

2026 Akita University Faculty of Medicine Syllabus

Category	: 基礎医学 III
Course Title	: Neuroscience and Organ function I - 神経科学・各臓器の機能・運動生理学・感覚生理学・自律神経科学 -
Eligible Students	: grade 2 Related Course
Code	: 71563012
Schedule	: week 1 ~ week 12
Credits	: 4

1. Lead Instructor

Tomohiro Numata (Professor, Department of Integrative Physiology, 6272, Office Hour: By appointment)

Takafumi Miki (Professor, Department of Cell Physiology, 6069, Office Hour: By appointment)

2. Instructors

Tomohiro Numata (Professor, Department of Integrative Physiology, 6272, Office Hour: By appointment)

Takafumi Miki (Professor, Department of Cell Physiology, 6069, Office Hour: By appointment)

Yosuke Okamoto (Lecturer, Department of Cell Physiology, 6070)

3. Course Description Outline(Course Objectives)

A deep understanding of the human body's functions is essential to address unknown pathological conditions encountered in clinical practice and to devise appropriate treatments. This understanding begins with a comprehensive grasp of physiological functions at all molecular, cellular, tissue, and systemic levels.

To apply the knowledge from lectures to clinical practice, students will actively explore the fundamental mechanisms underlying various diseases using ICT (information and communication technology) and critically evaluate potential treatment options. This structured approach helps lay the foundation for lifelong learning habits.

To realize evidence-based medicine (EBM), students will engage in international literature searches and data analysis, fostering their scientific curiosity. Moreover, they will develop the ability to understand the knowledge and techniques they discover and communicate them effectively to others. This process strengthens their presentation skills and the communication abilities required for collaboration.

Through these learning activities, students will cultivate a foundation for lifelong learning and establish the fundamental research mindset necessary for future professional endeavors. Additionally, the course includes learning activities focused on professionalism (including trust, integrity, empathy, reflection, and ethics), as well as medical behavioral science, medical safety, healthcare law and systems, and comprehensive decision-making using EBM. Appropriately using ICT is emphasized to build a well-rounded and integrated body of knowledge.

This holistic approach ensures students have the skills and understanding necessary for clinical and research settings.

(1) Be able to provide an overview of the nervous system, from molecules and cells to organs and individuals, including its physiological functions and pathology. (1-1 1-2, 2-1 2-6, 2-8, 3-1 3-7, 4-1 4-7, 5-1 5-4, 6-1 6 -2)

(2) Understand the structure and function of the nerves that form the basis of the nervous system, and based on this, be able to comprehensively outline everything from physiological functions to pathology at each level of the human body. (1-1 1-2, 2-1 2-6, 2-8, 3-1 3-7, 4-1 4-7, 5-1 5-4, 6-1 6 -2)

(3) Understand the normal functions of the central nervous system and its pathology, and be able to explain related diseases and their causes. (1-1 1-2, 2-1 2-6, 2-8, 3-1 3-7, 4-1 4-7, 5-1 5-4, 6-1 6 -2)

- (4) Understand the normal functions of peripheral nerves and their pathology, and be able to explain related diseases and their causes. (1-1 1-2, 2-1 2-6, 2-8, 3-1 3-7, 4-1 4-7, 5-1 5-4, 6-1 6-2)
- (5) Understand the normal function of the autonomic nervous system and its pathology, and be able to explain related diseases and their causes. (1-1 1-2, 2-1 2-6, 2-8, 3-1 3-7, 4-1 4-7, 5-1 5-4, 6-1 6-2)
- (6) Understand the normal function of motor nerves and their pathology, and be able to explain related diseases and their causes. (1-1 1-2, 2-1 2-6, 2-8, 3-1 3-7, 4-1 4-7, 5-1 5-4, 6-1 6-2)
- (7) Understand the normal functions of sensory nerves and their pathology, and be able to explain related diseases and their causes. (1-1 1-2, 2-1 2-6, 2-8, 3-1 3-7, 4-1 4-7, 5-1 5-4, 6-1 6-2)
- (8) Understand the normal functions of environmental physiology and its pathology, and be able to explain related diseases and their causes. (1-1 1-2, 2-1 2-6, 2-8, 3-1 3-7, 4-1 4-7, 5-1 5-4, 6-1 6-2)
- (9) Understand the normal function of skeletal muscles and their pathology, and be able to explain related diseases and their causes. (1-1 1-2, 2-1 2-6, 2-8, 3-1 3-7, 4-1 4-7, 5-1 5-4, 6-1 6-2)
- (10) Understand the normal function of the myocardium and its pathology, and be able to explain related diseases and their causes. (1-1 1-2, 2-1 2-6, 2-8, 3-1 3-7, 4-1 4-7, 5-1 5-4, 6-1 6-2)
- (11) Understand the normal function of smooth muscle and its pathology, and be able to explain related diseases and their causes. (1-1 1-2, 2-1 2-6, 2-8, 3-1 3-7, 4-1 4-7, 5-1 5-4, 6-1 6-2)
- (12) Understand the normal function of the heart and circulation and its pathology, and be able to explain related diseases and their causes. (1-1 1-2, 2-1 2-6, 2-8, 3-1 3-7, 4-1 4-7, 5-1 5-4, 6-1 6-2)
- (13) Understand the normal function of breathing and its pathology, and be able to explain related diseases and their causes. (1-1 1-2, 2-1 2-6, 2-8, 3-1 3-7, 4-1 4-7, 5-1 5-4, 6-1 6-2)
- (14) Learn about related professionalism (trust, honesty, consideration, reflection, ethics), medical behavioral science, medical safety, medical law (system), comprehensive judgment using ENM, and appropriate use of ICT. (1-1 1-2, 3-3, 3-5, 3-7, 4-4)

臨床現場で遭遇する未知の病態に対処して治療法を考案するためには、人体の機能に関する知識が欠かせない。この知識の取得は人体の機能について、分子・細胞・組織・個体に至る各階層の生理機能を包括的に理解することから始まる。講義で得た知識を診療に活かすためには、各疾患の根本的なメカニズムを ICT を駆使して検索し、治療の可能性について主体的に検討する。これらの計画により、生涯を通じて学び続ける習慣の礎が築かれる。EBM を実現するために国際的な文献検索の方法の実践やデータを読み解く体験を通じ、科学的探究心を養う。また自らの発見した知識や技術を理解し、他者に分かりやすく説明するための表現力やその作成過程で生じるコミュニケーション能力を養う。これらの学習を通じて、生涯学習に加えてリサーチマインドの基礎を身につける。また、プロフェッショナリズム（信頼、誠実、思いやり、省察、倫理）医療行動科学、医療安全、医療法（制度）、EBM を活用した総合的に理解するための学習も含め、ICT の適切な活用に焦点を当てて包括的な知識を築き上げる。

