Course Coding(科目ナンバー)	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)
RDM7-001-79-2	2026whole year	Graduate School of Medical Sciences (20020)	1, 2, 3, 4	2	others

Course Title(Theme)(科目名(講義題目))	Instructor(s)(担当教員)
Pathophysiology and Structural Biochemis (For students admitted in 2022 and before)(B1)	ARIMA Yuichiro, YAMANAKA Kunitoshi, YAMAGATA Kazuya, BABA Masaya, MIHARADA Kenichi

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 will be used in the lectures, and active participation in the discussion is encouraged.
Course Goals(授業の目的)	(1)To understand the pathophysiology of hypertension, cardiac hypertrophy, and atherosclerosis, and the therapeutic strategy of these cardiovascular diseases. (2)To understand the basic knowledge of glucose/lipid metabolism and its dysregulation in diabetes mellitus, metabolic syndrome, and lipid metabolism disorder. (3) Molecular basis, various cellular functions, and roles of ATPases, especially AAA family proteins, in human diseases will be learnt. (4) To understand the mechanisms for protein quality control in cells and its implications in diseases (5) To understand the role of hypoxia signaling pathway, mTOR signaling pathway and metabolite signaling in diseases
Course Learning goals(学修目標)	【A level (A水準)】 To understand the detailed findings of the structure, function, physiological role, role in various diseases, and clinical application of biomolecule, and to be able to apply them to the study. 【C level (C水準)】 To understand the structure, function, physiological role, role in various diseases, and clinical application of biomolecule.
Course Outline(授業の概要)	(1) You will learn the mechanism for the regulation of oxidative stress and its signaling cascades. (2) You will learn fundamental metabolic pathways under normal conditions and its relationship to pathology. (3) Proteins are biopolymers containing functional motifs and domains. Molecular chaperones and ATP-dependent proteases are related to life of proteins and consist of several different types of ATPases. Their functions will be discussed from the point of view of ATPases. In particular, common molecular basis and various cellular functions of AAA family proteins will be discussed. In addition, human genetic diseases and developmental disorders of model animals caused by mutations in AAA family proteins will be described. (4) You will learn how quantity and quality of functional proteins is maintained at the desired levels, and molecular mechanisms of unfolded protein response. Furthermore,you will learn how its disruption is implicated in various diseases. (5)You will learn the role of hypoxia signaling pathway, mTOR signaling pathway and metabolite signaling in diseases

Details for Individual Classes(各回の授業内容)

No.(回)	Date(月日)	Class Theme(授業テーマ)	Brief Outline of Class(内容概略)
1		ARIMA Yuichiro 【eEJ-0】	Pathophysiology of cardiovascular diseases (1)
2		ARIMA Yuichiro 【eEJ-0】	Pathophysiology of cardiovascular diseases (2)
3		ARIMA Yuichiro 【eJ-0】	Pathophysiology of cardiovascular diseases (3)
4		YAMAGATA Kazuya 【eEJ-0】	Pathophysiology of glucose/lipid metabolism (1)
5		YAMAGATA Kazuya 【eEJ-0】	Pathophysiology of glucose/lipid metabolism (2)
6		YAMAGATA Kazuya 【eEJ-0】	Pathophysiology of glucose/lipid metabolism (3)
7		YAMANAKA Kunitoshi【eEJ-0】	ATPases related to life of proteins
8		YAMANAKA Kunitoshi 【eEJ-0】	Various functions of AAA proteins
9		YAMANAKA Kunitoshi【eEJ-0】	Human diseases caused by AAA proteins
10		MIHARADA Kenichi 【eJ-0】	Growth factors and receptors in cancer
11		MIHARADA Kenichi 【eJ-0】	Cell signaling in cancer
12		MIHARADA Kenichi 【eJ-0】	Molecular targeted therapy in cancer
13		BABA Masaya【eJ-0】	Hypoxia signaling pathway and disease
14		BABA Masaya【eJ-0】	mTOR signaling pathway and disease
15		BABA Masaya【eJ-0】	metabolite signaling and disease

Estimated out-of-class study time	
Required Textbook(テキスト)	Textbooks are not specified, and handouts will be distributed in some classes.
Reading List(参考文献)	“Harper's Illustrated Biochemistry” by Robert K. Murray, Daryl K. Granner, Victor W. Rodwell, The McGraw-Hill Companies, 2006 “Handbook of Lipoprotein Testing” by Nader Rifal et al., AACC Press, 2000
Enrollment Conditions(履修条件)	
Assessment Methods and Criteria(評価方法・基準)	The students' understanding will be evaluated comprehensively based on the quality of report. Students must select one area from all attended courses and submit its report to the Student Affairs Section.

Textbook/Material Language(教科書・資料の言語)	Combination of Japanese and English
Course Based on Practical Work Experience(実務経験を活かした授業)	Not applicable