肿瘤生物学原理（MED333）课程大纲

课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	**课程名称 Course Title**	肿瘤生物学原理 Cancer Biology Principles
2.	**授课院系 Originating Department**	医学院 School of Medicine
3.	**课程编号 Course Code**	MED333
4.	**课程学分 Credit Value**	3
5.	**课程类别 Course Type**	专业选修课/ Major Elective Course
6.	**授课学期 Semester**	春季/ Spring
7.	**授课语言 Teaching Language**	中英双语 English & Chinese
8.	**授课教师、所属学系、联系方式（如属团队授课，请列明其他授课教师） Instructor(s), Affiliation& Contact （For team teaching, please list all instructors）**	董金堂，医学院，人类细胞生物和遗传学系，dongjt@sustech.edu.cn Jintang Dong, School of Medicine, Department of Human Cell Biology and Genetics, dongjt@sustech.edu.cn
9.	**实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact**	
10.	**选课人数限额(可不填) Maximum Enrolment （Optional）**	

11.	授课方式 Delivery Method	讲授 Lectures	习题/辅导/讨论 Tutorials	平时考试/ Regular tests	期末考试/Final exam	总学时 Total
	学时数 Credit Hours	42	1	3	2	48

12.	先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	无/NA
13.	后续课程、其它学习规划 Courses for which this course is a pre-requisite	待定/To be determined
14.	其它要求修读本课程的学系 Cross-listing Dept.	待定/To be determined

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

肿瘤是危害人类健康的重大疾病之一，肿瘤研究几十年以来一直是生命科学和医学研究的重大和热点领域之一。本课程的教学目标为：
（1）获得对肿瘤这类疾病的认识，包括发病情况、对社会的影响、组织病理和临床特点、诊断和治疗等方面的基本概念和原理。
（2）掌握肿瘤生物学的基本知识，了解各个主要方面的内容，包括肿瘤细胞的各种特点、肿瘤信号通路、肿瘤细胞的代谢、肿瘤免疫、分子诊断、衰老和癌症、肿瘤预防和治疗等。
（3）获得并加强对肿瘤各主要方面的兴趣，拓宽学术视野，为将来进行相关研究和临床工作打好基础。

Cancer is one of the major health problems, and cancer research has been one of the major areas of biomedical sciences. The teaching objectives of this course are:
(1) To gain knowledge of cancer, including its incidence and impact on society, histopathological and clinical features, and the concepts and principles behind the diagnosis and treatment of cancers.
(2) To Grasp basic knowledge of cancer biology and understand the main research aspects of cancer biology, including various cellular characteristics, cancer cell signaling pathways, cancer cell metabolism, tumor immunology, tumorigenesis, molecular diagnosis, aging and cancer, and cancer prevention and treatment etc.
(3) To gain and/or strengthen the interest in cancer, broaden the vision for biomedical sciences, and lay the foundation for future career in research or clinical work targeting cancer.

16. 预达学习成果 Learning Outcomes

通过本课程的学习，预期将获得对肿瘤作为一类疾病的基本认识（发病情况、其对社会的影响、其诊断和治疗等方面的基本概念和原理等）；掌握肿瘤生物学的概念和原理并了解各主要方面的内容，包括肿瘤细胞的各种特点、肿瘤信号通路、肿瘤细胞的代谢、肿瘤免疫、分子诊断、衰老和癌症、肿瘤预防和治疗等等；获得或强化对肿瘤各主要方面的兴趣，为将来进行相关研究或临床工作打下基础。

By completing this course, students will gain knowledge of cancer and its impact on society, and the concepts and principles behind the diagnosis and treatment of various cancers; Grasp basic knowledge of cancer biology in the major areas, including various cellular characteristics, cancer cell signaling pathways, cancer cell metabolism, tumor immunology, tumorigenesis, molecular

diagnosis, aging and cancer, and cancer prevention and treatment etc.; and Gain and/or strengthen the interest in cancer research or clinical work on cancer in the future.

