

DEPARTMENT OF BIOCHEMISTRY



WHAT IS THE EXPECTATION? IS A BIG LAB BETTER?

WHAT TO CONSIDER IN SELECTING A PROJECT?

Wednesday 13th March, 2019

11.30 AM

MD7 Level 2, Conference Room

Program

TIME	DETAILS
11.30 am	Guests to be seated
11.30 am – 11.50 am	Welcome Speech and Presentation by Module Coordinator
11.50 am - 12 pm	Q & A
12 pm	Interaction & Tea Reception

Life Sciences Honours Project Administration

- Students could browse mounting projects from Life Science Program or approach PIs for potential projects from the Department





<http://www.lifesciences.nus.edu.sg/>



<http://bch.nus.edu.sg/acad.htm>

- After both main supervisor and student agree on an Honours project, student need to provide the main supervisor with the following information for registration:
 - ~ Matriculation Number
 - ~ Mobile Number
- The main supervisor will register on behalf of the student with the information provided via the Science Intranet. Student will receive an auto-generated email stating that he/she has been successfully registered for the specific project. Note that this registration is only possible if the student has cleared the File For Project (FFG) check.
- The main supervisor and student will mutually agree on the exact date to commence work for the project, which is not necessarily followed academic calendar.
- Honours students will be assessed on **their general work performance during the terms** of the Honours project **by their main supervisors**. Each student will also be examined by **2 examiners** via a one-time **poster presentation** in late March and the **submitted Honours thesis** in mid April.



BIOCHEMISTRY HONOURS BOOK PRIZE

A **cash prize of \$400** for Top Honours Students of each AY or to be shared equally when two or more students are of equal merit.

Awardee(s) should confer with a **1st Class Honours Degree** and obtain the highest mark for Honors Year Project conducted in Biochemistry department.



Yong Loo Lin School of Medicine

Proudly presented by Department of Biochemistry, Yong Loo Lin School of Medicine, NUS

Module Coordinators



Dr Long Yun Chau
(bchlongy@nus.edu.sg)

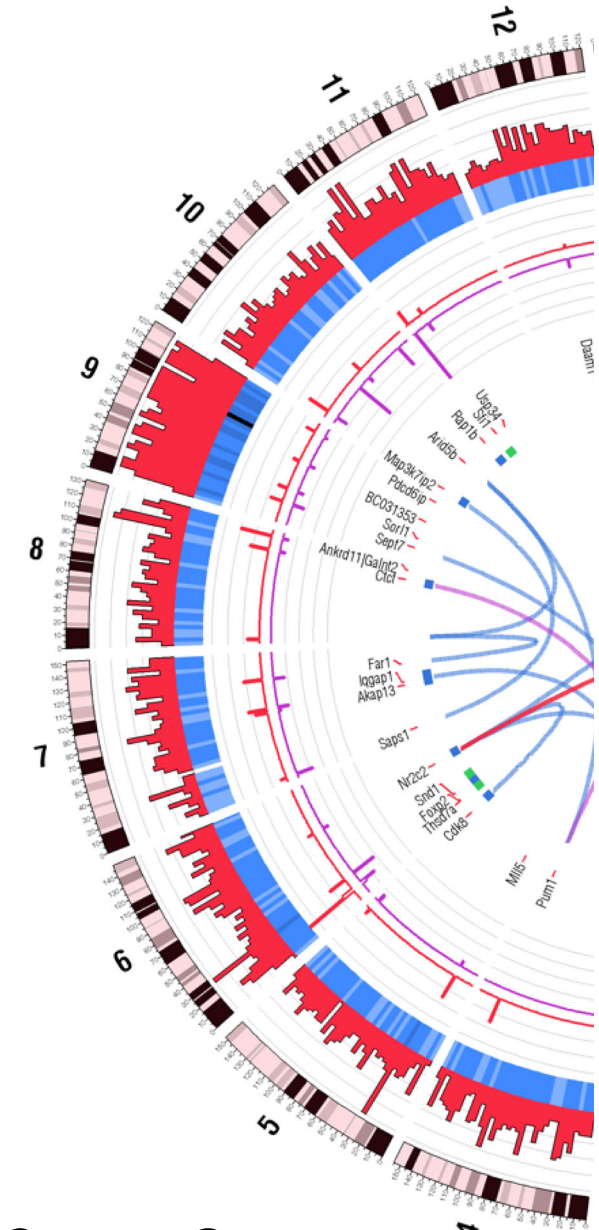
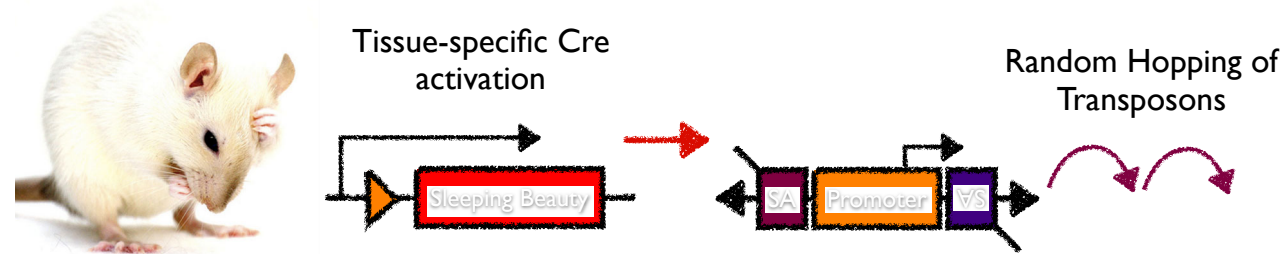




