

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	糖脂代谢与健康 Carbohydrate and Lipid Metabolism in Health
2.	授课院系 Originating Department	医学院 School of Medicine
3.	课程编号 Course Code	MED234
4.	课程学分 Credit Value	3
5.	课程类别 Course Type	专业选修课 Major Elective Courses
6.	授课学期 Semester	春季 Spring
7.	授课语言 Teaching Language	英文 English
8.	授课教师、所属学系、联系方式 Instructor(s), Affiliation & Contact (For team teaching, please list all instructors)	陈默 Mo Chen 医学院 School of Medicine chenm7@sustech.edu.cn
9.	实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact	待公布 To be announced
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	实验/实习 Lab/Practical	其它(请具体注明) Other (Please specify)	总学时 Total
	48	0	0	0	48
学时数 Credit Hours					
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	无/NA				
14. 其它要求修读本课程的学系 Cross-listing Dept.	无/NA				

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

本课程以糖脂生物学的基础知识为起点，涵盖了在我们日常生活中常见的食品、药品和护肤品中所含的各种糖脂。不仅介绍了糖脂的主要种类和基本结构，还深入研究了糖脂的合成代谢、作用机制以及在生物学中的重要意义。除了全面探讨糖脂生物学的各个方面，课程还将介绍糖脂研究领域常用的方法和尖端技术。该课程的首要目标是帮助学生建立坚实的糖脂生物学理论基础，同时激发他们对这一领域的研究兴趣。此外，我们还致力于培养学生的研究技能，包括课题设计、实验方法、科学模型构建以及英语表达能力，以确保他们能够跟随科学前沿的步伐，为未来的学习和研究奠定坚实基础。

This course begins with the foundational knowledge of carbohydrate and lipid biology and covers various carbohydrates and lipids found in common foods, medications, and skincare products in our daily lives. It not only introduces the main types and basic structures of carbohydrates and lipids but also delves into their synthesis, metabolism, mechanisms of action, and their significance in biology. In addition to comprehensive exploration of various aspects of carbohydrate and lipid biology, the course will also introduce commonly used methods and cutting-edge technologies in the field of carbohydrate and lipid research. The primary goal of this course is to help students establish a strong theoretical foundation in carbohydrate and lipid biology while inspiring their interest in research in this field. Furthermore, we are committed to developing students' research skills, including topic design, experimental methods, scientific model construction, and English communication abilities, to ensure that they can keep pace with the forefront of science and build a solid foundation for future learning and research.

16. 预达学习成果 Learning Outcomes

本课程旨在帮助本科生获取相关基础知识，同时了解相关课题设计、实验手段以及科学模型构建等研究方法，以保持与科学前沿的步伐。课程的评估将包括前沿文献的深入阅读、科学模型的设计和 PPT 展示，以培养学生查找、解读和综述某一领域文献的能力，同时也加强学生进行科技论文调研、构建科学模型以及进行口头学术报告的能力。

The primary aim of this course is to assist undergraduate students in gaining a solid foundation in relevant knowledge while understanding research methods such as topic design, experimental techniques, and scientific model construction. This is essential to stay current with the scientific forefront. Course assessments will include in-depth reading of cutting-edge literature, designing scientific models, and delivering PPT presentations. These assessments aim to cultivate students' abilities to search for, interpret, and summarize literature in a specific field, as well as enhance their skills in conducting research for scientific papers and delivering oral academic presentations.

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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.)

本课程将深入探讨糖脂的作用机制和生物学意义。我们将涵盖以下内容：常见糖脂类型、结构与功能；各种糖脂的生物合成、代谢与运输；它们的作用方式和作用位点；在细胞信号通路中的作用；以及糖脂信号失调所导致的病理后果。此外，我们还将介绍与糖脂相关的常见食品、护肤品和药品，以及前沿的糖脂代谢和信号传导实验方法。

This course will provide an in-depth exploration of the mechanisms and biological significance of carbohydrates and lipids. We will cover the following topics: common types, structures, and functions of carbohydrates and lipids; the biosynthesis, metabolism, and transport of various carbohydrates and lipids; their modes of action and sites of action; their roles in cellular signaling pathways; and the pathological consequences of carbohydrate and lipid signaling imbalances. In addition, we will introduce common foods, skincare products, and medications related to carbohydrates and lipids, as well as cutting-edge experimental methods in carbohydrate and lipid metabolism and signaling.

