

國立清華大學 102 學年第 2 學期新開課程課程大綱

科號		組別		學分	2	人數限制	0
修課年級	<input type="checkbox"/> 大學部 年級以上 <input checked="" type="checkbox"/> 碩士班一年級以上(含博士班) <input checked="" type="checkbox"/> 碩士班二年級以上(含博士班)						
上課時間	W78			教室	LSI-505A		
科目中文名稱	細胞週期檢查點訊息傳遞特論						
科目英文名稱	Special topics on the cell cycle checkpoint signaling						
任課教師	王慧菁						
擋修科目				擋修分數			

※下列各欄由任課教師提供※

一、課程說明	The major aim of this lecture is to provide in-depth knowledge about the control and regulation of cellular checkpoint signaling and cell cycle progression. We will focus on exploring the underlying mechanism for three major transitions in the cell cycle: G1/S, G2/M, and M/G1.
二、指定用書	N/A
三、參考書籍	David Morgan: The Cell Cycle
四、教學方式	Lecture: 60% Group discussion: 20% Journal presentation: 20%
五、教學進度	See the attached document.
六、成績考核	Journal presentation and discussion
七、講義位址 http://	

I. Cell cycle overview (week 1 and 2)

-- To give a comprehensive understanding the events of the eukaryotic cell cycle and their basic control system

II. Model organisms for the study in cell cycle control (week 3 and 4)

-- To introduce several model organisms which are used to study the cell cycle control. Explain and describe the unique features for each organism. Yeast (both budding and fission), *Xenopus laevis*, *Drosophila melanogaster* and mammalian systems will be discussed.

III. Basic cell cycle control system (week 5 and 6)

-- Introduction of major components of basic cell cycle control machinery including cyclin dependent kinases, cyclin, anaphase promoting complex (APC) and their regulation.

IV. DNA replication/Chromosome duplication (week 7 and 8)

-- A brief introduction of chromosome duplication in G1/S phase and its regulation.

Journal presentation/discussion about the G1/S checkpoint (week 9)

V. Entry into mitosis (week 10)

-- Discuss about the events that control the mitotic entry. Explain what do cell do to get an access into mitosis.

VI. The mitotic spindle assembly (week 11)

-- Introduce the process of mitotic spindle formation, the role of chromosome structure, spindle pole body separation, cell geometry for bi-orientation, and the kinetochore attachments.

VII. The spindle assembly checkpoint – the activation and maintenance (week 12 and 13)

-- Describe how does SAC monitor both the kinetochore-microtubule attachment and tension in-between sister chromatids and how the "wait-anaphase" signal is maintained or activated before anaphase onset.

VIII. The spindle assembly checkpoint – the satisfaction and silencing (week 14)

-- Discuss the subsequent event when SAC is satisfied. The control for anaphase onset by the activation of separase, cdc14, APC/C and inactivation of cyclin B/Cdk1.

IX. Cytokinesis (week 15)

-- Describe how does a cell execute division of cytoplasmic components and perform abscission after chromosome separation.

X. On the road to cancer: mitotic adaptation, slippage, catastrophe and aneuploidy (week 16)

-- Discuss what happens when cells cannot satisfy the SAC, the outcome of mitotic adaptation, slippage, catastrophe and aneuploidy caused by the failure in mitosis.

Journal presentation and discussion (week 17)