Kenneth Ban, MBBS, PhD

Senior Lecturer,
Department of Biochemistry, NUS &
Institute of Molecular and Cell Biology, A*STAR

Office : MD4 Level 1
Lab : MD4 Level 1 & #3-11, IMCB, Biopolis
Email : bchbhkk@nus.edu.sg



Research Areas:

- Prostate and Breast Cancer Genetics
- Genetic Screens using Transposon Mutagenesis

Honours Projects:

- Validation and Functional Studies of Prostate/Breast Cancer Genes
- Development of Knock-In Cell Lines for Genetic Screens



A/P Matthew Chang

bchcmw@nus.edu.sg

<http://synCTI.org/>

Research interests

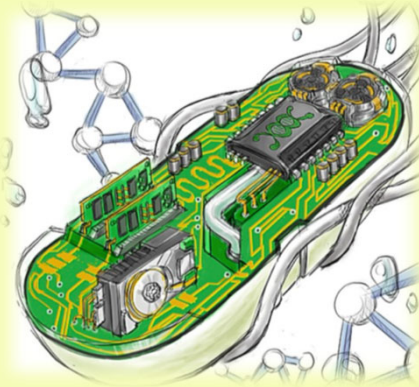
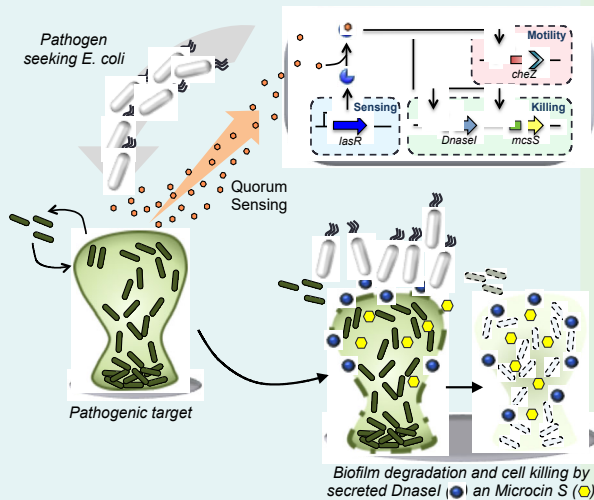
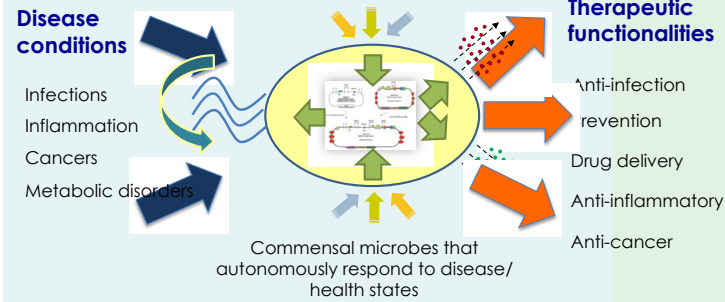
- Synthetic Biology
- Engineering functional commensal microbes
- Metabolic engineering for biochemical production



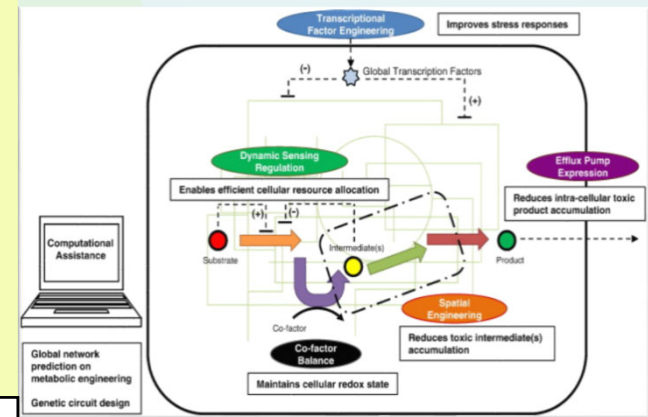
SynCTI
Synthetic Biology for Clinical & Technological Innovation

