

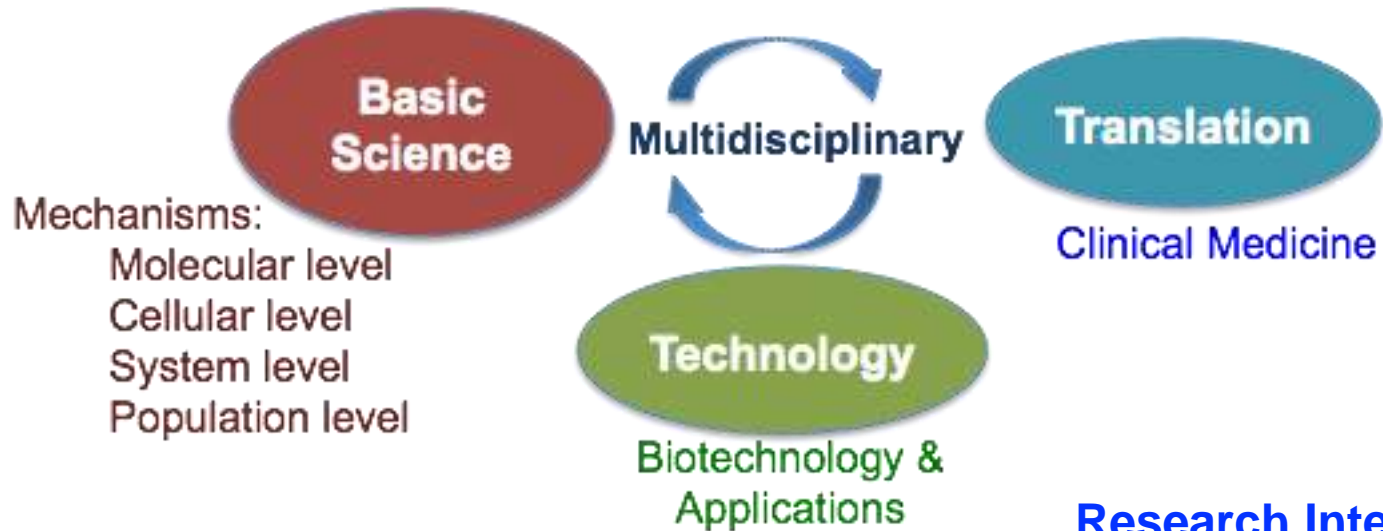
國立陽明交通大學生命科學院

生命科學系暨基因體科學研究所 簡介



民國112年11月

From Basic to Application and Translation Medicine



Approaches:

Structural biology

Molecular biology

Cell biology

Model organisms

Evolutionary genomics

Drug discovery

Computer simulation

Biochemistry

Enzymology

Proteomics

Genomics

Imaging

Biophysics

Big data analysis

Research Interests:

Cancers

Aging diseases

Neural diseases

Renal diseases

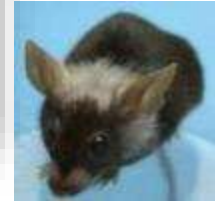
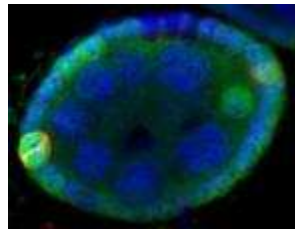
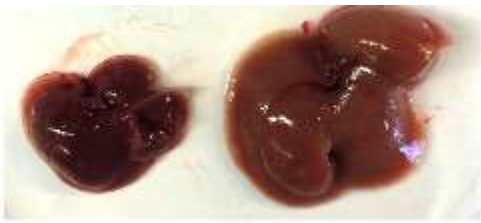
Infective diseases

Congenital diseases

Reproduction

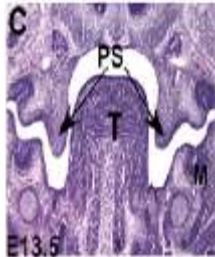
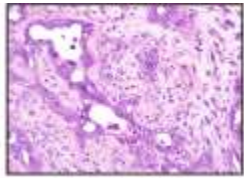
Development

基礎與轉譯醫學

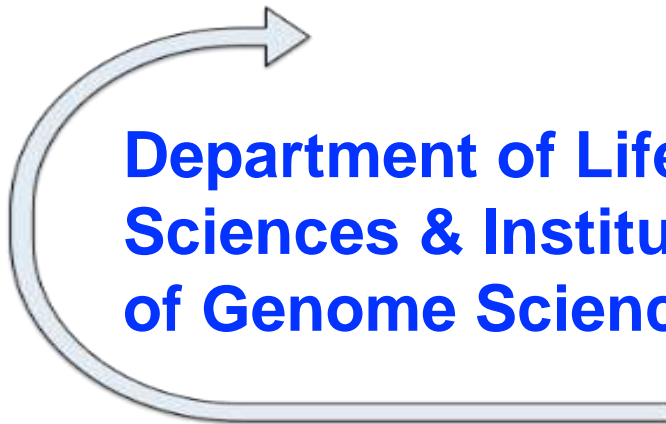


Organ level

Organism level



Tissue level



Department of Life Sciences & Institute of Genome Sciences

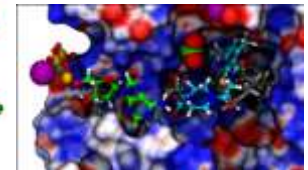
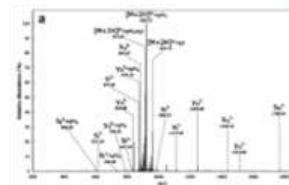
Population level



Organoids

Cellular level

Molecular level





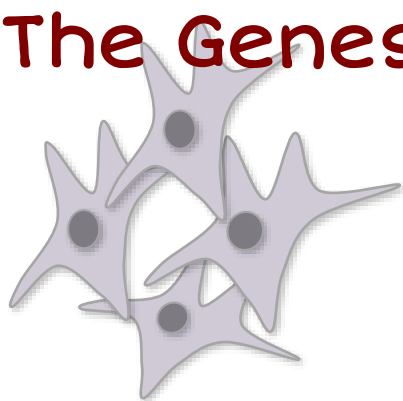
藥物發展與結構生物學組

(The Drug Development and
Structural Biology sector)

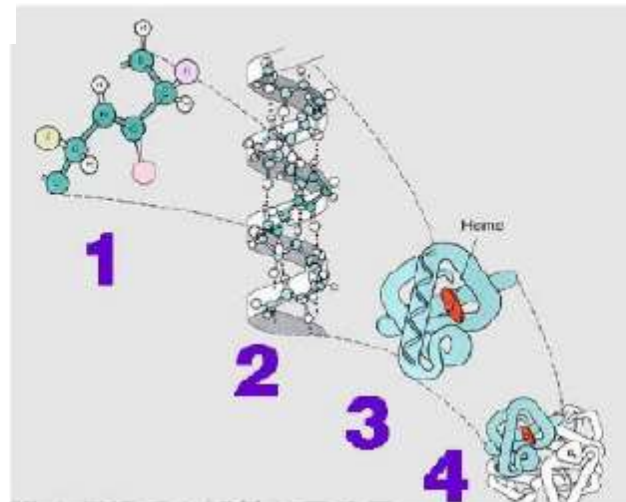
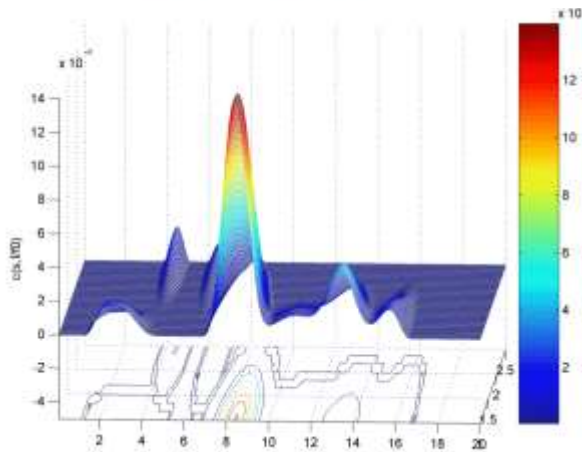
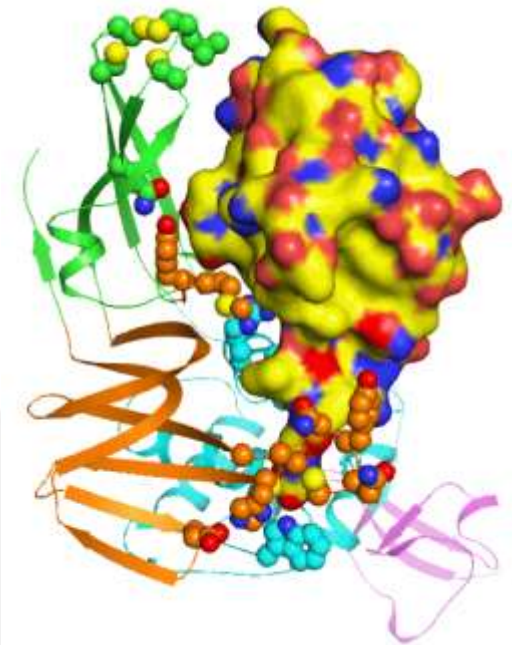
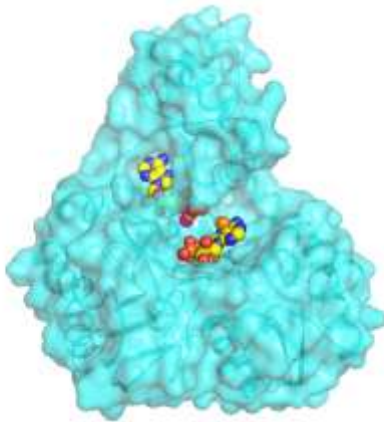


基因與發育組

(The Genes and Development sector)



藥物發展與結構生物學組



Sequence

Mass

Structure

X-ray crystal
NMR
CD

Function & Activity

Fluorescence
ITC
AUC
Single molecule

Application

Drug design

藥物開發與奈米生醫材料能源發展實驗室

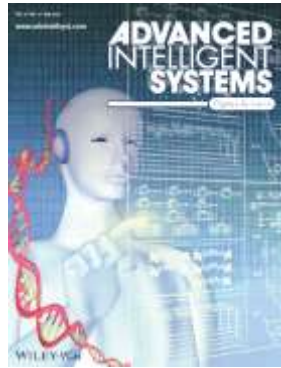
研究方向與成果

許世宜 教授
(Sheh-Yi Sheu)

國立陽明交通大學
生命科學系暨
基因體科學研究所
生物醫學大樓7樓708室
電話：28267233

實驗室：28267000 x 65675

E-mail: sysheu@nycu.edu.tw



結構生物/生醫資訊
分子結構與功能;資料探勘;
人工智慧;機器學習



生物物理/分子模擬/計算化學

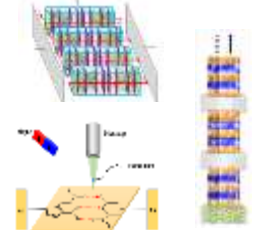
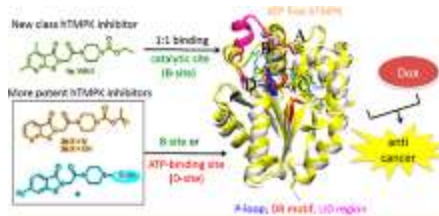
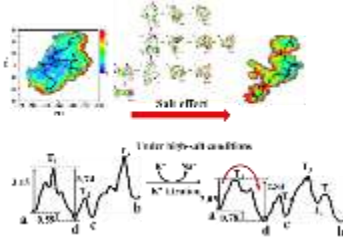
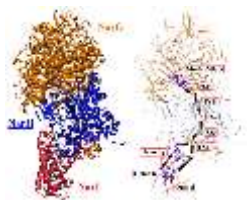
神經退化性疾病致病機轉;訊息傳遞;
電子轉移;酵素反應機轉

藥物設計

人工智慧/電腦輔助
藥物設計開發

奈米生醫仿生材料

奈米生物元件;生醫仿生材料;
海水淡化元件;奈米電池;
生物量子電腦





張欣暘副教授簡歷

蛋白結構與功能研究室

現職：國立陽明交通大學 基科所副教授

經歷：中研院 生化所 博士後 (2013-15)

芝加哥大學生化分生所 博士後 (2011-13)

學歷：伊利諾大學香檳分校 生化博士 (2005-10)

