

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 | 神经胶质细胞生物学 Glia Biology | | | | |
| 2. | 授课院系 Originating Department | 生物系 Department of Biology | | | | |
| 3. | 课程编号 Course Code | BIO325 | | | | |
| 4. | 课程学分 Credit Value | 2 | | | | |
| 5. | 课程类别 Course Type | 专业选修课（生物科学、生物技术、生物信息学专业） Major Elective Courses(Biological Sciences, Biotechnology, Bioinformatics Majors) | | | | |
| 6. | 授课学期 Semester | 秋季 Fall | | | | |
| 7. | 授课语言 Teaching Language | 英文 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) | 生物系 Department of Biology 肖波；手机：18960201822 Xiao Bo, Cell phone: 189-806-01822 Email: xiaob@sustc.edu.cn | | | | |
| 9. | 实验员/助教、所属学系、联系方式 Tutor/TA(s), Contact | 无 NA / 待公布 To be announced / 已确定的实验员/助教联系方式 Please list all Tutor/TA(s) (请保留相应选项 Please only keep the relevant information) | | | | |
| 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 |
| | 学时数 Credit Hours | 32 | | | | |

| | |
|--|------------------------------------|
| 12. 先修课程、其它学习要求 Pre-requisites or Other Academic Requirements | BIO103 生物学原理 Principles of Biology |
| 13. 后续课程、其它学习规划 Courses for which this course is a pre-requisite | 无 None |
| 14. 其它要求修读本课程的学系 Cross-listing Dept. | 无 None |

教学大纲及教学日历 SYLLABUS

15. 教学目标 Course Objectives

课程结束时，学生应能理解：1)理解神经胶质细胞在大脑功能中的作用；2)对大脑中多种神经胶质细胞的基本功能进行定义；3)概述神经元和神经胶质细胞之间的“交流”方式；4)概述神经胶质细胞生物学中的疾病发病机制；5)概述神经胶质发育过程中细胞及分子水平上的重要事件。

After completing this course, students should be able to 1) appreciate the importance of glia in brain function; 2) define the basic functions of each type of glia in the brain; 3) describe the basic modes of the “cross-talk” between neurons and glia; 4) describe the disease processes (pathogenesis) involving glia biology; and 5) describe the major cellular and molecular events underlying glia development.

16. 预达学习成果 Learning Outcomes

80%的学生可以完成上述教学目标

80% of the class participants will achieve the objectives outlined above.

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.)**

单元 1：神经胶质与大脑：绪论（授课）

Unit 1: Glia and Brain: General Considerations (Lecture)

第一周：课程简介和细胞间相互作用概述。

Week 1: Course introduction and overview of cell-to-cell interactions.

第二周：中枢神经系统和周围神经系统的多种细胞类型；神经血管单位和血脑屏障

Week 2: Multiple cell types in the central and peripheral nervous systems; Neurovascular unit and blood brain barrier.

单元 2：星形胶质细胞生物学（授课）

Unit 2: Astrocyte Biology (Lecture)

第三周：星形胶质细胞的生物学功能：

在神经元能量代谢中的作用

在神经元修复中的作用

Week 3: Biological functions of astrocytes

In neuronal energy metabolism

In neural repair

第四周：神经胶质细胞与神经递质

Week 4: Astrocytes and neurotransmitters

单元 3：少突胶质细胞生物学（授课）

Unit 3: Oligodendrocyte Biology (Lecture)

第五周：少突胶质细胞的生物学功能：

在轴突的髓鞘形成中的作用

对轴突的营养支持作用

Week 5: The biological functions of oligodendrocytes

Myelination of axons

Trophic support to axons

第六周：少突胶质细胞（OL）的形成：

少突胶质细胞分化过程中的重要事件

少突胶质细胞分化过程中的分子调控机制

Week 6: The formation of oligodendrocytes (OL)

Major events in OL differentiation

Molecular control of OL differentiation

第七周：少突胶质细胞与神经退行性疾病：

少突胶质细胞功能障碍在神经退行性疾病中的概述

阿尔茨海默病（AD）与异常少突胶质细胞的生物学关系

Week 7: Oligodendrocytes and neurodegeneration

Overview of oligodendrocyte dysfunction in neurodegeneration

Aberrant oligodendrocyte biology in Alzheimer's disease (AD)

第八周：中枢神经系统中的髓鞘再生：

综述髓鞘脱失与再生

用遗传学手段建立脱髓鞘小鼠模型

Week 8: Remyelination in the CNS: from biology to therapy

General considerations of demyelination and remyelination

Genetic approaches to demyelination in mouse models

第九周：星形胶质细胞与少突胶质细胞的相互作用

星形胶质细胞在髓鞘形成中的作用

介导星形胶质细胞与少突胶质细胞间相互交流的分子

Week 9: Astrocyte-oligodendrocyte interactions

The role of astrocytes in myelination

Molecules that mediate the cross-talk between astrocytes and oligodendrocytes

单元 4：逐渐被重视的小胶质细胞（授课）

Unit 4: Rise of Microglia (Lectures)

第十周：小胶质细胞-大脑中的免疫细胞

起源

小胶质细胞的分子生物学

Week 10: Microglia—immune cells in the brain

Origin

Molecular biology of microglia

第十一周：小胶质细胞在神经元发育和突触功能中的作用

Week 11: Microglia in neuronal development and synaptic function

第十二周：小胶质细胞与神经元发育之间的研究

Week 12: Readings on microglia and neuronal development

第十三周：小胶质细胞与脑发育疾病

小胶质细胞在精神分裂症和自闭症中的作用

Week 13: Microglia and developmental brain disease

Microglia in Schizophrenia and Autism

第十四周：以小胶质细胞为靶点治疗阿尔茨海默病

小胶质细胞在阿尔茨海默病发病机制中的作用

以小胶质细胞为靶点介入治疗

Week 14: Targeting microglia for the treatment of Alzheimer's disease

Microglia in AD pathogenesis

Therapeutic interventions targeting microglia

第十五周：小胶质细胞与疼痛

胶质细胞（星形胶质细胞和小胶质细胞）在疼痛感中的作用

参与慢性疼痛的细胞因子

Week 15: Glia and pain

The role of glia (astrocytes and microglia) in pain sensation.

Cytokines involved in chronic pain.

第十六周：血脑屏障形成中胶质细胞与神经元的相互作用

大脑功能障碍与血脑屏障、疾病和药物开发

血脑屏障形成中的细胞相互作用

Week 16: Glia-Neuron interactions in blood-brain-barrier formation

Blood-brain-barrier, disease and drug development for brain disorders



Cellular interactions in the blood-brain-barrier formation.

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

《Glial Neurobiology: A Textbook》, 2007, Author(s): Alexei Verkhratsky, Arthur Butt

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 | | 15 | | |
| 课堂表现 Class Performance | | 10 | | |
| 小测验 Quiz | | | | |
| 课程项目 Projects | | | | |
| 平时作业 Assignments | | 25 | | |
| 期中考试 Mid-Term Test | | 25 | | |
| 期末考试 Final Exam | | 25 | | |
| 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)

| | | | |
|--|--|--|--|
| | | | |
|--|--|--|--|

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.