ねらい

- (1) 神経系について、分子・細胞から臓器・個体の階層にわたり、神経系の生理機能から病態まで含めて概説することができる。(1-1～1-2, 2-1～2-6, 2-8, 3-1～3-7, 4-1～4-7, 5-1～5-4, 6-1～6-2)
- (2) 神経系の基礎となる神経の構造と機能を理解し、これを基盤にして人体の各階層における生理機能から病態まで含めて包括的に概説することができる。(1-1～1-2, 2-1～2-6, 2-8, 3-1～3-7, 4-1～4-7, 5-1～5-4, 6-1～6-2)
- (3) 中枢神経の正常な機能とその病態を理解し、関連する疾患やその原因について説明することができる。(1-1～1-2, 2-1～2-6, 2-8, 3-1～3-7, 4-1～4-7, 5-1～5-4, 6-1～6-2)
- (4) 末梢神経の正常な機能とその病態を理解し、関連する疾患やその原因について説明することができる。(1-1～1-2, 2-1～2-6, 2-8, 3-1～3-7, 4-1～4-7, 5-1～5-4, 6-1～6-2)
- (5) 自律神経の正常な機能とその病態を理解し、関連する疾患やその原因について説明することができる。(1-1～1-2, 2-1～2-6, 2-8, 3-1～3-7, 4-1～4-7, 5-1～5-4, 6-1～6-2)
- (6) 運動神経の正常な機能とその病態を理解し、関連する疾患やその原因について説明することができる。(1-1～1-2, 2-1～2-6, 2-8, 3-1～3-7, 4-1～4-7, 5-1～5-4, 6-1～6-2)
- (7) 感覚神経の正常な機能とその病態を理解し、関連する疾患やその原因について説明することができる。(1-1～1-2, 2-1

~2-6、2-8、3-1~3-7、4-1~4-7、5-1~5-4、6-1~6-2)

(8) 環境生理の正常な機能とその病態を理解し、関連する疾患やその原因について説明することができる。(1-1~1-2、2-1~2-6、2-8、3-1~3-7、4-1~4-7、5-1~5-4、6-1~6-2)

(9) 骨格筋の正常な機能とその病態を理解し、関連する疾患やその原因について説明することができる。(1-1~1-2、2-1~2-6、2-8、3-1~3-7、4-1~4-7、5-1~5-4、6-1~6-2)

(10) 心筋の正常な機能とその病態を理解し、関連する疾患やその原因について説明することができる。(1-1~1-2、2-1~2-6、2-8、3-1~3-7、4-1~4-7、5-1~5-4、6-1~6-2)

(11) 平滑筋の正常な機能とその病態を理解し、関連する疾患やその原因について説明することができる。(1-1~1-2、2-1~2-6、2-8、3-1~3-7、4-1~4-7、5-1~5-4、6-1~6-2)

(12) 心臓・循環の正常な機能とその病態を理解し、関連する疾患やその原因について説明することができる。(1-1~1-2、2-1~2-6、2-8、3-1~3-7、4-1~4-7、5-1~5-4、6-1~6-2)

(13) 呼吸の正常な機能とその病態を理解し、関連する疾患やその原因について説明することができる。(1-1~1-2、2-1~2-6、2-8、3-1~3-7、4-1~4-7、5-1~5-4、6-1~6-2)

(14) 関連するプロフェッショナルリズム (信頼、誠実、思いやり、省察、倫理) 医療行動科学、医療安全、医療法 (制度) ENM を活用した総合的な判断、ICT の適切な活用について学ぶ。(1-1~1-2、3-3、3-5、3-7、4-4)

4. Textbook/Reference Books

人体の正常構造と機能
スタンフォード神経生物学
カンデル神経科学

5. Assessment

Attendance, reports and exams.

To be eligible for the common examination, students must attend at least two-thirds of the lectures in each course.

出席状況、レポート及び試験

ただし、統一試験の受験資格は、各講座の講義について出席率が 2/3 以上であることを要件とする。

6. Out of Class Study/Message

- Proceed with lectures according to designated textbooks and handouts.
- The designated textbook should be prepared by the first day of the course.
- Slight changes may occur depending on the schedule of the instructor.

- 指定教科書及び配布資料に沿って講義を進める。
- 指定教科書は事前に指示するので、講義初日までに用意し、予習して受講すること。
- 担当教員の予定により、若干変更する場合がある。

Topics and Contents of class, Course Objectives						
	Class Date	Period	Class Format	Topics and Contents of class, Course Objectives	Instructors	Class Room
1	4/6 (Mon)	1-2	Lecture	<p>Theme: Orientation and Introduction to Physiology Content: How to study physiology (multi-level integration, homeostasis, feedback); linking basic physiology to clinical reasoning; effective study cycle (pre-class lecture review practice). Learning Objectives:</p> <ol style="list-style-type: none"> 1.Explain, using examples, why physiology provides the basis for clinical reasoning and treatment decisions. 2.Illustrate and explain homeostasis and negative/positive feedback control. 3.Develop a personal learning plan for this course (preparation, review, information search, summarization). 	Tomohiro Numata	第2講義室
2	4/6 (Mon)	3-4	Lecture	<p>Theme: Nervous System Overview (1) Introduction of the nervous system Content: Overview of central, peripheral, and autonomic nervous systems; neurons and glia; basic architecture of information processing. Learning Objectives:</p> <ol style="list-style-type: none"> 1.Diagram the organization of the CNS and PNS and summarize their roles. 2.Compare functions of neurons and glial cells in signaling, metabolic support, and homeostatic maintenance. 	Tomohiro Numata	第2講義室
3	4/6 (Mon)	5-6	Lecture	<p>Theme: Nervous System Overview (2) The membrane potential of biological membrane 1 Content: Intra-/extracellular ion composition; osmolality; determinants of resting membrane potential (gradients, permeability, pumps). Learning Objectives:</p> <ol style="list-style-type: none"> 1.Explain major ionic compositions of intracellular and extracellular fluids and the meaning of osmolality. 2.Explain how resting membrane potential is established (diffusion, selective permeability, Na/K pump). 	Tomohiro Numata	第2講義室
4	4/6 (Mon)	7-8	Lecture	<p>Theme: Nervous System Overview (3) The membrane potential of biological membrane 2 Content: Factors determining membrane potential; equilibrium potential and driving force; excitability and changes in membrane voltage. Learning Objectives:</p> <ol style="list-style-type: none"> 1.Explain membrane potential changes in terms of equilibrium potential and driving force. 2.Predict, at a basic level, how changes such as serum K; alterations affect membrane potential and excitability. 	Tomohiro Numata	第2講義室

