

课程大纲

COURSE SYLLABUS

1.	课程代码/名称 Course Code/Title	MED5031
2.	课程性质 Compulsory/Elective	专业选修课
3.	开课单位 Offering Dept.	医学院
4.	课程学分/学时 Course Credit/Hours	3 学分、48 学时
5.	授课语言 Teaching Language	双语
6.	授课教师 Instructor(s)	董金堂
7.	开课学期 Semester	春/秋季
8.	是否面向本科生开放 Open to undergraduates or not	否
9.	先修要求 Pre-requisites	(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.) 无
10.	教学目标 Course Objectives	
	(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.) 本课程的教学目标包括: 1) 掌握肿瘤生物学中肿瘤遗传基础、细胞行为特点、分子信号特征、转移耐药机理和肿瘤精准医疗等主要方向的基本概念和原理; 2) 了解相关研究进展和特色领域的前沿; 3) 获得肿瘤生物学科研思维的训练。	
11.	教学方法 Teaching Methods	
	(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.) 1) 基本概念和原理的讲述: 针对肿瘤生物学的不同主题, 授课教师讲述相关的基本概念和原理 (第一节课)。 2) 文献展示与讨论: 授课教师选定相关研究论文, 并指导学生进行文献阅读和展示, 组织学生进行讨论 (第二节课)。 3) 学术报告和讨论: 将安排 2 次由肿瘤生物学研究的专家学术报告, 并进行充分讨论 (最后两次课)。	
12.	教学内容 Course Contents	
	(如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)	
	Section 1	Course introduction and basic concepts, characteristics and models of cancer / 课程介绍与癌症的基本概念、特点和模型 <ul style="list-style-type: none"> • Course objectives (教学目标)

	<ul style="list-style-type: none"> • Course assessment (课程考核) • Text book and supplementary readings (教材和参考资料) • Overview of cancer and its biology (肿瘤生物学概述)
Section 2	<p>Tumor histopathology / 肿瘤组织病理学</p> <ul style="list-style-type: none"> • Histology (组织学概述) • From organ to tissue (器官的组织学分析) • Morphology of cancer (肿瘤的形态) • Differentiation and atypia of tumors (肿瘤分化和异型性变) • Benign and malignant tumors (良性和恶性肿瘤) • Stage of tumors (肿瘤分级)
Section 3	<p>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</p> <ul style="list-style-type: none"> • Features of cancer cell proliferation (肿瘤细胞增殖特征) • The mammalian cell cycle (哺乳动物细胞周期) • Regulators of cell cycle (细胞周期调控因子) • Proliferation and differentiation (增殖与分化) • Case study (实例分析)
Section 4	<p>Cancer cell senescence, immortalization, death and survival / 癌细胞衰老、永生化、凋亡和存活</p> <ul style="list-style-type: none"> • Cancer cell senescence (癌细胞衰老) • Cancer cell immortalization (癌细胞永生化) • Apoptosis and cancer cell survival (肿瘤细胞凋亡与存活)
Section 5	<p>Cancer genetics and oncogenes / 肿瘤遗传学和癌基因</p> <ul style="list-style-type: none"> • Basic concept of genetics (遗传学概述) • Genetic alternations in cancer (肿瘤中的遗传变异) • Oncogenes (癌基因) • Mechanisms for activating proto-oncogenes (癌基因激活机理)
Section 6	<p>Tumor suppressor genes / 抑癌基因</p> <ul style="list-style-type: none"> • Two-hit model (二次打击模型) • Loss of heterozygosity (杂合型缺失) • Some tumor suppressor genes (抑癌基因举例) • Epigenetic silencing of tumor suppressor genes (抑癌基因的表现遗传学沉默)
Section 7	<p>Cancer genomics / 肿瘤基因组学</p> <ul style="list-style-type: none"> • Cancer genomics (肿瘤基因组学) • Pathways and networks (信号通路和网络) • Application examples (应用实例)
Section 8	<p>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</p> <ul style="list-style-type: none"> • Cancer etiology (肿瘤病因学) • Carcinogens (致癌剂) • The two-stage model of carcinogenesis (两阶段致癌模型) • Case study (实例分析)

