

## Syllabus

1. Course Title, style, and credit

Cardiovascular Physiology

Lecture, 1 credit

2. Appropriate grade level and Eligible Departments

D1, D2 (obligatory), D3-5 (optional) School of Life Science

3. Lecturer(s)

Motohiro Nishida

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OIIB (Yamate)

4. Time

[oral]

10:00~12:00 on every Friday from January 15 to March 4, 2016

5. Place

2F Seminar room in the west side of Yamate No. 2 building

6. Prerequisites and Styles

This course is given as oral lecture in English

7. Contents

The heart plays an essential role in maintaining functions of all other organs by supplying blood (oxygen). To understand the dynamism of cardiovascular system, it is important to understand the mechanisms underlying adaptation and maladaptation of the cardiovascular systems against hemodynamic load through structural and morphological changes. The transfiguration of cardiocirculatory homeostasis will be causes for various circulatory diseases. In this course, we present the recent understanding of the structure-function relationship of the cardiovascular system and regulation of adaptation and maladaptation against hemodynamic load. We also present the molecular basis of cardiac excitation-contraction coupling and its

regulation by ion channels, and peripheral blood circulation through muscle-muscle interaction.

#### 8. Course Objectives

1. To understand the mechanism underlying neurohumoral regulation of the heart and its adaptation and maladaptation hemodynamic load
2. To understand the mechanism underlying cardiac electrophysiology and its pathology (arrhythmias).
3. To understand molecular mechanisms underlying regulation of peripheral blood circulation via muscle-muscle interaction.

#### 9. Schedule

1. January 15  
Introduction of Cardiovascular Physiology  
Motohiro Nishida (NIPS, OIIB)
2. January 22  
Cardiac Development and Disease  
Motohiro Nishida (NIPS, OIIB)
3. January 29  
Cardiac Electrophysiology and Arrhythmias : From Cell To Organ  
Junko Kurokawa (Tokyo Medical and Dental University)
4. February 5  
Neurohumoral Regulation and Signal Transduction of the Heart  
Akiyuki Nishimura (NIPS, OIIB)
5. February 12  
Regulation of peripheral blood circulation by ion channels  
Takuro Numaga-Tomita (NIPS, OIIB)
6. February 19  
Muscle Repair and Regeneration  
Motohiro Nishida (NIPS, OIIB)
7. February 26  
Role of calcium homeostasis in the cardiovascular system  
Susumu Minamisawa (The Jikei University School of Medicine)
8. March 4  
Multi-scale approaches for the understanding of cardiac mechanics  
Seiryu Sugiura (Graduate School of Frontier Sciences, The University of Tokyo)

1 0 . Lecture materials and readings

Arnold M. Katz, 「Physiology of the Heart」 (4<sup>th</sup> edition)

Brunton, Lazo, Parker, 「Goodman & Gilman's The Pharmacological Basis of Therapeutics」 (11<sup>th</sup> edition)

1 1 . Grades

The lecturer will present a theme based on the course objective at the end of the course. Students are requested to submit an essay report on the theme by the dead line. The grades will be determined by the quality of the report, and will be either “passed” or “failed”.

1 2 . Notes

Nothing particular.