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國立東華大學

課　　綱　Course Outline

生化暨分子醫學科學系碩士班國際組

中文課程名稱 Course Name in Chinese	細胞訊息傳遞特論				
英文課程名稱 Course Name in English	Special topics in cellular signaling				
科目代碼 Course Code	BMM_M0090	班 別 Degree	碩士班 Master’s		
修別 Type	選修 Elective	學分數 Credit(s)	3.0	時 數 Hour(s)	3.0
先修課程 Prerequisite					

課程目標
Course Objectives

1. To understand the basic principles and mechanisms of cellular signaling and give examples of different types of extracellular signals and receptors,
and explain their functional significance.
（了解細胞的基本原理和機制訊息，並舉例說明不同類型的細胞外訊息和受體，並解釋它們的功能意義）。
2. To describe and give examples of the structure and properties of the major components of signal transduction pathways and their function.
（描述並舉例說明其結構和特性訊息傳遞的主要成分及其功能）。

系教育目標
Dept.’s Education Objectives

1	培養從事生命科學及生物技術之專業人才。 Cultivating professionals engaged in biochemistry and molecular medicine.
2	培育學生具有自我學習、獨立思考與創新之能力。 Fostering students to acquire the capabilities of self-learning, independent thinking, and innovation.

系專業能力 Basic Learning Outcomes		課程目標與系專業能力相關性 Correlation between Course Objectives and Dept.’s Education Objectives
A	具備生物技術相關學科之基礎知識。 Having a fundamental understanding of subjects related to biotechnological techniques.	●
B	具備邏輯分析與解決問題的能力。 Having the capabilities of logical analysis and problem solving.	●

C	具備資料整合、數據分析與書面及口頭報告能力。 Having the capabilities of data integration and analysis, and the skills of written and poster presentation.	●
D	具備終生學習的能力。 Having the capability of lifelong learning.	●
E	溝通協調能力與團隊合作之精神，及生物醫學工作人員專業倫理。 The spirit of communication, coordination, and teamwork, as well as professional ethics for biomedical workers.	

圖示說明Illustration ：● 高度相關 Highly correlated ○中度相關 Moderately correlated

課程大綱
Course Outline

1. Signals and receptors (訊息和受體)
2. Protein regulation in signal transduction (蛋白調控及訊息傳遞)
3. Second messengers (次級傳訊者)
4. MAP kinase pathway (MAP激?路徑)
5. The PI3K-AKT pathway (PI3K-AKT路徑)
6. mTOR signaling (mTOR訊息路徑)
7. Wnt signaling (Wnt訊息路徑)
8. Hedgehog and Notch signaling (Hedgehog和Notch訊息路徑)
9. Toll-like receptor signaling (Toll-like受體訊息路徑)
10. Signaling pathways that control cell proliferation (調控細胞增生的訊息路徑)
11. Signaling pathways that regulate cell division (調控細胞分裂的訊息路徑)
12. Signaling in control of cell growth and metabolism (調控細胞生長及代謝的訊息路徑)
13. Signaling pathways that regulate cell migration (調控細胞移動的訊息路徑)
14. Cell signaling and stress responses (細胞訊息傳遞與壓力反應)
15. Cell Death signaling (細胞死亡訊息傳遞)
16. Signal transduction in cancer (癌症訊息傳遞)

資源需求評估 (師資專長之聘任、儀器設備的配合・・・等)
Resources Required (e.g. qualifications and expertise, instrument and equipment, etc.)

Computer and Projector (電腦及投影機)

課程要求和教學方式之建議
Course Requirements and Suggested Teaching Methods

Class lectures, oral presentation, and discussion (課堂講授，口頭報告及討論)

其他
Miscellaneous

Textbooks (參考書)

1. Krauss G. (2015) Biochemistry of signal transduction and regulation (5th edition) Publisher: WILEY-VCH
2. Lewis C. Cantley (2014) Signal Transduction-Princiles, Pathways, and Processes (1st edition) Publisher: Cold Spring Harbor Laboratory Press