World Premier International Research Center Initiative (WPI)
Activities Report of the WPI Academy Center
(FY 2020 – FY 2023)

Host Institution	Osaka University	Host Institution Head	NISHIO Shojiro
Research Center	Immunology Frontier Research Center (IFReC)		
Center Director	TAKEDA Kiyoshi	Administrative Director	TAKAGI Akihiko

Common Instructions:
* Unless otherwise specified, prepare this report based on the current (31 March 2024) situation of your Center.
* Use yen (¥) when writing monetary amounts in the report. If an exchange rate is used to calculate the yen amount, give the rate.
* Prepare this report within 10 pages (excluding the appendices, and including "Summary of State of WPI Academy Center Progress" (within 2 pages)).

Summary of WPI Academy Center's Activities (write within **2 pages**)

Established as a WPI center in 2007, the Immunology Frontier Research Center (IFReC) at Osaka University has produced excellent results by conducting research activities aimed at a "comprehensive understanding of the immune system" through the integration of immunology, imaging, and informatics. In 2015, IFReC was highly evaluated by the WPI Program Committee for attaining World Premier Status. Although WPI grant support for IFReC ended at the close of FY2016, IFReC's distinguished research capabilities were recognized, leading to major funding from pharmaceutical companies under comprehensive collaboration agreements starting in FY2017. This funding has provided IFReC with a stable financial base for its operations, allowing it to maintain the same scale as during its WPI-supported period.

Under the strong leadership of Director TAKEDA Kiyoshi, who assumed the directorship in July 2019, IFReC has set a goal of contributing to society through basic research results produced by its industry-academia collaborations. To achieve this goal, IFReC has focused on (1) promoting human immunology, (2) fostering next-generation researchers and (3) advancing the internationalization of IFReC. During the COVID-19 outbreak from 2020 to 2023, IFReC accelerated its human immunology research to combat the virus and promoted the Team Handai Project in collaboration with other departments and research institutes within the university. Despite the stagnation in international collaborations due to activity restrictions caused by the pandemic, partnerships with overseas research institutions were significantly strengthened. In addition, as one of the centers of the WPI Academy, IFReC endeavors to accelerate and expand the international circulation of young talented researchers.

Maintaining a High Level of Research Since its establishment, IFReC has amassed an extremely high level of research achievements. To date, approximately 2,600 peer-reviewed papers have been published, with an average citation count of 77.9 and an h-index of 179. The percentages of top 1% and top 10% papers are 4.9% and 24.4%, respectively. Focusing only on immunology papers, these percentages rise to 6.0% and 28.7%, respectively, demonstrating an internationally recognized high level of research. The proportion of papers on human immunology has risen to over 50% in 2023.

Implementation of Cross-Institutional Research through Research against COVID-19 IFReC played a central role in the Team Handai Project, in which Osaka University made a concerted effort to overcome COVID-19. As the development of treatments for COVID-19 required intensive interdisciplinary research by researchers from diverse fields in addition to basic research, the sharing of research information and the promotion of interdisciplinary joint research were carried out through the voluntary participation of researchers (65 PIs) from graduate schools and research institutes within Osaka University. This initiative led to the establishment of the Center for Infectious Disease Education and Research (CiDER) and the Center for Advanced Modalities and Drug Delivery Systems (CAMaD) at Osaka University.

Promotion of Human Immunology In order to contribute to the development of diagnostic and therapeutic methods for human diseases, it is necessary to shift from research using animal models to immunological research using human samples. For measurements on small amounts

of human samples, it is necessary to use cutting-edge technologies such as single-cell analysis and multicolor cytometry. These highly complex technologies require proficiency in bioinformatics to handle the large amounts of data they generate. Organizational support for the use of these technologies includes: (1) technical support for single-cell analysis and mass cytometry provided by the Human Immunology Laboratory, (2) continuous enhancement of common equipment (approximately 200 million yen annually), (3) financial support for expensive measurements using single-cell analysis (50 million yen annually), (4) collaboration with Becton Dickinson Japan for using multicolor flow cytometry, and (5) the establishment of a bioinformatics center within Osaka University's life sciences departments in FY2023 and the promotion of its joint use.

Development of Next-Generation Researchers From 2020 to 2023, five PIs retired due to reaching retirement age, and four new young PIs were recruited: Dr. OKABE Yasutaka as a Young Lead Researcher in 2020, Dr. KAMADA Nobuhiko (Professor) in 2021, who holds a tenured position (associate professor) at the University of Michigan, USA, and two female researchers, Dr. KANG Sujin and Dr. MATSUOKA Yumi, in 2022. These young PIs, expected to become core researchers at IFReC, received financial support, with senior PIs actively mentoring them.

Through the Advanced Postdoc Program, implemented since 2017, 16 outstanding young researchers who are internationally active have been recruited to date from a total of 1,112 applicants. Although IFReC offered financial support to young researchers for overseas travel and research activities, the pandemic restricted their activities, making it difficult for them to participate in overseas conferences. During this period, IFReC provided financial support to encourage young researchers to publish their research papers. In addition, when outstanding research results were published, videos were created and posted on IFReC's YouTube channel.

Cooperation with leading overseas research institutions In order to fully utilize rapidly advancing technologies, it is necessary to enhance collaboration with prominent overseas research institutions. Close collaborations also strengthen IFReC's role as a hub for the international circulation of young researchers. IFReC has strengthened its collaborations through ongoing research exchanges with ImmnuSensation^2 at the University of Bonn in Germany and with two of Osaka University's Global Knowledge Partners: University College London (UCL) in the UK and the University of Melbourne in Australia.

Preparations for a Doctoral Degree Program Preparations are underway for a doctoral degree program to foster young researchers into the next generation of immunology researchers, slated to begin in FY2024. In this program, students will be affiliated with the Graduate School of Medicine and will conduct their doctoral studies under the supervision of PIs at IFReC or other life science research institutions at Osaka University. The program consists of two sub-programs: a degree program for international students from partner institutions in Asia, and a Double Degree Program with the University of Bonn.

Ratio of International and Female Researchers Although the relative decline in remuneration in Japan compared to other countries due to currency fluctuations has made it more difficult to recruit talented international researchers than in the past, IFReC has maintained an international researcher ratio of 26.0%. IFReC promotes the recruitment of female researchers and has recruited two young female PIs, improving the female researcher ratio from 23.8% in January 2020 to 29.1% in December 2023.

Securing the operational foundation through industry-academia collaboration IFReC has comprehensive collaborations with two pharmaceutical companies for the period from FY2017 to FY2026, with total funding of more than 10 billion yen. This has enabled IFReC to secure a financial foundation for its operations. In these agreements, IFReC's researchers are guaranteed the freedom to conduct basic research. IFReC prioritizes the disclosure of its latest research results to the companies in return for the funding, leading to the start of many joint research projects, and the application of basic research results. In FY2023, IFReC obtained 1.82 billion yen through industry-academia collaborations.

Support from host institution Osaka University allocated six tenured posts (3 professors, 1 assoc. professor, and 2 assist. professors) and prioritized the assignment of bilingual and capable administrative staff to IFReC. Offices modeled after IFReC's Research Planning and Management Office (RPMO) have been established in the Center for Quantum Information and Quantum Biology (QIQB), the Premium Research Institute for Human Metaverse Medicine (WPI-PRIMe), CiDER, and CAMaD, utilizing IFReC's experience and know-how.

* Describe clearly and concisely the progress being made by the Center from the viewpoints below.
- In addressing the below-listed 1-8 viewpoints, place emphasis on the following:
  (1) Whether research standards and operation of the Center is maintaining a "world premier" status.
  (2) Whether the Center participate and cooperate to the activities to advance the overall development of the WPI Program and to promulgate its achievements.

1. Overall Image of Your Center

・Describe the Center's current identity and overall image.
・List the Principal Investigators in Appendix 2, diagram the Center's management system in Appendix 3-1, enter the number of center personnel in Appendix 3-1a, and enter center funding in Appendix 3-2.

Established as a WPI center in 2007, the Immunology Frontier Research Center (IFReC) at Osaka University has conducted research activities aimed toward a "comprehensive understanding of the immune system" through the integration of immunology, imaging, and informatics. In 2015, IFReC was also highly evaluated by the WPI Program Committee for attaining World Premier Status. Although WPI grant support for IFReC ended at the close of FY2016, IFReC's distinguished research capabilities were demonstrated by its outstanding research achievements, leading to major funding from pharmaceutical companies under comprehensive collaboration agreements for the period from FY2017 to FY2026. This funding has provided IFReC with a stable financial base for its operations, allowing it to maintain the same scale as during its WPI-supported period and continue its activities pursuant to the WPI philosophy. Under the strong leadership of Director TAKEDA Kiyoshi, IFReC has set a goal of contributing to society through basic research results produced by its industry-academia collaborations. During the COVID-19 outbreak, IFReC accelerated its human immunology research to combat the virus and promoted the Team Handai Project in collaboration with other departments within the university. In addition, as one of the centers of the WPI Academy, IFReC endeavors to accelerate and expand the international circulation of young talented researchers.

Maintaining a High Level of Research With more than 2,600 published papers to date reaching an average citation count of 77.9 and an h-index of 179, IFReC has accumulated an extremely high level of research achievements. The percentages of top 1% and top 10% papers are 4.9% and 24.4%, and 6.0% and 28.7% in the field of immunology, respectively, demonstrating an internationally recognized high level of research.

Promotion of Human Immunology As recent rapid developments in technologies have enabled the measurement of small amounts of human-derived samples, IFReC has been promoting research in human immunology by updating its equipment, providing financial support for high measurement costs, and establishing various support systems and programs. In addition, IFReC also participated in the establishment of a Bioinformatics Center, which serves as an organizational support system that consolidates the research resources of the life sciences institutions within Osaka University. Through these efforts, the human immunology-related papers published by IFReC in FY2023 comprised more than half of its total number of papers.

Implementation of Cross-Institutional Research through Research against COVID-19 IFReC played a central role in the Team Handai Project, in which Osaka University made a concerted effort to overcome COVID-19. This initiative led to the establishment of the Center for Infectious Disease Education and Research (CiDER) and the Center for Advanced Modalities and Drug Delivery Systems (CAMaD) at Osaka University.

Utilizing Fundamental Research Results through Industry-Academia Collaborations Under the comprehensive cooperation agreements with pharmaceutical companies, IFReC's researchers are guaranteed the freedom to pursue basic research, and their latest findings are disclosed to the companies, leading to the start of many joint research projects.

Development of Next-Generation Researchers IFReC has recruited four young PIs, including one Young Lead Researcher, for the period from 2020 to 2023. IFReC has been providing support to these PIs to develop them into core researchers through mentoring by senior PIs. IFReC has supported the international circulation of young researchers through the Advanced Postdoc Program to recruit outstanding overseas young researchers, and programs to support research activities overseas and the publication of research papers.

Cooperation with leading overseas research institutions Close collaborations strengthen IFReC's role as a hub for the international circulation of young researchers. IFReC has strengthened its collaborations through ongoing research exchanges with ImmnuSensation^2 at the University of Bonn in Germany and two of Osaka University's Global Knowledge Partners: University College London (UCL) in the UK and the University of Melbourne in Australia.

2. Advancing Research of the Highest Global Level

・Describe what's been accomplished in the Center's research objectives and plans.
・In Appendix 1, list the papers underscoring those research achievement and list the Center's research papers published in 2020-2023 in a manner prescribed in Appendix A.

Research Papers: Since its establishment, IFReC has amassed an extremely high level of research achievements. To date, approximately 2,600 peer-reviewed papers have been published, with an average citation count of 77.9 and an h-index of 179. The percentages of top 1% and top 10% papers are 4.9% and 24.4%, respectively. Focusing only on immunology papers, these percentages rise to 6.0% and 28.7%, respectively, demonstrating an internationally recognized high level of research. About 900 papers were published by IFReC's researchers from 2020 to 2023, averaging over 220 per year. A total of 117 papers were published in high-impact journals, such as the sister journals of Nature and Science, accounting for 13% of the total (Attachment A Center's Research Result; Web of ScienceTM searched on April 15, 2024).

