fellowship and YSP award)			
Tuesday 27 November 2012				
09:00-10:00	***FAOBMB Research Award and Lecture* : Michael William Parker**, Australia "Membrane proteins: A toxic choice"			
10:00-10:30	Coffee/Tea Break			
10:30-11:30	***Plenary Lecture III (FEBS Lecture)* : Nigel Scrutton,** UK "Quantum biology of enzymatic H-transfer"			
11:30-12:10	***Special Invited Lecture I* : Jean Paul Thiery,** Singapore "Control of adhesive strength in cadherin-mediated intercellular adhesion"			
12:10-14:00	Lunch & Poster Session II			
14:00-15:00	***Plenary Lecture IV (Kunio Yagi Lecture)* : Hiroyuki Sasaki**, Japan "Genomic imprinting, DNA methylation and small RNA in mammalian germ cells"			
15:00-15:30	Coffee/Tea Break			
	Session I: Food Biochemistry and Biotechnology (Room I)	***Session B: Biological Catalysis and Recognition (Room II)***	***Session C: Signaling and Cell Regulation (Room III)***	***Session L: Biochemical Education (Room IV)***
15:30-16:00	***IL-I-01* Gracia Fe Yu** "Bioactive phytochemical components of rattan (Calamus ornatus Blume var.	***IL-B-05* Lisandra Martin** "Conformational control of P450 aromatase (CYP19) by protein association"	***IL-C-05* Briony Forbes** "Molecular mechanisms underlying insulin-like growth factor (IGF) action: Development	15:30-18:00 ***IL-L-01* Graham R. Parslow** "The Khan effect on flipped an blended learning"

	philippine-nsis) shoots consumed by indigenous people in the Phillipines"		of a novel tumour inhibitor"	***IL-L-02*** **Tan Tin Wee "Bioinformatics education in the life science curriculum"**
16:00-16:30	***IL-I-02*** **Soottawat Benjakul** "Endogenous proteases associated with quality loss of fish and fish products: their role and prevention"	***IL-B-06*** **James R. Ketudat-Cairns** "Structural studies of hydrolysis of glucosides, mannosides and oligosaccharides by rice family GH1 glycoside hydrolases"	***IL-C-06*** **Tanapat Palaga** "Notch signaling regulates IL-12 expression via c-Rel in macrophages and its impact on the severity of experimental autoimmune"	***IL-L-03*** **Bhinyo Panijpan** "Extremely stereospecific enzyme-catalyzed reactions as illustrated by hand-held household objects"
16:30-16:50	***O-I-01*** **Mohammad Riazul Islam**	16:30-17:00 ***IL-B-07*** **M. Waheed Akhtar** "Role of the binding modules on the activities of glycoside hydrolases"	***O-C-03*** **Guang-Yaw Liu**	***IL-L-04*** **Susan Howitt** "What do undergraduate stude learn from research experiences?"
16:50-17:10	***O-I-02*** **Wipa Suginta**	17:00-17:20 ***O-B-03*** **Noriko Fujiwara**	***O-C-04*** **Zhao Zhang**	***IL-L-05*** **Syed Saleheen Qad** "The Bangladesh biochemistry olympiad: An attempt at inspiri students to choose biochemist for career-building"