Synthetic Biology

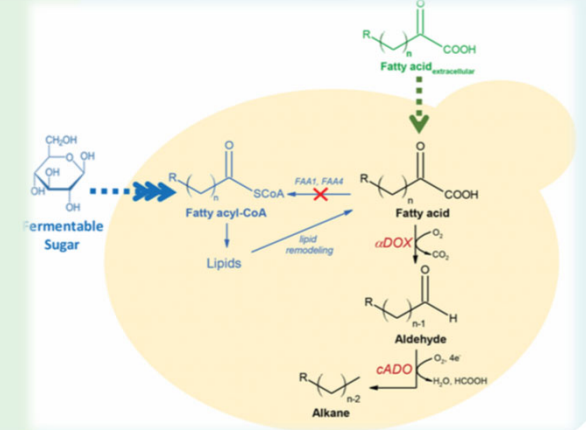
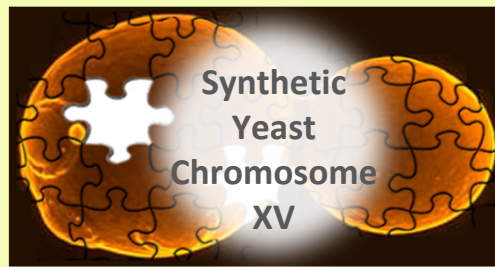
Microbiome engineering



Microbial cell factories



Synthetic Genomics





Chen Ee Sin

Associate Professor

Email: bhces@nus.edu.sg

Our research interests:

- Chromatin & Epigenetic Regulations
- Genetic Inheritance Control in the Cell Cycle
- Chemogenomics & Drug Screening
- Synthetic Biology

AY2017/18 Honors Projects :

1. Search for molecular prognostic markers of **Down Syndrome** (Project 17369)
2. **Epigenetic** control of chromosomal inheritance in cell division (Project 17370)
3. Synthetic Biological designing a yeast-based system for **drug screening** against Hepatitis B virus (Project 17376)



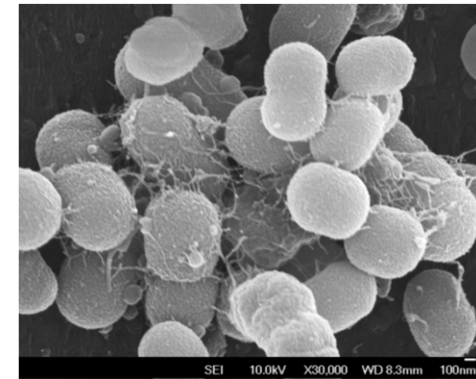
Associate Professor Chua Kim Lee

Department of Biochemistry, Yong Loo Lin School of Medicine,
NUS, MD4 Level 1

Email: bchckl@nus.edu.sg

Research Interest

Intrinsic and acquired bacterial multidrug resistance



Honours Projects

Surveillance of carbapenem-resistant Enterobacteriaceae from imported unprocessed food



Maxey C.M. Chung

Associate Professor
Department of Biochemistry
bchcm@nus.edu.sg

Research Areas:

Proteomics and cancer biomarker discovery

Current Projects:

- Mining for biomarkers of gastric and colorectal cancer metastasis
- Functional studies of proteins involved in gastric and colorectal cancer metastasis
- Identification of Prognostic biomarkers for relapse hepatocellular carcinoma
- Discovery of biomarkers for mitral valve prolapse



DENG Lih Wen, PhD

Associate Professor,
Department of Biochemistry
MD7 #04-07, National University of Singapore
Tel: 65161239 Email: bchdlw@nus.edu.sg

Research Interests:

Understanding the cellular and molecular mechanism in cancer development and developing novel targets for therapeutic cancer intervention.

Honors Projects for AY2019/2020

- Repurposing FDA-approval drugs to sensitise radioresistant cervical cancer cells.
- Study the effects of cancer-associated fibroblast on prostate cancer migration

Laboratory techniques involved

Molecular biology: DNA/RNA extraction, molecular cloning, Real time-PCR

Protein biochemistry: SDS-PAGE/Western Blot, Immunoprecipitation, Enzymatic assays,

Cell biology: mammalian tissue culture, overexpression /siRNA knockdown, crystal violet/MTS assay, transwell migration assay. soft agar transformation assay

To find out more, please visit <http://bch.nus.edu.sg/bchdlw.htm>



Gan Yunn Hwen, PhD

Associate Professor, Dept of Biochemistry, NUS

Immunology Program, NUS

NUS Graduate School for Integrative Sciences and Engineering (NGS)

Tel : 65163678

Email: yunn_hwen_gan@nuhs.edu.sg

Research Areas:

1. Interaction of *Burkholderia pseudomallei* with the host innate immune response
2. Regulation of virulence and identifying virulence factors in bacterial pathogens
3. Inactivating multidrug resistant bacteria through novel strategies
4. Pathogenesis of hypervirulent *Klebsiella pneumoniae* in causing liver abscess

Model systems:

C elegans

Various bacteria

Mammalian cell-lines

Mouse and human primary cells

Mouse models

Common techniques:

Bacterial growth

Cloning of genes and creating bacterial mutants

Cell infection and related assays

Immune assays and cell isolation techniques

Flow cytometry and confocal microscopy



Caroline G. Lee, PhD

Associate Professor, Department of Biochemistry, NUS
Associate Professor, DUKE-NUS Graduate Medical School
Principal Investigator, National Cancer Centre
Tel: 6516-3251 or 6436-8353
Email: bchleec@nus.edu.sg

Research Areas:

1. Genetic Polymorphisms
 - a. Searching for signatures of recent positive selection in drug response genes
 - b. Computational approaches to the identification of potentially functionally important polymorphisms and drugs that exhibit population differentiation

2. Functional Genomics of Hepatocellular Carcinoma
 - a. Role of HBV in hepatocarcinogenesis
 - b. Role of FAT10 in hepatocarcinogenesis
 - c. miRNAs and lncRNAs in hepatocarcinogenesis

Title of Honors Project:

- Computational Identification of Drugs that show population differences in response / ADR and development of a Pharmacogenetics web resource / app
- Role of FAT10 polymorphisms in HCC
- Elucidation of the role of chimeric HBx in HCC



Long Yun Chau, PhD

Senior Lecturer

Department of Biochemistry, NUS

Email: bchlongy@nus.edu.sg

Main Research Interest:

1. Insulin/ insulin-like growth factor signaling and cellular nutrient sensing.
2. Regulation of energy substrates utilization and its role in cellular signaling.
3. Transcriptional regulation of metabolic network and gene expression.
4. Role of NAD/ NADH and pyruvate metabolism in nutrient-gene communication.
5. Implications of altered metabolic program in skeletal muscle and metabolic disorders such as insulin resistance and diabetes.

Professor Markus R Wenk



Research areas:

- Neurosecretion
- Host-pathogen interaction
- drug and biomarker development

 LipidProfiles

For further information contact
markus.wenk@lipidprofiles.com

www.lipidprofiles.com

Honors Projects:

1. Development of novel tools for detection of bioactive lipids.

A few oxidized lipids are known to be involved in the pathogenesis of chronic inflammatory disease and atherosclerotic plaque formation. We aim to set up bioassays in order to identify novel bioactive modified/oxidized lipids.

2. Understanding the function of glycolipids during influenza virus infection.

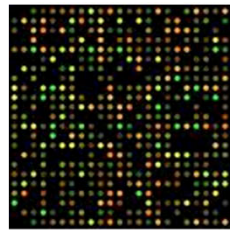
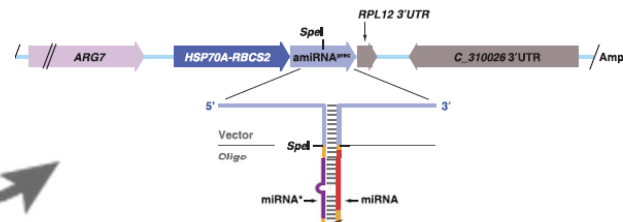
Involvement of glycolipids in the form of different glycosphingolipids (GSL) classes during virus infection is controversial and we aim at clearly elucidating the exact role of GSL classes during influenza virus endocytosis.

Systems biology of lipid metabolism and its regulation in the model alga *Chlamydomonas*

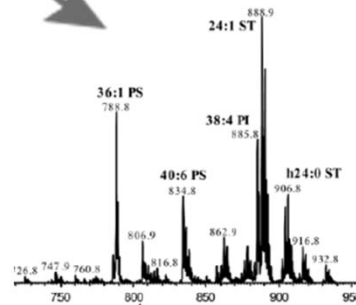
Chlamydomonas genome



Targeted gene expression knockdowns (artificial microRNA)

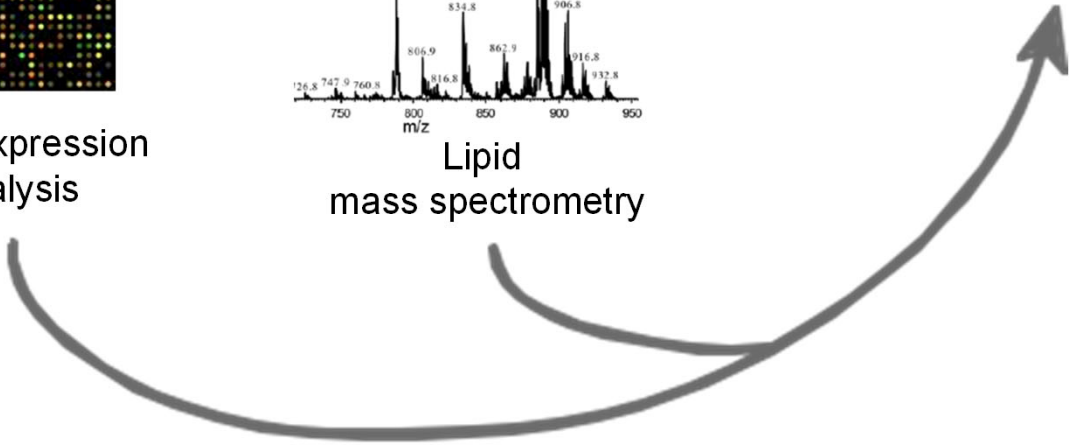
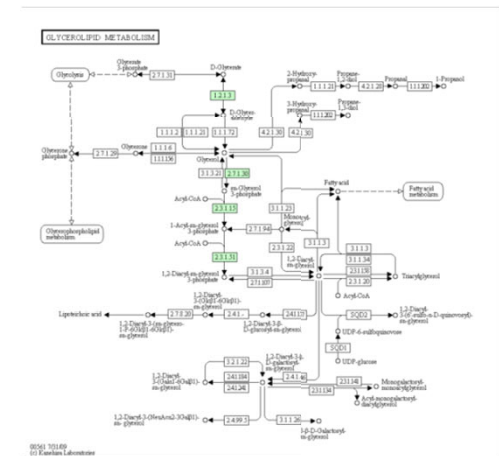


