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
   E-mail: nishida@nips.ac.jp
   TEL: 0564-59-5560
   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
   suppling 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
      Seiryo Sugiura (Graduate School of Frontier Sciences, The University of Tokyo)
10. Lecture materials and readings
   Arnold M. Katz, 「Physiology of the Heart」 (4th edition)
   Brunton, Lazo, Parker, 「Goodman & Gilman’s The Pharmacological Basis of Therapeutics」 (11th edition)

11. 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 deadline. The grades will be determined by the quality of the report, and will be either “passed” or “failed”.

12. Notes
   Nothing particular.