Topics and Contents of class, Course Objectives						
	Class Date	Period	Class Format	Topics and Contents of class, Course Objectives	Instructors	Class Room
5	4 / 6 (Mon)	9-10	Lecture	<p>Theme: Nervous System Overview (4) Action potential1</p> <p>Content: Phases of the action potential (depolarization, repolarization, hyperpolarization); voltage-gated channels; refractory periods.</p> <p>Learning Objectives:</p> <p>1.Explain each phase of the action potential with reference to opening/closing of key ion channels.</p> <p>2.Explain the significance of refractory periods in one-way propagation and limits on firing frequency.</p>	Tomohiro Numata	第 2 講義室
6	4 / 7 (Tue)	1-2	Lecture	<p>Theme: Nervous System Overview (5) Action potential2</p> <p>Content: Continuous vs saltatory conduction; myelinated vs unmyelinated axons; determinants of conduction velocity.</p> <p>Learning Objectives:</p> <p>1.Explain why myelinated and unmyelinated axons conduct differently based on structure (myelin, nodes of Ranvier).</p> <p>2.Identify factors that determine conduction velocity (axon diameter, myelination, etc.).</p>	Tomohiro Numata	第 2 講義室
7	4 / 7 (Tue)	3-4	Lecture	<p>Theme: Nervous System Overview (6) Mechanism of nerve excitation and conduction</p> <p>Content: Electrical vs chemical transmission; synaptic transmission; excitatory vs inhibitory signaling; neuromuscular junction.</p> <p>Learning Objectives:</p> <p>1.Describe the sequence of chemical synaptic transmission (release reception termination).</p> <p>2.Explain EPSPs vs IPSPs in terms of receptors and ionic currents.</p> <p>3.Explain the neuromuscular junction and outline examples of pharmacological interventions.</p>	Tomohiro Numata	第 2 講義室
8	4 / 7 (Tue)	5-6	Lecture	<p>Theme: Introduction to muscles, skeletal muscle (1)</p> <p>(1) Explain the excitation-contraction coupling of skeletal muscle. (2) Explain the mechanism of contractile force regulation of skeletal muscle.</p> <p>(1) 骨格筋の興奮収縮連関について説明できる。 (2) 骨格筋の収縮力調節の仕組みを説明できる。</p>	Takafumi Miki	第 2 講義室
9	4 / 7 (Tue)	7-8	Lecture	<p>Theme: Skeletal muscle (2)</p> <p>(1) Explain the excitation-contraction relationship of skeletal muscles. (2) Explain the mechanism of skeletal muscle contractility regulation.</p> <p>(1) 骨格筋の興奮収縮連関について説明できる。(2) 骨格筋の収縮力調節の仕組みを説明できる。</p>	Takafumi Miki	第 2 講義室
10	4 / 7 (Tue)	9-10	Lecture	<p>Theme: Skeletal muscle (3)</p> <p>Explain the mechanism of neuromuscular transmission.</p> <p>神経筋伝達の仕組みについて説明できる。</p>	Takafumi Miki	第 2 講義室

Topics and Contents of class, Course Objectives						
	Class Date	Period	Class Format	Topics and Contents of class, Course Objectives	Instructors	Class Room
11	4/8 (Wed)	1-2	Lecture	Theme: Skeletal muscle (4) Learn about typical diseases related to skeletal muscle and neuromuscular transmission. 骨格筋及び神経筋伝達に関連する代表的な疾患について学ぶ。	Takafumi Miki	第2講義室
12	4/8 (Wed)	3-4	Lecture	Theme: Cardiac muscle (1) Explain the structure and contraction of the myocardium. 心筋の構造と収縮について説明できる。	Takafumi Miki	第2講義室
13	4/8 (Wed)	5-6	Lecture	Theme: Nervous System Overview (7) Ion channels and diseases Content: Ion channel classes and functions; channelopathies and disease mechanisms; synaptic plasticity. Learning Objectives: 1.Compare voltage-gated and ligand-gated ion channels. 2.Outline the concept of channelopathies using representative examples and associated symptoms. 3.Explain basic concepts of synaptic plasticity (LTP/LTD).	Tomohiro Numata	第2講義室
14	4/8 (Wed)	7-8	Lecture	Theme: Nervous System Overview (8): Cerebral Blood Supply Content: Major cerebral arteries; relation to functional localization; neurovascular coupling. Learning Objectives: 1.Outline major cerebral arterial territories and possible clinical symptoms of vascular lesions. 2.Explain the concept of the neurovascular unit.	Tomohiro Numata	第2講義室
15	4/8 (Wed)	9-10	Lecture	Theme: Nervous System Overview (9): Neurotransmitters and Neural Transmission Content: Major neurotransmitters and receptors; termination mechanisms; review of neuromuscular transmission and clinical linkage. Learning Objectives: 1.Match major neurotransmitters with their receptors and explain excitatory/inhibitory actions. 2.Explain termination mechanisms (reuptake, enzymatic degradation, etc.). 3.Summarize key points of neuromuscular transmission and outline typical symptoms when disrupted.	Tomohiro Numata	第2講義室
16	4/10 (Fri)	1-2	Lecture	Theme: Central nervous system (1): Cerebral Cortex; Structure and Function Content: Cortical layers; functional localization (motor, sensory, association areas); cortical networks. Learning Objectives: 1.Explain major cortical regions and their functions. 2.Outline basic symptoms based on lesion location (motor deficits, aphasia, etc.).	Tomohiro Numata	第2講義室