Since the publications are recent as of April 2024, the citation count analysis is provided for reference only. IFReC was comparable to the La Jolla Immunology Institute (USA), which is of similar size to IFReC in terms of number of papers, but below it in terms of average citations per paper, and the percentages of papers in the top 1% and top 10%. On the other hand, when compared with the Institute of Medical Science at The University of Tokyo (IMSUT), Japan's top research institution, IFReC showed superior results in terms of average citations per paper, and the percentages of papers in the top 1% and the top 10%. This was particularly evident in the field of immunology, where the respective values were 14.1, 1.6, 14.5 for IFReC and 8.3, 0.78, 11.4 for IMSUT (based on InCitesTM search conducted on April 15, 2024).

The proportion of papers on human immunology, initially in the 20% range, has risen to over 50% in 2023.Although IFReC, like other research institutions in Japan, faced challenges during the COVID-19 pandemic, it now leads in the field of immunology in Japan, primarily through its contributions to human immunology.

Invited Lectures In 2020, Professor KISHIMOTO Tadamitsu and Professor SAKAGUCHI Shimon gave memorial lectures when they received their international awards, the Tang Prize and the Robert Koch Prize, respectively, which were presented online and on-site on an international stage. Since the easing of COVID-19 restrictions on activities in 2023, many PIs at IFReC have been actively giving lectures at meetings around the world, including prestigious gatherings such as the Keystone Symposia and Cold Spring Harbor Symposia (Appendix 1-2).

Awards and Decorations In 2020, Professor SAKAGUCHI Shimon received Germany's prestigious Robert Koch Prize, and Professor KISHIMOTO Tadamitsu received the Tang Prize, often referred to as "Asia's Nobel Prize." In 2021, Professor KISHIMOTO also was a Clarivate Citation Laureate, which is also called the "Nobel Prize Prediction." Other recipients of Japan's leading life science awards include Professors ARASE in 2020 and YAMASAKI in 2022 (Hideyo Noguchi Memorial Prize), KUROSAKI in 2023 (Mochida Memorial Award), TAKEDA in 2022 (Takeda Prize for Medical Science), KINOSHITA in 2021 (Osamu Hayaishi Memorial Prize), and ARASE in 2021 (Erwin von Bälz Prize). Additionally, Professor YANAGIDA Toshio was elected as a member of the Japan Academy (Appendix 1-3). Furthermore, three graduate students affiliated with IFReC received the JSPS Ikushi Award, which is awarded to only 18 students a year across all disciplines.

3. Facilitating Interdisciplinary Research Activities

・Describe the content of measures taken by the Center to facilitate interdisciplinary research activities. For example, measures that create an environment that will facilitate doing joint research by researchers in differing fields.
・Describe the contents and results of interdisciplinary research activities yielded by the measures described above.

Team Handai Project for COVID-19 research The COVID-19 pandemic from 2020 claimed many victims, mainly the elderly and other vulnerable members of society. Driven by a mission to study the immune system as a host response to infectious diseases, IFReC was actively involved in COVID-19 research. In order to develop diagnostic and therapeutic methods for COVID-19, IFReC launched the interdisciplinary research consortium 'Team Handai Project' in July 2020. This project started with researchers from IFReC, the Research Institute for Microbial Diseases (RIMD) and Osaka University Hospital, and later included researchers from nine other graduate schools and research institutions. This led to cross-departmental joint research activities involving a total of 65 PIs affiliated with Osaka University. Regular monthly meetings

and a retreat (June 2023) were held to share the latest research information and promote interdisciplinary joint research. Based on these concerted research efforts, Osaka University established CiDER in 2021, which then received support from the Nippon Foundation. In 2022, CAMaD was established at Osaka University by the Strategic Center of Biomedical Advanced Vaccine Research and Development for Preparedness and Response (SCARDA) at AMED.

Interdisciplinary research of Immunology, Imaging and Informatics Since its establishment, IFReC has promoted an interdisciplinary approach to research by integrating immunology, imaging and informatics, and continues to promote the exchange of research information among researchers in different fields through the monthly IFReC colloquia. Research integrating these disciplines is widely adopted throughout IFReC. The Nikon Imaging Center, established in 2020 with Dr. ISHII Masaru as its director, is Japan's largest facility dedicated to bio-imaging set in a university, leading bio-imaging research and contributing to the promotion of interdisciplinary research throughout Osaka University. Bioinformatics has also become indispensable for analyzing the vast amounts of measurement data generated from single-cell analysis and other techniques essential for human immunology. In order to maximize the use of bioinformatics, it is necessary to systematically and continuously update bioinformatics facilities and provide support to researchers. In response to this, the life sciences research departments in Osaka University described later have collaborated to establish the Bioinformatics Center at RIMD in 2023, which consolidates and utilizes their research resources. Representative results produced through these interdisciplinary research efforts over the past four years are presented below.

(1) SAKAGUCHI, OKUZAKI and others compiled a comprehensive reference of circulating CD4+ T cells, encompassing 12 gene programs and 18 clusters. They revealed disease-specific cellular characteristics through the integration of genome-wide association studies and single-cell meta-analysis. Their work provides insights for precision medicine (Yasumizu et al. Cell Gen. 2024).

(2) A research group led by OKADA Yukinori performed immune phenotype analysis on 1000 patients with 11 types of autoimmune diseases and clarified the networks composed of autoimmune diseases and immune cells (Tanaka et al. ARD. 2023).

(3) The research group of NISHIDE and KUMANOGOH identified the immunological phenotypes of microscopic polyangiitis (MPA) by single cell multi-omics analysis. They provide clinical insights for personalized treatment and accurate prognostic prediction (Nishide et al. Nat Commun. 2023).

(4) YAMAMOTO and their research group developed a genetic screen using CRISPR technology in mice to confirm known genes and identify new genes involved in Toxoplasma fitness, i.e., the ability of the parasite to survive and thrive within a host (Tachibana et al. Cell Rep. 2023).

(5) KUMANOGOH, OKADA, OKUZAKI and their research groups performed a single-cell analysis of 900,000 peripheral blood mononuclear cells derived from 148 Japanese as well as an integrated analysis with host genome information. They found that CD14+CD16++ monocytes, a rare subset among monocytes, are involved in COVID-19 severity (Edahiro et al. Nat Gen. 2023).

(6) Using the cutting-edge mass cytometry, the research group of WING uncovered sex-specific differences in a type of Treg cells and in the production of antibodies, as part of the response to COVID-19 infection (Søndergaard et al. PNAS 2023).

(7) Using an orthotopic murine lung cancer model and human carcinoma samples, ISHII Masaru and their research group revealed that Alveolar macrophages support cancer cell proliferation (Taniguchi et al. Nat Commun. 2023).

(8) Combining proteomics and single cell analysis, the research group of KUMANOGOH discovered that MACROH2A1 in extracellular vesicles is a potential biomarker of refractory COVID-19 and may reflect the pathogenesis of COVID-19 in monocytes (Kawasaki et al. Inflamm Regen. 2022).

(9) YAMASAKI, TAKEDA, KUMANOGOH, KUROSAKI and the research group collected T cells activated with various antigens from peripheral blood of patients who had recovered from COVID-19. By the single-cell TCR and RNA sequences analyzing, they identified conserved SARS-CoV-2 S epitopes that activate public cTfh clonotypes associated with mild symptoms (Lue et al. J Exp Med. 2021).

(10) The group led by SMITH collected Raman spectra from neutrophil extracellular traps (NETs) and frozen/thawed necrotic cells using a custom built high-throughput platform which is able to rapidly measure spectra from single cells. Principal component analysis of Raman spectra from

NETs clearly distinguished them from necrotic cells (Lelliott et al. Sci Rep. 2023).
(11) By the use of cutting-edge imaging technology, the group of ISHII Masaru identified a serine protease inhibitor and secretory leukocyte protease inhibitor as a critical mediator that is involved in the PTH-mediated shift to the osteoblastic phase (Morimoto et al. Nat Commun. 2021).
(12) By combining cryo-EM and X-ray crystallography, the NAGATA group determined the structure of Xkr8-Basigin, which localizes on membranes at an overall resolution of 0.38 nm.
(13) SUZUKI, STANDLEY and their research group demonstrated the molecular mechanism by which celastrol, a component of traditional Chinese medicine, improves the pathology of an autoimmune disease. The cryo-EM and the docking simulation method using genetic information were used to determine its molecular structure (Shirai et al. Sci Immunol 2023). This methodology was also used by ARASE, who showed both neutralizing antibodies that protect against infection as well as infection-enhancing antibodies that increase infectivity are produced after infection with SARS-CoV-2 (Liu et al. Cell 2021).

4. Maintaining an International Research Environment

- Describe what's been accomplished in the efforts to raise the Center's recognition as a genuine globally visible research institute, along with innovative efforts proactively being taken, including the following points, for example:
  - Efforts being developed to maintain an international research environment based on the analysis of number and state of world-leading, frontline researchers; exchanges with overseas entities
  - Proactive efforts to raise the level of the Center's international recognition
  - Efforts to make the Center into one that attracts excellent researchers from around the world (such as creating of an environment in which researchers can concentrate on their research, providing startup research funding, supporting efforts that will foster young researchers and contribute to advancing their career paths, and arranging support system for the research activities of overseas researchers.)
  - Consolidation of the administrative structures to support implementing the efforts described above
- In Appendix 3-1, describe the state of cooperation with overseas satellites, and list the main international research meetings held by the Center.

To revitalize research, IFReC has strengthened partnerships with overseas institutions and facilitated the international circulation of young researchers. IFReC continued to improve its international research environment and support system that have developed since the WPI-supported period to accommodate international researchers. While research activities abroad and exchange activities with overseas research institutes were considerably stagnated during the pandemic, collaboration with overseas research institutes has significantly strengthened since 2021.

Collaboration with leading overseas research institutions IFReC has strengthened its relationship with ImmunoSensation^2, a Cluster of Excellence at the University of Bonn in Germany, by co-organizing three joint symposia (online in 2021, and Bonn in 2022 and 2023) and two sessions of the International School on Advanced Immunology. Furthermore, a Double Degree Program to jointly train PhD students has been agreed upon and starts in FY2024. University College London (UCL, UK) is one of Osaka University's Global Knowledge Partners (GKP), with which joint symposia have been regularly held (Osaka in 2019 and London in 2022) to promote research exchange. IFReC, together with ImmunoSensation^2 and UCL, has been selected for the JSPS Core-to-Core Program and is using it to strengthen their relationships. As the University of Melbourne (Australia) is also a GKP, joint symposia (Melbourne in 2022 and Osaka in 2023) were held with funding from both universities.

International Symposia IFReC organized 11 international research conferences in 2020-2023 (including four held overseas). IFReC international symposia are generally held every year as opportunities to disseminate IFReC's latest research results and to introduce cutting-edge research results from abroad to researchers in Japan. However, they could not be held during the COVID-19 pandemic in 2020 and 2021. Seven joint symposia with overseas institutions including the above-mentioned ones were held, one in 2021, three in 2022, and three in 2023. In 2022 and 2023, the NGS Expos were held for domestic researchers and companies to discuss the latest next-generation sequencing technologies, including single-cell analysis technology.

International School on Advanced Immunology IFReC held the Winter School on Advanced Immunology with the Singapore Immunology Network (SIgN) in 2011-2020, and re-launched it as the International School on Advanced Immunology with the University of Bonn in 2022. The School was conducted on Awaji Island in 2022 and at Maria Laach in 2023 for doctoral students and early-stage postdocs. The School hosted by IFReC in 2022 selected 53 outstanding participants from a total of 382 applications. The School was highly evaluated for its effectiveness in educating young researchers and fostering a network of future leaders in

immunology. Furthermore, IFReC has succeeded in recruiting some of the outstanding participants from the School as postdoctoral researchers.

Advanced Postdoc Program Available since 2017 to recruit talented young researchers with international experience, this program offers an internationally competitive salary and an annual research grant of 3 million yen during the three-year employment period. 16 Advanced Postdocs have been recruited from a total of 1,112 applicants (recruits/applicants: 1/169 in 2020, 3/134 in 2021, 0/153 in 2022 and 1/210 in 2023).

