

Course Coding(科目番号)	Year/Semester/Term(年度・学期)	Faculty Offering Course(時間割所属・時間割コード)	Eligible Student Year(開講年次)	Credits(単位数)	Weekday and Period(曜日・時限)
RDM7-011-82-2	2026whole year	Graduate School of Medical Sciences (20120)	1, 2, 3, 4	2	others
Course Title(Theme)(科目名(講義題目))			Instructor(s)(担当教員)		
Metabolic and Circulatory Regulations(C3)			KUBOTA Naoto, MATSUMURA Takeshi, YOKOI Hideki, Gotou Tomomi, SUGITA Michiko, Oike Yuuichi, ADACHI Masataka, TSUJITA Kenichi, Yamamoto Eiichirou, IZUMI Yuichiro, HIRATA Naoyuki, MATSUZAWA Yasushi		
Goals with their ratio(学修成果とその割合)					
1.Advanced expert knowledge, skill and research capability ……30% 2.Profound inter-disciplinary knowledge ……30% 3.Global perspective and ability to take initiative action ……30% 4.Social leadership drive ……10%					
Type of Class(授業の形態)	Lecture				
Teaching Method(授業の方法)	PowerPoint/Zoom will be used in the lectures, and active participation in the discussion is encouraged. Extra classes and e-learning are considered for those who are not able to attend regular classes for unavoidable reasons. Please be sure to refer to the syllabus change as it will be announced on the website of the Graduate school of Medical Sciences.				
Course Goals(授業の目的)	Metabolic and Circulatory Regulations aim at learning the following items: (1) the pathogenesis of acute coronary syndrome and related factors, (2) the molecular mechanisms and therapeutic strategies of chronic heart failure, (3) the pathogenesis of metabolic disorders including diabetes mellitus and diabetic vascular complications, and its therapeutic strategy, (4) the molecular mechanisms of actions and secretion of insulin, (5) the molecular mechanisms and therapeutic strategy for metabolic syndrome and the development of obesity, (6) the relation between the progression of atherosclerosis or obesity, and inflammatory cells, (7) the molecular basis of renal physiology, and the functional differentiation/regulation of each segment of the nephron, (8) the pathogenesis of major renal diseases and the underlying mechanisms causing the pathological conditions, (9) the influence and mechanisms of surgical stress to the metabolism and circulation, and the therapeutic strategy for controlling these influences.				
Course Learning goals(学修目標)	<p>【A level (A水準)】 In this lecture, you are expected not only to learn the followings but also to apply them to research study or clinical activity:</p> <ol style="list-style-type: none"> 1. Mechanisms of atherosclerosis evaluated by coronary imaging and the therapeutic strategies. 2. Basic mechanisms of myocardial ischemia/reperfusion injury and cardiac remodeling in experimental acute myocardial infarction. 3. Molecular mechanisms and therapeutic strategies of chronic heart failure; 4. Pathogenic mechanisms of diabetes mellitus, diabetic complications, and the actions and secretion of insulin; 5. Molecular mechanisms and therapeutic strategy for metabolic syndrome and obesity, one of the main pathogenesis of atherosclerotic diseases. 6. Molecular basis of water-electrolyte balance by channels and transporters, and the regulation along the nephron. 7. Regulation and dysregulation of renal blood flow and blood pressure, and the pathophysiological mechanisms of proteinuria and renal dysfunction. 8. Various influences of surgical stress (i.e. activation of the sympathetic nervous system, pain, inflammatory reactions, etc.) to the metabolism and circulation, and the therapeutic strategy based on understanding these influences. <p>【C level (C水準)】 You are required to roughly understand each item listed above; otherwise you are regarded not having reached to the level to apply them to research study or clinical activity.</p>				
Course Outline(授業の概要)	<ol style="list-style-type: none"> 1. Mechanisms of atherosclerosis evaluated by coronary imaging and the therapeutic strategies. 2. Basic mechanisms of myocardial ischemia/reperfusion injury and cardiac remodeling in experimental acute myocardial infarction. 3. Molecular mechanisms and therapeutic strategies of chronic heart failure; 4. Pathogenic mechanisms of diabetes mellitus, diabetic complications, and the actions and secretion of insulin; 5. Molecular mechanisms and therapeutic strategy for metabolic syndrome and obesity, one of the main pathogenesis of atherosclerotic diseases. 6. Molecular basis of water-electrolyte balance by channels and transporters, and the regulation along the nephron. 7. Regulation and dysregulation of renal blood flow and blood pressure, and the pathophysiological mechanisms of proteinuria and renal dysfunction. 8. Various influences of surgical stress (i.e. activation of the sympathetic nervous system, pain, inflammatory reactions, etc.) to the metabolism and circulation, and the therapeutic strategy based on understanding these influences. 				