Section	Topic	Hours
1	糖脂生物学简介/Introduction to Carbohydrate and Lipid Biology 1.1 Overview of carbohydrates and lipids 1.2 Carbohydrate and lipid in nutrition 1.3 Basic principles of carbohydrate and lipid metabolism	3
2	常见糖脂类型、结构与功能/Major Carbohydrate and Lipid Types, Structure, and Function 2.1 Carbohydrate and lipid classification 2.2 Carbohydrate and lipid structure 2.3 Carbohydrate and lipid function	3
3	糖脂的合成、代谢与运输/ Carbohydrate and Lipid Biosynthesis, Metabolism, and Transport 3.1 Carbohydrate and lipid biosynthesis 3.2 Carbohydrate and lipid metabolism 3.3 Systemic and cellular transport	3
4	糖脂信号分子/ Carbohydrate and Lipid Signaling Molecules 4.1 Introduction to signaling molecules 4.2 Carbohydrate signaling molecules 4.3 Lipid signaling molecules	3
5	细胞膜上的糖脂信号/ Carbohydrate and Lipid Signaling on Plasma Membrane 5.1 Membrane carbohydrate and lipid composition 5.2 Membrane semi-permeability and fluid mosaic model 5.3 Cell surface receptors and lipid signaling cascade	3
6	内膜系统上的糖脂信号/ Carbohydrate and Lipid Signaling on Endo-membranes 6.1 Carbohydrate and lipid signaling on endosomes and lysosomes 6.2 Carbohydrate and lipid signaling on endoplasmic reticulum and Golgi complex 6.3 Carbohydrate and lipid signaling on mitochondria	3

7	细胞核内的糖脂信号 Carbohydrate and Lipid Signaling in the Nucleus 7.1 Nuclear membrane and non-membrane structures 7.2 Carbohydrate and lipid signaling on nuclear membrane structures 7.3 Carbohydrate and lipid signaling on nuclear non-membrane structures	3
8	蛋白质上的糖脂信号/ Carbohydrate and Lipid Complexed with Proteins 8.1 Carbohydrate modification on proteins 8.2 Lipid signaling anchored on proteins 8.3 Protein scaffold for carbohydrate and lipid signaling	3
9	糖脂生物学的研究进展/Research Frontiers in Carbohydrate and Lipid Biology 9.1 Discussion of selected research article I 9.2 Discussion of selected research article II 9.3 Discussion of selected research article III	3
10	文献精读-学生 PPT 展示/ Literature review-Student PPT presentation	3
11	糖脂与细胞通路/ Carbohydrate, Lipids and Cellular Pathways 11.1 Cell proliferation and differentiation 11.2 Cell survival and apoptosis 11.3 Immune response and inflammation	3
12	糖脂与疾病/ Carbohydrate, Lipids and Diseases 12.1 Cancer and tumorigenesis 12.2 Cardiovascular diseases 12.3 Neurodegeneration and autoimmunity	3
13	糖脂与生活/ Carbohydrate, Lipids and Everyday life 13.1 Carbohydrate, Lipids in food and supplements 13.2 Carbohydrate, Lipids in skin care products 13.3 Common drugs targeting carbohydrate and lipid signaling	3
14	研究糖脂生物学的前沿方法/Frontier Approaches in Carbohydrate and Lipid Biology Study 14.1 <i>In vivo</i> approaches 14.2 <i>In situ</i> approaches 14.3 <i>In vitro</i> approaches	3
15	绘制糖脂生物学科学模型/Creating Scientific Illustrations for Carbohydrate and Lipid Biology 15.1 Tools for designing and creating scientific model/illustration 15.2 Practical session I: prepare scientific model for carbohydrate and lipid isomers 15.3 Practical session II: prepare scientific model for carbohydrate and lipid metabolism	3
16	小综述与科学模型-学生 PPT 展示/Mini Review and Scientific Model Student PPT presentation	3

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

参考书（《Carbohydrate Metabolism》、《Lipid Signaling and Metabolism》、《Advanced Nutrition and Human Metabolism》、《Phosphoinositides: Methods and Protocols》、《Lipid Signaling Protocols》），以及与每个部分相关的研究前沿文献与综述。

References（《Carbohydrate Metabolism》、《Lipid Signaling and Metabolism》、《Advanced Nutrition and Human Metabolism》、《Phosphoinositides: Methods and Protocols》、《Lipid Signaling Protocols》）and relative cutting-edge research articles and reviews.

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		10		
课堂表现 Class Performance		20		
小测验 Quiz				
课程项目 Projects		30		
平时作业 Assignments				
期中考试 Mid-Term Test				
期末考试 Final Exam				
期末报告 Final Presentation		40		
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

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