17. 课程内容及教学日历（如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）
Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

Each section takes 3 hours to finish. The 5th, 10th and 15th sections include a one-hour test for contents from the previous sections.

每个部分需要三小时完成。第 5、10 和 15 部分包括一个 60 分钟的考试，考前面几次的学习内容。

Section 1/第 1 部分
Cancer: incidence, mortality, histopathologic and clinical features, and biological hallmarks
癌症发生率、死亡率、组织病理和临床特点以及生物学特征

Section 2/第 2 部分
Cancer cell immortalization, proliferation, and survival
癌细胞永生化、增殖和生存

Section 3/第 3 部分
Oncogenes
癌基因

Section 4/第 4 部分
Tumor suppressor genes
肿瘤抑制基因

Section 5/第 5 部分
Causes of cancer, DNA damage and repair, and genetic/epigenetic alterations
癌症的起因、DNA 损伤修复以及遗传与表观遗传改变

Section 6/第 6 部分
Chemical carcinogenesis and multistep and multifactor nature of cancer
化学癌变以及癌症的多步骤多阶段特点

Section 7/第 7 部分
Physical and biological carcinogenesis
物理和生物因子诱导的癌变

Section 8/第 8 部分
Hereditary factors in cancer development
癌症发生的遗传因素

Section 9/第 9 部分
Invasion and cancer metastasis
浸润和肿瘤转移

Section 10/第 10 部分
Tumor microenvironment and immune evasion
肿瘤微环境和免疫逃逸

Section 11/第 11 部分
Omics and cancer signaling network
组学和肿瘤信号网络

Section 12/第 12 部分
Stem cells and the cellular origin of cancer
干细胞和癌症的细胞起源

Section 13/第 13 部分
Other hallmarks of cancer – angiogenesis and cancer metabolism
癌的其他特征：血管新生和癌细胞代谢

Section 14/第 14 部分
Cancer screening, diagnosis, and treatment
癌症的筛查、诊断和治疗

Section 15/第 15 部分
Cancer prevention
癌症预防

Section 16
Review and discussion, 1 hour; Final exam, 2 hours
复习与讨论，1 小时；期末考试，2 小时

Section	Topic	Hours
1	Cancer: incidence, mortality, histopathologic and clinical features, and biological hallmarks 癌症发生率、死亡率、组织病理和临床特点以及生物学特征	3
2	Cancer cell immortalization, proliferation, and survival 癌细胞永生化、增殖和生存	3
3	Oncogenes 癌基因	3
4	Tumor suppressor genes 肿瘤抑制基因	3
5	Causes of cancer, DNA damage and repair, and genetic/epigenetic alterations 癌症的起因、DNA损伤修复以及遗传与表观遗传改变	3
6	Chemical carcinogenesis and multistep and multifactor nature of cancer 化学癌变以及癌症的多步骤多阶段特点	3
7	Physical and biological carcinogenesis 物理和生物因子诱导的癌变	3
8	Hereditary factors in cancer development 癌症发生的遗传因素	3

9	Invasion and cancer metastasis 浸润和肿瘤转移	3
10	Tumor microenvironment and immune evasion 肿瘤微环境和免疫逃逸	3
11	Omics and cancer signaling network 组学和肿瘤信号网络	3
12	Stem cells and the cellular origin of cancer 干细胞和癌症的细胞起源	3
13	Other hallmarks of cancer – angiogenesis and cancer metabolism 癌的其他特征：血管新生和癌细胞代谢	3
14	Cancer screening, diagnosis, and treatment 癌症的筛查、诊断和治疗	3
15	Cancer prevention 癌症预防	3
16	Review and discussion, 1 hour; Final exam, 2 hours 复习与讨论，1小时；期末考试，2小时	3

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

教材/Textbooks：

1. Kleinsmith LJ (2014) Principles of Cancer Biology - Pearson New International Edition. Pearson Education Limited, London, UK..

2. Weinberg RA (2014) The Biology of Cancer. Willey and Sons, New York.

课程评估 ASSESSMENT

19.