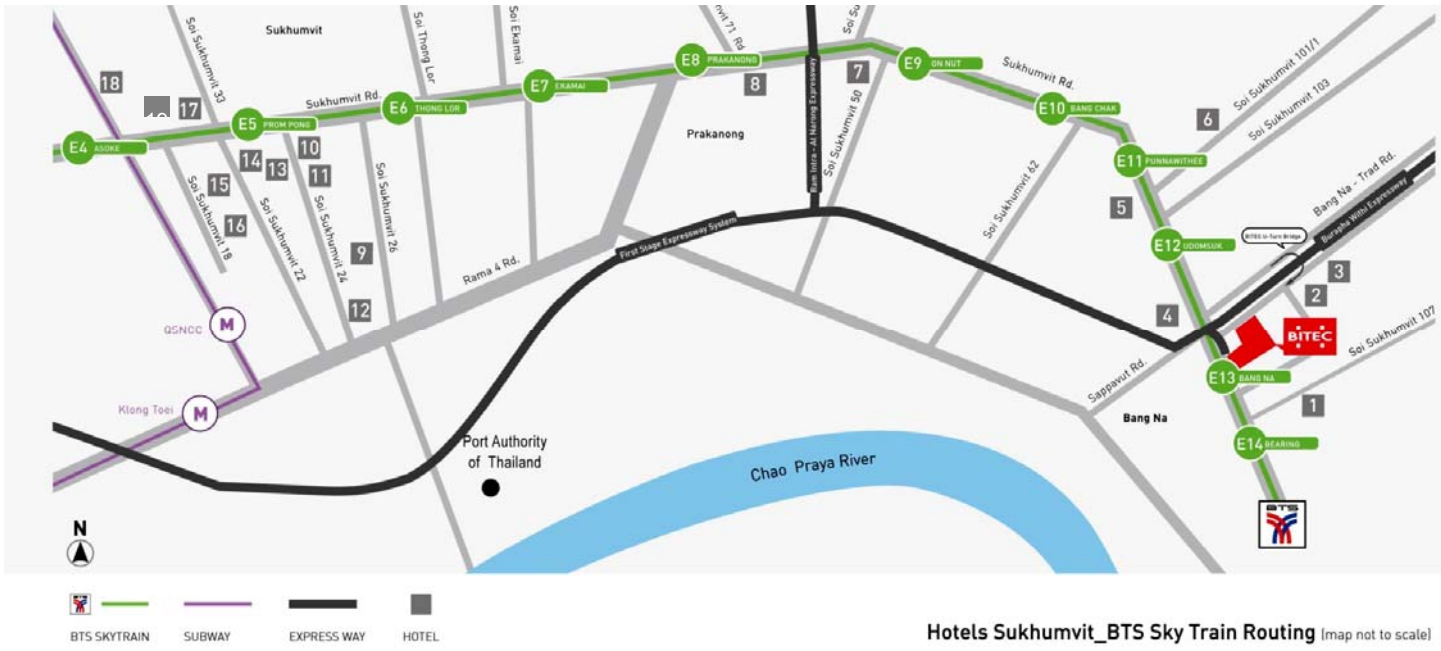
Wednesday 28 November 2012				
09:00-10:00	***FAOBMB YSA Award and Presentation*** **:** **Jade Forwood,** Australia "Structural and functional characterisation of acyl-CoA" **Lai Kuan Goh**, Malaysia "Molecular mechanisms of epidermal growth factor receptor endocytosis: role in signal transduction and tumorigenesis"			
10:00-10:30	Coffee/Tea Break			
10:30-11:30	***Plenary Lecture V (FAOBMB Lecture)*** **: Merlin Crossley,** Australia "Transcription factors in human genetic disease"			
11:30-12:10	***Special Invited Lecture II*** **: Yongyuth Yuthavong,** Thailand "From targets to drugs: Probing the interface between chemistry and biology"			
12:10-14:00	Lunch & Poster Session II			
13:00-14:00	***IL-L-06*** **Janet Macaulay and Susan Howitt**, Australia ***(Room I)*** "Collaborative university biomedical education network"			
14:00-15:00	***Plenary Lecture VI (Ramachandran Lecture)*** **: Kanury V.S. Rao**, India "Deciphering the host-pathogen interplay in human macrophages infected with *Mycobacterium tuberculosis*"			
15:00-15:30	Coffee/Tea Break			
	Session F: Plant Biochemistry and Biotechnology (Room I)	***Session E: Molecular Biology of Diseases (Room II)***	***Session C: Signaling and Cell Regulation (Room III)***	***Session L: Biochemical Education Workshop (Room IV)***
15:30-16:00	***IL-F-01*** **Hongwei Guo** "Coordinated control of Arabidopsis seedling de-etiolation by light and ethylene"	***IL-E-01*** **Joon Kim** "Human ribosomal protein s3 has multiple functions in DNA repair cancer and cell cycle regulation"	***IL-C-07*** **Sue-Goo Rhee** "Control of adrenal steroidogenesis via H_2O_2-dependent, reversible inactivation of peroxiredoxin III in mitochondria"	15:30-17:30 **Bhinyo Panijpan & Pintip Ruenwongsa** - Active participation by undergraduates in an enzyme laboratory - Construction of simple models of double-stranded DNA and ordered-polypeptide chain - Active learning process in instructing the topic of Diabetes Mellitus
