

## CU-BMB Summer Camp (CU-BSC2022) Schedule

Round 2: 18 – 22 July 2022 (9 a.m. – 4 p.m.)

Round 3: 1 – 5 August 2022 (9 a.m. – 4 p.m.)

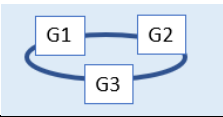
Venue: Room 521, 5<sup>th</sup> Floor, Klum Watcharobol Building (Sci10)

Department of Biochemistry, Faculty of Science, Chulalongkorn University

Sunday 17 July/ 31 July	Monday 18 July/ 1 August	Tuesday 19 July/ 2 August	Wednesday 20 July/ 3 August	Thursday 21 July/ 4 August	Friday 22 July/ 5 August	Saturday 23 July/ 6 August
	Lab Safety  RNA interference: Tool for the control of shrimp disease	Bioplastic synthesis by CO <sub>2</sub> from microalgae and Bio-oil by microalgae	Exploring plant cells for the productive substances	Purification and characterization of fluorescent proteins	Track your food intake and blood glucose	
	RNA interference: Tool for the control of shrimp disease	Phage therapy: A new strategy to beat superbugs	Exploring plant cells for the productive substances	Bacteria identification	From protein structure to drug discovery	

18 July 2022/1 August 2022	
9.00 – 10.00	<b>Lab safety:</b> Associate Prof. Dr. Saowarath Jantaro
10.00 – 10.15	Break
	<b>RNA interference: Tool for the control of shrimp disease</b> Associate Prof. Dr. Kunlaya Somboonwiwat Dr. Pattana Jaroenlak
10.15 – 10.35	Lecture: Introduction to RNA interference (RNAi) technology Using RNAi to identify new therapeutic targets for shrimp disease control
10.35 – 11.00	Lab: Production of dsRNA in E. coli system - Inoculation of E. coli - Centrifugation of bacterial cell
11.00 – 12.00	Lab: Purification of dsRNA and agarose gel electrophoresis - Precipitation of dsRNA (30 mins) - ** Teaching how to use a pipette** - Run agarose gel

12.00 – 13.00	Lunch Break
13.00 – 13.30	Lab: (Demonstration) dsRNA challenge and sample collection - injection of dsRNA - collect HC, HP, Sto, Gill, Int
13.30 – 14.30	Lab: Determination of the gene silencing efficiency by RT-PCR - mock PCR (fake chemicals) - teaching how to put the PRC tube in a machine and set the condition - Show the results in the picture (print x 26)
14.30 – 14.45	Break
14.45 – 15.45	Lab: - Total hemocyte count (Demonstration) The scanning electron micrograph (SEM) of shrimp hemocytes - Observation of histology of hepatopancreas under a light microscope
15.45 – 16.00	Lab discussion (Q&A)

19 July 2022/2 August 2022	
	<b>Bioplastic production from CO<sub>2</sub> by microalgae</b> Associate Prof. Dr. Tanakarn Monshupanee Associate Prof. Dr. Saowarath Jantaro
9.00 – 9.10	Brief lecture 1. Why to use bioplastic? 2. Microalgae producing bioplastic from CO <sub>2</sub> 3. How to visualize bioplastic PHB inside the cells?
9.10 – 9.30	Lab: 1. Stanning bioplastic beads inside algae cells (TM +TA) 2. Slide preparation (TM +TA)
9.30 – 10.15	Divided to 3 groups: 20 min each group  G1. Fluorescence microscopy G2. PHB extraction G3. PHB Research
10.15 – 10.30	Break
	<b>BIO-OIL FROM ALGAE, POPULAR PRODUCT FOR BRAIN HEALTH</b> Associate Prof. Dr. Saowarath Jantaro Associate Prof. Dr. Tanakarn Monshupanee
10.30 – 10.50	Brief about Lipid production from algae: OIL and DHA product for brain health Note: all students will do all experiments (no grouping)
10.50 – 11.30	1. Bio-oil extraction: solvent extraction method 2. Bio-Oil dye test: Qualitative method 2.1 Various unknown (extracted) samples will be ready for testing oil 2.2 Light microscope: visualize algal cells producing oil
11.30 – 12.00	Lipid determination and separation: (quantitative methods) - Dichromate oxidation method: unknow sample will be checked for lipid concentration - TLC: if applicable (time required)