Topics and Contents of class, Course Objectives						
	Class Date	Period	Class Format	Topics and Contents of class, Course Objectives	Instructors	Class Room
17	4 / 10 (Fri)	3-4	Lecture	<p>Theme: Central nervous system(2): Cerebral Cortex&#8212;Higher Functions and Plasticity Content: Language function; hemispheric dominance; sex/individual differences; plasticity and rehabilitation concepts. Learning Objectives:</p> <p>1.Outline language-related cortical areas and basic types of aphasia. 2.Explain hemispheric specialization and dominance. 3.Explain neural plasticity as a framework for learning and functional recovery.</p>	Tomohiro Numata	第 2 講義室
18	4 / 10 (Fri)	5-6	Lecture	<p>Theme: Cardiac muscle (2) (1) Explain the excitation-contraction coupling of cardiac muscle. (2) Explain the mechanism of contractile force regulation of cardiac muscle.</p> <p>(1) 心筋の興奮収縮連関について説明できる。 (2) 心筋の収縮力調節について学ぶ。</p>	Takafumi Miki	第 2 講義室
19	4 / 10 (Fri)	7-8	Lecture	<p>Theme: Cardiac muscle (3) Explain the electrical activity of cardiac muscle. 心筋の電気活動について説明できる。</p>	Takafumi Miki	第 2 講義室
20	4 / 10 (Fri)	9-10	Lecture	<p>Theme: Smooth muscle (1) Learn the structure and the mechanism of contraction of smooth muscle. 平滑筋の構造と収縮の仕組みを学ぶ。</p>	Takafumi Miki	第 2 講義室
21	4 / 13 (Mon)	1-2	Lecture	<p>Theme: Smooth muscle (2) (1) Learn about smooth muscle contraction regulation by physiologically active substances. (2) Explain the structure and function of skeletal muscle, myocardium, and smooth muscle in comparison. (1) 生理活性物質による平滑筋収縮調節について学ぶ。 (2) 骨格筋、心筋、平滑筋の構造と機能を対比して説明できる。</p>	Takafumi Miki	第 2 講義室
22	4 / 13 (Mon)	3-4	Lecture	<p>Theme: Heart/Circulation (1) - Structure of the heart and circulatory system (1) Explain the structure of the heart. (2) Explain the features of blood vessels / nerves and coronary arteries distributed in the heart and their distribution areas. (3) Explain systemic circulation and pulmonary circulation. (4) The aorta and major branches (head and neck, upper limbs, chest, abdomen, lower limbs) can be illustrated to outline the distribution area. (1) 心臓の構造を説明できる。 (2) 心臓に分布する血管・神経、冠動脈の特長とその分布域を説明できる。 (3) 体循環と肺循環を説明できる。 (4) 大動脈と主な分枝(頭頸部、上肢、胸部、腹部、下肢)を図示し、分布域を概説できる。</p>	Takafumi Miki	第 2 講義室

Topics and Contents of class, Course Objectives						
	Class Date	Period	Class Format	Topics and Contents of class, Course Objectives	Instructors	Class Room
23	4 / 13 (Mon)	5-6	Lecture	<p>Theme: Central nervous system (3): Brainstem Content: Midbrain, pons, medulla; cranial nerve nuclei; vital functions. Learning Objectives:</p> <ol style="list-style-type: none"> 1. Describe subdivisions of the brainstem and their major functions. 2. Outline possible symptoms due to brainstem lesions (consciousness, respiration/circulation, cranial nerve signs). 	Tomohiro Numata	第 2 講義室
24	4 / 13 (Mon)	7-8	Lecture	<p>Theme: Central nervous system (4): Brainstem and Cerebellum Content: Cerebellar functions (motor coordination, learning); vestibular linkage; basic features of ataxia. Learning Objectives:</p> <ol style="list-style-type: none"> 1. Explain the role of the cerebellum in motor control. 2. Outline typical signs of cerebellar dysfunction (e.g., ataxia). 	Tomohiro Numata	第 2 講義室
25	4 / 13 (Mon)	9-10	Lecture	<p>Theme: Central nervous system (5): Neural Pathways I Content: Fundamentals of ascending/descending pathways; corticospinal tract; dorsal column&#8211;medial lemniscus; spinothalamic tract. Learning Objectives:</p> <ol style="list-style-type: none"> 1. Explain major motor and sensory pathways using simplified diagrams. 2. Explain how pathway differences correspond to sensory modalities (touch/pressure vs pain/temperature). 	Tomohiro Numata	第 2 講義室
26	4 / 14 (Tue)	1-2	Lecture	<p>Theme: Central nervous system (6): Neural Pathways II (Lesion Localization Basics) Content: Integration of pathways and localization; basic logic of lesion-side determination (laterality, decussation). Learning Objectives:</p> <ol style="list-style-type: none"> 1. Explain decussation and the relationship between lesion side and symptoms. 2. Use basic case descriptions to propose likely lesion levels (brain vs spinal cord). 	Tomohiro Numata	第 2 講義室
27	4 / 14 (Tue)	3-4	Lecture	<p>Theme: Central nervous system (7): Sleep, Wakefulness, Memory, and Learning Content: Sleep stages; arousal systems; circadian rhythms; memory classification and neural bases; learning and plasticity. Learning Objectives:</p> <ol style="list-style-type: none"> 1. Explain basic mechanisms of sleep/wake regulation and the concept of circadian rhythms. 2. Outline major categories of memory and related brain regions. 3. Provide a basic conceptual framework for sleep and memory disorders. 	Tomohiro Numata	第 2 講義室

Topics and Contents of class, Course Objectives						
	Class Date	Period	Class Format	Topics and Contents of class, Course Objectives	Instructors	Class Room
28	4 / 14 (Tue)	5-6	Lecture	Theme: Heart/Circulation (2) - Physics of circulatory physiology Explain the basics of cardiovascular physiology, such as Ohm's law and Poiseuille's law. オームの法則やポアズイユの法則等、循環生理学の基本事項について説明できる。の基本事項について説明できる。	Takafumi Miki	第2講義室
29	4 / 14 (Tue)	7-8	Lecture	Theme: Heart/Circulation (3) - Electrical activity of the myocardium (1) Explain the electrical activity of the myocardium (2) Explain the action potential and automaticity of the myocardium. (1) 心筋の電気活動について説明できる。 (2) 心筋の活動電位及び自動能について説明できる。	Takafumi Miki	第2講義室
30	4 / 14 (Tue)	9-10	Lecture	Theme: Heart/Circulation (4) - Electrical activity of the myocardium (1) Explain the physiological significance of each waveform of the body surface electrocardiogram (ECG). (2) Explain the relationship between ECG and the action potential of cardiac myocytes. (3) Heart rate and rhythm abnormalities can be read from ECG. (1) 体表面心電図の各波形の生理的意義を説明できる。 (2) 体表面心電図と活動電位との関係について説明できる。 (3) 体表面心電図から、心拍数及びリズム異常を読み取ることができる。	Takafumi Miki	第2講義室
31	4 / 15 (Wed)	1-2	Lecture	Theme: Heart/Circulation (5) - ECG exercises (1) From the actual ECG, the heart rate, atrioventricular conduction time, intraventricular conduction time, cardiac electrical axis, etc. can be read. (2) Be able to outline arrhythmia. (3) Be able to outline abnormal electrocardiograms (sinus arrhythmia, extra systoles, atrioventricular conduction disorders). (1) 実際の心電図から、心拍数、房室伝導時間、心室内伝導時間、心臓電気軸等を読み取ることができる。 (2) 不整脈について概説できる。 (3) 異常心電図(洞性不整脈、期外収縮、房室伝導障害)について概説できる。	Takafumi Miki	第2講義室
32	4 / 15 (Wed)	3-4	Lecture	Theme: Heart/Circulation (6) - Pump function of the heart 1 (1) Learn about the pump function of the heart. (2) Explain hemodynamics (changes in atrial pressure, atrial volume, ventricular pressure, ventricular volume, aortic pressure, aortic blood flow, capillary pressure, venous pressure, etc.) associated with the cardiac cycle. (1) 心臓のポンプ作用について学ぶ。(2) 心周期にともなう血行動態(心房圧、心房容量、心室圧、心室容量、大動脈圧、大動脈血流、毛細血管圧、静脈圧、等の変化)を説明できる。	Takafumi Miki	第2講義室

