

國立清華大學 103 學年第上學期課程大綱

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| 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 checked="" 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 checked="" type="checkbox"/> 碩士班二年級以上(含博士班) | | | | | | |
| 上課時間 Time | F7F8 | 教室 Room | R213 LSB II | | | | |
| 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 I | | | | | | |
| 任課教師 Teacher | 王歐力 | | | | | | |
| 擋修科目 Prerequisite | | | | 擋修分數 credit | | | |

※下列各欄由任課教師提供※

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| 一、課程說明 Course Description | <p>The motivation for this class originates from recent findings that relate molecular motors to neurodegeneration. Though I generally believe that complex diseases (such as cancer or neurodegeneration) rely on complex network of entangled factors, the idea that malfunction in neuronal transport leads to accumulation of axonal “disease proteins” (tau in Alzheimer’s disease, neurofilaments in ALS or α-synuclein in Parkinson’s disease), and thus to neuropathological phenotypes, seems not only scientifically sound but is indeed reflected in a large set of publications (which we will discuss in part in this class). The bidirectional transport of cargoes along microtubules guarantees neuronal function as polarization, elongation, neuronal plasticity and, based on recent studies, even brain wiring and higher brain functions. Compared to its thin diameter, the axon is an extremely crowded cellular extension housing a diverse set of cytoskeletal elements as microtubules, neurofilaments and actin filaments as well as many types of different organelles as synaptic vesicles, mitochondria and RNA granules. Even more challenging for the axonal transport system is that the cytoskeleton is largely cross-linked with microtubule- and neurofilament-binding proteins, whereas microtubules are not smooth themselves but decorated with MAPs, providing acute obstacles for motors. Many of neuropathological disease phenotypes related to axonal transport and cytoskeleton resemble those in adult-onset neurodegenerative diseases (AONDS), a group of neurological disorders that are based on an</p> |
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| | age-dependent diminishment in neuronal function associated with a decline in synaptic activity, axonal connectivity, degeneration of axons and synapses (“dying back” pattern) and, at a later stage, neuronal cell death. 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, specifically in Taiwan with its very low birth rates and the expected severe increase in the aged population. |
| 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:// | http://life.nthu.edu.tw/~laboiw/Handouts/index.html |