Program for International Circulation for Young Talented Researchers IFReC has provided travel support to nine of IFReC's young researchers (two in 2022 and seven in 2023) for them to participate in overseas research activities. The young researchers later posted activity reports on IFReC's internal website to share their experiences. During the COVID-19 pandemic, it was difficult for young researchers to attend conferences abroad, so IFReC provided support for publishing their research papers so that they would be recognized in the international academic community. In addition, IFReC created videos for particularly outstanding research results and made them available on IFReC's YouTube channel.

Preparations for a Doctoral Degree Program Preparations are underway to establish a doctoral degree program to foster young researchers. In this program, students affiliated with the Graduate School of Medicine will conduct their doctoral studies under the supervision of PIs at IFReC or other life science research institutions at Osaka University. The program consists of the following two sub-programs. **(1) Program for students from partner institutions in Asia** This sub-program aims to develop immunological research by accepting driven and ambitious students from emerging Asian countries. Based on recommendations from our partner institutions in Asia (Mahidol University in Thailand and Translational Health Science and Technology Institute in India), students will be selected for acceptance in October 2024. The accepted students will receive a scholarship for the duration of their enrollment. **（2）Double Degree Program with the University of Bonn** Early experience in research activities abroad is important for developing young Japanese researchers. In this sub-program, students are enrolled at both universities and work on a joint research project under the supervision of a PI from each university. During their enrollment, students spend at least one year conducting research at the partner university. Students will receive separate doctoral degrees from both universities. Students will be accepted starting from FY2025.

Support for International Researchers The Research Planning and Management Office (RPMO) extensively supports international researchers in both research and daily life. IFReC organizes weekly Japanese language classes for international researchers, and during the COVID-19 pandemic, set up a dedicated webpage and distributed an English newsletter to keep international researchers and their families informed about the pandemics and activity restrictions.

5. Making Organizational Reforms

- Describe distinctive effort in managing research operation and administrative organization, such as the strong leadership that the director is giving on the Center's operation, strong performance by the administrative director who provides the center director with strong administrative and managerial support, and division of roles and authority between the Center and its host institution.
- Describe the ripple effects that activities to disseminate experience and know-how accumulated by the Center, such as the followings, have/had on the host institution (or other research institutes, if any):
  - System reforms made through the Center's leading activities to its research operation and administrative organization
  - Experience and know-how accumulated by the Center as it have worked to establish itself as top world-level research institutes.
- Other than the above, give examples, if any, of cooperative activities by the Center and the whole WPI Program or other WPI centers, to disseminate experience and know-how accumulated by the WPI program and/or the WPI centers.

Management of IFReC under the Strong Leadership of the Director The Director's strong leadership was essential for the development of human immunology at IFReC, as well as for IFReC's partnerships with overseas institutions and strong collaborations within Osaka University, which led to the Team Handai Project. This initiative further led to the establishment of CiDER and CAMaD, as well as the Bioinformatics Center, enhancing the infrastructure of life science research facilities.

Change of Administrative Director In August 2020, Dr. TAKAGI Akihiko, with previous research experiences at a university and as a University Research Administrator (URA) at the RPMO, was appointed as the new Administrative Director, concurrently also the Head of the RPMO.

Development of Human Resources IFReC provides support to researchers at each stage of their careers.

(1) Fostering the next generation of researchers Doctoral students and postdocs were trained and supported through the Advanced Postdoc Program, the International School on Advanced Immunology, and a program to support travel expenses for research activities abroad.
(2) Young Lead Researchers In 2020, Dr. OKABE Yasutaka was appointed as a Young Lead Researcher (YLR) as a young PI on the verge of becoming independent. YLRs run their own independent research groups and can immediately start their research upon appointment in an open lab set up at IFReC.
(3) New young PIs IFReC recruited Dr. KAMADA Nobuhiko as a new PI through a cross-appointment in 2021. Expected to become a full-time PI in the near future, he holds a tenured position at the University of Michigan, USA, and was selected as a Highly Cited Researcher (Clarivate) in 2022 and 2023. Dr. KANG Sujin and Dr. MATSUOKA Yumi, two young outstanding female researchers, were also promoted to PIs in 2022. These young PIs, including a YLR, who are expected to become IFReC's core researchers, have been supported with 7 million yen per year for three years, as well as evaluation and advice from senior researchers.
(4) Senior PIs Five PIs (Drs. KIKUTANI, HATAZAWA, SAITO, KINOSHITA and KUROSAKI) have retired due to reaching retirement age. On the other hand, IFReC has allowed four senior PIs who have world-leading research capabilities (Drs. KISHIMOTO, NAGATA, SAKAGUCHI, and AKIRA) to continue their research, as they have obtained sufficient external research funding even beyond retirement age, and contribute to the development of the next generation of researchers as mentors.
(5) Research management personnel The vigorous activities of university research administrators (URAs) with expertise and experience are essential for supporting researchers and planning and managing IFReC activities. Four URAs with PhDs and seven administrative staff in the RPMO are responsible for these tasks.
Dissemination of Achievements The experience and know-how accumulated at IFReC were disseminated as follows:
(1) RPMO as a role model in new centers At Osaka University, offices modeled after IFReC's RPMO have been established in the Center for Quantum Information and Quantum Biology (QIQB), the Premium Research Institute for Human Metaverse Medicine (WPI-PRIMe), CiDER, and CAMaD, with experienced researchers appointed as heads of these offices. The experience and know-how of IFReC's RPMO, as an organization that implements the policies defined by its director, are being shared.
(2) International Advanced Research Institute (IARI) Osaka University prioritized the assignment of experienced IFReC administrative staff to QIQB and WPI-PRIMe, which belong to the IARI headed by the President, enabling their activities to benefit from IFReC experiences.
(3) Broad dissemination of experience and know-how in public relations and outreach activities IFReC has taken the lead in international public relations and outreach activities within the university. In the past, IFReC has hosted joint press releases and events in collaboration with the Public Relations Offices of the Graduate School of Medicine and RIMD at Osaka University. From 2021 onwards, IFReC has also conducted public relations and outreach activities jointly with CiDER and CAMaD. IFReC's URAs also concurrently serve at CiDER, and share their past experiences and know-how in event hosting and publication with CiDER members. In particular, IFReC disseminated information regarding Osaka University-wide research activities on COVID-19 through the Team Handai Project, holding regular research meetings and annually publishing a magazine for the general public. Furthermore, IFReC held several faculty development (FD) seminars on public relations and outreach for Osaka University's academic staff, which were well received.

6. Efforts expected to WPI Academy Center to Enhance and Amplify the Visibility and Brand of the Overall WPI Program

- Describe how the Center's outreach activities have contributed to enhancing and amplifying the visibility and brand of the WPI program. Describe the successful cases of the Center's outreach activities in Appendix 4, and enter the number of activities in Appendix 4a.
- Other than the above, describe, if any, the activities and their concrete contents that have contributed to the enhancement and amplification of the visibility and brand of the WPI program (such as holding a large international research meeting, collaborative activities with multiple WPI centers). If you have already provided this information, please indicate where in the report.
- Describe the Center's efforts in making it a place that expands and accelerates the international circulation of the world's best brains. Give their success cases and describe their concrete contents and effect in narrative.
- Describe examples, if any, of cooperative activities by the Center and the whole WPI Program or other WPI centers, to disseminate experience and know-how accumulated by the WPI program and/or the WPI centers.

Since FY2017, IFReC has strengthened its PR and outreach efforts targeting young researchers in Japan and abroad to accelerate and expand the international circulation of talented researchers. IFReC has also actively promoted outreach activities to the general public to increase public awareness and to garner support for IFReC's activities as a WPI Academy Center.
Acceleration and expansion of international circulation of talented researchers Efforts to improve the visibility of the center among young researchers in Japan and abroad were made mainly through the Advanced Postdoc Program and the International School on Advanced Immunology. By utilizing the lists of immunology research institutes and researchers that IFReC has compiled to date (approximately 300 domestic institutes, 450 domestic researchers, 350 overseas institutes, and 1,150 overseas researchers), and by posting job advertisements on the websites of leading academic journals, IFReC's proactive PR activities have resulted in an increase in the number of applications to these programs.
Outreach Activities to the General Public IFReC's public relations and outreach activities changed drastically since the outbreak of COVID-19 in 2020, with online activities becoming the main focus (Appendix-4a). IFReC's researchers provided basic knowledge about COVID-19 at the Science Agora sponsored by JST, and gave a total of 12 online lectures in a joint project with Grand Front Osaka Knowledge Capital. Although in-person events such as the Science Café and the distribution of publications were no longer possible, IFReC continued to publish a public relations magazine, Imuneco, and a PR magazine related to activities of the Team Handai Project. Eight seminars introducing the latest research to high school teachers were held online jointly with other WPI centers, and attracted a total of approximately 600 participants. IFReC created 14 short videos featuring their young researchers talking about their research, and posted them on its website and YouTube. In 2022, IFReC's website underwent a complete renewal, resulting in improved readability, easier access to information, and better smartphone compatibility, which led to a 10%-50% increase in page views. In addition, many publications aimed at the general public, mainly related to COVID-19, were issued.
Branding of WPI The number of press releases for the media increased along with the number of papers published, reaching 22 in 2023. The overseas press releases included those introducing WPI. Fundraising activities have been conducted to promote WPI branding and diversify future operating funds. In 2023, when in-person events resumed following the subsiding of the COVID-19 situation, pamphlets were updated and in-person visits were conducted, resulting in a sixfold increase in donations compared to the previous year.

7. Effort to Secure the Center's Future Development over the Mid- to Long-term

・Address each of the following items that have been done to secure mid- to long-term center development:
- Contents of the measures taken by the host institution to support maintaining the activities of the Center (such as securing financial and personnel resources, coordination among host institution to bring together in-house researchers, in-kind provision and/or facilities afforded in terms of usage of building, lab space and other equipment, new management reform carried out after the funding period ends).
- Actions and measures taken to sustain the Center as a world premier international research center.

Securing the operational foundation through industry-academia collaboration IFReC has secured a financial foundation for its operations for the period from FY 2017 to FY2026 through funding from comprehensive collaborations with Chugai Pharmaceutical Co., Ltd. and Otsuka Pharmaceutical Co., Ltd. These agreements give IFReC's researchers the freedom to conduct basic research. In return for the funding, IFReC discloses its research results to the companies, allowing them to propose joint research, which are funded separately under usual joint research agreements. In FY2023, IFReC obtained 1.82 billion yen through industry-academia collaborations.
Promotion of Human Immunology IFReC has been enhancing its research in human immunology since 2019. To contribute to the development of diagnostic and therapeutic methods for human diseases, a shift from conventional animal-based immunology research to using human-derived samples for studying the human immune system is necessary. Cutting-edge technologies such as single-cell analysis and multicolor cytometry are necessary to perform measurements on small amounts of human samples. These technologies are highly complex, and a proficiency in bioinformatics is essential to handle the large amounts of data they generate. Therefore, organizational support is crucial. **(1) Support by Support Groups** In 2019, the Human Immunology Laboratory was established with two PIs (associate professors) providing support for single cell analysis and mass cytometry measurements. **(2) Enhancement of Common Equipment** Significant investments have been made annually to enhance common

equipment, mainly for single cell analysis and for the expansion of next-generation sequencing equipment. (380 million yen in FY2020, 220 million yen in FY2021, 210 million yen in FY2022 and 100 million yen in FY2023). **(3) Support for the High Cost of Measurements** As the high cost of cutting-edge measurements used in human immunology, such as single-cell analysis and mass cytometry, can be prohibitive for young researchers, IFReC has provided financial assistance for these costs (50 million yen in FY2020, FY2021 and FY2023, and 100 million yen in FY2022). **(4) Establishment of BD Laboratory** In 2021, a collaboration with Becton Dickinson Japan (BD Japan) was initiated to enhance the use of multicolor flow cytometry, leading to the establishment of a BD laboratory within IFReC, with BD Japan technicians regularly visiting to provide guidance and consulting services. A support program was implemented in FY2022 and FY2023 to promote the use of this technology and assist in the development of new technologies needed for immunological research.

