

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	Molecular Pharmacology 分子药理学				
2.	授课院系 Originating Department	Department of Biology, 生物系				
3.	课程编号 Course Code	BIO403-16				
4.	课程学分 Credit Value	3				
5.	课程类别 Course Type	专业选修课(生物科学、生物技术、生物信息学) Major Elective Courses (Biological Sciences, Biotechnology, Bioinformatics)				
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)	饶枫 生物系 Tel: 88018439 18518079089 Feng Rao, Department of Biology, raof@sustc.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)	30				
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
	学时数 Credit Hours	36	4		8 (presentation)	48

12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements	Cell Biology, Animal Physiology
13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite	Advanced Pharmacological Science 高级药理科学
14. 其它要求修读本课程的学系 Cross-listing Dept.	Chemistry (化学系)

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

This elective course (3 credit hours) will be offered during the spring semester. Designed to provide the students an overview of the molecular mechanism of drug actions, this course will focus on discussing basic pharmacological principles as well as representative physiological systems as selective drug targets. Mathematical, chemical, biochemical, and molecular basis governing drug efficacy, potency, specificity, and dose-response relationship will be discussed. In addition, this course will introduce the modern concepts underlying drug design and development, along with a brief introduction of related research approach/methods and philosophies.

该选修课程（3学分）将于春季学期开设。旨在为学生提供药物作用分子机制的概述，本课程将重点讨论基本药理学原理以及代表性的生理系统作为选择性药物目标。将讨论控制药物功效，效力，特异性和剂量-反应关系的数学，化学，生物化学和分子基础。此外，本课程还将介绍药物设计和开发的现代概念，并简要介绍相关的研究方法/方法和理念。

16. 预达学习成果 Learning Outcomes

By the end of this course, each student should be able to: 1. Identify the fundamental principles of pharmacokinetics and pharmacodynamics and apply these principles to describe drug actions in humans. 2. Compare and contrast the specific pharmacology of the major classes of drugs, important distinctions among members of each class, the risks and benefits, in relation to the organ systems they affect, and the diseases for which they are used therapeutically.

在本课程结束时，每个学生都应该能够：1. 确定药代动力学和药效学的基本原理，并应用这些原则来描述人类的药物作用。2. 比较和对比主要类别药物的特定药理学，每个类别成员之间的重要区别，与其所影响的器官系统相关的风险和益处，以及它们在治疗中使用的疾病。

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.)



This course will adopt a combination of didactic and discussion formats, which aim to encourage students' participation in the critical assessment of some of the existing principles and theories. Specifically, the students will be assigned to groups to discuss and present on one pertinent topic at the end of each lecture session.

Lectures (each lecture lasts 2 hours).

1.Introduction to pharmacology

Properties of ideal drugs; pharmacology history; drug discovery process and administrations.

2.Brief Introduction to human anatomy

The five levels of anatomy (atomic to organismic), the eleven anatomical systems; Homeostasis control.

3.Pharmacokinetics

Route of administration; factors affecting absorption (Drug properties vs host properties); Drug distribution and reservoirs.

4.Pharmacokinetics (continued)

Metabolism, and excretion. Volume of distribution, half-life, Bioavailability

5.Pharmacodynamics

Drug receptor classes; Signaling pathways;EC50; LD50; Therapeutic Window

6.Introduction to autonomic pharmacology, cholinergic and anti-cholinergic drugs

Sympathetic vs parasympathetic nervous system; Cholinergic neurotransmitters; Cholinergic receptor subclasses; Targetable pathways in the cholinergic system; Cholino-mimic and anti-Cholinergic drugs

7.Adrenergic and anti-adrenergic drugs

Sympathetic vs parasympathetic nervous system; Adrenergic neurotransmitters; Adreceptor subclasses;Targetable pathways in the adrenergic system; Adrenergic and anti-Adrenergic drugs

8.Introduction to CNS pharmacology, sedatives, hypnotics

Mechanisms of signal propagation in the CNS; Methods for studying CNS pharmacology; Central Neurotransmitters; Sedative-hypnotic drug subclasses;

9.Project based learning: case study of blockbuster drugs (Aspirin, Isoproterenol, acetaminophen)

10.Antipsychotics and antidepressants

Psychotic symptoms; Hypotheses of Schizophrenia; Anti-psychotic agents;

Pathophysiology of depression; Basic and emerging pharmacology of anti-depressants

11.Opioid analgesics and drugs of abuse

History of opioid use. Opioid receptor discovery and subclasses; Opioid analgesics; Pleasure response neural circuits; Classification of addictive drugs; Pharmacology of addictive drugs.

Midterm Exam

12. Antiseizure drugs and anesthetics

The nature and pathophysiology seizure/epilepsy; Pharmacology of antiseizure drugs; General vs Local Anesthetics, and different drug classes within each group.

13. drugs for neurodegenerative diseases

Major neurodegenerative syndromes; Pharmacology of antiseizure drugs; General vs Local Anesthetics, and different drug classes within each group.

14. Antihypertensive and vasodilatory agents

The cause of hypertension; Baroreceptor control; Sites of action of hypertensive drugs; Classification and pharmacology of each hypertensive drug families.

15. Drugs used in heart failure and cardiac arrhythmias

The causes and vicious cycle of heart failure; Pharmacologic agents and their mechanism of actions; Categories of arrhythmia and the underlying cardiac electrophysiology; Pharmacologic actions of anti-arrhythmic drugs.

16. Cancer Chemotherapy I

The hallmarks of cancer. Alkylating agents, Antimetabolites; Signal transduction inhibitors, Anti-angiogenic drugs and antitumor antibiotics.

17. Cancer Immunotherapy (continued)

Monoclonal antibodies; biological response modifiers; PD-L1, CAR-T

18. Immunopharmacology I

Major steps in immune responses; immune suppressors, immune boosters; immunodeficiency diseases; HIV drug discovery

19. Pancreatic hormone and anti-diabetic drugs

Pancreatic secretory products; Diabetes: classification and disease mechanisms; Treatment of type II diabetes: insulin mimic, insulin secretagogues; insulin sensitizers; alpha-glucosidase inhibitors and peptide analogs.

20. Project Based Learning: case study of Thalidomide, PD-L1 antibodies, Metformin,

21. Review for Final Exam

Revision and Q & A

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

Required Texts: None.

We recommend "Basic and Clinical Pharmacology" by Katzung (McGraw Hill Lange, 13th Edition, 2012), which covers 80% of the content taught in this course. The textbook serve as a source for clarification and elaboration and for more detail on specific drugs not covered in this course. Handouts in PowerPoint form will be provided before each lecture. The students are expected to review the relevant physiological and biochemical principles prior to each lecture.

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				
小测验 Quiz				
课程项目 Projects				
平时作业 Assignments				
期中考试 Mid-Term Test		30		
期末考试 Final Exam		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)	Presentation	20		

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

本课程经生物系本科教学指导委员会审议通过。
 This Course has been approved by Undergraduate Teaching Steering Committee of Department of Biology.