

## 國立清華大學 100 學年第 上 學期課程大綱

科號 Course No.	LSMC510700	組別 group		學分 credit	2	人數限制 Size limit	0
修課年級 For grade	<input type="checkbox"/> 大學部 年級以上 (undergraduate) <input checked="" type="checkbox"/> 碩士班一年級以上(含博士班) graduate <input type="checkbox"/> 碩士班二年級以上(含博士班)						
上課時間 Time	M3M4	教室 Room					
科目中文名稱 Course title in Chinese	分子馬達與軸突運輸特論						
科目英文名稱 Course title in English	Special topics on Molecular Motors and Axonal Transport						
任課教師 Teacher	藍忠昱, 林彩雲, 王歐力, 桑自剛, 張鑑中						
擋修科目 Prerequisite			擋修分數 credit				

※下列各欄由任課教師提供※

一、課程說明 <a href="#">Course Description</a>	<p>Adult-onset neurodegenerative diseases (AONDs) is a group of neurological disorders based on an age-dependent diminishment in neuronal function associated with a decline in synaptic activity and neuronal cell death. Earliest events in AONDs are loss of synaptic function, axonal connectivity and degeneration of axons. Recently identified genes related to AONDs, however, only insufficiently explain basic mechanisms underlying these disorders. To develop novel therapeutic strategies, we need to understand how to delay or even cure neurodegeneration which becomes increasingly important as human lifespan increases and therefore incidences of AONDs. Importantly, Taiwan's society is undergoing a dramatic aging process based on its low birth rates. In this class, we discuss the significance of axonal transport in neurodegenerative diseases. Accumulation of cargo in the thin, lengthy and overall crowded axon is a hallmark of many neuropathological disorders, e.g., Tau protein accumulation in Alzheimer's, neurofilament clusters in ALS and <math>\alpha</math>-Synuclein plaques in Parkinson's. Interestingly, molecular motors are directly linked to several diseases, e.g., in motoneuron pathologies (Charcot-Marie-Tooth and Hereditary Spastic Paraplegias) mutations in kinesin-1 and dynein can be found. In ALS, mutant SOD1 (Superoxide Dismutase) activates a p38MAP kinase that phosphorylates the heavy chain of kinesin-1 and negatively affects the motor's movement along microtubules. Similar in Alzheimer's disease, kinases as CK2 and GSK3<math>\beta</math> (as well as in Huntington's disease kinase JNK3)</p>
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	phosphorylate and negatively regulate kinesins. Based on this knowledge, investigating the mechanisms that underlie axonal transport (and how molecular motors are regulated) becomes increasingly important. Remarkably, only little is known how motors recognize, bind and release their cargo (as synaptic precursors and vesicles). Furthermore, signals that activate and deactivate axonal motors are largely unknown. Therefore, in this course we discuss recent advances on this important topic.
二、指定用書 Text Books	Chapters in current cell biology textbooks (“Alberts”, Lodish”, “Pollard” etc.) related to the cytoskeleton and molecular motors.
三、參考書籍 References	See HTTP below
四、教學方式 Teaching Method	Lecture (PI) and student’s journal presentations.
五、教學進度 Syllabus	2 hourly seminar whole semester, no exam
六、成績考核 Evaluation	Attendance: 20%. Performance: 35%. Presentation: 45%
七、位址 http://	<a href="http://life.nthu.edu.tw/~laboiw/Handouts/index.html">http://life.nthu.edu.tw/~laboiw/Handouts/index.html</a>