16:00-16:30	***IL-F-02*** **Saisamorn Lumyong** "Ectomycorrhizal mushrooms in northern Thailand: diversity, food utilization and cultivation"	***IL-E-02*** **Viroj Boonyaratanakornkit** "Role of progesterone receptor extranuclear signaling in breast cancer tumorigenesis"	***IL-C-08*** **Skorn Mongkolsuk** "Roles of multiple *A. tumefaciens* OhrR homologs in differential regulation of gene expression in response to a wide range of organic hydroperoxide concentrations"	
16:30-16:50	***O-F-01*** Thidarat Nimchua	***O-E-01*** **Suchada Phimsen**	***O-C-05*** **Abu Shadat Mohammod Noman**	
16:50-17:10	***O-F-02*** Thanit Pewnim	***O-E-02*** **Karthigayan Gunalan**		
18:30-20:30	Invited Dinner (FAOBMB EC & Delegates, Organizing Committee, Guest Speakers and all Non-Thai Participants)			
Thursday 29 November 2012				
09:00-10:00	***Plenary Lecture VII (Takashi Murachi Memorial Lecture)*** **: Michael A. Marletta,** USA "Building selective gas sensors: Nature's way"			
10:00-10:30	Coffee/Tea Break			
	Session F: Plant Biochemistry and Molecular Biology (Room I)	***Session E: Molecular Biology of Diseases (Room II)***	***Session D: Stem Cell and Developmental Biology (Room III)***	***Young Scientist Session (Room IV)***
10:30-11:00	***IL-F-03*** **Mikio Nishimura** "Biogenesis and dynamics of plant peroxisomes"	***IL-E-03*** **Phillip Nagley** "Molecular aspects of neuronal responses to	***IL-D-01*** **Yau-Huei Wei** "Coordinated upregulation of genes involved in	***O-B-04*** **Tatiana Pereira Soares Da Costa**