Topics and Contents of class, Course Objectives						
	Class Date	Period	Class Format	Topics and Contents of class, Course Objectives	Instructors	Class Room
33	4 / 15 (Wed)	5-6	Lecture	<p>Theme: Central nervous system (8): Epilepsy and Dementia</p> <p>Content: Overview of seizure mechanisms; major dementia subtypes; neurodegeneration concepts.</p> <p>Learning Objectives:</p> <ol style="list-style-type: none"> 1.Explain the basic concept of epilepsy (abnormal excitation and synchronization). 2.List major dementia subtypes and outline their features. 3.Outline the physiological targets of treatments (e.g., anti-seizure drugs) at a conceptual level. 	Tomohiro Numata	第 2 講義室
34	4 / 15 (Wed)	7-8	Lecture	<p>Theme: Central nervous system (9): Limbic System</p> <p>Content: Limbic structures (amygdala, hippocampus); emotion and motivation; linkage to stress responses.</p> <p>Learning Objectives:</p> <ol style="list-style-type: none"> 1.Explain key limbic structures and their roles in emotion and memory. 2.Outline stress response as an integrated neuroendocrine framework. 	Tomohiro Numata	第 2 講義室
35	4 / 15 (Wed)	9-10	Lecture	<p>Theme: Central nervous system (10): Hypothalamus</p> <p>Content: Hypothalamic functions (autonomic, endocrine, thermoregulation, feeding, water balance); integration of homeostasis.</p> <p>Learning Objectives:</p> <ol style="list-style-type: none"> 1.Explain hypothalamic homeostatic functions using concrete examples (temperature, feeding, etc.). 2.Describe, at a basic level, how autonomic and endocrine responses are integrated. 	Tomohiro Numata	第 2 講義室
36	4 / 17 (Fri)	1-2	Lecture	<p>Theme: CNS Pathophysiology (2): Neurodegenerative Disorders II</p> <p>Content: General concepts of neurodegeneration; pathology, symptoms, and progression of Alzheimer 's disease.</p> <p>Learning Objectives:</p> <ol style="list-style-type: none"> 1.Explain core concepts of neurodegenerative diseases (selective vulnerability, progressive course). 2.Outline major pathology and clinical features of Alzheimer 's disease. 	Tomohiro Numata	第 2 講義室
37	4 / 17 (Fri)	3-4	Lecture	<p>Theme: CNS Pathophysiology (1): Alzheimer 's Disease and Neurodegeneration I</p> <p>Content: Overview of other major neurodegenerative disorders.</p> <p>Learning Objectives:</p> <ol style="list-style-type: none"> 1.List major neurodegenerative disorders and outline differences in clinical features. 2.Explain basic diagnostic perspectives (symptom combinations and progression patterns). 	Tomohiro Numata	第 2 講義室

Topics and Contents of class, Course Objectives						
	Class Date	Period	Class Format	Topics and Contents of class, Course Objectives	Instructors	Class Room
38	4 / 17 (Fri)	5-6	Lecture	Theme: Heart/Circulation (7) - Pump function of the heart2 (1) Explain the Starling law of the heart. (2) Explain the preload and afterload. (3) Explain the relationship between cardiac output and heart rate, cardiac contractility, preload, and afterload. (1) 心臓のスターリングの法則について説明できる。 (2) 前負荷、後負荷について説明できる。 (3) 心拍出量と心拍数、心収縮性、前負荷、後負荷との関係について説明できる。	Takafumi Miki	第 2 講義室
39	4 / 17 (Fri)	7-8	Lecture	Theme: Heart/Circulation (8) - Pump function of the heart3 (1) Explain the regulation mechanism of cardiac contractile force. (2) Explain the autonomic nervous system's effect on cardiac output. (1) 心臓収縮力の調節機構について説明できる。 (2) 心拍出量への自律神経の作用を説明できる。	Takafumi Miki	第 2 講義室
40	4 / 17 (Fri)	9-10	Lecture	Theme: Heart/Circulation (9) - Pump function of the heart4 Explain the pathophysiology using the cardiac output curve and venous return curve. 心拍出量曲線と静脈還流量曲線から病態を理解できる。	Takafumi Miki	第 2 講義室
41	4 / 20 (Mon)	1-2	Formative assesment	Theme: Formative assessment		第 2 講義室
42	4 / 20 (Mon)	3-4	Formative assesment	Theme: Formative assessment		第 2 講義室
43	4 / 20 (Mon)	5-6	Self learning	Theme:		
44	4 / 20 (Mon)	7-8	Self learning	Theme:		
45	4 / 20 (Mon)	9-10	Self learning	Theme:		
46	4 / 21 (Tue)	1-2	Lecture	Theme: Respiration (1) - Structure of respiratory system (1) Explain the structure of the airway, the lobe of lung, lung area and the hilum. (2) Explain the difference between pulmonary circulation and systemic circulation. (3) Explain the structure of the mediastinum and pleural space. (1) 気道の構造、肺葉・肺区域と肺門の構造を説明できる。 (2) 肺循環と体循環の違いを説明できる。 (3) 縦隔と胸膜腔の構造を説明できる。	Yosuke Okamoto	第 2 講義室