Details for Individual Classes(各回の授業内容)					
No.(回数)	Date(月日)	Class Theme(授業テーマ)	Brief Outline of Class(内容概略)		
1		Yasushi Matsuzawa 【eE-0】	Endothelial Dysfunction and Atherosclerosis: From Molecular Mechanisms to Clinical Management		
2		Eiichiro Yamamoto 【eE-0】	Molecular mechanisms and therapeutic strategies of chronic heart failure		
3		Kenichi Tsujita 【eE-0】	Mechanisms of atherosclerosis and therapeutic strategies		
4		Michiko Sugita 【eE-0】	Perioperative Stress and Invasive Control Mechanisms		
5		Tomomi Gotoh 【eE-0】	NO and nitrogen metabolism disorders		
6		Naoto Kubota 【eE-0】	Insulin and its actions—their molecular basis		
7		Takeshi Matsumura 【eE-0】	Diabetic complications and their therapeutic approaches		
8		Naoyuki Hirata 【eE-0】	Mechanisms and therapeutic strategies of perioperative organ injury		

9		Naoyuki Hirata [eE-0]	Mechanisms and therapeutic strategies of Postoperative cognitive decline
10		Masataka Adachi [eE-0]	Renal potassium handling
11		Hideki Yokoi [eE-0]	Structure and function of nephron
12		Yuichiro Izumi [eE-0]	Sodium and water handling by the kidney
13		Tomomi Gotoh [eE-0]	ER stress-related diseases
14		Naoto Kubota [eE-0]	Pathogenesis and therapies of metabolic diseases
15		Yuichi Oike [eE-0]	Clarification of molecular and cellular mechanisms underlying aging and its associated diseases
Estimated out-of-class study time		This course consists of contents which requires 90 hours of work. As the total of in-class hours becomes 30 hours (two hours x15 classes), additional 60 hours of pre-post study including some task will be required in order to improve comprehension of the course.	
Required Textbook(テキスト)		Textbooks are not specified, and handouts will be distributed.	
Reading List(参考文献)		<ul style="list-style-type: none"> ・ Braunwald' s Heart Disease: A Textbook of Cardiovascular Medicine, 12th edition, edited by Libby P, et al. Saunders, Philadelphia, 2021. ・ Miller' s Anesthesia, 9th edition, edited by Miller RD. Elsevier Churchill Livingstone, Philadelphia, 2019. ・ Brenner & Rector' s The Kidney, 11th edition, Elsevier, Philadelphia, 2020. ・ Comprehensive Clinical Nephrology, 6th edition, Mosby, 2019. 	
Enrollment Conditions(履修条件)		no limitation	
Assessment Methods and Criteria(評価方法・基準)		Grading will be based on active class participation, paper summaries, and the final report. Grading will be based on the student's understanding of the course subject matter. The students' understanding will be evaluated on the basis of papers and quizzes related to the topics dealt with in class to be scored from 0 to 100. Final grades will be based on the average score of the papers and tests as well as participation in class discussions	
Language Used in Instruction(使用言語)		English (English)	
Textbook/Material Language(教科書・資料の言語)		English (English)	
Course Based on Practical Work Experience(実務経験を活かした授業)		Not applicable	