

# 课程大纲

## COURSE SYLLABUS

1.	课程名称(中英文) <b>Course Title(Chinese and English)</b>	癌症生物学 (The Biology of Cancer)
2.	课程类别 <b>Course Type</b>	研究生课程 (post-graduate level)
3.	授课院系 <b>Originating Department</b>	生物系 (Department of Biology)
4.	可选课学生所属院系 <b>Open to Which Majors</b>	生命科学学院 (School of Life Sciences), 理学院 (School of Science)、工学院 (School of Engineering)
5.	课程学时 <b>Credit Hours</b>	32
6.	课程学分 <b>Credit Value</b>	2
7.	授课语言 <b>Teaching Language</b>	英语 (English)
8.	授课教师 <b>Instructor(s)</b> (如果是一个课题组共同讲授的, 请标明 MI 以及其他构成成员。)	邓怿 (DENG YI)
9.	先修课程、其它学习要求 <b>Pre-requisites or Other Academic Requirements</b>	
10.	<b>教学目标 Course Objectives</b>	
	<p>本门课程的目的深入介绍癌症发生发展的原因, 研究现状和治疗手段, 培养学生对癌症研究的兴趣。</p> <p>The goal for this course is 1) to introduce how human cancers developed and how cancers are treated; 2) to cultivate the interest in cancer research.</p>	
11.	<b>教学方法及授课创新点 Teaching Methods and Innovations</b>	
	<p>教学方法主要由课堂讲授和文献讨论组成。本课程增加了癌症的最新研究领域进展, 主要包括介绍癌症滋生的微环境, 癌症与免疫系统的关系和癌症免疫治疗等最新研究进展。</p> <p>Lectures and students' presentations. We will introduce the novel discoveries in cancer research, with a focus on the introduction of microenvironment in cancer development, the functions of immune systems in the development of cancer and novel technologies in cancer immunotherapy.</p>	
12.	<b>教学内容及学时分配 Course Contents and Course Schedule</b>	

教学周 Week	Lecture Topic	《The Biology of Cancer》教材对应章节 Chapter Reading	学时 Credit Hours
1	Lecture 1. Introduction <ul style="list-style-type: none"> <li>This history of cancer discovery</li> <li>The nature of cancer</li> <li>The history of cancer treatment</li> </ul>	1	2
2	Lecture 2. Viral oncogenesis <ul style="list-style-type: none"> <li>The historical reflection of tumor virology</li> <li>Molecular mechanisms of viral oncogenesis in human</li> </ul>	3 Vogt (2012) Nature Reviews Cancer 12: 639-648	2
3	Lecture 3. Cellular oncogenes <ul style="list-style-type: none"> <li>The categories of cellular oncogene</li> <li>The activation of cellular oncogene</li> </ul>	4 Navas, et al. (2012) Cancer Cell 22:318-330	2
4	Lecture 4. Aberrant cell growth signalling in cancer <ul style="list-style-type: none"> <li>Growth factors and their receptors</li> <li>Ras-regulated signaling pathways</li> <li>Integral signaling pathways</li> <li>Cytokine signaling</li> <li>Wnt signaling</li> <li>GPCR signaling</li> <li>“Dural-address” signaling</li> <li>Nuclear receptor signaling</li> </ul>	4, 5, 6 Gupta, et al. (2007) Cell 129:957-968 Castellano, et al (2013) Cancer Cell 24:617-630	2
5	Lecture 5. Reprogramming energy metabolism in cancer <ul style="list-style-type: none"> <li>How is cancer cell metabolism different?</li> <li>How to study cancer metabolism?</li> <li>How to exploit metabolic changes for therapeutic benefit?</li> </ul>		2
6	Lecture 6. Tumour suppressor genes <ul style="list-style-type: none"> <li>What is a tumor suppressor?</li> <li>How may a tumor suppressor get lost?</li> <li>How to find a tumor suppressor?</li> <li>What do tumor suppressors function in the cell?</li> </ul>	7	2
7	Lecture 7. Altered control of the cell cycle clock in cancer <ul style="list-style-type: none"> <li>What is “cell cycle clock”?</li> <li>How is restriction point dysregulated in the cell cycle clock in cancer?</li> </ul>	8	2
8	Lecture 8. The role of p53 and cell apoptosis in tumour progression <ul style="list-style-type: none"> <li>Discovery of p53 and its roles in tumorigenesis</li> <li>p53 function and its regulation</li> <li>p53 and cell apoptosis</li> </ul>	9 Chen, et al. (2014) Cancer Cell 25:652-665 Weissmueller, et al (2014) Cell 157:382-394	
9	Lecture 9. Cell immortalization and tumorigenesis <ul style="list-style-type: none"> <li>What is replicative immortality?</li> <li>How do cancer cells bypass replicative senescence?</li> </ul>	10 Feldser and Greider (2007) Cancer Cell 11:461-469 Wang, et al (2016) Aging Cell 15:646-660	2
10	Lecture 10. Multi-step tumorigenesis and the evolution of cancer <ul style="list-style-type: none"> <li>Can a single mutated oncogene transform normal human cells?</li> <li>How many different sequential changes are required in cells and tissues in order to create a human cancer?</li> <li>How does multi-step tumorigenesis really proceed?</li> </ul>	11	2

11	Lecture 11. Genome instability: DNA repair defects and their relationship to cancer • DNA replication errors • DNA damage and DNA repair defects	12	2
12	Lecture 12. Tumour microenvironment: from monolog to dialog • The components of tumour microenvironment • The interaction between tumour cells and their microenvironment	13	1
12	Lecture 13. Tumour angiogenesis • Endothelial cells and vessel formation • Angiogenic switch • Anti-angiogenesis therapies.	13 Su, et al. (2018) Cell 172:841-856 Rhim, et al (2014) Cancer Cell 25:735-747	1
13	Lecture 14. Tumour invasion and metastasis: differentiation and cancer • The epithelial-mesenchymal transition • Cancer cell migration and invasion	14 Tsai, et al. (2012) Cancer Cell 22:725-736 Krebs, et al (2016) Nature Cell Biology 19:519-529	2
14	Lecture 15. Tumour immunology and cancer immunotherapies • The immune system functions to kill cancer cells • The rise of cancer immunotherapy	15	2
15	Lecture 16. Rational design of cancer therapeutics • Surgery, radiotherapy, and chemotherapy are the major pillars on which current cancer therapies rest • Exploration of therapeutic targets	16 Pao, et al. (2004) PNAS 101:13306-13311 Sordella, et al. (2004) Science 305:1163-1167 Foster, et al. (2016) Cancer Cell 29:477-493	2
16	Poster symposium		2

**13. 课程考核 Course Assessment**

出勤 (attendance) 5%

小测 (quizzes) 10%

作业 (problem sets) 25%

期末考试 (final exam) 40%

个人海报报告 (poster presentation) 20%

**14. 教材及其它参考资料 Textbook and Supplementary Readings**

1. The Biology of Cancer, R.A. Weinberg, 2nd edition (Garland Science, 2014), 课堂提供

2. The reading materials listed above.