

Summary of Proposal

Host institution name	Osaka University
Head of host institution	Kiyokazu Washida, Osaka University, President
Prospective center director	Shizuo Akira, Osaka University, Professor (WPI IFRc)
Prospective administrative director	Norio Furushiro, Osaka University, Professor (WPI IFRc)
Title of center project	Osaka University Immunology Frontier Research Center
Center name	Osaka University Immunology Frontier Research Center (IFRc)
Project Summary	The aim of this program is to unveil the whole picture of dynamic immune system by employing a variety of imaging techniques to visualize the immune cells within live animals. We will attempt to improve an imaging technology, which allows us to track the dynamic behavior of immune cells and their communications more directly and understand how immune cells respond to non-self such as pathogens and cancers in vivo. Based on these basic studies, we will seek to develop new strategies for diagnosis and treatment of various diseases including infectious diseases, autoimmune diseases, allergy and cancer.
Research fields	Fields: Immunology and Bioengineering Relevant fields: Biosciences, Precision and mechanical engineering Importance: Research on the immune system, which deals with the host defense mechanism against invading microbial pathogens, is important in treatment of various diseases including infectious disease, allergy, inflammation, autoimmune disease, and immunodeficiency, all of which are intimately associated with abnormality in the immune response. Although numerous studies have focused on identifications of cells and factors involved in the immune system, it still remains unclear how immune cells actually interact each other in the in vivo immune organs in response to infections or in pathological conditions. Thus, it will be necessary to develop a new imaging technology that tracks the immune response as well as a method to artificially control the immune response in the future. In foreign countries, the incorporation of the imaging technology into immunology research has already started. However, such movement is not seen in Japan, and both fields are still isolated. The immunology in Japan, especially Osaka University, is internationally acclaimed in its high quality of basic research. Therefore, creating a research center for immunology in Osaka University in which domestic and overseas researchers come together, and explore the in vivo imaging of the immune system is imperative to establish not only a new field of basic science but also overcome the above-mentioned diseases.
Research objectives	Development of an imaging technology for visualization of immune system in vivo and a new method based on the imaging technology that controls immune system for the treatment of immune diseases
Outline of management	Dr. Norio Furushiro, who is familiar with managements in English, will head the administration department. The administration department will have three sections: the research management section consisting of 2-3 members with PhD degree, and accounting section and general affairs section each consisting of a senior supervisor with rich administrative experiences in the University, and several bilingual or English-speaking full-time and part-time personnel. The research management section deals with planning and logistics of scientific meetings sponsored by the Research Center, public information and liaison, and issues relating to intellectual properties. Center management committee consisting of center director (Chairman), administrative director, Principal Investigators will make mid-to-long term plan of the Center based on advices by the International Advisory/Review Board. The center director, based on suggestions by the center management committee, will make decisions on major issues necessary for center's managements, such as researchers' salaries, appointment of new researchers and administrative director. The University president will approve the center director's decisions on major issues necessary for center's managements.
Researchers and other center staffs	Our center will have about 200 people, including investigators, researchers and staffs by the year of 2010. The number of Principal Investigators will be about 20. List of the name of main PI: Shizuo Akira, Tadamiyoshi Kishimoto, Toshio Hirano, Masayuki Miyasaka, Hitoshi Kikutani, Taroh Kinoshita, Atsushi Kumanogoh, Kiyoshi Takeda, Hisashi Arase, Shimon Sakaguchi, Takashi Saito, Tomohiro Kurosaki, Fritz