评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
出勤 Attendance		2		
课堂表现 Class Performance		4		
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments				
期中考试 Mid-Term Test				
期末考试 Final Exam	120 min/120 分钟	40		
期末报告 Final Presentation				

其它（可根据需要改写以上评估方式） **Others (The above may be modified as necessary)**	**第 5 周考试** **Test in the 5th week** 50 min/50 分钟 **第 10 周考试** **Test in the 10th week** 50 min/50 分钟 **第 15 周考试** **Test in the 15th week** 50 min/50 分钟	18 18 18		

20. **记分方式 GRADING SYSTEM**

☑ A. **十三级等级制 Letter Grading**
☐ B. **二级记分制（通过/不通过） Pass/Fail Grading**

课程审批 REVIEW AND APPROVAL

21. **本课程设置已经过以下责任人/委员会审议通过**
This Course has been approved by the following person or committee of authority

本课程已经医学院教学副院长张文勇教授审核通过。

课程详述

COURSE SPECIFICATION

以下课程信息可能根据实际授课需要或在课程检讨之后产生变动。如对课程有任何疑问，请联系授课教师。

The course information as follows may be subject to change, either during the session because of unforeseen circumstances, or following review of the course at the end of the session. Queries about the course should be directed to the course instructor.

1.	**课程名称 Course Title**	肿瘤生物学原理 Cancer Biology Principles
2.	**授课院系 Originating Department**	医学院 School of Medicine
3.	**课程编号 Course Code**	MED333
4.	**课程学分 Credit Value**	3
5.	**课程类别 Course Type**	专业选修课/ Major Elective Course
6.	**授课学期 Semester**	春季/秋季 Spring/Fall
7.	**授课语言 Teaching Language**	中英双语/Chinese and English
8.	**授课教师、所属学系、联系方式（如属团队授课，请列明其他授课教师） Instructor(s), Affiliation& Contact （For team teaching, please list all instructors）**	董金堂，医学院，人类细胞生物和遗传学系，dongjt@sustech.edu.cn Jintang Dong, School of Medicine, Department of Human Cell Biology and Genetics, dongjt@sustech.edu.cn
9.	**实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact**	
10.	**选课人数限额(可不填) Maximum Enrolment （Optional）**	

11. 授课方式 Delivery Method	讲授 Lectures	复习、讨论、论文提纲展示、论文展示 / Review, discussion, paper outline and paper presentation	平时考试/ Regular tests	期末考试/Final exam	总学时 Total
学时数 Credit Hours	40	8	0	0	48

12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	无/None
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	待定/To be determined
14. 其它要求修读本课程的学系 Cross-listing Dept.	待定/To be determined

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

肿瘤是危害人类健康的重大疾病之一，肿瘤研究几十年以来一直是生命科学和医学研究的重大和热点领域之一。本课程的教学目标为：
（1）获得对肿瘤这类疾病的认识，包括发病情况、对社会的影响、组织病理和临床特点、诊断和治疗等方面的基本概念和原理。
（2）掌握肿瘤生物学的基本知识，了解各个主要方面的内容，包括肿瘤细胞的各种特点、肿瘤信号通路、肿瘤细胞的代谢、肿瘤免疫、分子诊断、衰老和癌症、肿瘤预防和治疗等。
（3）获得并加强对肿瘤各主要方面的兴趣，拓宽学术视野，为将来进行相关研究和临床工作打好基础。

Cancer is one of the major health problems, and cancer research has been one of the major areas of biomedical sciences. The teaching objectives of this course are:
(1) To gain knowledge of cancer, including its incidence and impact on society, histopathological and clinical features, and the concepts and principles behind the diagnosis and treatment of cancers.
(2) To Grasp basic knowledge of cancer biology and understand the main research aspects of cancer biology, including various cellular characteristics, cancer cell signaling pathways, cancer cell metabolism, tumor immunology, tumorigenesis, molecular diagnosis, aging and cancer, and cancer prevention and treatment etc.
(3) To gain and/or strengthen the interest in cancer, broaden the vision for biomedical sciences, and lay the foundation for future career in research or clinical work targeting cancer.