		misfolding of mutant proteins in amyotrophic lateral sclerosis"	mitochondrial biogenesis and antioxidant enzymes in the differentiation of human mesenchymal stem cells"	***O-B-05*** **Ruchanok Tinikul** ***O-I-03*** **Yuzheng Zhao** ***O-A-03*** **Natthiya Wetsaphan** **YSP Best Oral Presenter**
11:00-11:30	***IL-F-04*** **Frederic Berger** "Epigenetic reprogramming during sexual reproduction in plants"	***IL-E-04*** **Sopit Wongkham** "Thymosin β10 possibly a tumor suppressor of cholangiocarcinoma"	***IL-D-02*** **Naihe Jing** "BMP signaling and spinal cord development"	
11:30-11:50	***O-F-03*** **Jun Yang**	***O-E-03*** **Chung-Eun Ha**	***O-D-01*** **Guan-Yu Chen**	
11:50-12:10	***O-F-04*** **Saba Riaz**	***O-E-04*** **Atit Silsirivanit**	***O-D-02*** **Sirikul Manochantr**	
12:10-13:30	Lunch			
	Session K: Bioenergy (Room I)	***Session E: Molecular Biology of Diseases (Room II)***	***Session D: Stem Cell and Developmental Biology (Room III)***	***Young Scientist Session (Room IV)***
13:30-14:00	***IL-K-01*** **Peter Lindblad** "Design, engineering, and construction of photosynthesis microbial cell factories for renewable solar fuel production"	***IL-E-05*** **Shiroh Iwanaga** "A high-coverage artificial chromosome library for the genome-wide screening of drug resistance genes in malaria parasites"	***IL-D-03*** **Qi Zhou** "Reprogrammed haploid stem cell and the potential application"	***O-C-06*** **Hong Wee Ivan Ng** ***O-E-05*** **Wanxing Eugene Ho** ***O-E-06*** **Parichut Thummarati**
14:00-14:30	***IL-K-02*** **Yuan Kun Lee** "Photosynthetic algae for biofuel production"	***IL-E-06*** **Sumalee Kamchonwongpaisan** "*De novo* heme biosynthesis is not essential in blood-stage malaria parasites"	***IL-D-04*** **Suradej Hongeng** "Development of immortalized hepatocyte-like cells from human mesenchymal stem cells"	
14:30-15:00	Coffee/Tea Break			
15:00-16:30	Panel on "Biochemistry and Molecular Biology in 2020: For Fighting against Disasters and Diseases" **Andrew H.-J.Wang**, Taiwan; **Michael A. Marletta**, USA and **Yongyuth Yuthavong**, Thailand			
16:30-17:00	Awarding and Closing Ceremony			