	<p>Melchers, Toshio Yanagida, Junji Seki, Yoshichika Yoshioka, Takashi Jin, Yutaka Hata List of the name of satellite organizations and other partner institutions: RIKEN Research Center for Allergy and Immunology, National Institutes of Health, Harvard University, New York University, Stanford University, California Institute of Technology, University of California San Francisco</p>
<p>Outline of research environment</p>	<ul style="list-style-type: none"> ○ Research management section consisting of people with PhD degree will be set up in the administration department. The research management section deals with planning and logistics of scientific meetings sponsored by the Research Center, public information and liaison, and issues relating to intellectual properties. The administration department also includes accounting section and general affairs section each consisting of a senior supervisor with rich administrative experiences in the University, and several bilingual or English-speaking full-time and part-time personnel. These administration staffs will fully support researchers so that researchers do not have to spend their time in paper work and other administrative functions. ○ Budget for equipments will be allocated to invite PIs from institutions outside Osaka University. Budget for consumables and supplies will also be provided to PIs so that those PIs are able to start research at maximum efficiency without losing time. To facilitate acquisition of competitive research grants from domestic funding sources, the research management section in the administration department will help PIs from abroad in application. ○ Postdocs will be hired through advertisement of positions on major journals, such as Nature and Immunity, and their home pages. ○ Dr. Norio Furushiro, who is familiar with managements in English, will head the administration department. The administration department will have three sections: the research management section, accounting section and general affairs section. ○ The center director will organize the International Advisory/Review Board consisting of ten-odd renowned immunologists. The International Advisory/Review Board will conduct evaluation of research groups' achievement every or every other year. The center director will determine principal investigators' salaries based on the evaluation by the International Advisory/Review Board. ○ The main research building (ten floors and 9,400 square m) will be constructed by March 2009 with University budget and external donation, and most of its space will be used for the Research Center. ○ The Research Center will organize international research conferences once a year. ○ Based on advices and/or suggestions by the International Advisory/Review Board, the center director will set up research environment suitable for international researchers.
<p>Outline of indicators for evaluating a center's global standing</p>	<ul style="list-style-type: none"> i) Criteria and methods to be used for evaluating the center's global standing in the subject field The following points will be evaluated not only quantitatively by numbers of publications, their citation and so on but also by external reviews of the reviewing committee that consists of internationally leading scientists in the corresponding fields. (a) Major contributions to main research areas: Are principal investigators of this center leading and advancing main research areas as major players in the corresponding fields? (b) Creation of new research areas: Are principal investigators of this center opening or creating new research areas in the corresponding fields? (c) Contribution to human life: Are there any accomplishments from this center, which have made great contributions to increases of quality of human life in various ways such as developing therapeutic or diagnostic means of diseases? ii) Results of current assessment made using said criteria and methods (a) Major contributions to main research areas: Principal investigators of this center have been leading main research areas of the immunology field (Shizuo Akira in research of innate immunity; Shimon Sakaguchi in research of regulatory T cells; Tadimitsu Kishimoto and Toshio Hirano in research of cytokines), which are obvious from an enormous number of citations of their papers. Toshio Yanagida is also a pioneer of the single molecule imaging. (b) Creation of new research areas: Principal investigators of this center are currently opening new research areas (Takashi Saito in the single molecule imaging analysis of immune responses; Hitoshi Kikutani and Atsushi Kumanogoh in immune regulation by semaphorins). (c) Contribution to human life: Tadimitsu Kishimoto and his colleagues developed anti-IL-6 receptor therapy for inflammatory diseases, which is highly expected for treatment of various immunological diseases such as rheumatoid arthritis. iii) Goals to be achieved through the project (at time of interim and final evaluations) Goals at time of interim - To keep current levels and global standing of immunological research of this center. - To further grow new research area that were opened by this center and make them major ones in the corresponding area. - To establish technical and theoretical basis of intravital and noninvasive single cell analysis of immune responses. Goals at final evaluation - To establish the methodology of intravital and noninvasive single cell analysis of immune responses. - To combine the above methodology with basic immunological knowledge obtained

	by conventional immunology research of this center and to present new paradigm for understanding the immune network.
Securing research funding	Osaka University will provide support to meet the necessary expense, on top of Grant-in-aid (about 15 -20 hundred million yen/year) and Research Grants for Principal Investigators. Note: Past record of competitive research grants for Principal Investigators 2002: 6.76 million dollars or 811 million yen; 2003: 9.39 million dollars or 1.127 billion yen; 2004: 9.48 million dollars or 1.137 billion yen; 2005: 9.20 million dollars or 1.104 billion yen ; 2006: 9.60 million dollars or 1.152 billion yen; Average 8.88 million dollars or 1.066 billion yen.
Summary of host institution's commitment	WPI will be the top priority in the mid-term strategic target and plan, and Osaka University will give full support by implementing institutional reforms that are necessary for formation of the WPI and improving the research systems. (1) Osaka University will assist the WPI to perform every possible support for operation and research activities of WPI. Osaka University will provide supports to the WPI resources that would be either greater or equal to the WPI project grant. (2) The WPI will be recognized as a department within the university. Osaka University will provide the Center Director with the entitlement to manage and operate the WPI. The Center Director is entitled to make decisions regarding substantive personnel and budget allocation as are the Deans and Directors in other faculties in Osaka University. An Administrative Director will support the Center Director and he will be responsible for office management so that the Director's decisions are kept to the bare essentials. Osaka University will support the Center Director's research environment. (3) Osaka University will support resource sharing/exchange between the WPI and other departments. (4) To maintain the excellent research environment for the WPI, the center will apply the existing employment system of Osaka University, including the annual salary system. If the present employee system of Osaka University does not fit in with the operation of the center, then Osaka University will consider revising and supplementing the present internal system of Osaka University. The new system should be flexibly operated. Osaka University will support the WPI's enforcement to endorse the system and its operation. (5) A new research building of ten floors with 9400m ² of space will be constructed by March 2009 for the Research Center. Osaka University will also provide laboratory space on the campus to accommodate research groups, which will join the Research Center before the new research building is completed. To meet the space requirements for an animal facility for newly coming research groups, Osaka University will construct a new block of animal facilities and provide it for the Research Center's use. (6) Osaka University will start a new "one stop service office" for international researchers and students in 2007. This all-in-one service aims to improve both the research and living conditions for visitors from abroad. Information including the research and daily life on campus and in the surrounding area has already been released on the web information service site "GCN-Osaka & Worldwide". Osaka University has established three Overseas liaison offices for Education and Research. Their central task is to collect and transmit information, and scout highly talented researchers. All the faculties and overseas offices of Osaka University will assist the WPI so as to become the "World Premier International Research Center".