Form 3

Report for Joint/usage program for Endocrine/Metabolism

Date: 2015/04/06

To:

Director of Institute for Molecular and Cellular Regulation

1. Program No. Program No.14023

2. Research title: Postprandial lipoprotein metabolism by lipoprotein lipase and hepatic lipase

3. Objective of the research: Analysis of the distribution of lipoprotein lipase and hepatic lipase in remnant lipoprotein fraction and their contents in post- and pre-heparin plasma samples collected at UC Davis by Peter Havel.

4. Name of Principal Researcher: Peter Havel
   Position/Affiliation: Professor, Department of Molecular Biosciences, School of Veterinary Medicine and Department of Nutrition University of California Davis

   Name of Co-applicant: Kimber Stanhope
   Position/Affiliation: Research Director/ Department of Molecular Biosciences, School of Veterinary Medicine and Department of Nutrition University of California Davis

   Name of Co-applicant: Katsuyuki Nakajima
   Position/Affiliation: Visiting professor, Graduate School of Health Sciences, Gunma University

   Name of Researcher in charge in IMCR: Fumikazu Okajima
   Position: Professor

5. Period: From 2014/04/01 to 2015/3/31

6. Research plans:

   Analysis of the distribution of lipoprotein lipase and hepatic lipase in remnant lipoprotein fraction and their contents in post- and pre-heparin plasma samples collected by Dr. Havel at UC Davis. using HPLC, Superose 6B gel-filtration and new enzyme immunoassay systems developed by Dr. Nakajima and their associates in collaboration with Dr. Okajima

7. Research results:

   We have found that most of the lipoprotein lipase (LPL) in circulating pre-heparin plasma was bound to remnant lipoproteins and became inactive. Also hepatic lipase (HTGL) was also found in bound form of apoE-rich HDL fraction in post-heparin plasma. We will investigate further about the mechanism and interaction of LPL and HTGL with remnant lipoproteins,

   As we have clarified the localization of LPL on remnant lipoproteins which will provide a new definition of remnant lipoprotein and the insight of its metabolism. As the specific binding of LPL on remnant lipoproteins in the circulating plasma was first found by this study, the mechanism of incorporation of remnant lipoproteins into atherosclerotic plaques will become clear.

8. Publications and/or Presentations made through this collaboration

   Shirakawa T, Nakajima K, Shimomura Y, Kobayashi J, Stanhope K, Havel P, Machida T, Sumino H, Murakami M. Comparison of the effect of post-heparin and pre-heparin lipoprotein lipase and hepatic triglyceride lipase on remnant lipoprotein metabolism. Clin. Chim Acta 440; 193-200 (2014).

   Tetsuo Machida, Kazuya Miyashita, Takuya Sone, Sayori Tanaka, Katsuyuki Nakajima, Masayuki Saito, Kimber Stanhope, Peter Havel, Hiroyuki Sumino, Masami Murakami. Determination of serum lipoprotein lipase using a latex particle-enhanced turbidimetric immunoassay with an automated analyzer. Clin. Chim Acta 2015; 442:130-5

(Please summarize the report in 2 pages)