Topics and Contents of class, Course Objectives						
	Class Date	Period	Class Format	Topics and Contents of class, Course Objectives	Instructors	Class Room
47	4 / 21 (Tue)	3-4	Lecture	Theme: Respiration (2) - The mechanics of lung ventilation (1) Explain the kinds of respiratory muscles and the mechanism of respiratory movements. (2) Explain the pulmonary volume fraction. (3) Explain pulmonary ventilation, dead space, lung compliance, airway resistance, and closing volume. (1) 呼吸筋と呼吸運動の機序を説明できる。 (2) 肺気量分画を説明できる。 (3) 換気、死腔、肺コンプライアンス、気道抵抗、クロージングボリュームを説明できる。	Yosuke Okamoto	第 2 講義室
48	4 / 21 (Tue)	5-6	Lecture	Theme: Peripheral Nervous System: Spinal Nerves and Plexuses Content: Spinal nerves; nerve plexuses; dermatomes; approach to peripheral neuropathy. Learning Objectives: 1.Explain the basic organization of spinal nerves and plexuses. 2.Explain dermatomes and apply them to localization of sensory deficits.	Tomohiro Numata	第 2 講義室
49	4 / 21 (Tue)	7-8	Lecture	Theme: Autonomic Nervous System (1): Organization and Function Content: Sympathetic/parasympathetic organization (pre-/post-ganglionic); target organs; reflexes and homeostasis. Learning Objectives: 1.Explain basic sympathetic and parasympathetic organization (pre-/post-ganglionic). 2.Explain roles of the autonomic nervous system in homeostasis using examples.	Tomohiro Numata	第 2 講義室
50	4 / 21 (Tue)	9-10	Lecture	Theme: Autonomic Nervous System (2): Transmission and Organ Effects Content: Neurotransmitters (ACh/NE) and receptors; organ responses; introduction to pharmacological modulation. Learning Objectives: 1.Organize key autonomic neurotransmitters/receptors and explain organ effects. 2.Outline how agonists/antagonists shift organ responses (conceptual direction).	Tomohiro Numata	第 2 講義室
51	4 / 22 (Wed)	1-2	Lecture	Theme: Motor System (1): Organization and Function I Content: Spinal cord organization; motor system basics; reflexes; reciprocal innervation. Learning Objectives: 1.Explain basic spinal cord organization and motor functional localization. 2.Explain spinal reflexes and reciprocal innervation.	Tomohiro Numata	第 2 講義室

Topics and Contents of class, Course Objectives						
	Class Date	Period	Class Format	Topics and Contents of class, Course Objectives	Instructors	Class Room
52	4 / 22 (Wed)	3-4	Lecture	Theme: Motor System (2): Organization and Function II Content: Voluntary motor control; upper vs lower motor neurons; basic clinical signs. Learning Objectives: 1.Explain hierarchical motor control (cortex spinal cord muscle). 2.Outline core differences between UMN and LMN lesions.	Tomohiro Numata	第 2 講義室
53	4 / 22 (Wed)	5-6	Lecture	Theme: Heart / Circulation (10) - Blood pressure and blood flow (1) Explain blood pressure and blood flow in arteries, capillaries, and veins. (2) Illustrate the major veins and explain the portal venous system and the superior and inferior vena cava systems. (3) Explain the exchange of substances and water in capillaries. (1) 動脈、毛細血管、静脈の血圧と血流について説明できる。 (2) 主な静脈を図示し、門脈系と上・下大静脈系を説明できる。 (3) 毛細血管における物質・水分交換を説明できる。	Takafumi Miki	第 2 講義室
54	4 / 22 (Wed)	7-8	Lecture	Theme: Heart / Circulation (11) - Circulatory regulation 1 (1) Explain the mechanism of blood pressure regulation. (2) Explain the arterial baroreceptor reflex. (3) Explain the hormonal regulation of circulatory system. (1) 血圧調節の機序を説明できる。 (2) 動脈圧受容器反射について説明できる。 (3) 循環系の液性調節について説明できる。	Takafumi Miki	第 2 講義室
55	4 / 22 (Wed)	9-10	Lecture	Theme: Heart /Circulation (12) - Circulatory regulation 2 Explain the mechanism of circulatory reaction associated with change of body position and exercise. 体位や運動に伴う循環反応とその機序を説明できる。	Takafumi Miki	第 2 講義室
56	4 / 24 (Fri)	1-2	Lecture	Theme: Respiration (3) - Gas exchange (1) Explain the relationship between gas exchange and blood flow in the alveoli. (2) Explain the effects of lung ventilation and blood flow (ventilation-blood flow ratio) on arterial blood gas. (3) Explain the alveolar air-arterial oxygen partial pressure difference (A-aDO ₂). (1) 肺胞におけるガス交換と血流の関係を説明できる。 (2) 肺の換気と血流 (換気血流比) が動脈血ガスにおよぼす影響を説明できる。 (3) 肺胞気-動脈血酸素分圧較差 (A-aDO ₂) について説明できる。	Yosuke Okamoto	第 2 講義室

Topics and Contents of class, Course Objectives						
	Class Date	Period	Class Format	Topics and Contents of class, Course Objectives	Instructors	Class Room
57	4 / 24 (Fri)	3-4	Lecture	Theme: Respiration (4) - Blood gas (1) Explain the partial pressure of oxygen and the partial pressure of carbon dioxide in the arteries and veins. (2) Explain the relationship between arterial blood pH and partial pressure of carbon dioxide. (3) Explain blood gas. (1) 動静脈の酸素分圧と二酸化炭素分圧について説明できる。 (2) 動脈血 pH と二酸化炭素分圧との関係について説明できる。 (3) 血液ガスについて説明できる。	Yosuke Okamoto	第 2 講義室
58	4 / 24 (Fri)	5-6	Lecture	Theme: Sensory Systems (1): General Principles Content: Overview of sensory systems; receptors and coding; psychophysics (thresholds; Weber–Fechner concepts). Learning Objectives: 1.Explain sensory system organization (reception conduction central processing). 2.Explain basic psychophysical concepts (threshold, discrimination).	Tomohiro Numata	第 2 講義室
59	4 / 24 (Fri)	7-8	Lecture	Theme: Somatosensation I: Mechanosensation, Thermosensation, Pain Content: Somatosensory receptors; nociception; primary afferents; pathways to thalamus and cortex. Learning Objectives: 1.Explain receptor mechanisms and main pathways for touch, temperature, and pain. 2.Outline pain physiology (nociception, referred pain).	Tomohiro Numata	第 2 講義室
60	4 / 24 (Fri)	9-10	Lecture	Theme: Somatosensation II: Proprioception and Pathways Content: Proprioceptors; spinocerebellar and dorsal column pathways; linkage to motor control. Learning Objectives: 1.Explain proprioceptors and their pathways. 2.Explain why proprioception is essential for coordinated movement.	Tomohiro Numata	第 2 講義室
61	4 / 27 (Mon)	1-2	Lecture	Theme: Vision I: Introduction Content: Ocular anatomy (cornea, lens, retina); retina as the entry point of vision. Learning Objectives: 1.Explain major ocular structures and their roles. 2.Explain photoreception in the retina (overview of rods and cones).	Tomohiro Numata	第 2 講義室