gene expression analysis



Lipid mass spectrometry

Network reconstruction



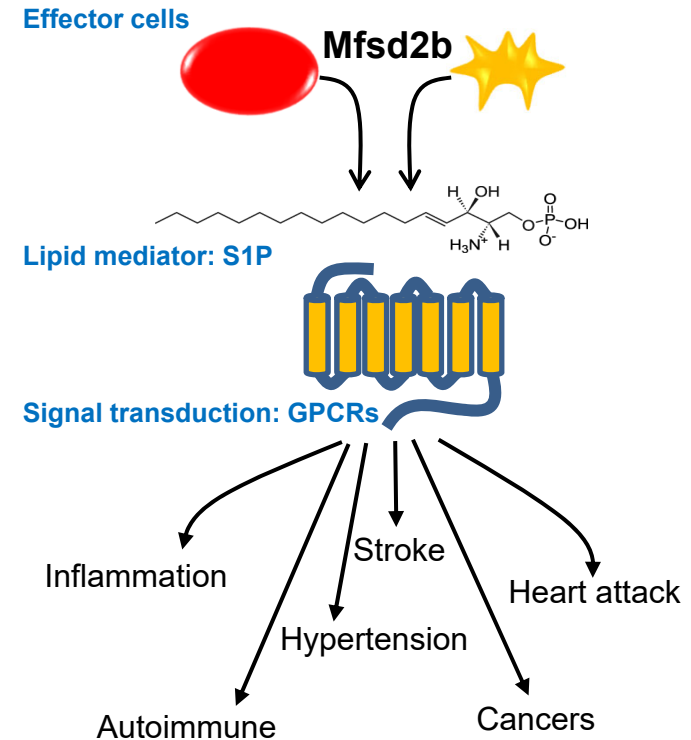
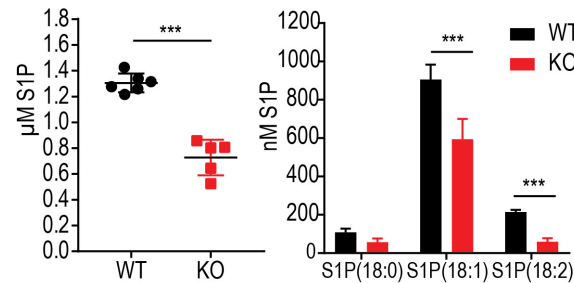
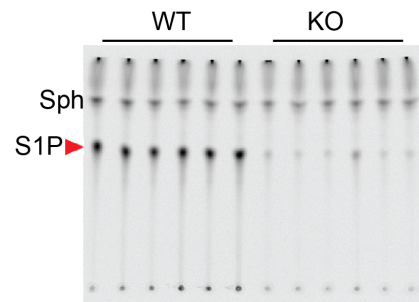
Neil Clarke
Genome Institute of Singapore

Markus Wenk
National University of Singapore



Nguyen Nam Long, PhD.
 Assistant Professor
 Department of Biochemistry.
 Email: bchnnl@nus.edu.sg

Lipid metabolism and signaling



Projects

- Roles of Mfsd2b in hematopoietic cells
- Mechanisms of Mfsd2b as the sphingosine 1-phosphate (S1P) exporter
- Unraveled the physiological roles of S1P using knockout mice
- Offered a new target for treatment of various diseases

Vu TM, Ishizu AN, Foo JC, Toh XR, Zhang F, Whee DM, Torta F, Cazenave-Gassiot A, Matsumura T, Kim S, Shio STE, Suda T, Silver DL, Wenk MR, **Nguyen LN.** (2017). Mfsd2b is essential for sphingosine-1-phosphate export in erythrocytes and platelets. **Nature** 2017.