Strengthening Collaboration with Institutions within University IFReC has been collaborating with RIMD on the joint operations of the Animal Resource Centers and the Central Instrumentation Laboratory. The state-of-the-art BSL3 facility at RIMD, which was reconstructed in 2023, has been made available to IFReC's researchers. The rapid development of bioinformatics technology has made it indispensable in life sciences research. However, the high cost of bioinformatics research facilities makes it difficult for a single institution like IFReC to bear. To address this, the Strategic Committee for Life Sciences, composed of graduate schools and research institutes for life sciences at Osaka University, led to the establishment of the Bioinformatics Center at RIMD in FY2023.

International and Female Researchers Although the relative decline in remuneration in Japan compared to other countries due to currency fluctuations has made it more difficult to recruit talented international researchers than in the past, IFReC has maintained an international researcher ratio of 26.0% through active recruitment activities and collaboration with overseas research institutions. In addition, two young female PIs have been recruited, bringing the current total to four female PIs at IFReC. The increase in the number of female PIs has encouraged the recruitment of female researchers who see them as attainable role models. As a result, the ratio of female researchers improved from 23.8% in January 2020 to 29.1% in December 2023.

Evaluation and Support by Host Institution As the host institution, Osaka University established the International Advanced Research Institute (IARI) in FY2017 with the university president as its director, and made IFReC one of IARI’s departments. As the host institution, Osaka University has provided the following support to IFReC.

(1) Human resources support Ongoing increases in the allocation of tenured posts (one assoc. professor position that was changed to a professor position in FY2022) have resulted in the allocation of 6 tenured posts (three professors, one assoc. professor and two assist. professors), which have been extremely useful for recruiting new PIs. In addition, measures were implemented to prioritize the assignment of bilingual and capable administrative staff to IFReC.

(2) Financial support Under the comprehensive collaboration agreement with Chugai Pharmaceutical Co., Ltd., the entire budget for all indirect costs that was allocated to the Administrative Bureau was allocated back to IFReC, and the entire amount received (1 billion yen per year) was made available for use by IFReC. In addition, a grant of 100 million yen from the Osaka University Foundation for the Future, a fund of donations, was provided to the Team Handai Project for research on COVID-19.

(3) Support for international cooperation Osaka University has taken the lead in promoting collaborations with UCL and the University of Melbourne, which are two of its Global Knowledge Partners. Osaka University provides support through funding for the aforementioned joint symposia to promote research exchange and enhances support programs to advance international joint research.

(4) Support for industry-academia collaboration The department responsible for industry-academia collaboration provides sufficient support to assist IFReC in managing its increasingly complex comprehensive collaborations, leading to many joint research projects.

8. Others

・In addition to the above1-7, note any of the Center's notable efforts and activities.

Appendix 1 List of Center's Major Research Achievements

1. List of Major Refereed Papers

*List **up to 20 papers** representative of the Center's research activities during the period between FY 2020 and FY 2023, and give brief descriptions (within 5 to 10 lines) of them.
*For each, write the author name(s); year of publication; journal name, volume, page(s) (or DOI number), and article title. Any listing order may be used as long as format is the same. If a paper has many authors, underline those affiliated with the Center.
*If a paper has many authors (say, more than 10), all of their names do not need to be listed.

1. Yen-Zhen Lu, Bhavana Nayer, Shailendra Kumar Singh, Yasmin K Alshoubaki, Elle Yuan, Anthony J. Park, Kenta Maruyama, Shizuo Akira, Mikaël M. Martino. CGRP sensory neurons promote tissue healing via neutrophils and macrophages. Nature. 2024. doi: 10.1038/s41586-024-07237-y.

   Collaborating with Shizuo Akira (Host Defense, IFReC), a research team led by Associate Professor Mikaël Martino (Monash University/IFReC) published a significant advancement in regenerative medicine. Their research sheds light on the intricate interplay between the nervous and immune systems, highlighting the critical involvement of sensory neurons in the repair and regeneration of tissues.

2. Yoshiaki Yasumizu, Daiki Takeuchi, Reo Morimoto, Yusuke Takeshima, Tatsusada Okuno, Makoto Kinoshita, Takayoshi Morita, Yasuhiro Kato, Min Wang, Daisuke Motooka, Daisuke Okuzaki, Yamami Nakamura, Norihisa Mikami, Masaya Arai, Xuan Zhang, Atsushi Kumanogoh, Hideki Mochizuki, Naganari Ohkura, Shimon Sakaguchi. Single-cell transcriptome landscape of circulating CD4+ T cell populations in autoimmune diseases. Cell Gen. 2023. doi: 10.1016/j.xgen.2023.100473.

   Yoshiaki Yasumizu, Naganari Ohkura and Shimon Sakaguchi (Experimental Immunology, IFReC) and their group compile a comprehensive reference of circulating CD4+ T cells, encompassing 12 gene programs and 18 clusters. They reveal disease-specific cellular characteristics through the integration of genome-wide association studies and single-cell meta-analysis. This work provides insights for precision medicine.

3. Hiroaki Tanaka, Yukinori Okada, Shingo Nakayamada, et al. Extracting immunological and clinical heterogeneity across autoimmune rheumatic diseases by cohort-wide immunophenotyping. Ann Rheum Dis. 2023. doi: 10.1136/ard-2023-224537.

   A variety of immune cells are involved in the pathology and onset of autoimmune diseases. A research group led by Yukinori Okada (Graduate School of Medicine, Osaka University/ Statistical Immunology, IFReC) performed immune phenotype analysis on 1000 patients with 11 types of autoimmune diseases and clarified the networks composed of autoimmune diseases and immune cells.

4. Masayuki Nishide, Kei Nishimura, Hiroaki Matsushita, Ryuya Edahiro, Sachi Inukai, Hiroshi Shimagami, Shoji Kawada, Yasuhiro Kato, Takahiro Kawasaki, Kohei Tsujimoto, Hokuto Kamon, Ryusuke Omiya, Yukinori Okada, Kunihiro Hattori, Masashi Narazaki, Atsushi Kumanogoh. Single-cell multi-omics analysis identifies two distinct phenotypes of newly-onset microscopic polyangiitis. Nat Commun. 2023. doi: 10.1038/s41467-023-41328-0.

   CD4+ T cells are key mediators of various autoimmune diseases; however, their role in disease progression remains unclear due to cellular heterogeneity. The research group of Masayuki Nishide, Kei Nishimura, and Atsushi Kumanogoh (Graduate School of Medicine, Osaka University/Immunopathology, IFReC) identified the immunological phenotypes of microscopic polyangiitis (MPA) by single cell multi omics analysis. They provide clinical insights for personalized treatment and accurate prognostic prediction.

5. Kotaro Shimizu, Junichi Kikuta, Yumi Ohta, Yutaka Uchida, Yu Miyamoto, Akito Morimoto, Shinya Yari, Takashi Sato, Takefumi Kamakura, Kazuo Oshima, Ryusuke Imai, Yu-Chen Liu, Daisuke Okuzaki, Tetsuya Hara, Daisuke Motooka, Noriaki Emoto, Hidenori Inohara & Masaru Ishii. Single-cell transcriptomics of human cholesteatoma identifies an activin A-producing osteoclastogenic fibroblast subset inducing bone destruction. Nat Commun. 2023. doi: 10.1038/s41467-023-40094-3.

   Cholesteatomas are made up of cysts or bumps in the ear that consist of skin, collagen fibers, skin cells, fibroblasts, keratin, and dead tissue. However, the exact mechanism for the creation of cholesteatomas remains unknown. The research group of Masaru Ishii (Graduate School of

Medicine/Graduate School of Frontier Biosciences/Immunology and Cell Biology, IFReC) revealed the cause of cholesteatomas, which may help in developing new therapies for patients who are suffering from this disease.

6. Go Sato, Yuya Shirai, Shinichi Namba, Ryuya Edahiro, Kyuto Sonehara, Tsuyoshi Hata, Mamoru Uemura, the Biobank Japan Project, Koichi Matsuda, Yuichiro Doki, Hidetoshi Eguchi, Yukinori Okada. Pan-cancer and cross-population genome-wide association studies dissect shared genetic backgrounds underlying carcinogenesis. Nat Commun. 2023. doi: 10.1038/s41467-023-39136-7.
   Integrating genomic data of multiple cancers allows de novo cancer grouping and elucidating the shared genetic basis across cancers. Yukinori Okada (Graduate School of Medicine, Osaka University/Statistical Immunology, IFReC) and his research group studied a large-scale genome analysis using information from 1.18 million human genomes. Based on genome-wide association analysis (GWAS), they identified ten new genetic polymorphisms affecting "genetic predisposition" in cancer.

7. Shimpei Kawamoto, Ken Uemura, Nozomi Hori, Lena Takayasu, Yusuke Konishi, Kazutaka Katoh, Tomonori Matsumoto, Masae Suzuki, Yusuke Sakai, Tatsuyuki Matsudaira, Takahiro Adachi, Naoko Ohtani, Daron M. Standley, Wataru Suda, Shinji Fukuda, Eiji Hara. Bacterial induction of B cell senescence promotes age-related changes in the gut microbiota. Nat Cell Biol. 2023. doi: 10.1038/s41556-023-01145-5.
   The elucidation of the mechanisms of ageing and the identification of methods to control it have long been anticipated. A research group led by Eiji Hara (Aging Biology, IFReC/RIMD/CiDER, Osaka University) revealed that long-term stimulation by gut microbiota causes the induction of cellular senescence in immunoglobulin A (IgA)-producing B cells, resulting in changes in the production and diversity of IgA, which in turn causes dysbiosis of gut microbiota.

8. Taiichiro Shirai, Akiko Nakai, Emiko Ando, Jun Fujimoto, Sarah Leach, Takao Arimori, Daisuke Higo , Floris J van Eerden, Janyerkye Tulyeu, Yu-Chen Liu, Daisuke Okuzaki, Masanori A Murayama, Haruhiko Miyata, Kazuto Nunomura, Bangzhong Lin, Akiyoshi Tani, Atsushi Kumanogoh, Masahito Ikawa, James B Wing, Daron M Standley, Junichi Takagi, Kazuhiro Suzuki. Celastrol suppresses humoral immune responses and autoimmunity by targeting the COMMD3/8 complex. Sci Immunol. 2023. doi: 10.1126/sciimmunol.adc9324.
   Celastrol, a bioactive molecule extracted from the Tripterygium wilfordii plant, has been shown to exhibit anti- inflammatory properties. However, its mechanism of action has not been fully elucidated. Taiichro Shirai, Kazuhiro Suzuki (Immune Response Dynamics, IFReC), and the research group showed Celastrol, an herbal medicinal ingredient, improves the pathology of autoimmune diseases by suppressing the COMMD3/8 complex.

9. Miyuki Watanabe, Daisuke Motooka, Sho Yamasaki. The kinetics of signaling through the common FcRγ chain determine cytokine profiles in dendritic cells. Sci Signal. 2023. doi: 10.1126/scisignal.abn9909.
   Dendritic cells detect pathogens through pattern recognition receptors, which generate distinct changes in gene expression and cytokine production, even when the receptors signal through the common subunit FcRγ. The research group of Miyuki Watanabe, Sho Yamasaki (Molecular Immunology, IFReC/RIMD/CiDER, Osaka University) uncovered how two receptors for different mycobacterial components, Dectin-2 and Mincle, can generate divergent dendritic cell responses through FcRgamma.

10. Tomomi Yoshihara, Yasutaka Okabe. Aldh1a2+ fibroblastic reticular cells regulate lymphocyte recruitment in omental milky spots. J Exp Med. 2023. doi: 10.1084/jem.20221813.
    Lymphoid clusters in visceral adipose tissue omentum, known as milky spots, play a central role in the immunological defense in the abdomen. However, their development and maturation mechanisms are poorly understood. Tomomi Yoshihara and Yasutaka Okabe (Immune Homeostasis, IFReC) identified a subset of fibroblastic reticular cells (FRCs) that are uniquely present in omental milky spots.

11. Jonas Nørskov Søndergaard, Janyerkye Tulyeu, Ryuya Edahiro, Yuya Shirai, Yuta Yamaguchi,

Teruaki Murakami, Takayoshi Morita, Yasuhiro Kato, Haruhiko Hirata, Yoshito Takeda, Daisuke Okuzaki, Shimon Sakaguchi, Atsushi Kumanogoh, Yukinori Okada, James Badger Wing. A sex-biased imbalance between Tfr, Tph, and atypical B cells determines antibody responses in COVID-19 patients. Proc Natl Acad Sci USA. 2023. doi: 10.1073/pnas.2217902120.

