

# 生命科學系 97 學年度下學期課程大綱

科號		組別		學分	2	人數限制	
科目中文名稱	神經元內傳輸及病理(part II)	教室					
科目英文名稱	Intra-neuronal trafficking and diseases (part II)						
任課教師	王歐力 Oliver Wagner						
上課時間	M3M4						
擋修科目				擋修分數			
一、課程說明	The neuron is a highly polarized cell, possessing dendrites that are specialized for signal reception, and an axon for signal conduction and transmission. Long and thin axons are densely packed with mitochondria, synaptic vesicles, microtubules and neurofilaments, molecular motors and cargo. Cargos include synaptic precursors, membranous organelles, cytoskeletal elements, signaling molecules, growth factors and more. Considering the extensive length and the small diameter coupled with the amount of material that must be transported, it is not surprising that <u>disruption in axonal transport lead to defects causing numerous neurodegenerative diseases</u> . Many of these neurodegenerative diseases are related to defects in microtubule-based motors and their cargos. For example, a mutation in the molecular motor dynein rescues axonal transport defects and extends the life span of <b>ALS</b> (Amyotrophic lateral sclerosis) mice. <b>Alzheimer's disease</b> occurs based on accumulation of amyloid precursor proteins (APP) which is a cargo for the molecular motor KIF5A. LIS1 is associated with dynein while a mutation in LIS causes <b>lissencephaly</b> . A mutation in the molecular motor KIF1B $\beta$ causes <b>Charcot-Marie-Tooth disease</b> type 2A. A single base-pair change in the p150Glued subunit of the dynein adaptor-protein dynactin causes LMN and <b>senile dementia</b> is based on neuronal cell death caused by defects in the transport of synaptic precursors by the molecular motor KIF1A. Recent progress on <b>Huntington's Disease</b> demonstrates that axonal polyglutamine (polyQ) aggregates could physically block microtubule-based cargo transport while Huntingtin and huntingtin-associated protein-1 (HAP1) interacts with dynein/dynactin and kinesin. To understand how defects in the axonal transport system lead to neurodegenerative diseases, we need to know the mechanisms of motor-cargo interaction and how the movement of molecular motors is regulated in the nervous system. In this class we discuss most recent studies on this at the present time central topic in neuroscience.						
二、指定用書	Cell biology and neuroscience textbooks related to this topic.						
三、教學方式	Special seminar for graduate and undergraduate students.						
四、教學進度	2 hourly seminar						
五、成績考核	Attendance: 30%. Performance (general performance and discussion of papers): 30%. Presentation (individual journal presentation): 40%						
六、講義位址 http://	Handouts by 王歐力: <a href="http://140.114.96.196:81/index.html">http://140.114.96.196:81/index.html</a>						