**Sudhakar JHA, PhD****Affiliation:**

Junior Principal Investigator, Cancer Science Institute of Singapore
Assistant Professor of Biochemistry, Yong Loo Lin School of Medicine,
National University of Singapore

Address:

Centre for Translational Medicine
14 Medical Drive, MD6-13-02J, Singapore 117599

E-mail: csisjha@nus.edu.sg ; bchsjsjha@nus.edu.sg

Tel: (65) 6601 2402 (office); (65) 6516 5993 (Lab) **Fax:** (65) 6873 9664

Research Areas:

My laboratory is interested in studying the role of chromatin remodeling complexes in cancer prevention. We are particularly interested in studying the changes in chromatin signature due to deregulation of these remodeling complexes and how these alterations in genome organization lead to transformation of cells from a normal to cancerous state (Molecular Cell, 2010 Vol. 38:700-711; Molecular Cell, 2009 Vol. 34:521-533; Molecular and Cellular Biology, 2008 Vol. 28:2690-2700).

Details for Honors Project:

Interested candidate will be involved in understanding the role of the chromatin remodeling complexes in the maintenance of histone code and tumor suppression at protein and genome-wide level.



Theresa Tan

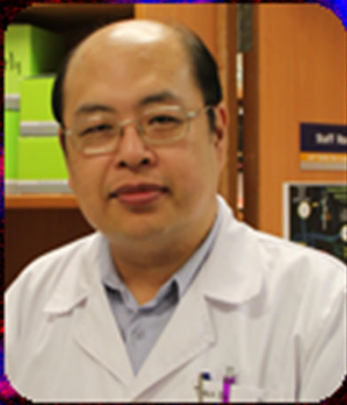
Associate Professor

Department of Biochemistry

Email : bchtant@nus.edu.sg

Tel : 6516-3685

- Research areas
 - Drug metabolism and transport, Hepatitis B, microRNAs, hepatocellular carcinoma and liver diseases
- Honors Projects
 - Role of microRNAs and Hepatitis B infection



A/P Tang Bor Luen

Molecular and Cellular Neurobiology

PROJECTS

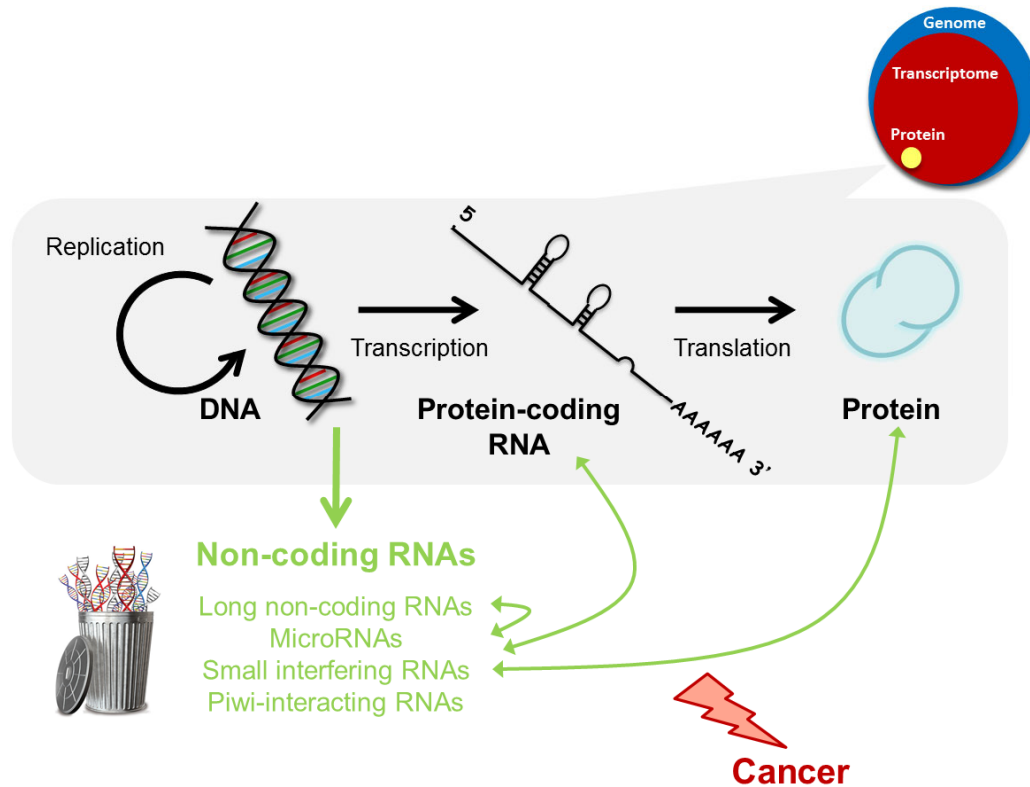
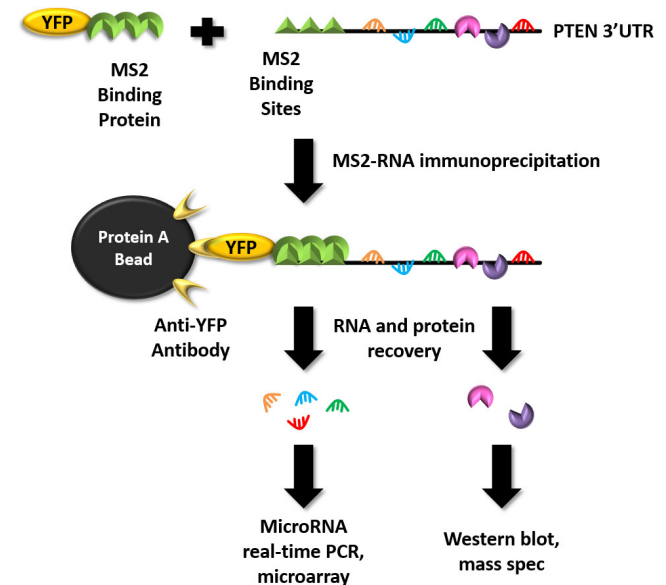
- 1. Role of brain enriched small Gtpases Rab22B and Rab23 in brain cancer**
- 2. Syntaxin 16 and its role in dendritic protein traffic**
- 3. Nogo, VAPB and ER stress in neuronal death and neuroprotection**