16. 预达学习成果 Learning Outcomes

通过本课程的学习，预期将获得对肿瘤作为一类疾病的基本认识（发病情况、其对社会的影响、其诊断和治疗等方面的基本概念和原理等）；掌握肿瘤生物学的概念和原理并了解各主要方面的内容，包括肿瘤细胞的各种特点、肿瘤信号通路、肿瘤细胞的代谢、肿瘤免疫、分子诊断、衰老和癌症、肿瘤预防和治疗等等；获得或强化对肿瘤各主要方面的兴趣，为将来进行相关研究或临床工作打下基础。

By completing this course, students will gain knowledge of cancer and its impact on society, and the concepts and principles behind the diagnosis and treatment of various cancers; Grasp basic knowledge of cancer biology in the major areas, including various cellular characteristics, cancer cell signaling pathways, cancer cell metabolism, tumor immunology, tumorigenesis, molecular diagnosis, aging and cancer, and cancer prevention and treatment etc.; and Gain and/or strengthen the interest in cancer research or clinical work on cancer in the future.

17. 课程内容及教学日历（如授课语言以英文为主，则课程内容介绍可以用英文；如团队教学或模块教学，教学日历须注明主讲人）
Course Contents (in Parts/Chapters/Sections/Weeks. Please notify name of instructor for course section(s), if this is a team teaching or module course.)

Each section takes 2 hours to finish. The 7th, 14th, 21st, and 24th sections are review, discussion, paper outline presentation (section 7), paper, and paper presentation (section 24).

每个部分需要二小时完成。第 7、14、21 和 24 部分用来复习、讨论、包括一个 60 分钟的考试，考前面几次的学习内容。

Section 1/第 1 部分
1. Course introduction / 课程介绍; 2. Basic concepts, characteristics and models of cancer / 癌症的基本概念、特点和模型

Section 2/第 2 部分
Tumor histopathology / 肿瘤组织病理学

Section 3/第 3 部分
Cancer cell growth, proliferation, differentiation and cell cycle abnormalities / 癌细胞生长、增殖、分化与细胞周期异常

Section 4/第 4 部分
Cancer cell senescence, immortalization, death and survival / 癌细胞衰老、永生化、凋亡和存活

Section 5/第 5 部分
Cancer genetics and oncogenes / 肿瘤遗传学和癌基因

Section 6/第 6 部分
Tumor suppressor genes and cancer genomics / 抑癌基因和肿瘤基因组学

Section 7/第 7 部分
Review, discussion, and paper outline presentation / 复习、讨论、论文提纲展示

Section 8/第 8 部分
Chemical carcinogenesis and multistep and multifactor nature of cancer / 化学癌变以及癌症的多步骤多阶段特点

Section 9/第 9 部分
DNA damage and repair and genomic instability / DNA 损伤修复以及基因组不稳定性

Section 10/第 10 部分

Physical and biological carcinogenesis / 物理和生物因子诱导的癌变

Section 11/第 11 部分
Hereditary factors in cancer development / 癌症发生的遗传因素

Section 12/第 12 部分
Cell invasion, EMT, and cancer metastasis / 细胞浸润、EMT 和肿瘤转移

Section 13/第 13 部分
Tumor microenvironment and tumor progression / 肿瘤微环境和肿瘤演进

Section 14/第 14 部分
Review and discussion / 复习和讨论

Section 15/第 15 部分
Tumor immunology and immunotherapies / 肿瘤免疫和免疫治疗

Section 16/第 16 部分
Tumor angiogenesis and therapeutic implications / 肿瘤血管新生及其治疗应用

Section 17/第 17 部分
Growth factors, signal transduction, and carcer therapy / 生长因子、信号转导和癌症治疗

Section 18/第 18 部分
Cell stemness and its roles in cancer malignant behaviors / 细胞干性及其在肿瘤恶性行为中的作用