The identification of the cellular basis for the known sex-specific differences will be key in protecting everyone, especially those most at risk from COVID-19 infection. The research group of Jonas Nørskov Søndergaard and James Wing (CiDER, Osaka University/Human Single Cell Immunology, IFReC) uncovered the sex-specific differences in a type of regulatory T cells (Treg), and in the production of antibodies.

12. Takuya Koike, Kentaro Fujii, Kohei Kometani, Noah S Butler, Kenji Funakoshi, Shinya Yari, Junichi Kikuta, Masaru Ishii, Tomohiro Kurosaki, Wataru Ise. Progressive differentiation toward the long-lived plasma cell compartment in the bone marrow. J Exp Med. 2022. doi: 10.1084/jem.20221717.

The longevity of plasma cells is dependent on their ability to access and reside in so-called niches that are predominantly located in the bone marrow. Many plasma cells die shortly after participating in an immune response, but a small population of plasma cells called long-lived plasma cells (LLPCs) can survive in the body for months or even years. The research group of Wataru Ise (CiDER, Osaka University) and Tomohiro Kurosaki (Lymphocyte Differentiation, IFReC) found that plasma cells were continuously replenished by new cells, a small portion of which differentiated into LLPCs.

13. Yoshiki Omatsu, Shota Aiba, Tomonori Maeta, Kei Higaki, Kazunari Aoki, Hitomi Watanabe, Gen Kondoh, Riko Nishimura, Shu Takeda, Ung-il Chung, Takashi Nagasawa. Runx1 and Runx2 inhibit fibrotic conversion of cellular niches for hematopoietic stem cells. Nat Commun. 2022. doi: 10.1038/s41467-022-30266-y.

In bone marrow, special microenvironments, known as niches, are essential for the maintenance of hematopoietic stem cells (HSCs). Yoshiki Omatsu, Takashi Nagasawa (Stem Cell Biology and Developmental Immunology, IFReC/Graduate School of Frontier Biosciences, Osaka University) and the research group showed HSC cellular niches require Runx1 or Runx2 to prevent their fibrotic conversion and maintain HSCs and hematopoiesis in adults.

14. Yuriko Otake-Kasamoto, Hisako Kayama, Toshihiro Kishikawa, Shinichiro Shinzak, Taku Tashiro, Takahiro Amano, Mizuki Tani, Takeo Yoshihara, Bo Li, Haruka Tani, Li Liu, Akio Hayashi, Daisuke Okuzaki, Daisuke Motooka, Shota Nakamura, Yukinori Okada, Hideki Iijima, Kiyoshi Takeda, Tetsuo Takehara. Lysophosphatidylserines derived from microbiota in Crohn's disease elicit pathological Th1 response. J Exp Med. 2022. doi: 10.1084/jem.20211291.

Crohn's disease is a chronic gastrointestinal tract disorder with transmural inflammation with unknown etiology. Hisako Kayama, Kiyoshi Takeda (Mucosal Immunology, IFReC/Graduate School of Medicine, Osaka University), and the research group showed a key metabolite LysoPS derived from dysbiotic microbiota enhances Th1 responses and exaggerate colitis in mouse models.

15. Kana Hasegawa,…, Atsushi Kumanogoh, Naoki Hosen. Selective targeting of multiple myeloma cells with a monoclonal antibody recognizing the ubiquitous protein CD98 heavy chain. Sci Transl Med. 2022. doi: 10.1126/scitranslmed.aax7706.

Cancer-specific cell surface antigens are ideal therapeutic targets for monoclonal antibody (mAb)-based therapy. Kana Hasegawa (Cellular Immunotherapy, IFReC), Atsushi Kumanogoh (Immunopathology, IFReC/Graduate school of Medicine, Osaka University), Naoki Hosen (IFReC/Graduate school of Medicine, Osaka University), and their research group discovered a new antibody R8H283, which recognizes CD98hc on multiple myeloma.

16. Xiuyuan Lu, Yuki Hosono, Masamichi Nagae, Shigenari Ishizuka, Eri Ishikawa,…, Sho Yamasaki. Identification of conserved SARS-CoV-2 spike epitopes that expand public cTfh clonotypes in mild COVID-19 patients. J Exp Med. 2021. doi: 10.1084/jem.20211327.

In adaptive immunity, follicular helper T (Tfh) cells are a subset of CD4+ T cells that mediate the production of protective antibodies; however, the SARS-CoV-2 epitopes activating Tfh cells are not well characterized. Sho Yamasaki (Molecular Immunology, IFReC/RIMD, Osaka University) and the research group identified and crystallized TCRs of public circulating Tfh clonotypes that are

expanded in patients who have recovered from mild symptoms. These public clonotypes recognized the SARS-CoV-2 spike (S) epitopes conserved across emerging variants.

17. Takaharu Sakuragi, Ryuta Kanai, Akihisa Tsutsumi, Hirotaka Narita, Eriko Onishi, Kohei Nishino, Takuya Miyazaki, Takeshi Baba, Hidetaka Kosako, Atsushi Nakagawa, Masahide Kikkawa, Chikashi Toyoshima, Shigekazu Nagata. The tertiary structure of the human Xkr8–Basigin complex that scrambles phospholipids at plasma membranes. Nat Struct Mol Biol. 2021. doi: 10.1038/s41594-021-00665-8.

    Xkr8-Basigin is a plasma membrane phospholipid scramblase activated by kinases or caspases. Takaharu Sakuragi and Shigekazu Nagata (Biochemistry & Immunology, IFReC) and their research group combined cryo-EM and X-ray crystallography to investigate its structure at an overall resolution of 3.8 Å. The structure of Xkr8-Basigin revealed by them provides insights into the molecular mechanisms underlying phospholipid scrambling.

18. Yafei Liu, Wai Tuck Soh,…, Hisashi Arase. An infectivity-enhancing site on the SARS-CoV-2 spike protein targeted by antibodies. Cell. 2021. doi: 10.1016/j.cell.2021.05.032.

    Antibodies against the receptor-binding domain (RBD) of the SARS-CoV-2 spike protein prevent SARS-CoV-2 infection. However, the effects of antibodies against other spike protein domains are largely unknown. A research group led by Hisashi Arase (Immunochemistry, IFReC/RIMD, Osaka University) discovered both neutralizing antibodies that protect against infection as well as infection-enhancing antibodies that increase infectivity are produced after infection with SARS-CoV-2 by analyzing antibodies derived from COVID-19 patients.

19. Miwa Sasai, Ji Su Ma, Masaaki Okamoto, Kohei Nishino, Hikaru Nagaoka, Eizo Takashima, Ariel Pradipta, Youngae Lee, Hidetaka Kosako, Pann-Ghill Suh, Masahiro Yamamoto. Uncovering a novel role of PLCβ4 in selectively mediating TCR signaling in CD8+ but not CD4+ T cells. J Exp Med. 2021. doi: 10.1084/jem.20201763.

    Because of their common signaling molecules, the main T cell receptor (TCR) signaling cascades in CD4+ and CD8+ T cells are considered qualitatively identical. Masahiro Yamamoto (Immunoparasitology, IFReC/RIMD, Osaka University) and his research group show that TCR signaling in CD8+ T cells is qualitatively different from that in CD4+ T cells, since CD8α ignites another cardinal signaling cascade involving phospholipase C β4 (PLCβ4).

20. Sujin Kang, Toshio Tanaka, Hitomi Inoue, Chikako Ono, Shoji Hashimoto, Yoshiyuki Kioi, Hisatake Matsumoto, Hiroshi Matsuura, Tsunehiro Matsubara, Kentaro Shimizu, Hiroshi Ogura, Yoshiharu Matsuura, Tadamitsu Kishimoto. L-6 trans-signaling induces plasminogen activator inhibitor-1 from vascular endothelial cells in cytokine release syndrome. Proc Natl Acad Sci USA. 2020. doi: 10.1073/pnas.2010229117.

    Cytokine release syndrome (CRS) is a life-threatening complication induced by systemic inflammatory responses to infections, including bacteria and chimeric antigen receptor T cell therapy. Sujin Kang, Tadamitsu Kishimoto (Immune Regulation, IFReC) and the research group found that interleukin (IL)-6 signaling plays a crucial role in endothelial cell dysfunction during bacterial and viral CRS.

2. Major Invited Lectures, Plenary Addresses (etc.)

*List up to 10 main presentations made between FY 2020 and FY 2023 in order from most recent.
*For each, write the date(s), lecturer/presenter's name, presentation title and conference name.

Date(s)	Lecturer/Presenter's name	Presentation title	Conference name
Mar. 21, 2024	Shimon Sakaguchi	"Regulatory T cell for cancer therapy"	World Veterinary Cancer Congress
Feb. 20, 2024	Sho Yamasaki	"Immunological and Biochemical Aspects of C-Type Lectin Receptors in Fungal Infections"	2024 Keystone Symposia on Fungal Pathogens
Dec. 13, 2023	Kiyoshi Takeda	"Immunopathogenesis of IBD: Pathways and Therapeutic Challenges"	International Psoriasis Council Global Seminar
Nov. 14, 2023	Shimon Sakaguchi	"Regulatory T cells for controlling immunological diseases"	Debrecen Award Lecture 2023
Nov. 7, 2023	Sho Yamasaki	"Deciphering clonotypic responses of human T cells against infection"	Cold Spring Harbor Asia 2023
Aug. 30, 2023	Kazuhiro Suzuki	"Targeting B cell migration in autoimmunity"	Finnish Japanese joint symposium 2023
Aug. 17, 2023	Shigekazu Nagata	"Regulation of phospholipid distribution by flippase and scramblase"	The 3rd Japan and Australia Meeting on Cell Death
Jun. 14, 2023	Eiji Hara	"Cellular senescence : relevance to microorganisms"	Wiggers-Bernard Conference
Nov. 16, 2020	Shimon Sakaguchi	"Control of immune responses by regulatory T cells"	Robert Koch Award Lecture 2020
May 28, 2020	Tadamitsu Kishimoto	"Memorial Address for the Tang Prize Laureate"	Tang Prize Week 2020

3. Major Awards

*List main awards received between FY 2020 and FY 2023 in order from the most recent (within 10 awards)..
*For each, write the date issued, recipient's name and the name of award. In case of multiple recipients, underline those affiliated with the Center.

Date	Recipient's name	Name of award
Oct. 26, 2023	Tomohiro Kurosaki	Mochida Memorial Award 2023
Sep. 26, 2022	Sho Yamasaki	Hideyo Noguchi Memorial Prize 2022
Sep. 14, 2022	Kiyoshi Takeda	Takeda Prize for Medical Science 2022
Dec. 20, 2021	Taroh Kinoshita	Osamu Hayaishi Memorial Prize 2021
Dec. 1, 2021	Hisashi Arase	2021 Erwin von Bälz the 1st Prize
Sep. 21, 2021	Tadamitsu Kishimoto	Clarivate Citation Laureate 2021
Dec. 14, 2020	Toshio Yanagida	Member of the Japan Academy
Sep. 16, 2020	Hisashi Arase	Hideyo Noguchi Memorial Prize 2020

Jun. 18, 2020	Tadamitsu Kishimoto	Tang Prize 2020
Jun. 7, 2020	Shimon Sakaguchi	Robert Koch Award 2020

Appendix 2　FY 2023 List of Principal Investigators

NOTE:

*Underline names of principal investigators who belong to an overseas research institution.

*Indicate newly added researchers for FY 2020-2023 in the "Notes" column.