聯絡方式：

hychang5@nycu.edu.tw

02-28267000分機67168

學術專長：

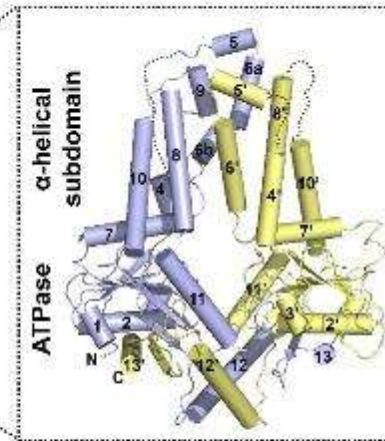
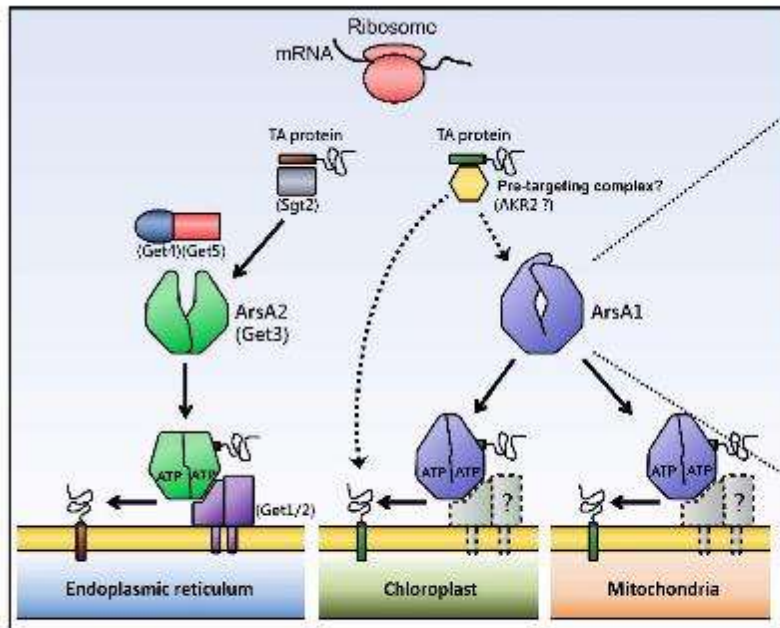
X-Ray 蛋白晶體學、酵素

動力學、結構生物學、

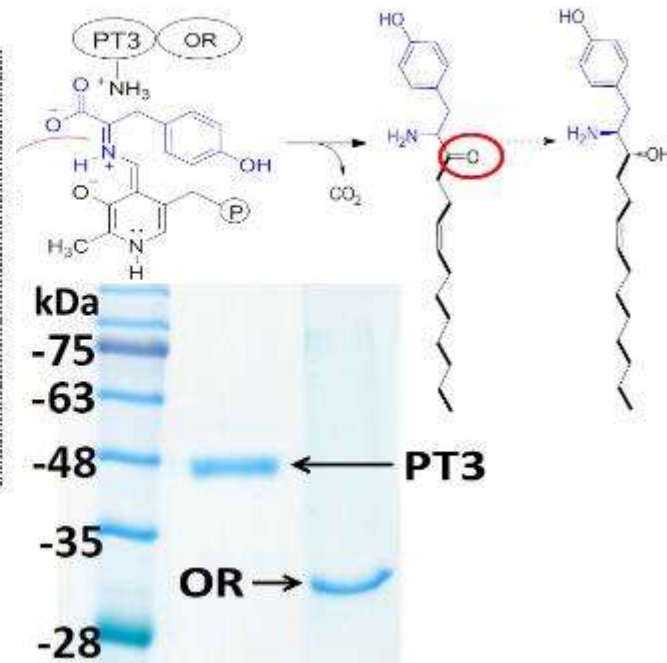
分子生物學、生物化學

重要研究成果

(1) Membrane protein biogenesis in eukaryotes



(2) The biosynthesis pathway of vitroprocine antibiotics



Model for the role of ArsA orthologs in post-translational membrane protein targeting in the alga *Chlamydomonas reinhardtii*. (2019 *The Plant Journal*, 99:128-143.)

林達顯 教授

結構生物學及生物物理學

從結構的觀點探討生物巨分子之功能。”動脈粥狀硬化”和”阿茲海默症”等老年退化性疾病相關的生物巨分子之結構生物學研究。

開發去泛素化酶(Ubiquitin specific protease, USP)之抑制劑，作為癌症藥物之先導化合物。

□ The strong connection of USPs with cancer phenotypes makes USPs attractive for the cancer drug discovery purposes.

□ USPs are potential drug targets

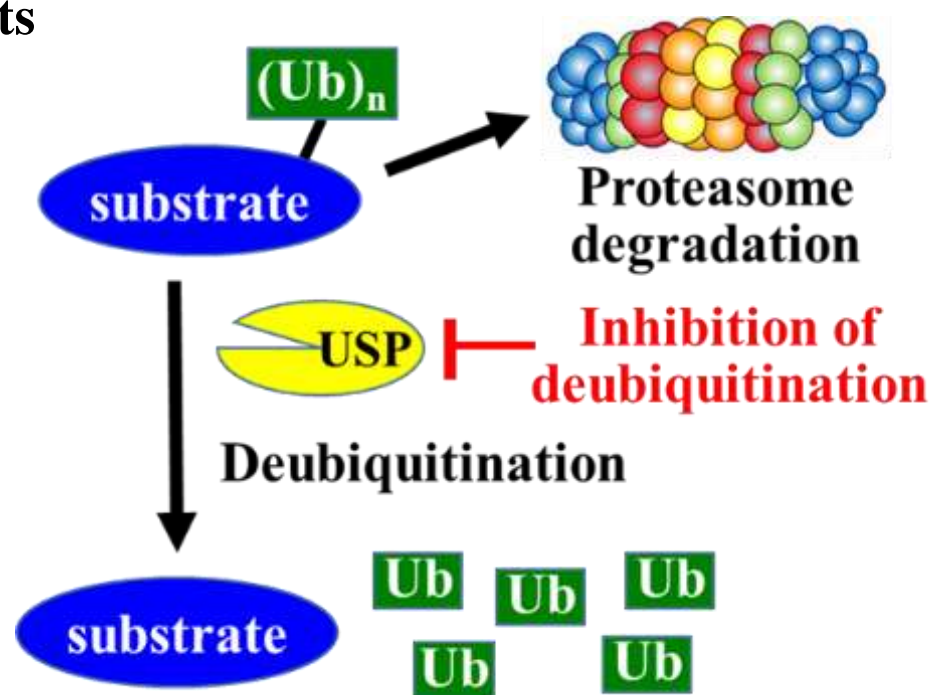
實驗室成員：

王嘉琳、何鎧全、陳宥誠、
朱苡瑄、陳少華、高聖祐、
孫佩珊、吳博文、林雨蓓、
莊詩晨、吳曼悅

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辦公室：台北榮總醫研部核磁共振研究室致德樓B-15



巫坤品

生物醫學資訊所 教授

跨領域醫學博士學位學程 主任

kpwu@nycu.edu.tw 02-2826-7273 守仁樓 303 室

<https://sites.google.com/view/kpwu>

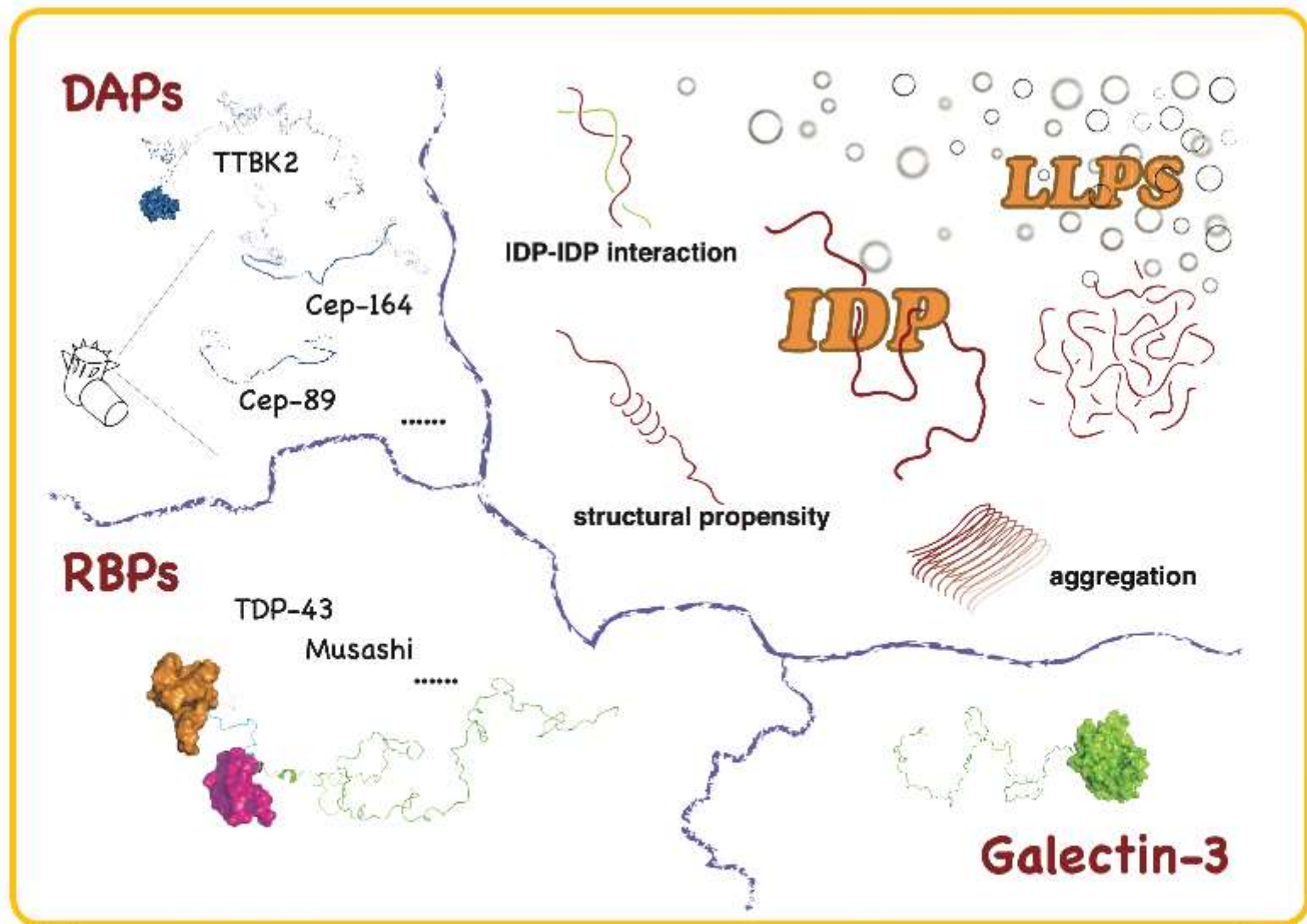


研究興趣：

- 實證醫學的文獻回顧
- 醫學資訊
- 計算運動醫學
- 生醫數據分析

研究方法：

- 人工智慧
- 資料探勘
- 數據分析
- 自然語言處理



黃介嶸 老師

.....實驗室介紹短片

實驗室網頁.....



林照雄 教授

代謝體及蛋白質體學實驗室 @ 傳醫大樓甲棟一樓112室
chaohsiunglin@nycu.edu.tw; (O) 02-2826-7280
<https://dls.nycu.edu.tw/faculty/faculty-member/chlin2.html>

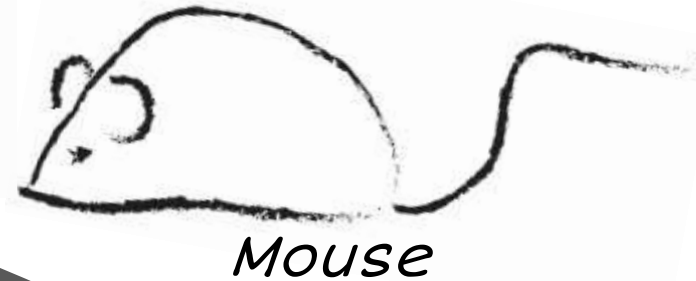
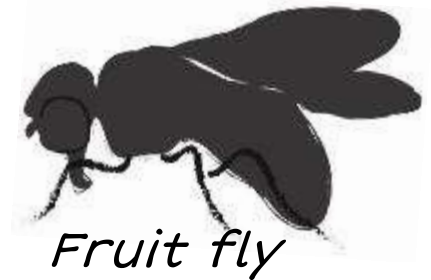
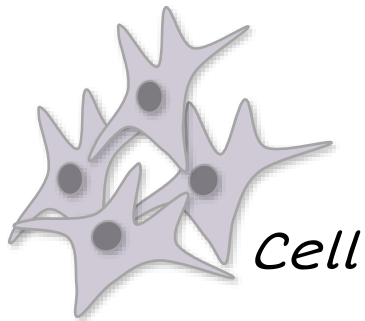
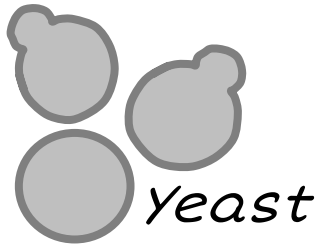


研究領域：抗癌機制開發、抗癌藥物機制探討、老化指標代謝物開發
研究方向：

1. 探討如何利用促進蛋白質交互作用的小分子化合物，以增加癌細胞在化療藥物作用下的細胞凋亡比例，進而開發抑制腫瘤生長之策略。
2. 探討抗癌天然物穿心蓮內酯(andrographolide)抑制人類肺腺癌細胞轉移的機制，特別是以代謝體學研究穿心蓮內酯如何調控脂質代謝物網絡。
3. 以代謝體學的研究方法，從臨床檢體或動物模式中，篩選老化相關的生物指標代謝物，並藉由機器學習運算邏輯，開發老化速度預測指數。

基因與發育組

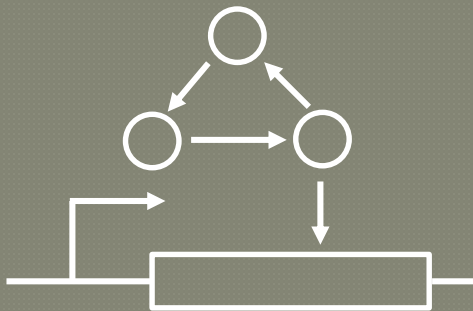
(The Genes and Development sector)



Laboratory of Synthetic Biology

陳滢州老師實驗室

Engineering gene circuits for precision medicine of neurodegenerative disorders, including ALS, Parkinson's, and Alzheimer's diseases.