Section 9	Physical and biological carcinogenesis / 物理和生物因子诱导的癌变 <ul style="list-style-type: none"> • Main causes of cancer (主要致癌因素) • Physical carcinogenesis (物理致癌因素) • Biological carcinogenesis (生物致癌因素) • Case study (实例分析)
Section 10	DNA damage responses and genomic instability / DNA 损伤反应与基因组不稳定性 <ul style="list-style-type: none"> • DNA damage basics (DNA 损伤基本概念) • Recognition of DNA damages and cellular responses (DNA 损伤的识别和应激反应) • Repair of DNA damages (DNA 损伤修复) • DNA repair defects and cancer susceptibility (DNA 损伤修复缺陷及肿瘤易感性)
Section 11	Hereditary factors in cancer development / 癌症发生的遗传因素 <ul style="list-style-type: none"> • Multifactorial inheritance (多因素遗传) • GWAS (全基因组关联分析) • The significance of hereditary factors in cancer (肿瘤中遗传因素的重要性) • Case study (实例分析)
Section 12	Cell invasion, EMT, and cancer metastasis / 细胞浸润、EMT 和肿瘤转移 <ul style="list-style-type: none"> • Cancer metastasis (肿瘤转移) • Tumor cell invasion (肿瘤细胞浸润) • EMT (上皮间质转化) • Metastasis suppressor (肿瘤转移抑制基因) • Targeting metastasis (靶向肿瘤转移)
Section 13	Tumor microenvironment and tumor progression / 肿瘤微环境和肿瘤演进 <ul style="list-style-type: none"> • Tumor microenvironment (肿瘤微环境) • Heterotypic signaling (交互信号) • Components in tumor microenvironment (肿瘤微环境组分) • Case study (实例分析)
Section 14	Tumor immunology and immunotherapies / 肿瘤免疫和免疫治疗 <ul style="list-style-type: none"> • Humoral immune response (体液免疫) • Cellular immune response (细胞免疫) • Immunosurveillance (免疫监视) • Immuno-evasive strategies (免疫逃逸) • Immunotherapies (免疫治疗)
Section 15	Tumor angiogenesis and therapeutic implications / 肿瘤血管新生及其治疗应用 <ul style="list-style-type: none"> • Tumor angiogenesis (肿瘤血管新生) • Cell types involved in tumor angiogenesis (肿瘤血管新生中的细胞类型) • The angiogenic switch (血管新生在肿瘤发展中的作用) • Anti-angiogenesis therapies (抗血管新生的肿瘤治疗)
Section 16	Growth factors, signal transduction, and cancer therapy / 生长因子、信号转

	<p>导和癌症治疗</p> <ul style="list-style-type: none"> • Growth factors (生长因子信号) • Signalling transduction (细胞信号转导) • Signalling transduction and drug resistance (细胞信号转导和耐药性) • Case study (实例分析)
Section 17	<p>Cell stemness and cancer malignant behaviors / 细胞干性与肿瘤恶性行为</p> <ul style="list-style-type: none"> • Cancer stem cells (肿瘤干细胞) • Origin of cancer stem cell (肿瘤干细胞起源) • Analysis of cancer stem cells (肿瘤干细胞的分析) • Cancer stem cell heterogeneity (肿瘤干细胞异质性) • Regulation of cancer stem cells by cellular intrinsic signals (肿瘤干细胞与信号通路) • Interaction of cancer stem cells and tumor microenvironment (肿瘤干细胞与肿瘤微环境)
Section 18	<p>Cancer cell metabolism / 肿瘤细胞代谢</p> <ul style="list-style-type: none"> • Metabolism (代谢) • Warburg effect (瓦博格效应) • Metabolic reprogramming (肿瘤代谢重编程) • Cancer metabolism and therapeutics (肿瘤代谢与肿瘤治疗) • Cancer metabolism and microenvironment (肿瘤代谢与微环境)
Section 19	<p>Omics and cancer signaling network / 组学和肿瘤信号网络</p> <ul style="list-style-type: none"> • Genomics (基因组学) • Proteomics (蛋白组学) • Metabolomics (代谢组学) • Epigenomics (表观遗传组学) • Signaling networks (信号网络)
Section 20	<p>Cancer screening and diagnosis / 癌症的筛查和诊断</p> <ul style="list-style-type: none"> • Cancer screening (肿瘤筛查) • Cancer diagnosis (肿瘤诊断) • Case study (实例分析)
Section 21	<p>Cancer therapies / 癌症治疗</p> <ul style="list-style-type: none"> • Traditional Therapies (传统治疗) • Targeted therapies (靶向治疗) • Drug resistance (耐药性) • Case study (实例分析)
Section 22	<p>Review / 复习</p> <ul style="list-style-type: none"> • Key concept review (重要知识点回顾) • Discussion (讨论)
Section 23	<p>Research seminar and discussion / 学术报告与讨论</p> <ul style="list-style-type: none"> • Research seminar (学术报告) • Discussion (讨论)
Section 24	<p>Research seminar and discussion / 学术报告与讨论</p>

		<ul style="list-style-type: none"> • Research seminar (学术报告) • Discussion (讨论)
13.	课程考核 Course Assessment	
	<p>(① 考核形式 Form of examination; ②. 分数构成 grading policy; ③ 如面向本科生开放, 请注明区分内容。 If the course is open to undergraduates, please indicate the difference.)</p> <p>考核形式: 考试</p> <p>本课程总分为 100 分: 1. 期末考试 (50%); 2. 上课出勤率 (10%); 3. 课堂表现 (10%); 4. 口头报告 (30%)。</p>	
14.	教材及其它参考资料 Textbook and Supplementary Readings	
	<ol style="list-style-type: none"> 1. Robert Weinberg. The Biology of Cancer. New York: Willey and Sons, 2014. 2. Lee RJ, Abramson JS & Goldsby RA. Case studies in cancer, 1st edition: W. W. Norton & Company, 2018. 	