	<Principal Investigators at the end of FY 2023>					Principal Investigators Total: 36
Name	Age	Affiliation (Position title, department, organization)	Academic degree, Specialty	Effort (%)*	Starting date of participation	Status of participation (Describe in concrete terms)	Note
Center director TAKEDA Kiyoshi	57	Director and Professor, WPI Immunology Frontier Research Center, Graduate School of Medicine, Osaka University	MD, PhD (Immunology)	100	01/11/2007	usually stays at the center	
KUROSAKI Tomohiro	68	Deputy Director and Professor, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Immunology and molecular biology)	80	03/12/2007	usually stays at the center	
ARASE Hisashi	58	Deputy Director and Professor, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Immunology)	40	01/10/2007	usually stays at the center	
YAMASAKI Sho	55	Deputy Director and Professor, WPI Immunology Frontier Research Center, Research Institute for Microbial Diseases, Osaka University	PhD (Immunology)	80	01/04/2017	usually stays at the center	
AKIRA Shizuo	71	Professor, Center for Advanced Modalities and DDS, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Immunology)	50	01/10/2007	usually stays at the center	

SAKAGUCHI Shimon	73	Professor, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Immunology)	70	01/04/2011	usually stays at the center	
NAGATA Shigekazu	74	Professor, WPI Immunology Frontier Research Center, Osaka University	PhD (Molecular/Cell Biology)	80	01/04/2015	usually stays at the center	
SUZUKI Kazuhiro	48	Professor, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Immune cell dynamics)	90	01/04/2011	usually stays at the center	
KUMANOGOH Atsushi	57	Professor, Graduate School of Medicine, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Immunology)	25	01/10/2007	usually stays at graduate school of medicine	
KIKUCHI Kazuya	58	Professor, Graduate School of Engineering, WPI Immunology Frontier Research Center, Osaka University	PhD (Chemical Biology)	5	01/08/2009	usually stays at the center	
YAMAMOTO Masahiro	45	Professor, Research Institute for Microbial Diseases, WPI Immunology Frontier Research Center, Osaka University	PhD (Immunology)	25	01/04/2012	usually stays at the center	
Daron M.STANDLEY	56	Professor, Research Institute for Microbial Diseases, WPI Immunology Frontier Research Center, Osaka University	PhD (Bioinformatics)	15	01/10/2008	usually stays at the center	

KINOSHITA Taroh	72	Professor, Center for Infectious Disease Education and Research, WPI Immunology Frontier Research Center, Osaka University	PhD (Immunology, Biochemistry)	50	01/10/2007	usually stays at the center	
YANAGIDA Toshio	77	Professor, Graduate School of Information Science and Technology, WPI Immunology Frontier Research Center, Osaka University	PhD (Molecular Imaging)	10	01/10/2007	joins seminars, symposium, and meetings (several times a year at IFReC)/ interdisciplinary research promotion at NICT CiNet	
ISHII Masaru	50	Professor, Graduate School of Frontier Biosciences, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Bioimaging)	15	01/12/2008	usually stays at the center	
KISHIMOTO Tadamitsu	84	Professor, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Immunology)	80	01/10/2007	usually stays at the center	
OKADA Yukinori	43	Professor, Graduate School of Medicine, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Bioinformatics)	5	01/04/2017	conducts research 2 or 3 times a week at the center	
YAMASHITA Toshihide	59	Professor, Graduate School of Medicine, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Neurological Science)	10	01/04/2017	conducts research 2 or 3 times a week at the center	

NAGASAWA Takashi	62	Professor, Graduate School of Frontier Biosciences, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Immunology)	36	01/04/2017	Conducts research relating to the Center and participates several times a month (includes visits) in exchanging information with the Center's researchers.	
HARA Eiji	59	Professor, Research Institute for Microbial Diseases, WPI Immunology Frontier Research Center, Osaka University	PhD (Molecular Biology)	5	01/08/2018	usually stays beside the center	
TAKAKURA Nobuyuki	61	Professor, Research Institute for Microbial Diseases, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Vascular and Stem Cell Biology)	15	01/08/2018	usually stays beside the center	
FUJIMOTO Manabu	57	Professor, Graduate School of Medicine, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Dermatology)	15	01/04/2019	usually stays at graduate school of medicine	
MORO Kazuyo	47	Professor, Graduate School of Medicine, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Immunology)	20	01/08/2019	usually stays at graduate school of medicine	
HOSEN Naoki	54	Professor, Graduate School of Medicine, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Immunology)	15	01/11/2020	usually stays at graduate school of medicine	
KAMADA Nobuhiko	48	Professor, WPI Immunology Frontier Research Center, Osaka University Associate Professor, Department of Internal Medicine, The University of Michigan Medical School	PhD (Immunology)	10	01/09/2021	usually stays at the University of Michigan and participates using the cross-appointment system	

Nicholas Isaac SMITH	49	Associate Professor, WPI Immunology Frontier Research Center, Osaka University	PhD (Engineering/ Applied Physics)	90	01/06/2009	usually stays at the center, except when teaching or during conference travel	
James Badger WING	43	Associate Professor, Center for Infectious Disease Education and Research, WPI Immunology Frontier Research Center, Osaka University	PhD (Immunology)	40	01/11/2019	usually stays at the center	
OKUZAKI Daisuke	51	Associate Professor, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Immunology)	80	01/11/2019	usually stays at the center	
OKABE Yasutaka	46	Associate Professor, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Immunology)	90	01/09/2020	usually stays at the center	
SAITO Takashi	73	Team leader, RIKEN Center for Integrative Medical Sciences Professor, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Immunology)	8	01/04/2008	usually stays at RIKEN, Research Center for Integrative Medical Sciences	
Benjamin John SEYMOUR	51	Oxford University Nuffield Department of Clinical Neuroscience, Wellcome Trust Senior Clinical Fellow (Cambridge University)	PhD (Neurological Science)	10	01/04/2014	usually stays at Oxford University	
ISHII Ken J.	55	Professor, The Institute of Medical Science, The University of Tokyo Professor, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Immunology, Vaccine Science)	1	01/11/2007	usually stays at the Institute of Medical Science, The University of Tokyo	

Cevayir COBAN	51	Professor, The Institute of Medical Science, The University of Tokyo, WPI Immunology Frontier Research Center, Osaka University	MD (Clinical Microbiology specialty)	1	01/04/2008	usually stays at the Institute of Medical Science, The University of Tokyo	
Fritz Melchers	87	Max Planck Fellow	PhD (Immunology)	10	01/10/2007	advice IFReC research and policies	
KANG Sujin	43	Associate Professor, WPI Immunology Frontier Research Center, Osaka University	PhD（Immunology）	90	01/04/2022	usually stays at the center	
MATSUOKA Yumi	45	Professor, WPI Immunology Frontier Research Center, Osaka University	MD, PhD (Cutaneous Immunology, Microbiology, Allergy)	85	01/11/2022	usually stays at graduate school of medicine	

*Percentage of time that the principal investigator devotes to his/her work for the Academy center vis-à-vis his/her total working hours.

Principal Investigators resigned since FY 2023

Name	Next Affiliation (Position title, department, organization)	Period of participation
KUROSAKI Tomohiro	Team Leader, RIKEN Center for Biosystems Dynamics Research	03/12/2007～31/03/2024
KINOSHITA Taroh	Professor, Center for Infectious Disease Education and Research, Osaka University	01/10/2007～31/03/2024
SAITO Takashi	Visiting Scientist, RIKEN Center for Biosystems Dynamics Research	01/04/2008～31/03/2024

Appendix 3-1 Record of Center Activities (FY 2020-FY 2023)

1. Researchers and Center Staffs, Satellites, Partner Institutions

1-1. Researchers and Center Staffs Participated in the Center's Activities

- Enter the number of researchers and center staffs affiliated with the Center in the table in Appendix 3-1a.

Special mention

- Describe the Center's concrete plans for the future and already-established schedules for employing researchers, particularly principal investigators.
- As background to how the Center is working on the global circulation of world's best brains, give good examples, if any, of how career paths are being established for the Center's researchers; that is, from which top-world research institutions do researchers come to the Center and to which research institutions do the Center's researchers go, and how long are their stays at those institutions.
- In Appendix 3-1b, describe the positions that postdoctoral researchers acquire upon leaving the Center.

1-2. Satellites and Partner Institutions

- List the satellite and partner institutions, both domestic and overseas, in the table below.
- Indicate newly added and deleted institutions in the "Notes" column.

<Satellite institutions>

Institution name	Principal Investigator(s), if any	Notes

< Partner institutions>

Institution name	Principal Investigator(s), if any	Notes

2. Status of Collaboration with Overseas Satellites

2-1. Coauthored Papers

- List the refereed papers published between FY 2020 and FY 2023 that were coauthored between the Center's researcher(s) in domestic institution(s) (include satellite institutions) and overseas satellite institution(s). List them by overseas satellite institution in the below blocks.
- Transcribe data in same format as in Appendix 1. Italicize the names of authors affiliated with overseas satellite institutions.

Overseas Satellite 1 Name (Total: OO papers)
1)
2)
3)
Overseas Satellite 2 Name (Total: OO papers)
1)
2)
3)

2-2. Status of Researcher Exchanges

- Using the below tables, indicate the number of researcher exchanges between the Center (include domestic satellite institutions) and overseas satellite institutions during the period of FY 2020-FY 2023. Enter by institution and fiscal year.
- Write the number of principal investigator visits in the upper space and the number of other researcher visits in the lower space.

Overseas Satellite 1:
<To overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators					
Other researchers					
Total					

<From overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators					
Other researchers					
Total					

Overseas Satellite 2:
<To overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators					
Other researchers					
Total					

<From overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators					
Other researchers					
Total					

3. Holding and Participating in International Research Meetings

3-1. Holding international Research Meetings

- Indicate the number of international research conferences or symposiums held between FY 2020 and FY 2023, and give up to **five examples** of the most representative ones using the table below.

FY 2020: 0 meetings	FY 2021: 2 meetings	FY 2022: 5 meetings	FY 2023: 6 meetings

Major examples (meeting titles, places and dates held)	Number of participants
International Symposium on Microbiology and Immunology - The 13th International Symposium of IFReC, Senri Life Science Center, Japan, Feb. 9, 2024.	From domestic institutions: 120 From overseas institutions: 20
The 2nd ImmunoSensation2 - IFReC International School on Advanced Immunology, Seehotel Maria Laach, Germany, Sep. 17-21, 2023.	From domestic institutions: 10 From overseas institutions: 50
Joint workshop with ImmunoSensation2 at the University of Bonn, the University of Bonn, Germany, June 14-15, 2023.	From domestic institutions: 10 From overseas institutions: 30
The 1st IFReC - Doherty Institute & Partners Immunology Symposium, the University of Melbourne, Australia, Mar. 20-21, 2023.	From domestic institutions: 10 From overseas institutions: 40
The 2nd UCL-OU Joint Symposium on Immunology, University College London, UK, May 13, 2022	From domestic institutions: 10 From overseas institutions: 30

3-2. Participating in International Research Meetings

- Give up to five examples of the most representative case in which the Center, not individual researchers, participated in international research meetings to enhance the visibility and brand of the Center or of the overall WPI Program

Meeting titles, places, dates held and number of participants	Form of participation (e.g. operating a booth)	Number of participants from the Center
N/A		

4. List of the Cooperative Research Agreements with Overseas Institutions

- Indicate the number of agreements concluded with overseas institutions still in effect as of the end of FY 2023 (March 31, 2024). Give five examples of the most representative agreements.

