Brain and Neuroscience

Special Subjects
Elective 2 credit

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1. Course Description

Students will study the structure of brain, function of neuron and glial cells, which constitute a nervous system, including neural circuit based on synapses. Furthermore, the lecture will provide neuropathlogy of brain diseases and several current topics on neuroscience, including animal model for brain disease and regenerative medicine. In this lecture, students will acquire knowledge and train comprehensive thinking skill on DP1,DP2 and DP3.

2. Course Objectives

Neurobiology is the study of operating principles of nervous system. The goal of this lecture is to understand the structure of brain including neural circuit, higher brain function, and brain diseases such as neurodegenerative disease and developmental disorders. Students can understand technical terms, describe their contents, and verbally explain them. Students can understand abstracts and diagrams of the original English papers and explain them verbally.

3. Grading Policy

Evaluation is comprehensively conducted based on the presentation of the issues in the lecture (approximately 70%) and the issue report (approximately 30%). The report will be returned after scoring.

4. Textbook and Reference

Textbook
坂井建雄、久光正監修　脳の辞典
　成美堂出版（ISBN 978-4-415-30999-6）
Reference
真鍋俊也、森寿、渡辺雅彦、岡野栄之、宮川剛編集　脳神経科学イラストレイテッド（第3版）　羊土社（ISBN 978-4-7581-2040-1）
渡辺雅彦著　脳神経ペディア　羊土社（ISBN 978-4-7581-2082-1）

5. Requirements(Assignments)

Since English original papers and reviews are used, you will need a dictionary.

6. Note

Distribute the prints if necessary.

7. Schedule

[1] Chapter 1. Introduction of neurobiology

[2] Chapter 2. Structure of brain 1: Basic structure of brain (cerebrum, cerebellum, hippocampus, striatum)
Textbook; P8-P13, P66-P67, P76-P79

[3] Chapter 3. Structure of brain 2: Neural cells(neurons and glial cells)
Textbook; P20-P21, P28-P29

[4] Chapter 4. Structure of brain 3: Structure and function of synapses
Textbook; P22-P27

[5] Chapter 5. Molecular mechanism of neuronal signal transduction: excitatory synapse and inhibitory synapse

[6] Chapter 6. Development of brain: Neuronal migration and laminar formation
Textbook; P16-P19, P30-P37

[7] Chapter 7. Molecular mechanism of neuronal maturation: Formation and pruning of synapses

[8] Chapter 8. Molecular mechanism of neuronal plasticity: Role of synaptic molecules
Textbook; P110-P123

[9] Chapter 9. Higher brain function 1: Recognition, perception, learning and memory
Textbook; P110-P123

[10] Chapter 10. Higher brain function 2: Esthesiohysiology in brain
Textbook; P90-P107

[11] Chapter 11. Higher brain function 3: Exercise physiology in brain
Textbook; P46-P51, P80-P89

[12] Chapter 12. Higher brain function 4: Mental biology in brain
Textbook; P124-P133

[13] Chapter 13. Brain disease 1: Neurodegenerative disease and cerebrovascular disease
Textbook; P146-P155

[14] Chapter 14. Brain disease 2: Developmental disorder and mental disorder
Textbook; P156-P161

[15] Chapter 15. Current topics on neuroscience: Animal model for brain disease and regenerative medicine