Topics and Contents of class, Course Objectives						
	Class Date	Period	Class Format	Topics and Contents of class, Course Objectives	Instructors	Class Room
62	4 / 27 (Mon)	3-4	Lecture	Theme: Vision II: Transduction and Visual Pathways Content: Optic pathway (chiasm, tract, LGN, optic radiation); visual fields and deficits. Learning Objectives: 1.Explain the visual pathway. 2.Outline basic patterns of visual field defects by lesion location.	Tomohiro Numata	第 2 講義室
63	4 / 27 (Mon)	5-6	Lecture	Theme: Heart /Circulation (13) - Organ circulation and microcirculation Explain the characteristics of the main organ circulation (coronary circulation, cerebral circulation, pulmonary circulation, portal vein, skin circulation, skeletal muscle circulation, renal circulation). 主な臓器循環（冠循環、脳循環、肺循環、門脈、皮膚循環、骨格筋循環、腎循環）の特徴を説明できる。	Takafumi Miki	第 2 講義室
64	4 / 27 (Mon)	7-8	Lecture	Theme: Heart /Circulation (14) - Lymphatic circulation (1) Explain the flow of lymph through the thoracic duct. (2) Explain the composition and physiological significance of lymph. (1) 胸管を経由するリンパの流れを説明できる。 (2) リンパ液の組成、生理的意義について説明できる。	Takafumi Miki	第 2 講義室
65	4 / 27 (Mon)	9-10	Lecture	Theme: Heart /Circulation (15) - Fetal circulation (1) Explain the fetal circulation. (2) Explain changes in blood circulation after birth. (1) 胎児循環について説明できる。 (2) 出生後の血液循環の変化について説明できる。	Takafumi Miki	第 2 講義室
66	4 / 28 (Tue)	1-2	Lecture	Theme: Respiration (5) - Pulmonary blood flow and shunt (1) Explain the characteristics of pulmonary blood flow. (2) Explain changes in blood gas due to shunting of pulmonary blood flow. (1) 肺血流の特徴を説明できる。(2) 肺血流のシャントによる血液ガスの変化について説明できる。	Yosuke Okamoto	第 2 講義室
67	4 / 28 (Tue)	3-4	Lecture	Theme: Respiration (6) - Regulation of respiration Explain the mechanism of respiratory regulation via the respiratory center. 呼吸中枢を介する呼吸調節の機序を説明できる。	Yosuke Okamoto	第 2 講義室
68	4 / 28 (Tue)	5-6	Lecture	Theme: Vision III: Ocular Motor Function and Reflexes Content: Eye movements; pupillary light reflex; convergence reflex; corneal reflex; related circuits. Learning Objectives: 1.Explain basic mechanisms of eye movements. 2.Explain the reflex arcs of the pupillary light reflex, convergence reflex, and corneal reflex.	Tomohiro Numata	第 2 講義室

Topics and Contents of class, Course Objectives						
	Class Date	Period	Class Format	Topics and Contents of class, Course Objectives	Instructors	Class Room
69	4 / 28 (Tue)	7-8	Lecture	Theme: Taste and Smell I Content: Gustatory/olfactory reception; receptors; pathways to primary centers. Learning Objectives: 1.Outline mechanisms and pathways of taste reception. 2.Outline mechanisms and pathways of olfactory reception.	Tomohiro Numata	第 2 講義室
70	4 / 28 (Tue)	9-10	Lecture	Theme: Taste and Smell II: Central Processing and Disorders Content: Central processing (including links to emotion and memory); clinical abnormalities (taste/smell disorders). Learning Objectives: 1.Outline characteristics of central processing for taste and smell. 2.Explain basic etiological classification of taste/smell disorders (peripheral vs central).	Tomohiro Numata	第 2 講義室
71	5 / 1 (Fri)	1-2	Lecture	Theme: Heart / circulation (16) - Pathophysiology 1 Outline heart failure, hypertension, and myocardial ischemia. 心不全、高血圧、心筋虚血について概説できる。	Takafumi Miki	第 2 講義室
72	5 / 1 (Fri)	3-4	Lecture	Theme: Heart / circulation (17) - Pathophysiology 2 Outline heart failure, hypertension, and myocardial ischemia. 心不全、高血圧、心筋虚血について概説できる。	Takafumi Miki	第 2 講義室
73	5 / 1 (Fri)	5-6	Lecture	Theme: Vestibular System (Balance) Content: Vestibular organs; semicircular canals and otoliths; vestibulo-ocular reflex; conceptual framework for vertigo. Learning Objectives: 1.Explain vestibular receptors and pathways. 2.Explain the significance of the vestibulo-ocular reflex. 3.Provide a basic framework for understanding vertigo.	Tomohiro Numata	第 2 講義室
74	5 / 1 (Fri)	7-8	Lecture	Theme: Hearing I: Auditory Transduction Content: Outer to inner ear; cochlea; basilar membrane; hair cells; frequency analysis. Learning Objectives: 1.Explain auditory transduction mechanisms (cochlea to hair cells). 2.Outline how sound frequency and intensity are encoded.	Tomohiro Numata	第 2 講義室