Synthetic **transcriptional factor**

Synthetic **biosensor**

Synthetic **suppressor**

Synthetic **gene networks**

Synthetic **recorder & memory**

Synthetic **intelligence**

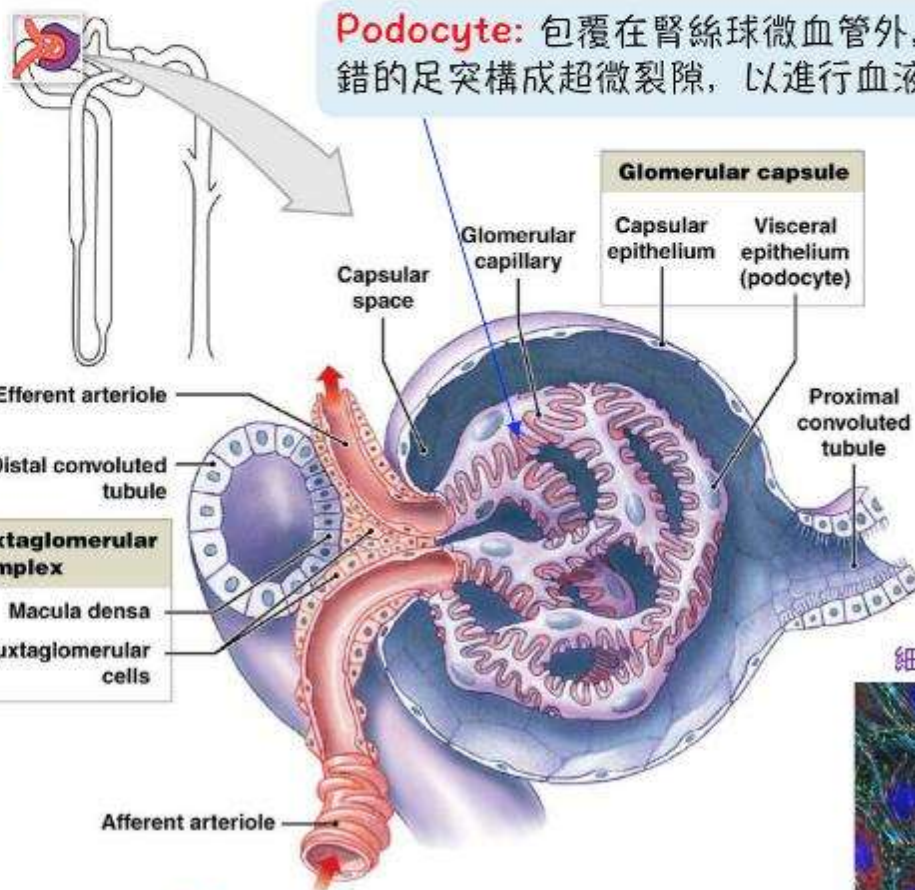
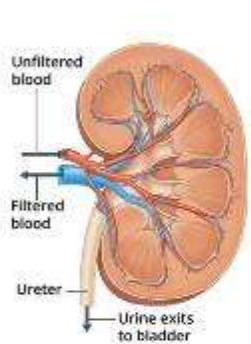
Your Synthetic creativity and participation

Email: yjoechen@nycu.edu.tw



(感謝陳俊銘老師實驗室提供)

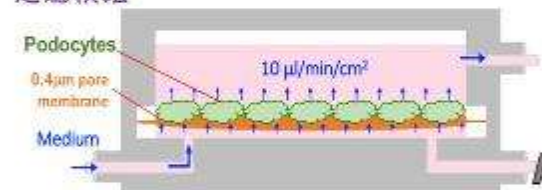
- 探討足細胞中細胞骨架訊息與基因表現的應力調控機制
- 建立足細胞實驗模式以發展藥物篩選平台



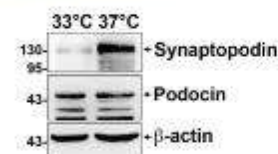
Important structural features of a renal corpuscle.

利用溫度誘導分化的足細胞株，建立模擬過濾壓力的細胞模式，探討足細胞的生理與病理問題。

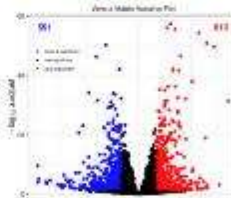
過濾模組



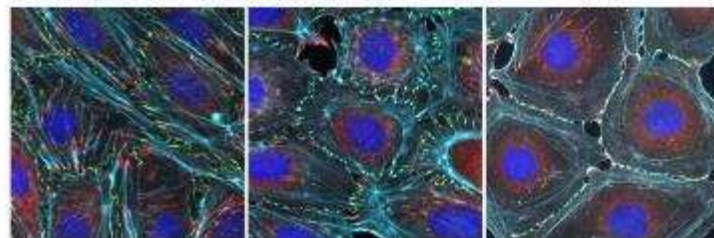
溫度誘導分化



基因表現的改變



細胞骨架、附着結構的變化



Paxillin/ZO-1/Phalloidin/Hoechst

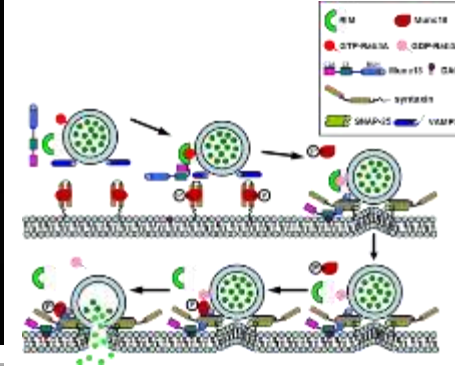
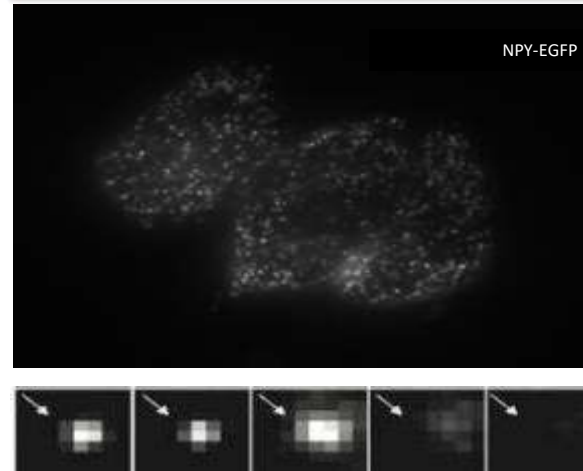
Lab of Cell Bioimage Informatics



Chung-Chih Lin 林崇智

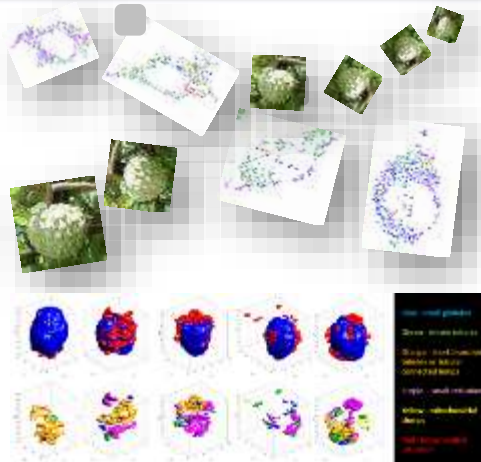
Department of Life Sciences and Institute of Genome Sciences, NYCU, Taiwan, Taipei

Tracking dynamic bioimage informatics to understand the molecular mechanism of secretion



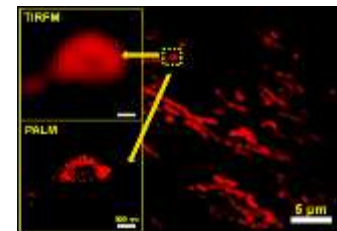
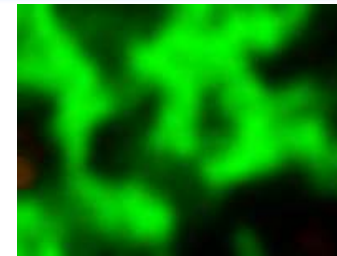
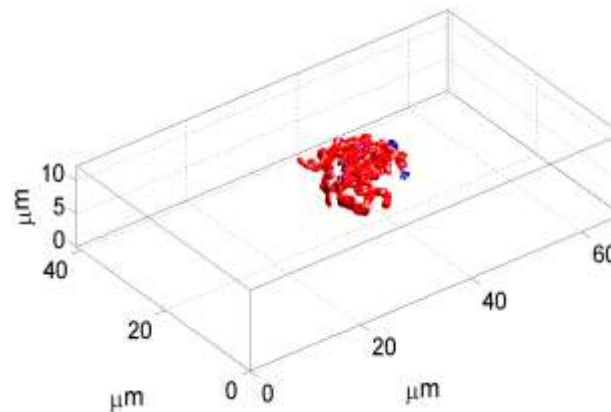
Huang et al., Traffic 2011
Huang et al., J. Cell Sci., 2018

High content analysis of mitochondria dynamics for drug profiling and disease diagnosis



Peng, et al., PLoS Computational Biology 2011

The mechanism of mitochondria dynamics and inheritance during cell division



藍昇輝老師實驗室

研究主題: 細胞自噬功能與調控

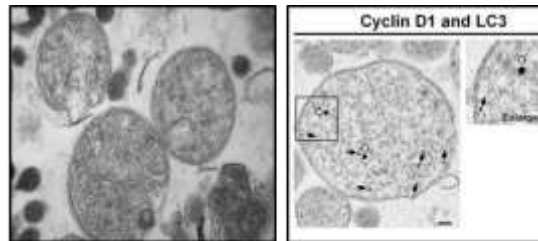
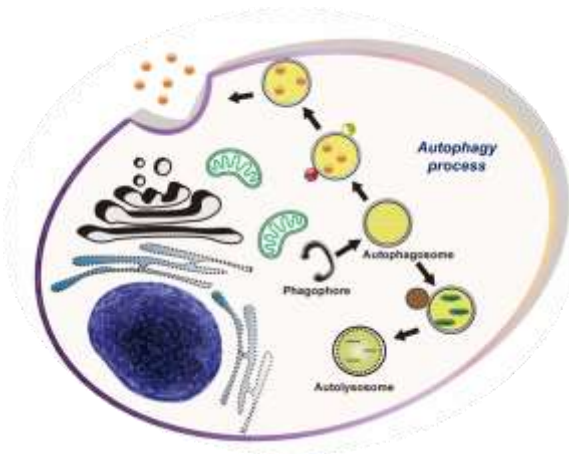


圖資大樓7樓 703室

shlan@nycu.edu.tw; 02-2826-7030 ext. 66210

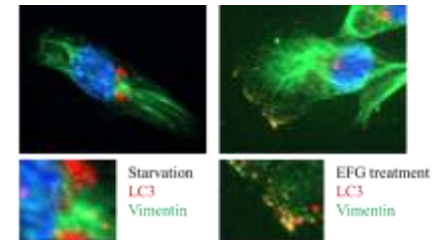
研究方向:

本實驗室研究方向是利用細胞與動物模式探討細胞自噬作用之創新功能，且進一步於生理及病理中印證，並結合臨床醫學開發相關之治療策略。



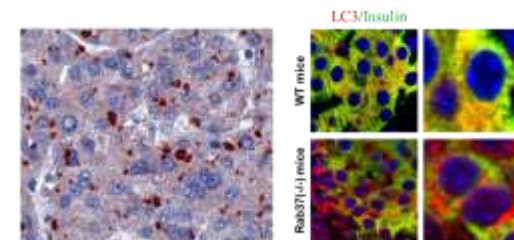
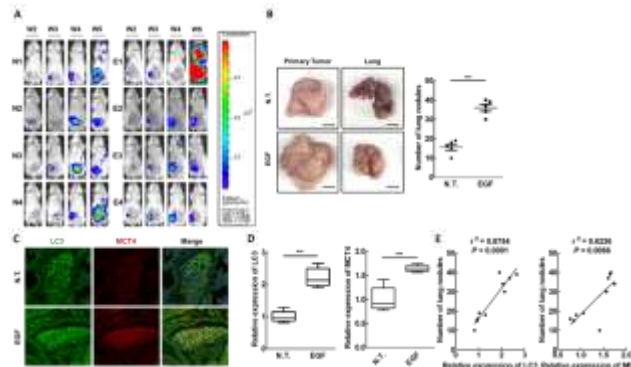
Degradative autophagy:

- To purified autophagosomes from cell lines and tissues
- To identify the novel cargos or regulatory proteins
- To manipulate the process of autophagy from initiation to degradation



Secretory autophagy:

- To monitor the kinetics of autophagy
- To clarify the novel biological function of secretory autophagy
- To manipulate the process of autophagy from initiation to secretion



The Role of Autophagy in physiology and pathology:

- To establish the animal model for diseases (e.g., cancer, type-II DM, aging)
- To regulate the autophagy activity *in vivo*
- To confirm the mechanisms *in vivo* and in clinical specimens (tissue array)



Molecular Cytogenetics

陳燕彰 副教授

研究主題:

發展遲緩兒童的基因異常偵測

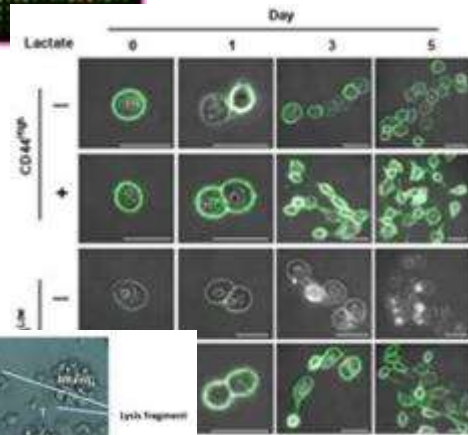
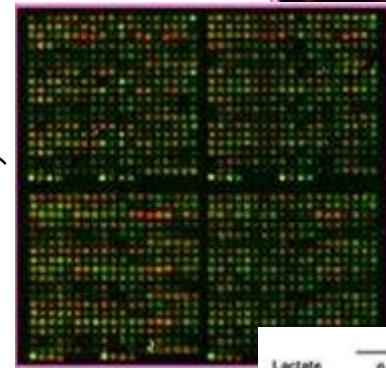
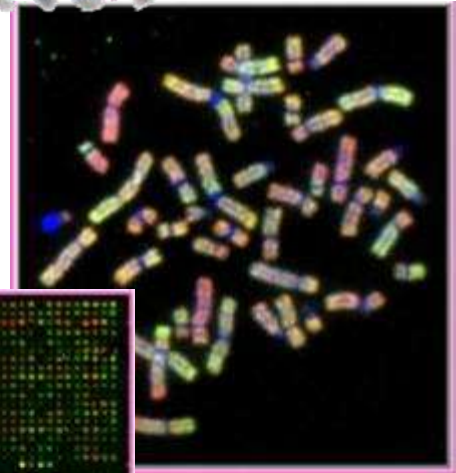
- 利用染色體晶片(array CGH), 次世代基因定序(NGS)、等技術, 提供發展遲緩兒童遺傳變異分析的完整解決方案, 藉此提升發展遲緩兒童正確的病因診斷。

先天代謝異常疾病基因治療的發展

- 以甲基丙二酸血症(Methylmalonic Acidemia, 簡稱MMA)為對象, 預計建立小鼠MMA模式, 利用AAV載體, 發展可能的基因治療方法

癌症的研究

- 1. 探討乳酸對腫瘤微環境中免疫細胞的細胞毒殺能力下降的機轉, 特別是對NK cell的影響。
- 2. 發展針對EpCAM的CAR-NK 92, 評估其對食道癌(esophageal carcinoma)等相關表皮細胞來源之惡性腫瘤的毒殺能力, 以及做為臨床癌症治療的可行性。





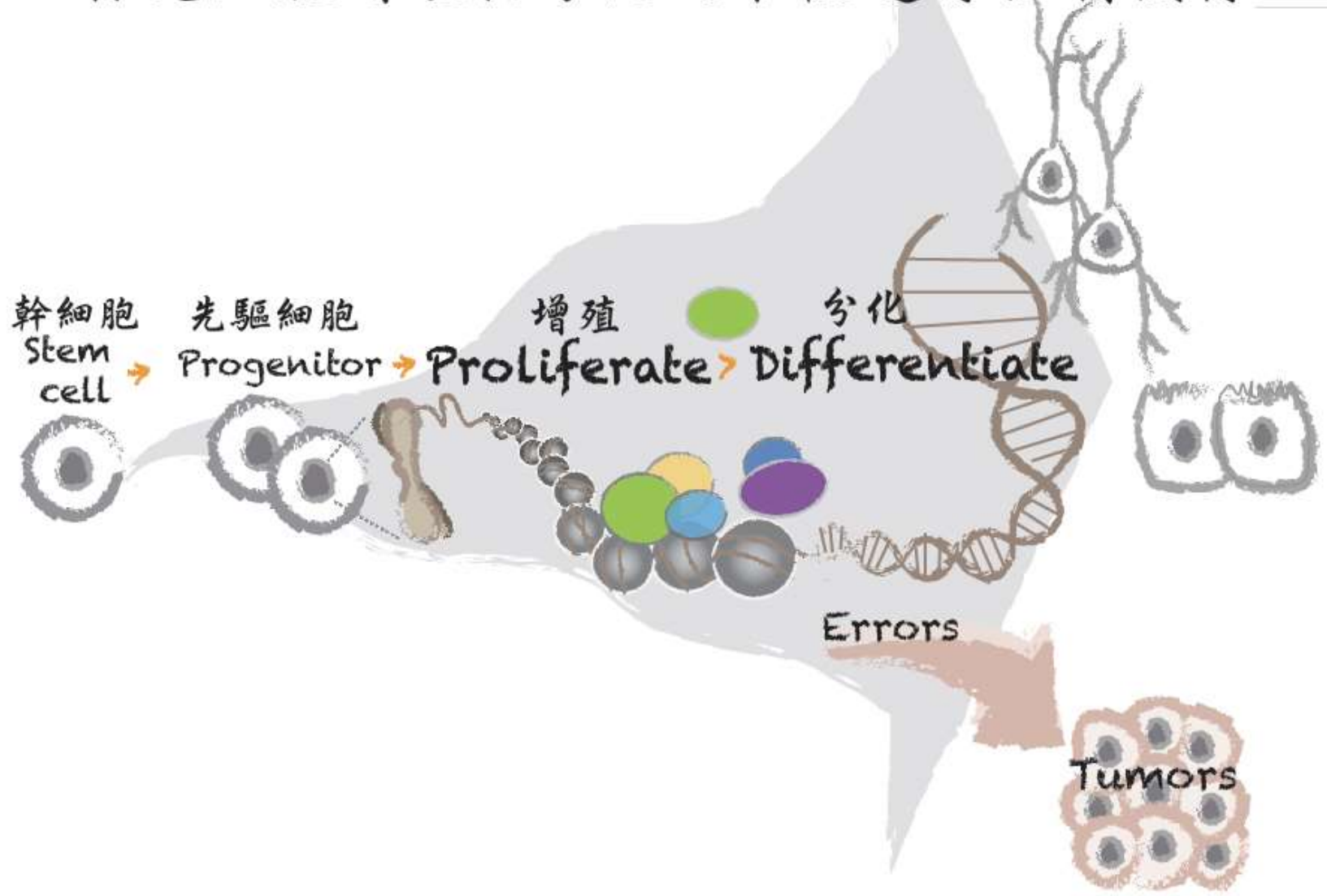
李敏嘉老師 (圖資904#67040)

Lab of Molecular Epigenetics

分子表觀遺傳學實驗室



探究細胞增殖與分化的表觀遺傳控制機轉





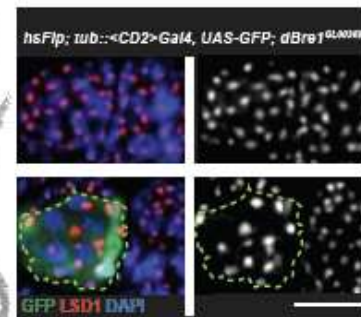
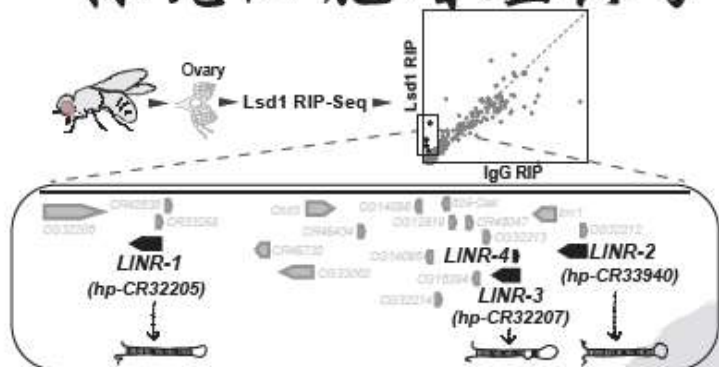
李敏嘉老師 (圖資904#67040)



Lab of Molecular Epigenetics

分子表觀遺傳學實驗室

探究細胞增殖與分化的表觀遺傳控制機轉

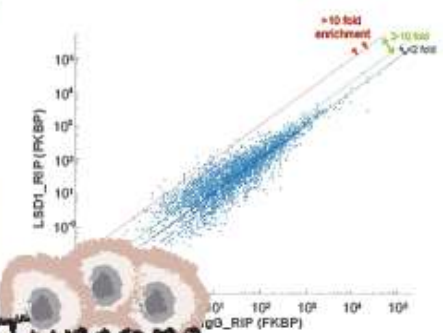
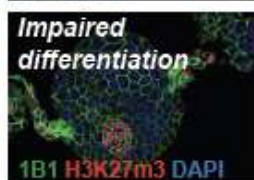
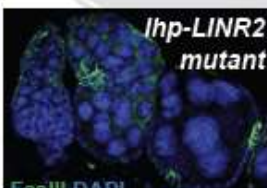
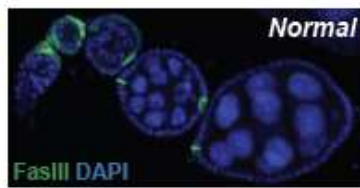
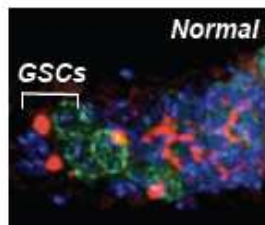


