

## Department of Internal Medicine

### Division of Cardiology

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Michihiro Yoshimura, *Professor*  
Ikuo Taniguchi, *Professor*  
Teiichi Yamane, *Associate Professor*  
Makoto Kawai, *Associate Professor*  
Kimiaki Komukai, *Assistant Professor*  
Taro Date, *Assistant Professor*

Mitsuyuki Shimizu, *Professor*  
Shingo Seki, *Associate Professor*  
Kenichi Hongo, *Associate Professor*  
Takahiro Shibata, *Assistant Professor*  
Takayuki Ogawa, *Assistant Professor*

#### General Summary and Research Activities

Research in every field, both clinical and basic, is being driven daily on the basis of reliable results.

##### *Clinical research*

In clinical research, we have been participating in multicenter collaborative studies, including large-scale clinical studies, and conducting research during routine clinical practice. In large-scale clinical studies, we have primarily collaborated in subanalyses in the Japanese Investigation of Kinetic Evaluation in Hypertensive Event And Remodeling Treatment (JIKEI HEART) study and in such studies as the Japanese Rhythm Management Trial for Atrial Fibrillation (J-RHYTHM II) study (a multicenter study of upstream drug therapy for atrial fibrillation associated with hypertension comparing calcium antagonists and angiotensin receptor blockers [ARBs]), the Assessment of  $\beta$ -Blocker Treatment in Japanese Patients with Chronic Heart Failure (J-CHF) study (a large-scale clinical study to establish a  $\beta$ -blocker treatment method in chronic heart failure), the Pitavastatin Heart Failure (PEARL) study (a multicenter cooperative study to investigate the ameliorative effect of 3-hydroxy-3-methylglutaryl coenzyme A reductase inhibitors on chronic heart failure), and the Nationwide Gender-based Atherosclerosis Determinants Estimation and Ischemic Cardiovascular Disease Prospective Cohort (NADESICO) Study (a multicenter cooperative prospective cohort study of sex differences in risk factors for arteriosclerotic diseases and prevention), which used computed tomographic examinations of coronary arteries.

We have converted patient data, including risk factors and lesion morphology, from catheter examinations and treatment in various clinical research divisions into a database and performed a study comparing risk factors, outcomes, and other variables of ischemic heart disease, cardiomyopathy, and other conditions. In addition, we have participated in nationwide clinical studies (the Japan-Drug Eluting Stents Evaluation: a Randomized Trial [J-DESSERT]; the Coronary Spasm Association [CSA]; Japan Unprotected Left Main Coronary Artery Disease PCI Strategy on New Generation Stents [J-LESSON]; and Omega-3 Fatty Acids for Prevention of Post-operative Atrial Fibrillation [OPERA] trial), mainly investigating in detail treatment with drug-eluting stents and the diagnosis of coronary vasospasm, which is closely related to the etiology of ischemic heart disease.

In regard to heart failure, which is an extremely common form of circulatory pathology,

we have been assessing data related to the concentration of serum brain natriuretic peptide, which is an index of circulatory pathology, and been conducting research on standard values that will be of use in clinical practice. In addition, we have reported in detail the pathology of heart failure before and after admission to the hospital and are now assessing clinical data that will serve as a new index.

We have been aggressively treating atrial fibrillation by catheter ablation, and during this fiscal year we have treated approximately 180 patients. In addition, in clinical research we have investigated 1) the usefulness of the pulmonary vein antrum isolation procedure by new mapping systems, and 2) optimal catheter ablation strategies for persistent atrial fibrillation.

#### *Basic research*

Research activity, such as studies at other institutions in Japan and abroad by graduate students in basic sciences and clinical sciences and presentation of the results of many studies, is being performed. In the field of arrhythmias, we have performed research in the form of a study of the basis of the development of atrial fibrillation by using various experimental models in regard to the effects of inflammatory cell invasion and fibrosis on the myocardium. In the field of cardiomyocyte physiology, we have investigated the physiological and pathophysiological regulatory mechanisms of myocardial contraction and relaxation and performed a study with molecular biology techniques and physiological techniques. We have also investigated a new signal transmission system in the  $\alpha$ -receptor stimulation effect in relation to L-type Ca channels in the rat myocardium, the effect of  $\beta$ -receptor stimulation in sarcoplasmic reticulum function, and cardiomyocyte intracellular Ca kinetics in mice in which dilated cardiomyopathy develops because of troponin T mutations. In the field of myocardial metabolism, we have investigated the association between ischemia-reperfusion damage and intracellular ion kinetics in isolated perfused hearts of mice with type 2 diabetes.

#### **Publications**

**Terao Y, Ayaori M<sup>1</sup>, Ogura M<sup>1</sup>, Yakushiji E<sup>1</sup>, Uto-Kondo H<sup>1</sup>, Hisada T<sup>1</sup>, Ozasa H, Takiguchi S<sup>1</sup>, Nakaya K<sup>1</sup>, Sasaki M<sup>1</sup>, Komatsu T<sup>1</sup>, Iizuka M<sup>1</sup>, Horii S<sup>1</sup>, Mochizuki S<sup>2</sup>, Yoshimura M, Ike-waki K<sup>1</sup> (Natl Defense Med Coll, <sup>2</sup>Musashino Univ Med Ctr).** Effect of sulfonyleurea agents on reverse cholesterol transport in vitro and vivo. *J Atheroscler Thromb.* 2011; **18**: 513-30.  
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### Reviews and Books

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