Number of effective agreements (as of March 31, 2024): 3

Five examples of the most representative agreements:

1. Name of the Agreement: Inter-University Agreement and Strategic partnership Agreement
   Dates of the Agreement: November 2004 (Osaka University)
   Counterpart in the Agreement: University College London
   Summary of the Agreement: Collaborative research and Exchange of students

2. Name of the Agreement: Memorandum of Understanding
   Dates of the Agreement: May 2020 (IFReC)
   Counterpart in the Agreement: Korea Advanced Institute of Science and Technology (KAIST)
   (Graduate School of Medical Science and Engineering)
   Summary of the Agreement: Collaborative research and Exchange of students

3. Name of the Agreement: Inter-University Agreement and Strategic partnership Agreement
   Dates of the Agreement: June 2022 (Osaka University)
   Counterpart in the Agreement: The University of Melbourne
   Summary of the Agreement: Collaborative research and Exchange of students

5. Postdoctoral Positions through Open International Solicitations

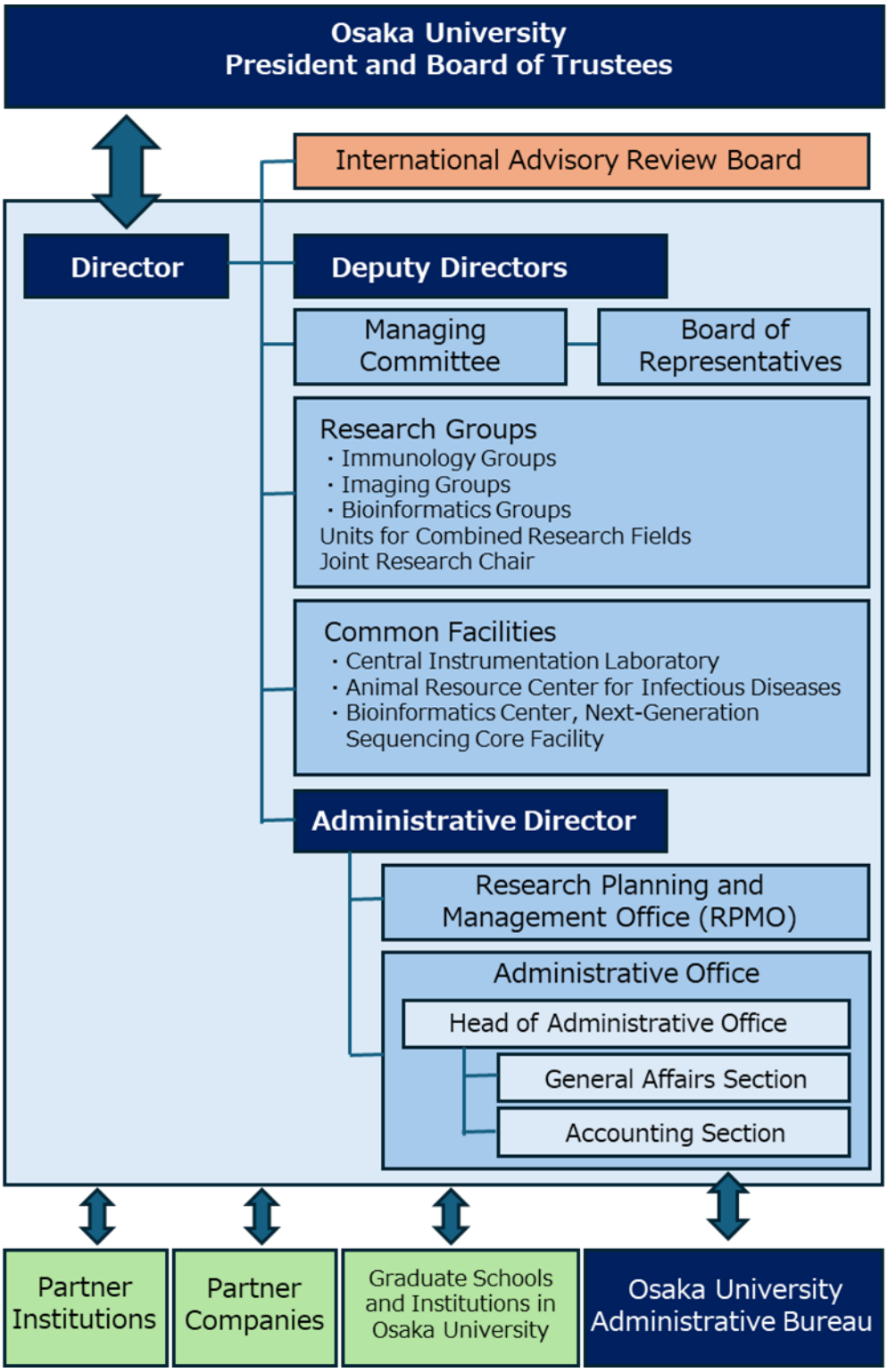
- In the columns "number of applications" and "number of selections," put the total number (upper) and the number and percentage of overseas researchers in the < > brackets (lower).
- In Appendix 3b, describe the status of employment of postdoctoral researchers.

Fiscal year	Number of applications	Number of selections
FY 2020	213	8
	〈213, 100%〉	〈 8, 100%〉
FY 2021	137	4
	〈121, 88.3%〉	〈 4, 100%〉
FY 2022	156	2
	〈154, 98.7%〉	〈 2, 100%〉
FY 2023	216	5
	〈215, 99.5%〉	〈 5, 100%〉

6. Diagram of Management System

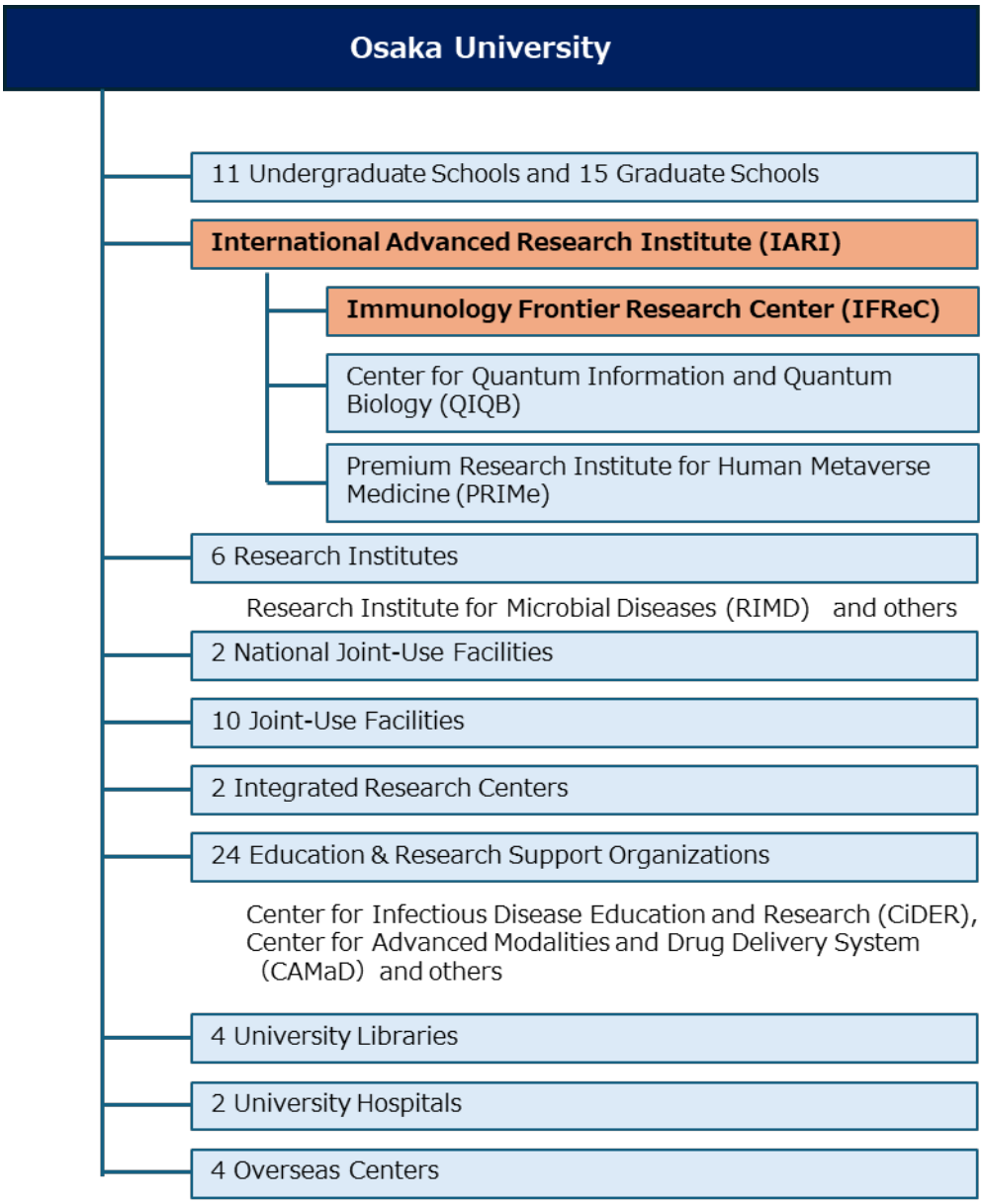
6-1.

- Diagram the Center's management system within the Center in an easily understood manner.
- If any changes have been made in the Center's management system vis-à-vis that stated in the application for WPI Academy center certification, describe them. Especially describe any important changes made in such as the center director, administrative director, head of host institution, and officer(s) in charge at the host institution (e.g., executive vice president for research).



6-2.

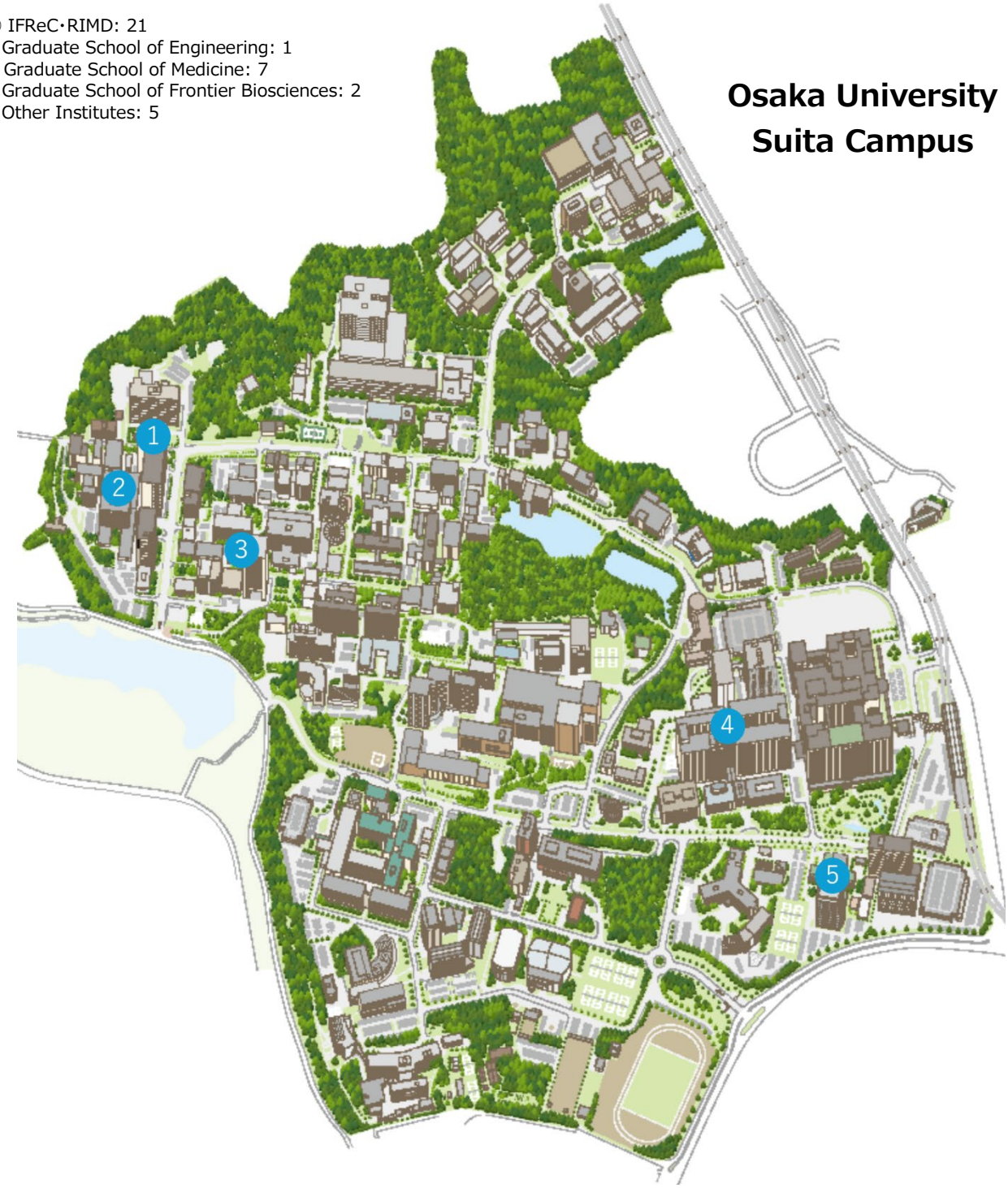
- Make a diagram of the organizational chart to show Center's position **within the host institution**.