幹細胞 Stem cell → 先驅細胞 Progenitor → 增殖 Proliferate → 分化 Differentiate



Errors

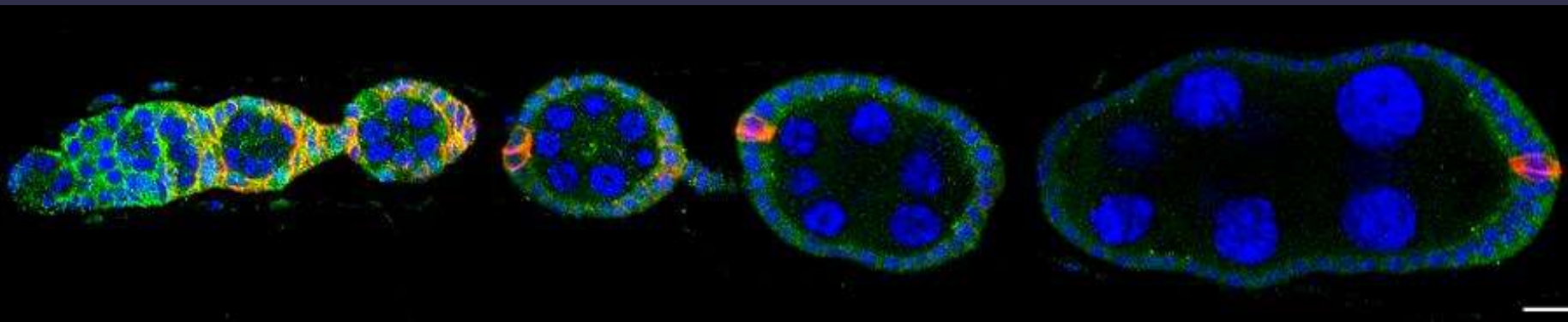
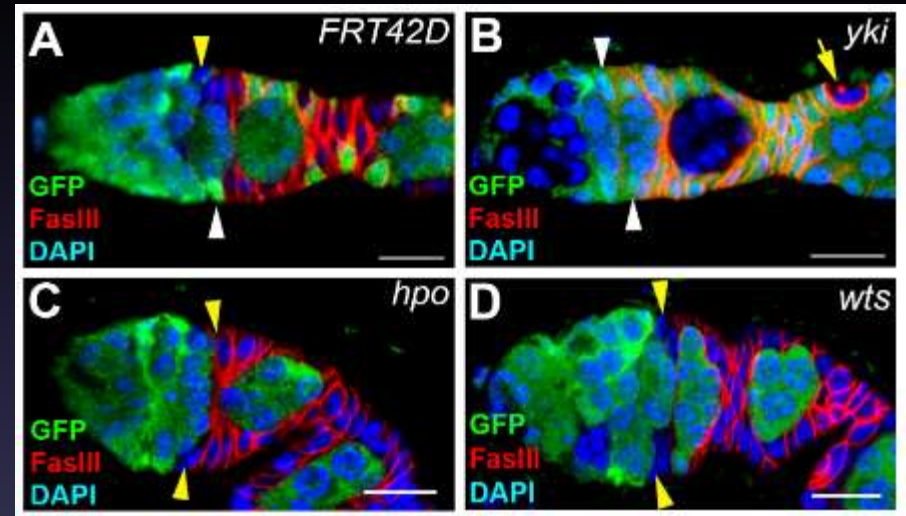
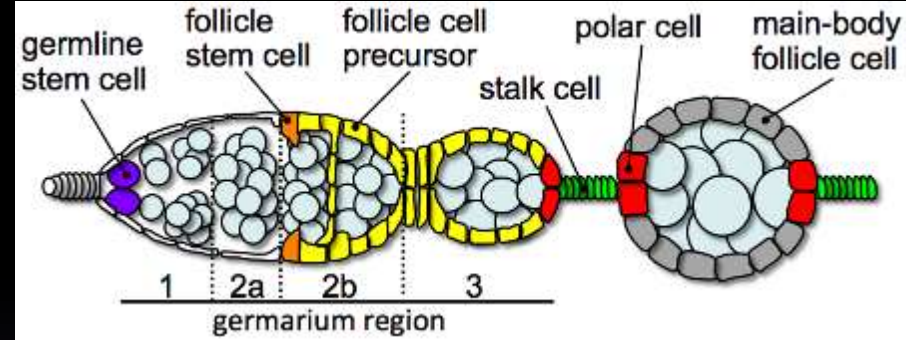
Tumors



俞震亞

專長：幹細胞，發育生物學，細胞生物學

研究主題：母果蠅一生不斷產卵。這些卵來自卵巢中的生殖幹細胞與濾泡幹細胞；這兩種幹細胞能進行自我更新與產生新的細胞；這些細胞進行分裂、分化、遷移、型態改變與細胞凋亡，最後成為成熟的卵。配合遺傳學工具，我們用卵巢為模式，探討不同的基因與訊息傳遞路徑如何影響細胞的各種行為與功能。



YT Chen Laboratory

Genomic, Molecular and Laboratory Medicine

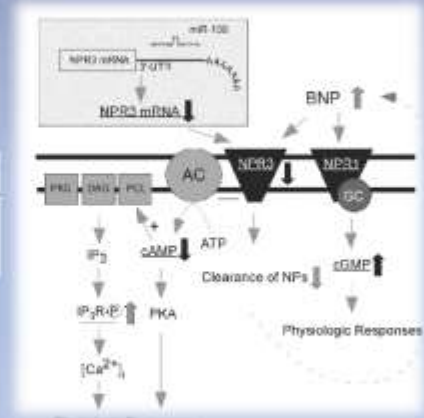
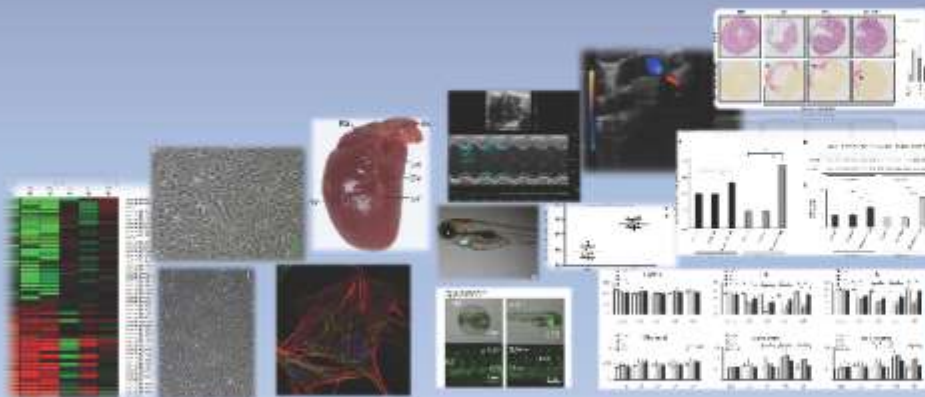


Department of Life Sciences & Institute of Genome Sciences
National Yang Ming Chiao Tung University, Taipei, Taiwan.

To explore the underlying mechanisms of human diseases from the dark side of genome.

Research interests are,

1. MicroRNA and LncRNA in cardiovascular diseases.
2. Orchestration between coding and noncoding RNAs.
3. Throughput *in vitro* and *in vivo* disease platforms.



Student researcher positions are available! Please contact Yei-Tsung Chen Ph.D. for more information.
Location: Library and formation Building R924; E mail: yeitsungchen@nycu.edu.tw; Phone: X66249



The Luo Lab (羅清維)

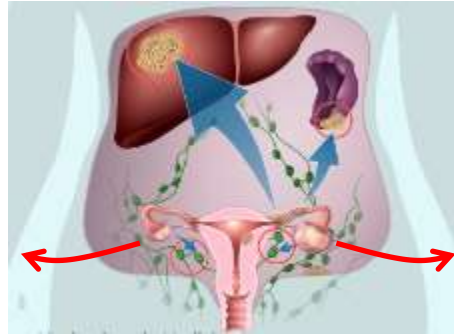
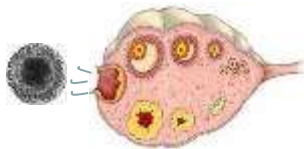
(Visit our web page at <http://cwluo.lab.nycu.edu.tw/>)