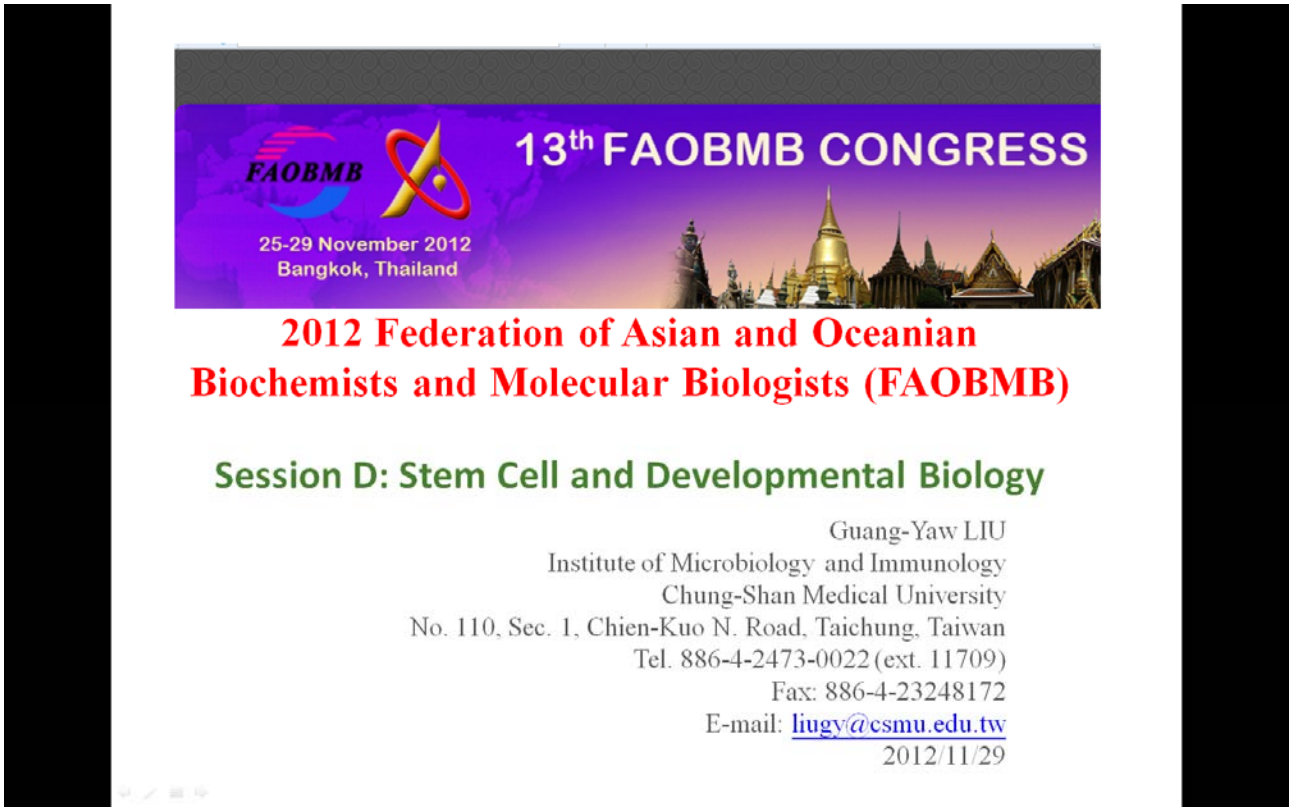
七、大會地圖



八、大會交通



九、Oral presentation



國科會補助計畫衍生研發成果推廣資料表

日期:2013/10/29

國科會補助計畫	計畫名稱: 烏胺酸去羧化酶、抑酶與抑酶抑制蛋白在計畫性細胞凋亡中所扮演之角色及其機制之探討與抑癌之應用
	計畫主持人: 劉光耀
	計畫編號: 99-2314-B-040-002-MY3　　學門領域: 血液科腫瘤科風濕免疫及感染

無研發成果推廣資料

99 年度專題研究計畫研究成果彙整表

計畫主持人：劉光耀	計畫編號：99-2314-B-040-002-MY3
計畫名稱：鳥胺酸去羧化酵、抑酵與抑酵抑制蛋白在計畫性細胞凋亡中所扮演之角色及其機制之探討與抑癌之應用	

成果項目			量化			單位	備註（質化說明：如數個計畫共同成果、成果列為該期刊之封面故事...等）
			實際已達成數（被接受或已發表）	預期總達成數(含實際已達成數)	本計畫實際貢獻百分比		
國內	論文著作	期刊論文	2	2	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	3	3	100%		
		專書	0	0	100%		
	專利	申請中件數	1	1	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（本國籍）	碩士生	2	2	100%	人次	
		博士生	1	1	100%		
		博士後研究員	1	1	100%		
		專任助理	0	0	100%		
國外	論文著作	期刊論文	0	0	100%	篇	
		研究報告/技術報告	0	0	100%		
		研討會論文	0	0	100%		
		專書	0	0	100%	章/本	
	專利	申請中件數	0	0	100%	件	
		已獲得件數	0	0	100%		
	技術移轉	件數	0	0	100%	件	
		權利金	0	0	100%	千元	
	參與計畫人力（外國籍）	碩士生	0	0	100%	人次	
		博士生	0	0	100%		
		博士後研究員	0	0	100%		
		專任助理	0	0	100%		

其他成果 (無法以量化表達之成果如辦理學術活動、獲得獎項、重要國際合作、研究成果國際影響力及其他協助產業技術發展之具體效益事項等，請以文字敘述填列。)	無

	成果項目	量化	名稱或內容性質簡述
科教處計畫加填項目	測驗工具(含質性與量性)	0	
	課程/模組	0	
	電腦及網路系統或工具	0	
	教材	0	
	舉辦之活動/競賽	0	
	研討會/工作坊	0	
	電子報、網站	0	
	計畫成果推廣之參與（閱聽）人數	0	

國科會補助專題研究計畫成果報告自評表

請就研究內容與原計畫相符程度、達成預期目標情況、研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）、是否適合在學術期刊發表或申請專利、主要發現或其他有關價值等，作一綜合評估。

1. 請就研究內容與原計畫相符程度、達成預期目標情況作一綜合評估

■達成目標

□未達成目標（請說明，以 100 字為限）

□實驗失敗

□因故實驗中斷

□其他原因

說明：

2. 研究成果在學術期刊發表或申請專利等情形：

論文：■已發表 □未發表之文稿 □撰寫中 □無

專利：□已獲得 ■申請中 □無

技轉：□已技轉 □洽談中 ■無

其他：(以 100 字為限)

3. 請依學術成就、技術創新、社會影響等方面，評估研究成果之學術或應用價值（簡要敘述成果所代表之意義、價值、影響或進一步發展之可能性）(以 500 字為限）

獨特蛋白酵素降解與細胞生長死亡調控扮演重要角色，有助抑制癌化研究