Deconvoluting regulatory RNA networks in cancer

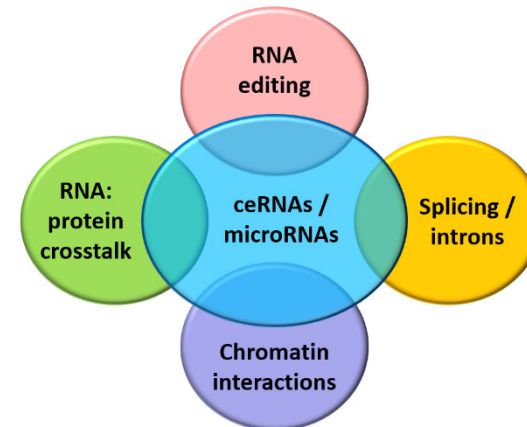
Yvonne Tay lab



Establish platforms to study RNA interactions



Functional crosstalk between RNA processes





Too Heng-Phon

Associate Professor
Department of Biochemistry
Yong Loo Lin School of Medicine
Email: bchtoohp@nus.edu.sg

Area of Concentration

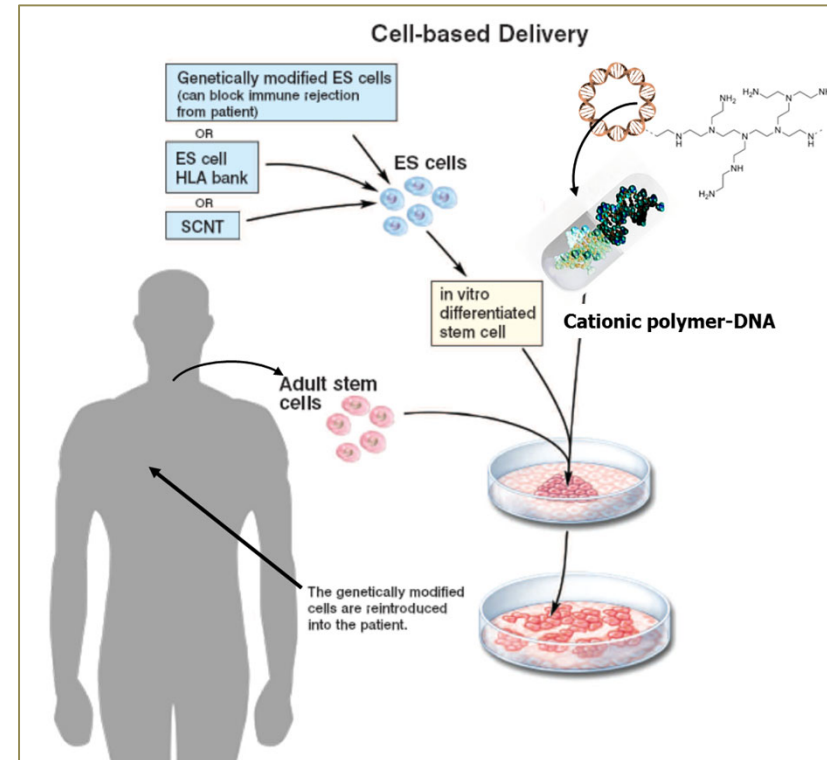
Biomedical Science / Cell and Molecular Biology / Biology

Research Project

Non-viral gene-modified Mesenchymal stem for cancer therapy

Project Description

A significant challenge in genetic medicine is the ability to delivery genes into some cell types without the use of viruses. Recently, we have discovered a rationale way to enhance gene transfection into many cell types previously thought to be hard-to-transfect. This novel approach is now used to generate modified mesenchymal stem cells (MSC) for gene-directed enzyme prodrug therapy (GDEPT). This is directed at late stage cancers (gastric, brain and lung).



