

Project No.:19004 Core Institution in Japan: Kyushu University

JSPS Core-to-Core Program -Strategic Research Networks-
FY2009 Research Report

Project No.	19004
Research Theme	Center for Magnetic Resonance Molecular Imaging of In Vivo Redox System
Duration of Project	2009/4/1-2012/3/31 (36 months)
Core Institution in Japan	Kyushu University

Implementing Organizations

Country	Japan
Core Institution	Kyushu University
Co-Chair (name and title)	Hideo Utsumi, Professor
Number of Cooperating Institutions	5
Cooperating Institutions	<ul style="list-style-type: none"> • Hokkaido University • Kumamoto University • Nagasaki University • Sojo University • National Institutes of Radiological Science

Country	USA
Core Institution	The Ohio State University
Co-Chair (name and title)	Periannan Kuppusamy, Professor
Number of Cooperating Institutions	2
Cooperating Institutions	<ul style="list-style-type: none"> • NIH/NCI • University of Chicago
Matching Fund	<ul style="list-style-type: none"> • National Institutes of Health, Development of spin probes for cell-targeting and oximetry, \$ 225,000/year, 2008/9/1 – 2012/8/31 • National Institutes of Health, Noninvasive monitoring of in situ oxygenation and cell therapy in infarct heart, \$ 225,000/year, 2007/7/1 – 2011/6/30 • National Institutes of Health, Novel trityl probes for measurement and bi-modal imaging of superoxide, \$ 180,000/year, 2008/7/1 – 2012/6/30

Country	UK
Core Institution	University of Aberdeen
Co-Chair (name and title)	David J. Lurie, Professor
Number of Cooperating Institutions	0
Cooperating Institutions	
Matching Fund	RCUK/EPSRC, Fast Field-Cycling Magnetic Resonance Imaging, £ 607,130/year, 2007/5/1– 2011/4/30

Country	Germany
Core Institution	Martin Luther University of Halle-Wittenberg
Co-Chair (name and title)	Karsten Mäder, Professor
Number of Cooperating Institutions	2
Cooperating Institutions	<ul style="list-style-type: none"> • University of Applied Sciences TFH Berlin • University of Kaiserslautern
Matching Fund	Institute of Pharmacy, Martin-Luther-University Halle plus money from own research projects (industry supported), Basic Research, €10,000/year

Country	Australia
Core Institution	Monash University
Co-Chair (name and title)	Harald Schmidt, Professor
Number of Cooperating Institutions	2
Cooperating Institutions	<ul style="list-style-type: none"> • University of Queensland • The Heart Research Institute
Matching Fund	<ul style="list-style-type: none"> • Australian Research Council, A National Biomedical Electron Paramagnetic Resonance and Molecular Imaging Centre, 500,000AUD/year, 1 year • Australian Research Council, Centre of Excellence in Free Radical Chemistry and Biotechnology, 210,000AUD/year, 5 year • Australian Research Council, Mechanisms and consequences of myeloperoxidase-mediated damage to glycosaminoglycans, proteins and proteoglycans, 175,000AUD/year, 5year • NHMRC, Heme-oxidised soluble guanylyl cyclase, a mechanism-based target for vascular diagnostics and vasoprotective therapy, 164,000AUD/year, 2 year • NHMRC, Novel treatment strategies for cardiovascular diseases, 104,000AUD/year, 3year • NHMRC, Underlying mechanisms of cardiovascular disease, 159,000AUD/year, 3 year

Country	China
Core Institution	Chinese Academy of Science
Co-Chair (name and title)	Baolu Zhao, Professor
Number of Cooperating Institutions	0
Cooperating Institutions	
Matching Fund	Department of National Science and Technology of China, New techniques of Provent and treatment against AD and PD., 100,000RMB/year, 2008-2010

Result of Program Implementation

– Collaboration –

The research collaboration of 4 subgroups, which are "Synthesis of probes for in vivo redox imaging", "Development of MRI and redox imager", "Imaging redox in vivo using magnetic resonance imager", and "Imaging analysis of redox in tumor", have been carried out, and 3 joint papers have already published or accepted.

– Seminar –

Four seminars were held in FY2009, and the attendees have reached to be totally 81 researchers and students. Free Radical School 2009 in Japan was held in Niigata on 2-6, September and jointed with Society of Free Radical Research (SFRR). Young core-to-core students studied with Asian young students of SFRR members about the basics of redox biology, chemistry and imaging, and obtained the skill of communication by English. Through the Oxygen Club of California 2010 World Congress, the activity of core-to-core program became to be well known to the attendees from other countries and lead to establish the international network of magnetic resonance molecular imaging study.

Achievements in FY2009 (Self Review)

The activities of in vivo redox research core have aggressively been promoted, and the goal in FY2009 was achieved as shown below.

– Research Result –

Three papers about imaging of redox status in tumor-implanted mice using magnetic resonance imager were published, collaborating with research groups in NIH/NCI, USA. Several soluble nitroxyl radicals were designed and successfully synthesized.

– Education of young researchers –

The 7 young exchange visitors skilled up the research techniques and the communication with researchers in USA, UK, Germany, and Australia during their stay for 1-2 months. Reports of young exchange visitors were distributed to most of overseas and Japanese core-to-core members.

– Ripple Effect of This Program –

The people, who visited the homepage of "Center for Magnetic Resonance Molecular Imaging of In Vivo Redox System", has reached to be 3808 since the opening of site.

Future Plan (Measures toward Achieving Research Objectives)

We will promote the establishment of international network of magnetic resonance molecular imaging study, and will finally aim the standardization of protocol of in vivo redox imaging directed to human health. To achieve the final goal, the collaborative research will be promoted and carried out the productive publication of joint papers. The core-to-core activity will spread around by effective usefulness of core-to-core homepage and next leaders of next generation will be grown up through young exchange program and school for young researchers.