專長：分子內分泌學、生殖相關癌症、訊息傳導

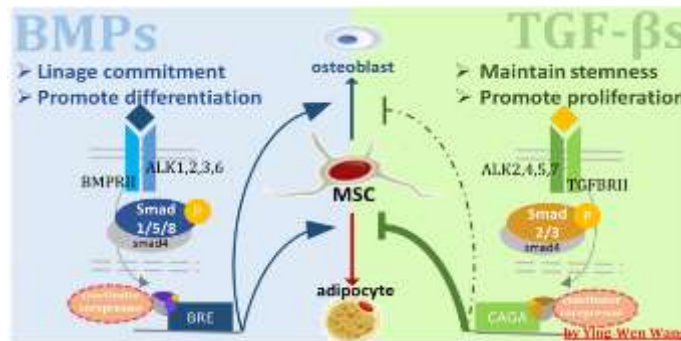
●研究主題一、卵巢生理調控與生殖系統癌症

- (1) 外泌蛋白分子對週期、卵子品質、女性不孕症的影響
- (2) 生殖系統癌症發生與轉移



●研究主題二、TGF- β /BMP 訊息對於幹細胞功能的影響

- (1) 間質幹細胞 成骨化與脂肪化的機轉
- (2) 骨質疏鬆 (osteoporosis) 機轉與拮抗訊息

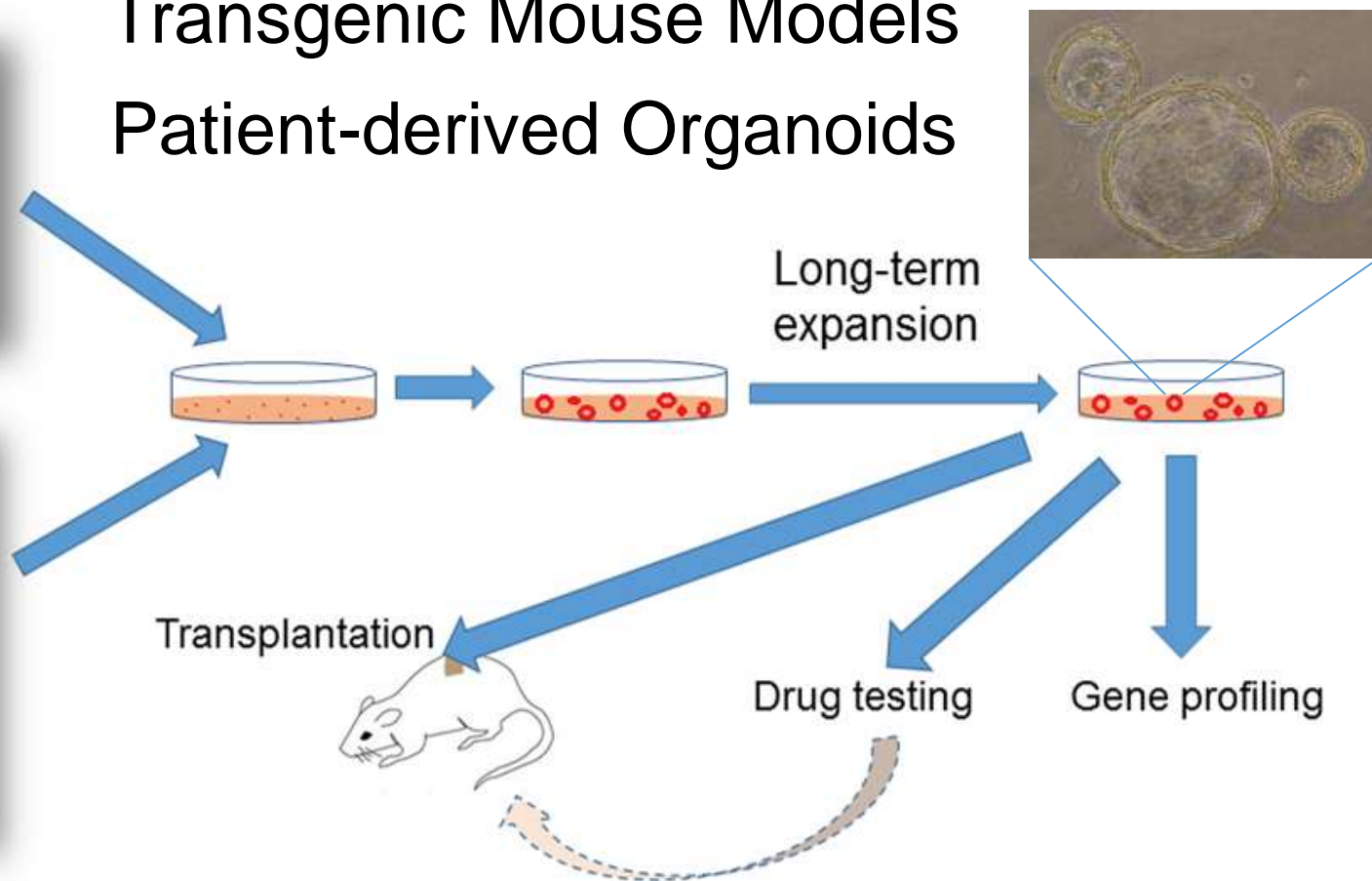




陳俊銘老師實驗室

研究上皮細胞分化與癌化機制

Transgenic Mouse Models
Patient-derived Organoids



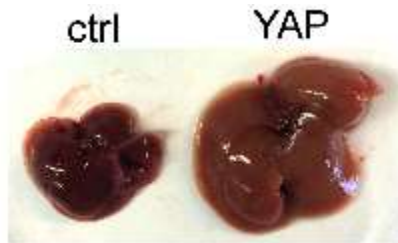
Organoid Models for Cancer Research

Laboratory of Tumorigenesis and Tissue Regeneration

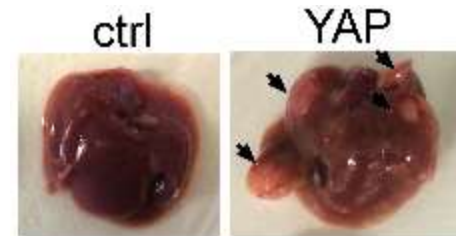
袁維謙 Wei-Chien Yuan
wcyuan@nycu.edu.tw



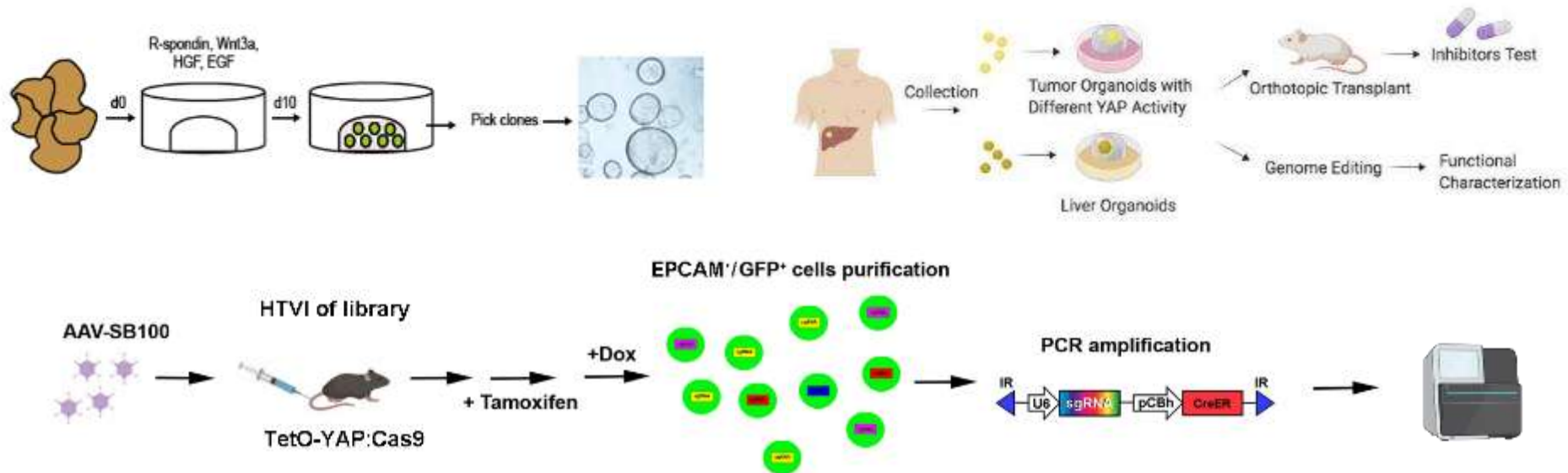
YAP overexpression for 1 week



YAP overexpression for 3 months



研究主題：結合 *In Vivo* CRISPR 高篩選平台與 Patient Derived Tumor Orgnoids 來探討肝癌致病機轉以及肝臟再生相關控制機制, 以提供新穎的臨床治療策略



Laboratory of Cancer Metabolism

陳嘉霖 (Chia-Lin Chen, PhD)

Cancer is a type of metabolic disease

癌症是一種“新陳代謝異常的疾病”

- 學歷：
美國南加州大學 基因分子細胞生物學博士 (2016)
- 經歷
2021-2022 加拿大英屬哥倫比亞大學 前列腺癌症
研究中心 訪問學者
2016-2021 國家衛生研究院 獨立博士後研究員

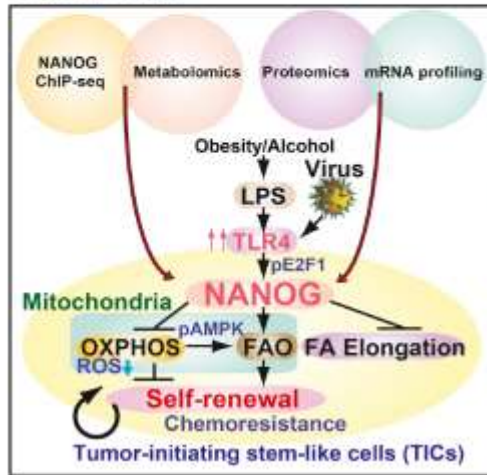
研究興趣

■ 發掘代謝物（胺基酸、脂肪、碳水化合物）在癌症發展過程中所扮演的角色
Metabolites were considered as intermediate products of metabolic pathways and served as different forms of energy resource. Emerging data has been shown that metabolites can act as growth factors, immuno-modulators, epigenetic regulators, etc., to govern various cellular functions. In this specific aim, we would like to uncover the novel roles of metabolites in tumorigenesis.

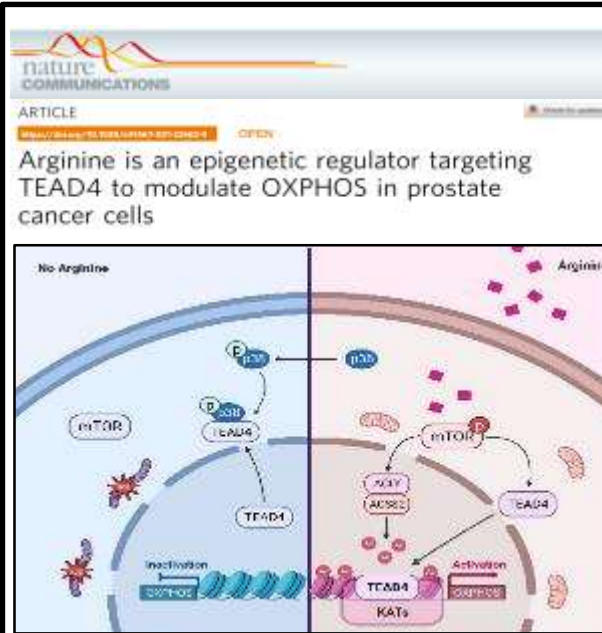
■ 探討粒腺體在癌症過程中所扮演的角色 (Let's talk about Warburg effect, again!)
In the face of "Warburg effects" as dominant theory of cancer metabolism, the role of mitochondria in tumorigenesis was frequently neglected. However, aerobic glycolysis does not predict loss of mitochondrial functions. Increasing evidence has shown mitochondrial activities need to be soundly maintained in cancer cells. In this specific aim, we would like to investigate the role of mitochondria in tumor progression and its implication for cancer therapy.

Cell Metabolism

NANOG Metabolically Reprograms Tumor-Initiating Stem-like Cells through Tumorigenic Changes in Oxidative Phosphorylation and Fatty Acid Metabolism



在肝癌的腫瘤幹細胞(cancer stem cells)中，stemness gene, NANOG 會誘導癌細胞內的代謝反應重整 (metabolic reprogramming)。一方面，NANOG 會抑制粒腺體中的氧化磷酸化 (oxidative phosphorylation) 反應來降低 ROS 的產生，以維持幹細胞的活性。另一方面，肝癌幹細胞會利用腫瘤微環境中的脂肪酸，並活化脂肪酸氧化(fatty acid oxidation) 代謝反應來作為產生能量的來源。



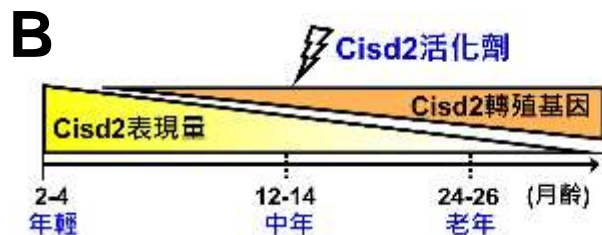
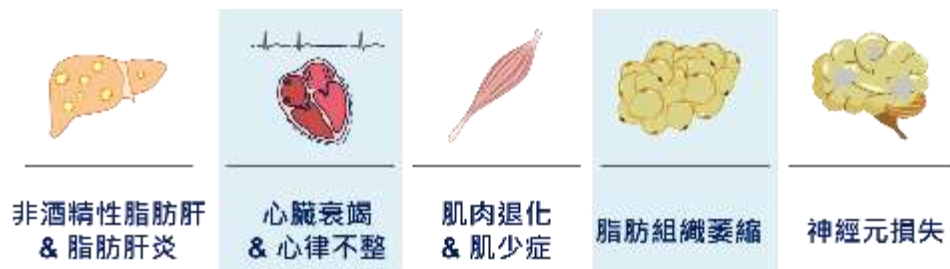
在前列腺癌中，精胺酸(arginine) 在調節表觀遺傳修飾 (epigenetic modification) 中扮演著重要的角色，特別是組織蛋白的乙醯化 (histone acetylation)，進而調控電子傳遞鏈的蛋白質表現。值得一提的是，在癌細胞中，產生精胺酸的重要酵素ASS1的表現是被抑制的，導致癌細胞必須仰賴細胞外的精胺酸來源來維持粒腺體功能正常。因此，精胺酸剝奪療法(arginine deprivation therapy) 為癌症代謝療法帶來新的一線曙光。

CISD2長壽基因、老化生物學、及抗老化新藥開發



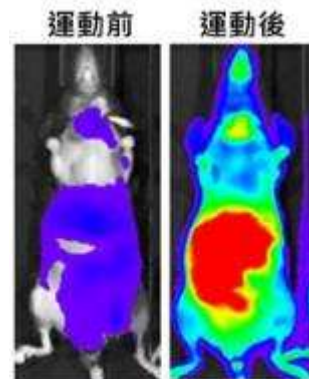
蔡亭芬 特聘教授

A CISD2表現不足，會導致多重器官功能衰退及老化



- CISD2長壽基因表現量在自然老化中明顯下降
- 提升CISD2長壽基因表現量可促進健康長壽

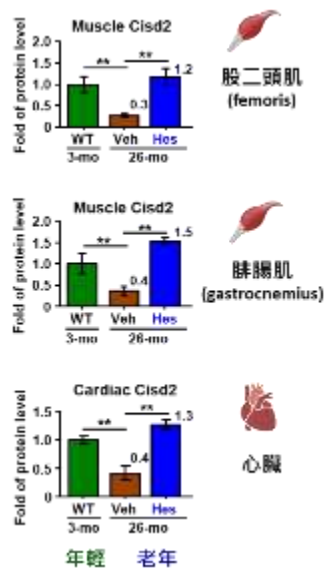
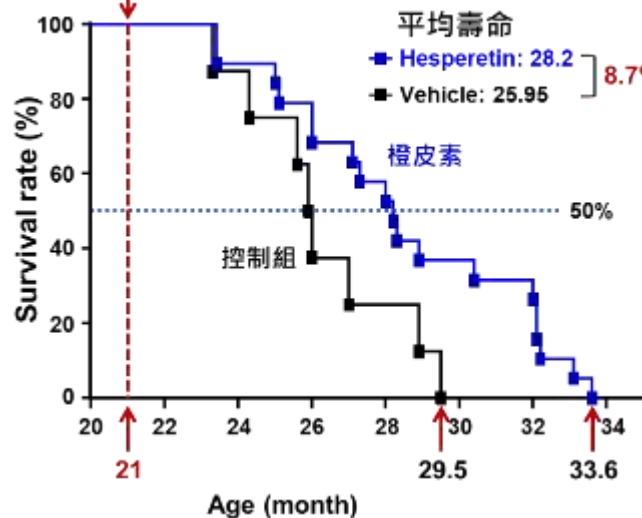
C 運動能有效提升 CISD2基因表現



增強的冷光訊號表示 CISD2長壽基因被活化

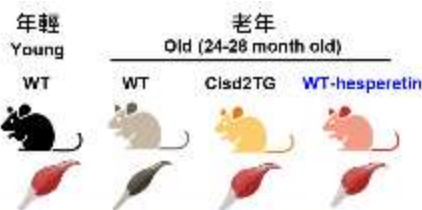
D 橙皮素

Hesperetin food (21-mo)



E

橙皮素延緩 (逆轉) 肌肉老化

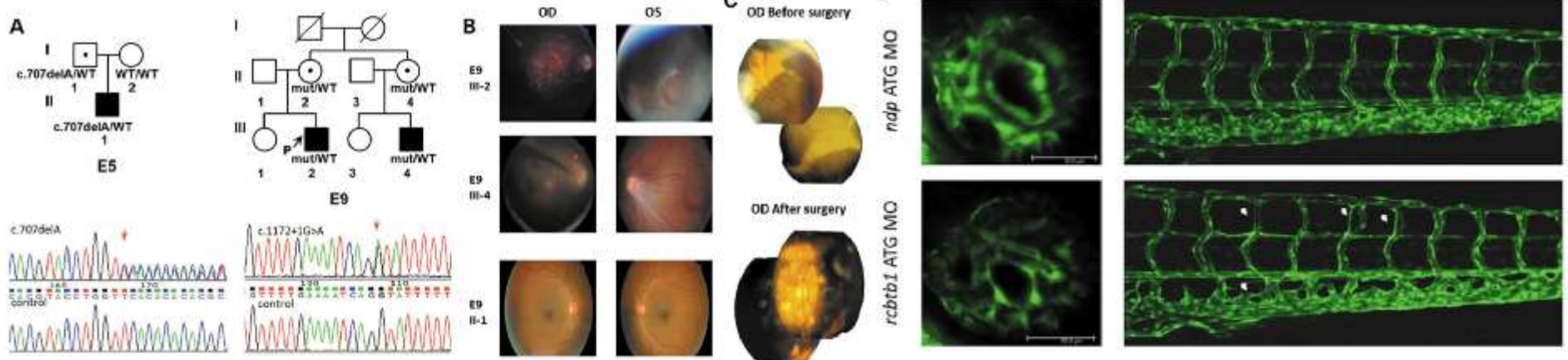


Cisd2 level	100%	16-20%	180%	150%
Sarcopenia				
Muscle mass	-	Loss	Improved	Improved
Muscle strength	-	Loss	Improved	Improved
Molecular & cellular levels				
Disturbance of triad architecture	-	++	+	+
Degenerated fibers	-	++	+	+
Fibrosis	-	++	+	+
Degenerated mitochondria	-	++	+	+

