

國立清華大學 111 學年第 1 學期課程大綱

科號	LSMC5154	組別	00	學分	2	人數限制	0				
修課年級	<ul style="list-style-type: none"> ■ 大學部 二 年級以上 ■ 碩士班一年級以上(含博士班) ■ 碩士班二年級以上(含博士班) 										
上課時間	RaRb		教室	LS I 生二 213							
科目中文名稱	分子演化特論										
科目英文名稱	Special Topics in Molecular Evolution										
任課教師	黃貞祥										
擋修科目	無/Offered in English 需與授課教師討論後加簽選	擋修分數		無							

※下列各欄由任課教師提供※

一、課程說明	Molecular evolution is the process of change in the sequence composition of cellular molecules such as DNA, RNA, and proteins across generations. The field of molecular evolution uses principles of evolutionary biology and population genetics to explain patterns in these changes. Major topics in molecular evolution concern the rates and impacts of single nucleotide changes, neutral evolution vs. natural selection, origins of new genes, the genetic nature of complex traits, the genetic basis of speciation, evolution of development, and ways that evolutionary forces influence genomic and phenotypic changes. We will also discuss articles from the original scientific literature at class.
二、指定用書	TBD
三、參考書籍	Selected papers from high profile journals such as <i>Cell</i> , <i>Science</i> , <i>Nature</i> , <i>Nature Genetics</i> , <i>Nature Communications</i> , <i>Nature Ecology & Evolution</i> , <i>PNAS</i> , <i>PLOS Biology</i> , <i>PLOS Genetics</i> , <i>Molecular Biology and Evolution</i> , <i>Genome Biology and Evolution</i> , etc.
四、教學方式	All students are required to read all assigned chapters and papers and then participate in classroom discussion.
五、教學進度	<p>Topics</p> <ul style="list-style-type: none"> ● GENOME EVOLUTION <ul style="list-style-type: none"> ■ Origins of New Genes and Pseudogenes ● PHYLOGENY <ul style="list-style-type: none"> ■ Reading a Phylogenetic Tree: The Meaning of Monophyletic Groups ■ Trait Evolution on a Phylogenetic Tree: Relatedness,

	<p>Similarity, and the Myth of Evolutionary Advancement</p> <ul style="list-style-type: none"> ● MACROEVOLUTION <ul style="list-style-type: none"> ■ The Molecular Clock and Estimating Species Divergence ● SPECIATION <ul style="list-style-type: none"> ■ Haldane's Rule: the Heterogametic Sex ■ Hybrid Incompatibility and Speciation ■ Hybridization and Gene Flow ■ Why Should We Care about Species? ● MICROEVOLUTION <ul style="list-style-type: none"> ■ Evolutionary Adaptation in the Human Lineage ■ Genetic Mutation ■ Natural Selection: Uncovering Mechanisms of Evolutionary Adaptation to Infectious Disease ■ Negative Selection ■ Neutral Theory: The Null Hypothesis of Molecular Evolution ■ Sexual Reproduction and the Evolution of Sex <p>Schedule:</p> <p>Week 1~4: Genome Evolution Week 5~6: Phylogeny Week 7~10: Macroevolution Week 11~13: Speciation Week 14~18: Microevolution</p>
六、成績考核	Class performance: 35%. Assigned presentation: 45%. Attendance: 20%.
七、講義位址 http://	eeclass