Section 19/第 19 部分
Cancer cell metabolism / 肿瘤细胞代谢

Section 20/第 20 部分
Omics and cancer signaling network / 组学和肿瘤信号网络

Section 21/第 21 部分
Review and discussion / 复习和讨论

Section 22/第 22 部分
Cancer screening and diagnosis / 癌症的筛查和诊断

Section 23/第 23 部分
Cancer therapies / 癌症治疗

Section 24/第 24 部分
Paper submission and paper presentation / 论文提交、论文展示

教学大纲：

Section	Topic	Hours
1	1. Course introduction / 课程介绍; 2. Basic concepts, characteristics and models of cancer / 癌症的基本概念、特点和模型	2
2	Tumor histopathology / 肿瘤组织病理学	2
3	Cancer cell growth, proliferation, differentiation and cell cycle abnormalities / 癌细胞生长、增殖、分化与细胞周期异常	2
4	Cancer cell senescence, immortalization, death and survival / 癌细胞衰老、永生化、凋亡和存活	2
5	Cancer genetics and oncogenes / 肿瘤遗传学和癌基因	2
6	Tumor suppressor genes and cancer genomics / 抑癌基因和肿瘤基因组学	2
7	Review, discussion, and paper outline presentation / 复习、讨论、论文提纲展示	2
8	Chemical carcinogenesis and multistep and multifactor nature of cancer / 化学癌变以及癌症的多步骤多阶段特点	2
9	DNA damage and repair and genomic instability / DNA损伤修复以及基因组不稳定性	2
10	Physical and biological carcinogenesis / 物理和生物因子诱导的癌变	2
11	Hereditary factors in cancer development / 癌症发生的遗传因素	2
12	Cell invasion, EMT, and cancer metastasis / 细胞浸润、EMT和肿瘤转移	2
13	Tumor microenvironment and tumor progression / 肿瘤微环境和肿瘤演进	2
14	Review and discussion / 复习和讨论	2
15	Tumor immunology and immunotherapies / 肿瘤免疫和免疫治疗	2
16	Tumor angiogenesis and therapeutic implications / 肿瘤血管新生及其治疗应用	2
17	Growth factors, signal transduction, and carcer therapy / 生长因子、信号转导和癌症治疗	2
18	Cell stemness and its roles in cancer malignant behaviors / 细胞干性及其在肿瘤恶性行为中的作用	2
19	Cancer cell metabolism / 肿瘤细胞代谢	2
20	Omics and cancer signaling network / 组学和肿瘤信号网络	2
21	Review and discussion / 复习和讨论	2

22	Cancer screening and diagnosis / 癌症的筛查和诊断	2
23	Cancer therapies / 癌症治疗	2
24	Paper submission and paper presentation / 论文提交、论文展示	2

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

教材/Textbooks：

Primary:

1. Kleinsmith LJ (2014) Principles of Cancer Biology - Pearson New International Edition. Pearson Education Limited, London, UK..

Secondary:

2. Weinberg RA (2014) The Biology of Cancer. Willey and Sons, New York.

Reference book:

3. Lee RJ, Abramson JS & Goldsby RA. Case studies in cancer, 1st edition: W. W. Norton & Company, 2018.

课程评估 ASSESSMENT

19. 评估形式 Type of Assessment	评估时间 Time	占考试总成绩百分比 % of final score	违纪处罚 Penalty	备注 Notes
出勤和课堂表现 / Attendance and class performance		10		
第 7 周论文提纲展示 / Paper outline presentation in the 7th week	5 min / 5 分钟	10		
第 16 周论文和展示 / Paper and presentation in the 16th week	10-15 min /10-15 分钟	80		
其它（可根据需要改写以上评估方式） Others (The above may be modified as necessary)				

20. 记分方式 GRADING SYSTEM

☐ A. 十三级等级制 **Letter Grading**
☑ B. 二级记分制（通过/不通过） **Pass/Fail Grading**

课程审批 REVIEW AND APPROVAL

21. **本课程设置已经过以下责任人/委员会审议通过**
This Course has been approved by the following person or committee of authority

本课程已经医学院教学副院长张文勇教授审核通过。