改善肌少症

改善肌肉損傷及纖維化、提升粒線體功能

長壽鼠 橙皮素處理

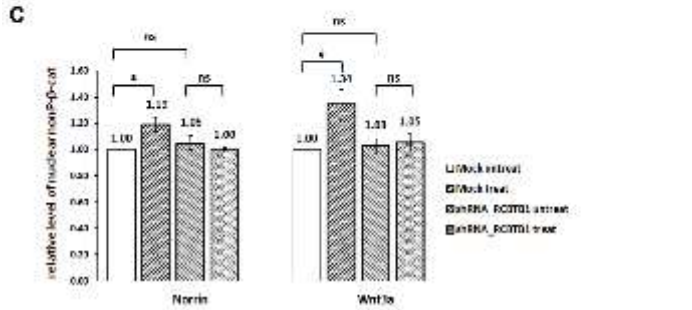
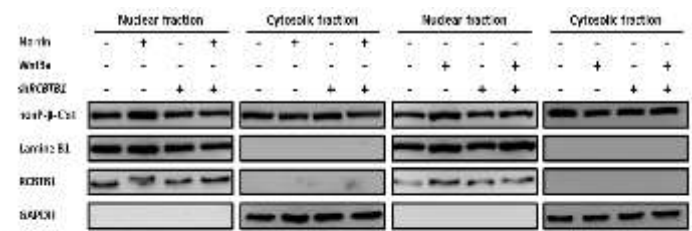
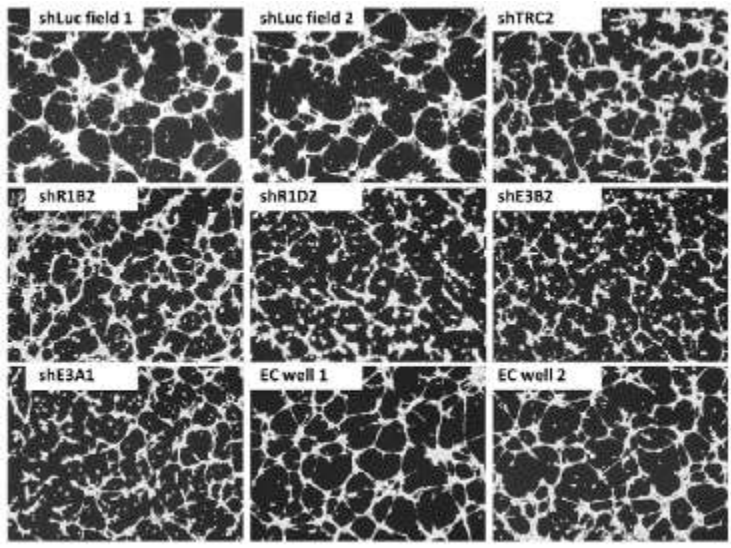


鍾明怡老師實驗室 Human Molecular Genetics

» 研究主題：

視網膜病變之新基因找尋與功能分析，包含 *RCBTB1* 在視網膜血管發育異常的角色
PLEKHA1 isoforms 在老年性黃斑部病變的角色、與開發 *RDH12* 基因補充治療。

mychung@nycu.edu.tw ; 北榮致德樓871室; 校內分機 68033



The Ultimate Relief for Chronic Pain

孫維欣教授 (Wei-Hsin Sun, PhD)

分子神經生物實驗室 (Molecular Neurobiology Lab)

Email: weihsin@nycu.edu.tw;

Tel: 02-28267268, 圖資708室



研究方向:

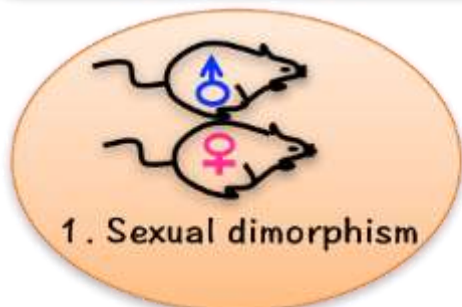
解析慢性疼痛的分子機制，且應用於開發有效且具選擇性的止痛藥，使多種持續性疼痛可以得到紓解。

Topic 1: Rheumatoid arthritis pain
(類風濕性關節炎性疼痛)

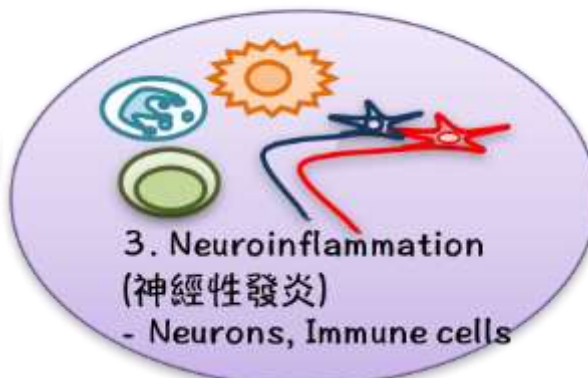
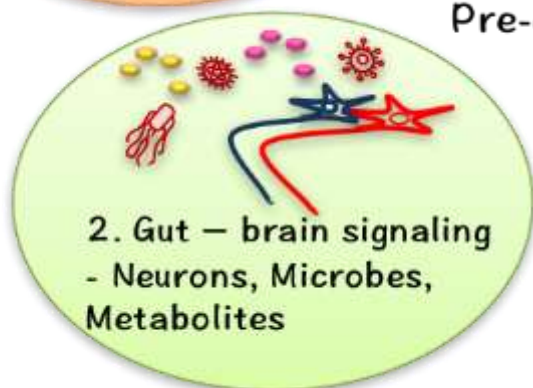
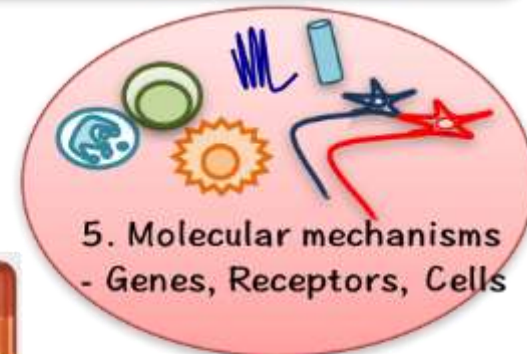
Chronic pain



Topic 2: Neuropathic pain
(神經病變性疼痛)



Development of analgesic treatments



The Laboratory of Neuroimmunology



陳虹如老師
神經免疫學實驗室
生物醫學大樓R709



Research Disciplines:
Neuroimmunology, Neonatal Brain Injury,
Stroke, Autism, Neurodegeneration,
Tauopathy, Mitochondria, Brain
energetics, Neurodevelopment

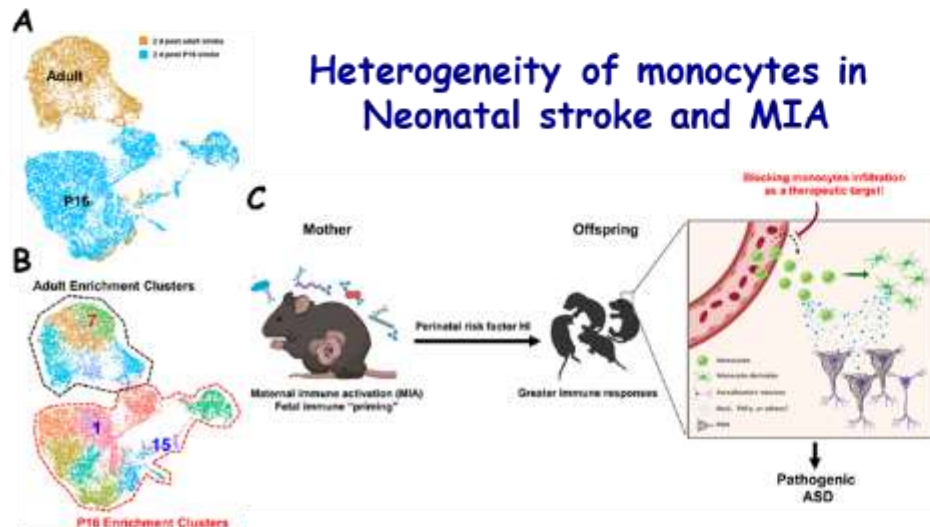


How does the immune
system interact with
the central nervous
system?

#1 Monocytes in Neonatal Brain Injury

研究方向一：新生兒腦部損傷

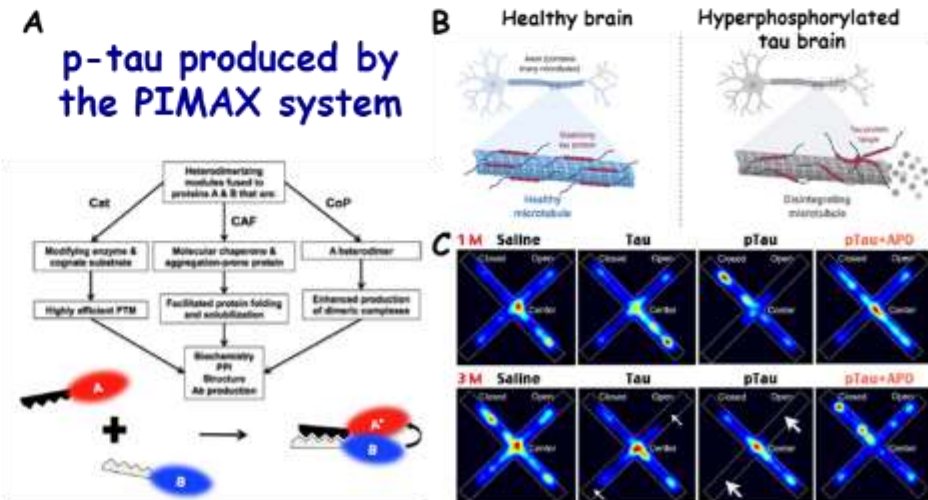
- (1) 單核球分泌之otx2如何影響PNNs生成造成自閉症
- (2) 單核球作為新生兒腦中風治療標的之機轉



#2 Hyperphosphorylated tau in Neurodegeneration

研究方向二：神經退化

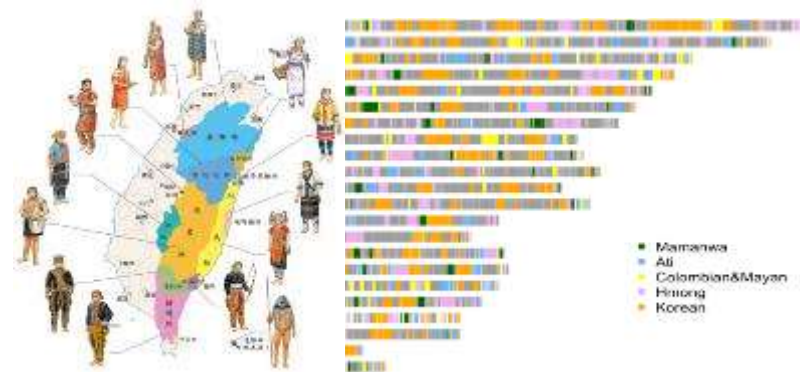
- (1) 探討單核球/微膠細胞在阿茲海默症中的疾病角色
- (2) 單核球/微膠細胞如何造成疾病模式小鼠之認知異常



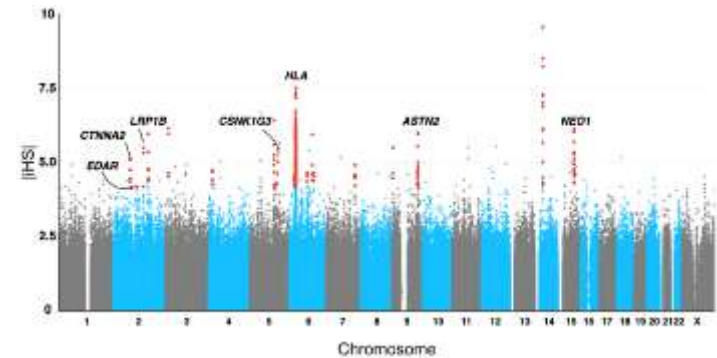
Population and evolutionary genomics lab

可文亞老師實驗室 (圖資629) (族群遺傳和演化基因體學實驗室)