12.00 – 13.00	Lunch Break
	<b>Phage therapy: A new strategy to beat superbugs</b> Dr. Vorrapon Chaikeratisak Dr. Pawinee Panpetch
13.00 – 13.15	1. Students are given the culture for sub-culturing and then induce the expression of TML001 gene by adding inducer (including the suppressor) with staining (Protocol step 3) 2. Students put the tubes into an incubator at 30 C (Protocol step 4)
13.15 – 14.15	1. Brief Lecture on Basic Molecular cloning 2. Students are allowed to perform a mock experiment; set up Gibson cloning reaction, Heat-shock transformation and spread the culture on selective media 3. Review the result (transformants on plates)
14.15 – 14.30	1. Lecture on How to operate the microscope
14.30 – 16.00 708/2 Klum W. Building	1. Students harvest the cells by centrifuge (Protocol step 5-7) 2. Students add cells onto a slide (Protocol step 8-9) 3. Bring to the scope room, look at the cell, and collect result (3 images per group) (Protocol step 10) <i>*30 min for slide prep and 60 min for 4 group-scope rotation</i>
Groups in waiting list: ~ 1 hour per group	1. Lab discussion / Answer to student questions 2. Include 15 min coffee break (Students take the break anytime in between) 3. Students are allowed to process the file by Fiji (own laptop)

20 July 2022/3 August 2022	
	<b>Engineering plant cells to produce active substances</b> Associate Prof. Dr. Teerapong Buaboocha Associate Prof. Dr. Supaart Sirikantaramas
9.00 – 9.45	Lecture 1 – Plant natural products: engineering (transient expression) and applications
9.45 – 10.00	Break
10.00 – 11.00	Lab 1 – Coloring your plant (agroinfiltration)
11.00 – 12.00	Lab 2 – Cryogenic freezing and smashing the plant cells (metabolite extraction and analysis)
12.00 – 13.00	Lunch Break
13.00 – 14.00	Lecture – Stable transformation and generation of transgenic plants
14.00 – 14.45	Lab 3 – Regeneration of your rice plant (plant tissue culture)
14.45 – 15.00	Break
15.00 – 16.00	Lab 4 – Histochemical detection of the reporter gene - GUS activity in the transgenic rice

21 July 2022/4 August 2022	
	<b>Purification and characterization of fluorescent proteins</b> Dr. Kittikhun Wangkanont Dr. Pattana Jaroenlak
9.00 – 9.30	Lecture – Protein purification and characterization
9.30 – 9.45	Ni-NTA affinity chromatography
9.45 – 10.00	Break
10.00 – 11.00	Ni-NTA affinity chromatography (continued)
11.00 – 12.00	SDS-PAGE
12.00 – 13.00	Lunch Break
	<b>Bacteria identification</b> Dr. Kittikhun Wangkanont Dr. Pattana Jaroenlak
13.00 – 13.30	Lecture – PCR and DNA sequencing
13.30 – 14.00	Polymerase Chain Reaction (PCR)
14.00 – 14.30	Agarose gel electrophoresis
14.30 – 15.00	Gel extraction
15.00 – 15.15	Break
15.15 – 16.00	DNA sequence analysis

22 July 2022/5 August 2022	
	<b>Track your food intake &amp; blood glucose</b> Assistant Prof. Dr. Rath Pichyangkura Associate Prof. Dr. Manchumas Prousoontorn Dr. Pawinee Panpetch
9.00 – 9.20	Lecture 1: What is carbohydrate?
9.20 – 10.00	Lab 1: Carbohydrate identification and determination of starch and sugars in various food products
10.00 – 10.15	Break
10.15 – 10.35	Lecture 2: How starch makes its way through your body? What is GI (Glycemix Index)?
10.35 – 11.45	Lab 2: Enzymatic assay for starch degradation by alpha-amylase
11.45 – 12.00	Wrap up
12.00 – 13.00	Lunch Break
	<b>From protein structure to drug discovery</b> Associate Prof. Dr. Kuakarun Krusong Associate Prof. Dr. Thanyada Rungrotmongkol
13.00 – 14.00	Lecture and Tutorial – Introduction to Protein Data Bank (PDB)
14.00 – 14.30	Lecture and Tutorial – Drug Discovery through Molecular Docking
14.30 – 14.45	Break
14.45 – 16.00	Workshop on Potential Drug Candidates Targeting SARS-CoV-2 Main Protease
<b>16.00 – 16.15</b>	<b>Certificate Presentation Ceremony</b>