Molecular & Cellular Approaches to Biotechnologies 分子與細胞生物科技

Offering time: **2026 Spring Semester**

Coordinator：**Dr. Pei-Wen Hsiao 蕭培文**

(Research Fellow, Agricultural Biology Research Center, Academia Sinica)

Classroom：**RmA236, 2F, Agricultural Technology Building, Academia Sinica**

(中央研究院農業科技大樓 2 樓 A236 教室)

Time：**Monday afternoon, 14:00~16:00**

Credit：

1. 4 credits (core course): MBAS 1st year students who took part I (course name: Core Approaches for current molecular biology research) in Fall semester and take this part II will receive 4 credits together in this semester.
2. 2 credits (elective course): non MBAS students who take this elective course will receive 2 credits in this semester.

Course description: This course offers an introduction to basic and advanced biotechnology systems with an emphasis on the use of transgenic approaches for research in modern biosciences. The lectures include approaches using genomics, epigenetics, proteomics, and metabolomics to study key questions for biotechnology development. Examples comprise plant and animal disease models and their interactions with microbes to deliver valuable biological molecules and agricultural products. Students taking this course are required to submit two term papers aiming the training for writing a research proposal on biotechnology to address key questions in cutting-edge biotechnology and an invention disclosure to pursue patent protection based on recent progress in biological science.

Week	Date	Topic	Lecturer
1	2/23	1. Introduction 2. Research and Development using Transgenic Biotechnology	Dr. Pei-Wen Hsiao (蕭培文)
2	3/2	Study of molecular mechanisms for human genetic diseases	Dr. Yi-Ching Lee (李宜靜)
3	3/9	Small-RNA-mediated gene regulation and its applications in plants	Dr. Ho-Ming Chen (陳荷明)
4	3/16	Development of antiviral strategies on plants	Dr. Hsin-Hung Yeh (葉信宏)
5	3/23	Discovery/Development of Natural Products as Therapeutics	Dr. Tsung-Lin Li (李宗璘)
6	3/30	Anther and Pollen: from Biology to Biotechnology	Dr. Der-Fen Suen (孫德芬)
	4/6	National Holiday- No Class	
7	4/13	Metabolomics technology in natural medicine R&D	Dr. Lie-Fen Shyur (徐麗芬)
8	4/20	Fundamentals of Mass Spectrometry and Its Applications in the Biological Sciences	Dr. Yet-Ran Chen (陳逸然)

		Midterm paper due before 2:00pm (Research Proposal)	
9	4/27	Microbiomics: Resarch,Technologies and Real-World Applications	Dr. Sen-Lin Tang (湯森林)
10	5/4	Design and Application of Chimeric Antigen Receptors on Immune Cells for Cancer Immunotherapy	Dr. Tai-Na Wu (吳岱娜)
11	5/11	In vivo biochemistry -Watching and quantifying biochemical processes in intact plants	Dr. Cheng-Hsun Ho (何承訓)
12	5/18	Induced Neuronal Differentiation - A Therapeutic Approach for Neuroblastoma	Dr. Yung-Feng Liao (廖永豐)
13	5/25	Translational mouse models for Immunotherapeutic Discovery & Development	Dr. Hui-Ming Chen (陳繪名)
14	6/1	Gene and cell-based bioreactors, animal tumor model and therapeutics	Dr. Pei-Wen Hsiao (蕭培文)
15	6/2	Epigenome Editing: Principles, Technologies, and Biological Insights	Dr. Cheng-Fu Kao (高承福)
16	6/8	**Final paper due before 2:00pm (Patent disclosure)**	