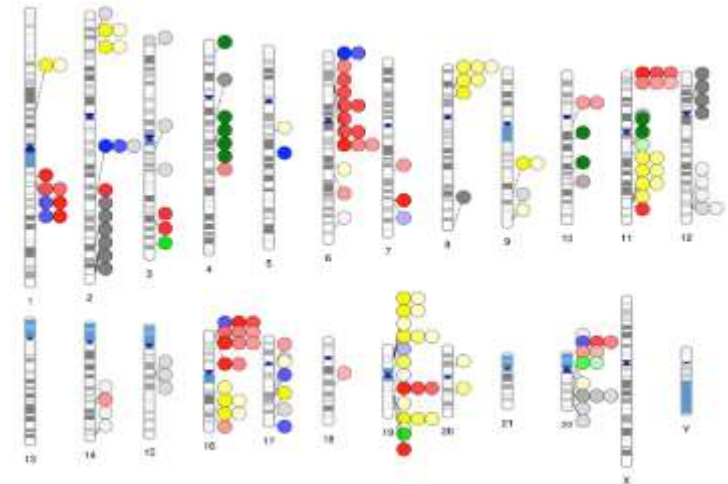
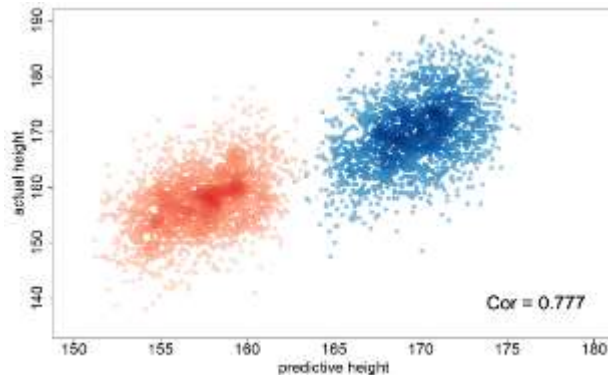
- Genetic origins and admixed ancestry characterization of human populations (人類族群與其基因體的遺傳起源)



- Identifying genetic variants underlying evolutionary adaptation and/or disease susceptibility in humans (尋找人類演化適應或與疾病相關的遺傳變異)



- Polygenic score risk prediction of disease susceptibility/complex traits (疾病與數量性狀的多基因風險預測)



兼任師資

蔡宜芳: 兼任教授, 中研院分生所特聘研究員

美國國家科學院海外院士

中央研究院分子生物研究所N317室

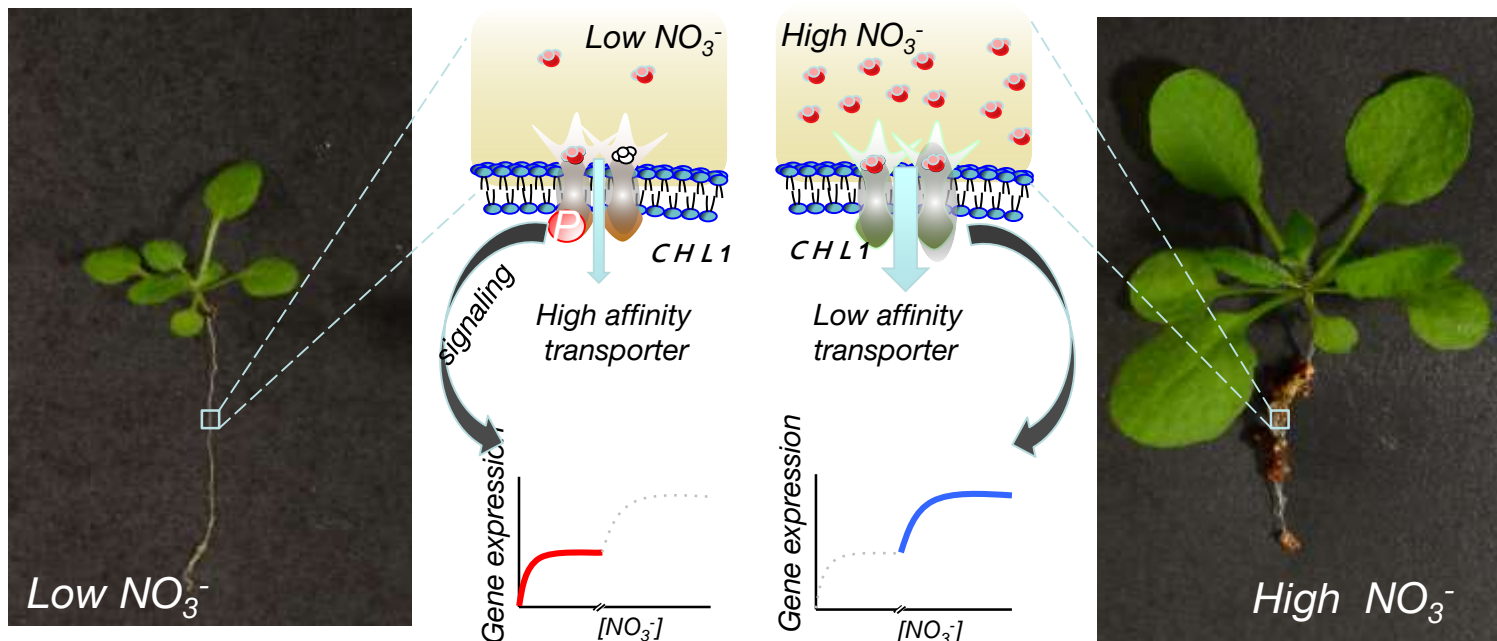
yftsay@gate.sinica.edu.tw · 27899198

<https://www.imb.sinica.edu.tw/ch/faculty/profile/mbyftsay.html>



研究領域: 訊息傳導、膜蛋白功能、營養學

研究方向: 硝酸鹽利用效率影響農作物產量甚大, 我們從分子生物的角度來了解植物如何從土壤中吸取硝酸鹽、如何儲存硝酸鹽、如何偵測外在或體內的硝酸鹽含量而改變植物的生長與代謝。實驗方法包含遺傳、分生、代謝質體、蛋白質體。



國家中醫藥研究所

盧重光 博士

天然藥物實驗室
傳醫大樓甲棟6樓652室
cklu@nricm.edu.tw
Tel. 02-28201999 ext.5441

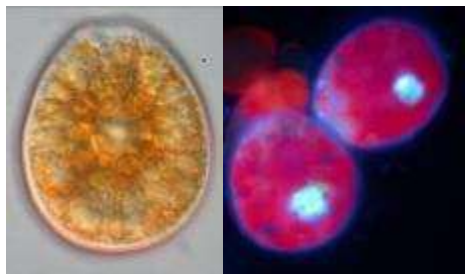


研究領域：天然藥物化學、藻類與微生物培養

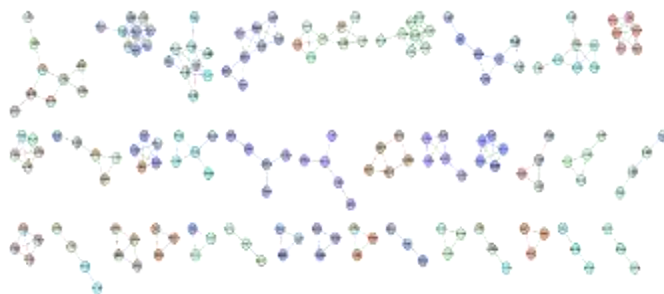
利用生物學與化學相結合的篩選方法，由海洋與陸地特殊棲所篩選共生於其他生物體中的藻類與微生物，發展藥用新資源。以現代層析技術與代謝體學分析方法，配合活性篩選平台，發掘具有專利性的新穎化合物，以高解析的NMR與質譜等技術完成化合物的結構解析，進行新先導藥物的研究。

目前主要的研究主題包括:

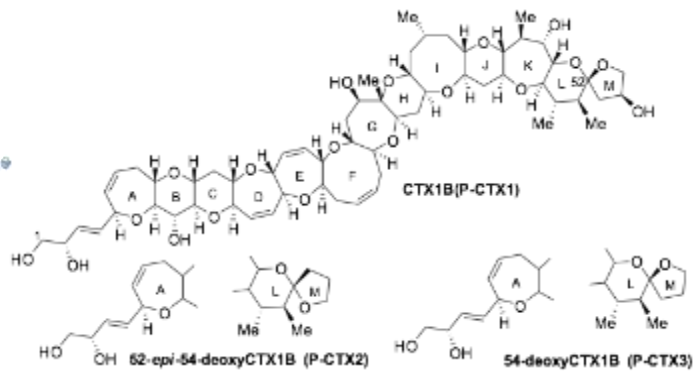
1. 由中草藥中找尋促進長壽、美容與神經再生之物質。
2. 調控海洋渦鞭毛藻 *Gambierdiscus* spp. 之生長條件，利用於量產Na⁺ channel activators。
3. 海洋微生物與藻類純化與培養、及其具生物活性天然物之結構解析，開發具潛力之先導藥物。



Prorocentrum lima



LC-MS/MS based molecular networking for finding the interested compounds.



林書葦 副研究員

神經迴路與行為實驗室 @ 中研院跨領域大樓8C03室
sueweilin@gate.sinica.edu.tw; (O) 02-2789-9315

<https://sueweilin.wixsite.com/linlab>



研究領域：動機與記憶的神經機轉、神經迴路的形成

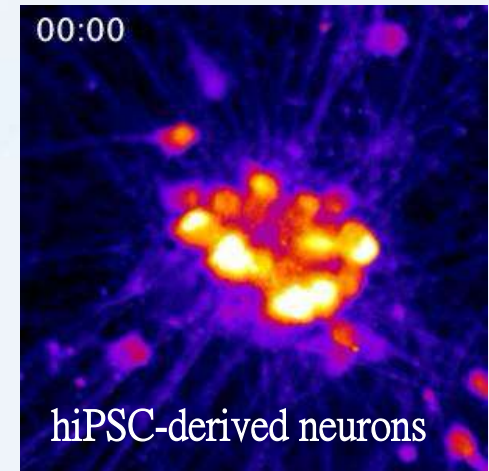
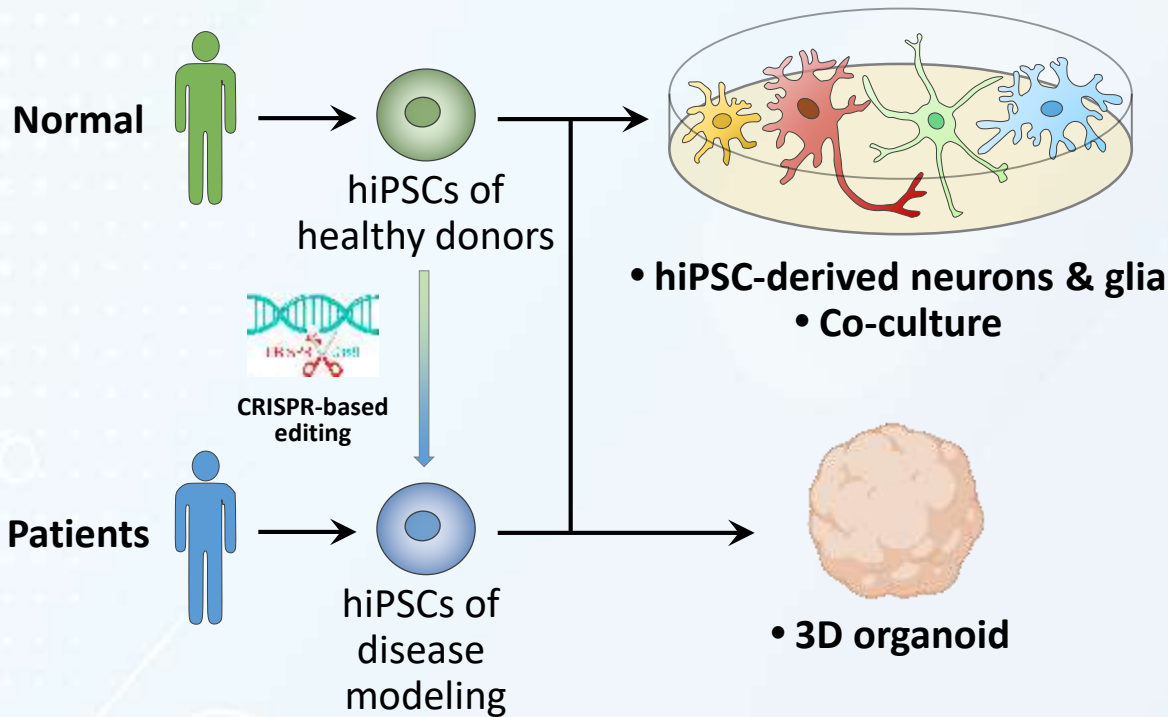
研究方向：

1. 以遺傳學與光學顯微技術研究果蠅腦神經迴路的形成機制
2. 探討餓與渴控制動物覓食、覓水行為的神經機轉
3. 研究大腦儲存、提取記憶的細胞與分子機制



Lab Theme: Exploring Neural Development and Degenerative Diseases with Human iPSC-Derived Cultures

透過人類誘導型多功能幹細胞(hiPSC)分化技術建立不同神經疾病模型
以及腦類胚體研究模式探討大腦發育及退化疾病之細胞層級機轉



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