Topics and Contents of class, Course Objectives						
	Class Date	Period	Class Format	Topics and Contents of class, Course Objectives	Instructors	Class Room
75	5 / 1 (Fri)	9-10	Lecture	Theme: Hearing II: Auditory Pathways and Hearing Loss Content: Auditory pathways; central processing; basic classification of hearing loss. Learning Objectives: 1.Explain the auditory pathway. 2.Classify hearing loss (conductive vs sensorineural) and outline key features.	Tomohiro Numata	第 2 講義室
76	5 / 8 (Fri)	1-2	Formative assesment	Theme: Formative assessment		第 2 講義室
77	5 / 8 (Fri)	3-4	Formative assesment	Theme: Formative assessment		第 2 講義室
78	5 / 8 (Fri)	5-6	Self learning	Theme:		
79	5 / 8 (Fri)	7-8	Self learning	Theme:		
80	5 / 8 (Fri)	9-10	Self learning	Theme:		
81	5 / 11 (Mon)	1-2	Lecture	Theme: Respiration (7) - Pathophysiology 1 Outline the pathophysiology of respiratory diseases (obstructive diseases, restrictive diseases). 呼吸疾患（閉塞性疾患、拘束性疾患）の病態生理について概説できる。	Yosuke Okamoto	第 2 講義室
82	5 / 11 (Mon)	3-4	Lecture	Theme: Respiration (8) - Pathophysiology 2 Outline the pathophysiology of respiratory diseases (obstructive diseases, restrictive diseases). 呼吸疾患（閉塞性疾患、拘束性疾患）の病態生理について概説できる。	Yosuke Okamoto	第 2 講義室
83	5 / 18 (Mon)	1-2	Lecture	Theme: Pathophysiology of Peripheral Neuropathy Content: Demyelinating vs axonal disorders; symptom patterns (weakness, sensory loss, reflex changes) and localization. Learning Objectives: 1.Explain major pathophysiological patterns of peripheral neuropathy (demyelinating vs axonal). 2.Use symptom combinations to suggest the likely pattern of pathology.	Tomohiro Numata	第 2 講義室
84	5 / 18 (Mon)	3-4	Lecture	Theme: Environmental Physiology 1 Content: Environmental factors (temperature, etc.), thermoregulation, energy metabolism, adaptation responses. Learning Objectives: 1.Explain fundamentals of thermoregulation (heat production, heat loss, central integration). 2.Outline effects of environmental stress on energy metabolism.	Tomohiro Numata	第 2 講義室

Topics and Contents of class, Course Objectives						
	Class Date	Period	Class Format	Topics and Contents of class, Course Objectives	Instructors	Class Room
85	5 / 25 (Mon)	1-2	Lecture	<p>Theme: Environmental Physiology 2 Content: Circadian rhythms; linkage to sleep; environmental factors related to exercise and physical fitness. Learning Objectives:</p> <p>1.Explain the mechanisms of circadian rhythms (including entrainment cues). 2.Outline how environmental factors influence exercise performance and physical fitness.</p>	Tomohiro Numata	第 2 講義室
86	5 / 25 (Mon)	3-4	Lecture	<p>Theme: Environmental Physiology 3 Content: Exercise, fatigue, and adaptation; physiological responses under environmental stress (dehydration, heat/cold). Learning Objectives:</p> <p>1.Explain exercise responses in terms of homeostasis (temperature, circulation, metabolism). 2.Explain basic risk and countermeasure concepts under environmental conditions (heat/cold exposure).</p>	Tomohiro Numata	第 2 講義室
87	6 / 1 (Mon)	1-2	Exercise	<p>Theme: Exercises on skeletal, cardiac and smooth muscle (1) Questions about skeletal, cardiac and smooth muscle</p> <p>(1) 骨格筋・心筋・平滑筋の講義内容を振り返り、設問に回答することができる。</p>	Takafumi Miki	第 2 講義室
88	6 / 1 (Mon)	3-4	Exercise	<p>Theme: Exercises on heart and circulation (1) Questions about heart and circulation</p> <p>(1) 心臓・循環の講義内容を振り返り、設問に回答することができる。</p>	Takafumi Miki	第 2 講義室
89	6 / 8 (Mon)	1-2	Exercise	<p>Theme: CNS Review & Practice 1 Content: Key points of CNS (cortex&#8211;brainstem&#8211;pathways); typical questions and guided practice. Learning Objectives:</p> <p>1.Summarize core CNS concepts using keywords. 2.Answer typical questions with clear rationale (mechanism and lesion site).</p>	Tomohiro Numata	第 2 講義室
90	6 / 8 (Mon)	3-4	Exercise	<p>Theme: CNS Review & Practice 2 (Higher Function & Disorders) Content: Higher functions (memory, emotion) and disorders (epilepsy, dementia); guided practice. Learning Objectives:</p> <p>1.Explain disorders as“ breakdown of normal function. ” 2.From short case vignettes, propose candidate functional areas/mechanisms.</p>	Tomohiro Numata	第 2 講義室

Topics and Contents of class, Course Objectives						
	Class Date	Period	Class Format	Topics and Contents of class, Course Objectives	Instructors	Class Room
91	6 / 15 (Mon)	1-2	Exercise	<p>Theme: Motor & Autonomic Systems Review Content: Integration of motor/autonomic systems; reflexes; receptor basics and pharmacology review. Learning Objectives:</p> <ol style="list-style-type: none"> 1.Diagram and explain reflex arcs, reciprocal innervation, and autonomic effects. 2.Explain how receptor differences alter organ responses using typical examples. 	Tomohiro Numata	第 2 講義室
92	6 / 15 (Mon)	3-4	Exercise	<p>Theme: Somatosensory Review & Localization Basics Content: Review of somatosensory modalities; pathway-based problem solving and lesion localization basics. Learning Objectives:</p> <ol style="list-style-type: none"> 1.Organize modality-specific pathways and apply them to questions. 2.Infer possible lesion sites at a basic level from findings. 	Tomohiro Numata	第 2 講義室
93	6 / 22 (Mon)	1-2	Exercise	<p>Theme: Special Senses Review Content: Vision/hearing/balance/taste/smell review; problem-solving exercises. Learning Objectives:</p> <ol style="list-style-type: none"> 1.Solve typical questions (visual field defects, hearing loss, vertigo) linking mechanisms to answers. 2.Summarize key points concisely and explain them to others. 	Tomohiro Numata	第 2 講義室
94	6 / 22 (Mon)	3-4	Exercise	<p>Theme: Peripheral Neuropathy & Environmental Physiology Review Content: Key concepts and practice for peripheral neuropathy and environmental physiology (temperature, circadian, exercise adaptation). Learning Objectives:</p> <ol style="list-style-type: none"> 1.Explain symptoms using neuropathy classifications (demyelinating vs axonal). 2.Organize environmental physiology concepts within the framework of homeostasis and apply them to questions. 	Tomohiro Numata	第 2 講義室