Understanding anti-fungal resistance

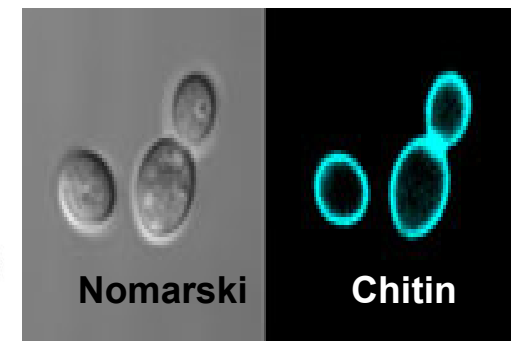
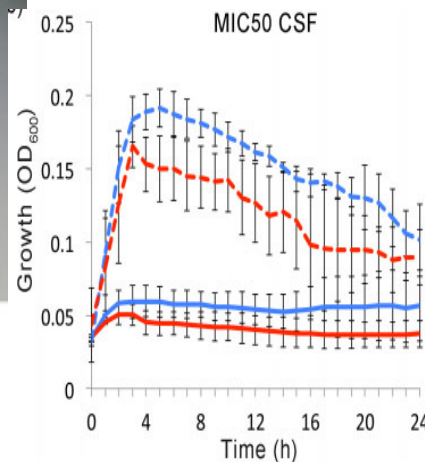
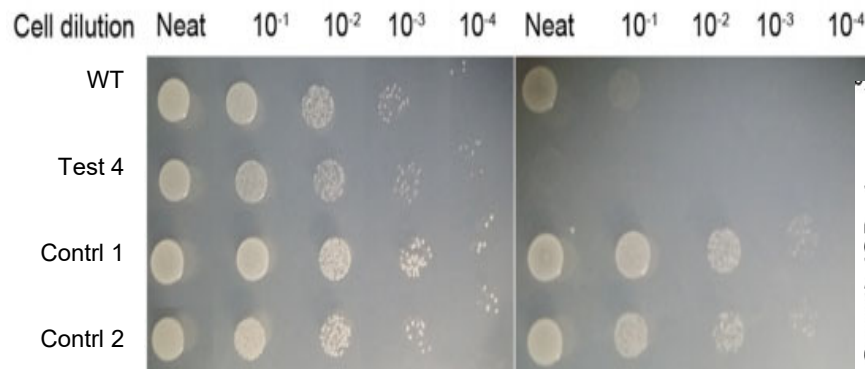
- Mycosis or infections by fungal pathogens, is an emerging problem
- Related to this is resistance to anti-fungal drugs

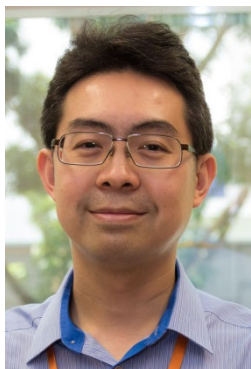


A/P Yeong Foong May

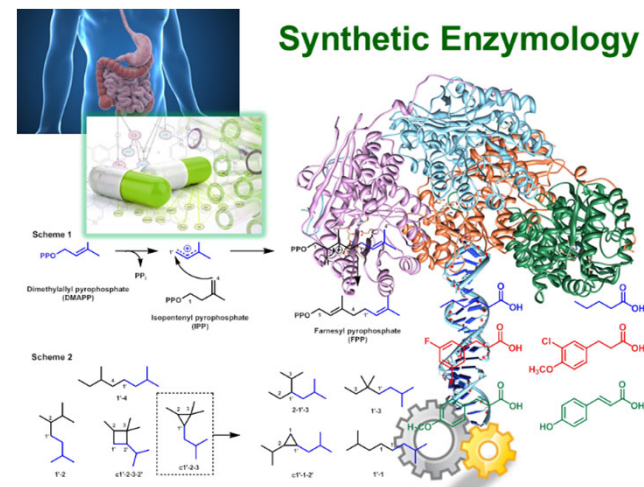
Aims of projects

- Screening for drug resistance genes
- Understanding the molecular basis of fungal drug resistance





YEW Wen Shan
Associate Professor
Department of Biochemistry
Synthetic Biology for Clinical & Technological Innovation (SynCTI)
WIL@NUS Corporate Laboratory
National University of Singapore



Research Areas:

1. **Synthetic Enzymology and Synthetic Biology.**
2. **Purposeful design and evolution of enzymatic activities for therapeutics and bioremediation.**
3. **Drug design and therapeutics targeting enzymes involved in cancer, cardiovascular diseases, infectious diseases, metabolic diseases and ageing.**

Available Research Projects:

1. **Synthetic Cannabinoid Biology – Repurposing Nature for Tomorrow's Therapeutics.**
2. **Synthetic Yeast Microcompartments for Sustainable Production in the new Bio-Economy.**
3. **Synthetic Industrial Enzymology – Development of Ultra-High-Throughput Platforms of the Future.**

Thank you!

For more information, please visit us at

<http://bch.nus.edu.sg/undergraduate.htm>



Yong Loo Lin School of Medicine

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