7. Campus Map

- Draw a simple map of the campus showing where the main office and principal investigator(s) are located.

①② IFReC･RIMD: 21
③ Graduate School of Engineering: 1
④ Graduate School of Medicine: 7
⑤ Graduate School of Frontier Biosciences: 2
Other Institutes: 5



Appendix3-1a Number of Center Personnel FY 2020-FY 2023

	FY 2020		FY 2021		FY 2022		FY 2023	
	Number of persons	%	Number of persons	%	Number of persons	%	Number of persons	%
Researchers	192		207		196		188	
Overseas researchers	51	27	53	26	45	23	49	26
Female researchers	39	20	48	23	47	24	55	29
Principal investigators (PIs)	36		37		37		36	
Overseas PIs	5	14	5	14	6	16	6	17
Female PIs	2	6	2	5	4	11	4	11
Other researchers	123		140		130		126	
Overseas researchers	23	19	27	19	18	14	28	22
Female researchers	29	24	36	26	33	25	40	32
Postdocs	33		30		29		26	
Overseas Postdocs	23	70	21	70	21	72	15	58
Female Postdocs	8	24	10	33	10	34	11	42
Research support staffs	48		54		55		67	
Administrative staffs	28		33		32		33	
TOTAL	268		294		283		288	

Number of persons who were/have been paid using the host institution's operating budget (excluding indirect funding) among the above persons.

	FY 2020	FY 2021	FY 2022	FY 2023
Principal investigators (PIs)	3	3	4	4
Other researchers	3	5	3	5
Postdocs	0	0	0	0
Research support staffs	0	0	0	0
Administrative staffs	4	4	4	4

※ Make consistent with the number of persons reported in Appendix 3-2.

	FY 2020		FY 2021		FY 2022		FY 2023	
	Number of persons	%	Number of persons	%	Number of persons	%	Number of persons	%
Doctoral students	68		79		67		64	
Employed	68	100.0	79	100.0	67	100.0	64	100.0

※ The number of doctoral students indicated in the lower table can also include those in the upper table of Total numbers.

Changes vis-à-vis the Center's application for academy center certification

※ If changes have been made vis-à-vis the Center's application for academy center certification, describe the main changes and the reasons for them.

Appendix 3-1b Career Path of WPI Postdocs

period from the start of the center through the end of FY 2023.

he spaces to the right. More spaces may be added.

:ion as of April 2024" blank if unknown.

Japanese Postdocs

Employment period	Position before employed at WPI center		Next position after WPI center		Position as of April 2024*	
	Position title, organization	Country where the organization is located	Position title, organization	Country where the organization is located	Position title, organization	Country where the organization is located
2008.4.1-2009.9.30	Graduate School of Medicine, Kyoto University, Postdoctoral Researcher	Japan	Institute for Frontier Medical Sciences, Kyoto University, JSPS Postdoctoral Fellowship	Japan		
2008.10.16-2009.10.15	Graduate School of Frontier Biosciences, Osaka University, Specially Appointed Researcher	Japan	Graduate School of Medicine, Osaka University, Specially Appointed Researcher	Japan	Professor, The Forefront Research Center (FRC), Graduate School of Science, Osaka University	Japan
2008.4.1-2011.3.31	The department of internal medicine, Kyoto Hospital Medical doctor	Japan	Graduate School of Medicine, Kyoto University, Assistant Professor	Japan	Professor, Graduate School of Medicine, Osaka Metropolitan University	Japan
2009.10.16-2011.3.31	Graduate School of Medicine, Osaka University, Specially Appointed Researcher	Japan	KAN Research Institute Inc., Researcher	Japan		

2008.4.1-2011.3.31	Institute for Frontier Medical Sciences, Kyoto University, Part-time Lecturer	Japan	Immunology Frontier Research Center, Osaka University, Specially Appointed Assistant Professor (Full-time)	Japan	Representative executive, Regcell Co., Ltd.	Japan
2010.4.1-2011.3.31	Graduate School of Engineering, Kyoto University, Graduate Student	Japan	Immunology Frontier Research Center, Osaka University, Specially Appointed Assistant Professor (Full-time)	Japan	Associate Professor, Graduate school of Life Sciences, Tohoku University	Japan
2010.6.1-2011.6.30	Research Institute for Microbial Diseases, Osaka University, Specially Appointed Researcher	Japan	Immunology Frontier Research Center, Osaka University, Specially Appointed Technical Staff	Japan		
2010.9.1-2011.6.30	Osaka University Hospital, Medical doctor	Japan	Eli Lilly Japan K.K., Clinical Research Physician	Japan		
2011.4.1-2011.9.30	Institute for Protein Research, Osaka University,JSPS Postdoctoral Fellowship	Japan	Department of Chemical & Biomolecular Engineering, Johns Hopkins University, Post-Doctoral Research Fellow	USA	Chief Researcher, Research Center for Drug and Vaccine Development, National Institute of Infectious Diseases	Japan
2009.4.1-2012.3.31	Graduate School of Medicine, Osaka University, JSPS Postdoctoral Research Fellow	Japan	Immunology Frontier Research Center, Osaka University, Specially Appointed Assistant Professor (Full-time)	Japan		

2010.4.1-2012.3.31	Graduate School of Medicine, Kyoto University, JSPS Postdoctoral Research Fellow	Japan	Immunology Frontier Research Center, Osaka University, Specially Appointed Assistant Professor (Full-time)	Japan	Associate Professor, Advanced Preventive Medical Sciences Research Center, Kanazawa University	Japan
2011.4.1-2012.3.31	Graduate School of Frontier Biosciences, Osaka University, Graduate Student	Japan	Graduate School of Medicine, Osaka University, Specially Appointed Researcher	Japan		
2010.4.1-2012.6.15	School of Medicine, University of California San Diego, Postdoctoral researcher	USA	Institute for Virus Research, Kyoto University, Assistant Professor	Japan	Assistant Professor, Graduate School of Medicine, Kyoto University	Japan
2011.4.1-2012.7.31	Institute for Frontier Medical Science, Kyoto University, Postdoctoral researcher	Japan	National Hospital Organization Osaka Minami Medical, Medical Staff	Japan	Medical Staff, National Hospital Organization Osaka Minami Medical Center	Japan
2010.4.1-2012.10.15	Graduate School of Life Science, Hokkaido University, Graduate Student	Japan	The Institute of Medical Science, The University of Tokyo, Assistant Professor	Japan	Associate Professor, Graduate School of Pharmaceutical Sciences, Osaka University	Japan
2010.4.1-2012.12.31	Takeda Pharmaceutical Company Limited Medical writer	Japan	Astellas Pharma Inc., Researcher	Japan		
2009.4.1-2013.3.31	Murakami Medical Hospital Asahi University, Internal medicine doctor	Japan	Immunology Frontier Research Center, Osaka University, Specially Appointed Assistant Professor (Full-time)	Japan	Lecturer, Department of Endocrinology and Metabolism, Kyoto Prefectural University of Medicine Graduate School of Medical Science	Japan

2009.4.1-2013.3.31	Research Institute for Microbial Diseases, Osaka University, Specially Appointed Researcher	Japan	Immunology Frontier Research Center, Osaka University, Specially Appointed Technical Staff	Japan		
2010.4.1-2013.3.31	Graduate School of Medicine, Osaka University, Graduate Student	Japan	Immunology Frontier Research Center, Osaka University, Specially Appointed Assistant Professor (Full-time)	Japan	Professor, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University	Japan
2010.4.1-2013.3.31	Graduate School of Science, Nagoya University, Assistant Professor	Japan	Immunology Frontier Research Center, Osaka University, Specially Appointed Assistant Professor (Full-time)	Japan	Associate Professor, Data Science/AI Innovation Research Promotion Center, Shiga University	Japan
2011.4.1-2013.3.31	School of Medicine, Iwate Medical University, Postdoctoral researcher	Japan	Immunology Frontier Research Center, Osaka University, Specially Appointed Assistant Professor (Full-time)	Japan	Associate Professor, Center for Translational Neuromedicine, University of Copenhagen	Denmark
2012.4.1-2013.3.31	Graduate School of Frontier Biosciences, Osaka University, Graduate student	Japan	Graduate School of Medicine, Osaka University,JSPS Postdoctoral Fellowship	Japan	Assistant Professor, Graduate School of Medicine, Osaka University	Japan
2010.4.1-2013.3.31	Graduate School of Frontier Biosciences, Osaka University, Specially Appointed Researcher	Japan	Graduate School of Frontier Biosciences, Osaka University, Specially Appointed Researcher	Japan		

2012.4.1-2013.3.31	L'Oreal Paris Japan Researcher	Japan	Institute for Academic Initiative, Osaka University, Specially Appointed Assistant Professor (Full-time)	Japan	Manager, TAKARA BELMONT CORPORATION	Japan
2010.4.1-2013.4.15	Research Institute for Microbial Diseases, Osaka University, Specially Appointed Technical Staff	Japan	Immunology Frontier Research Center, Osaka University, Specially Appointed Technical Staff	Japan		
2010.1.1-2013.4.30	Paul O' Gorman Leukaemia Research Centre, Division of Cancer Sciences and Molecular Pathology, Section of Experimental Haematology, University of Glasgow, Gartnavel General Hospital	UK	Babraham Institute, Researcher	UK	Principal Laboratory Research Scientist, The Francis Crick Institute	UK
2010.4.1-2013.5.15	Frontier Research Center for Applied Atomic Sciences, Ibaraki University Part-time researcher	Japan	NARA Institute of Science and Technology, Part-time researcher	Japan	Associate Professor, National Research Center for the Control and Prevention of Infectious Diseases, Nagasaki University	Japan
2010.6.1-2013.6.30	Research Institute of Molecular Pathology, Postdoctoral researcher	Austria	National Institute for Basic Biology, Researcher	Japan	Assistant Professor, Institute of Advanced Medical Sciences, Tokushima University	Japan
2011.4.1-2013.11.30	RIKEN Research Center for Allergy and Immunology, Junior Research Associate	Japan	Immunology Frontier Research Center, Osaka University, Endowed Chair Associate Professor	Japan	Lecturer, Institute of Advanced Medicine, Wakayama Medical University	Japan

2013.4.1-2014.3.31	Research Institute for Microbial Diseases, Osaka University, Specially Appointed Researcher	Japan	Graduate School of Medicine, Osaka University, Specially Appointed Researcher	Japan	Specially Appointed Assistant Professor(full-time), Immunology Frontier Research Center, Osaka University	Japan
2013.4.1-2014.6.30	Graduate School of Medicine, Kyoto University, Graduate Student	Japan	Institute for Frontier Medical Sciences, Kyoto University, Specially Appointed Researcher	Japan	Program-Specific Assistant Professor, Kyoto University Hospital Ki-CONNECT	Japan
2012.4.1-2014.8.31	Graduate School of Frontier Biosciences, Osaka University, Graduate Student	Japan	AbbVie GK	Japan	Manager, Bristol-Myers Squibb, Medical Project	Japan
2013.4.1-2014.8.31	Graduate School of Medicine, Nagoya University, Graduate Student	Japan	Graduate School of Frontier Biosciences, Osaka University, Assistant Professor	Japan	Medical Doctor, MIZUNO Clinic	Japan
2012.4.1-2015.5.31	Graduate School of Pharmaceutical Sciences, Osaka University, Graduate Student	Japan	Kanazawa University, Researcher	Japan	Project Assistant Professor, Department of Immunology, Graduate School of Medicine & WPI Nano Life Science Institute, Kanazawa University	Japan
2011.8.1-2015.7.31	Research Associate, Department of Cell Biology, Johns Hopkins University	USA	RIKEN Center for Life Science Technologies, Engineer	Japan		

2012.11.16-2015.11.30	Postdoctoral fellow, University of Pennsylvania school of medicine, Dept. of Cell & Developmental Biology	USA	Kanazawa University, Assistant Professor	Japan	Assistant Professor, Department of Immunology, Graduate School of Medicine & WPI Nano Life Science Institute, Kanazawa University	Japan
2016.4.1-2016.9.30	Specially Appointed Researcher(Full-Time), Research Institute for Microbial Diseases, Osaka University	Japan	Researcher, National Institute of Biomedical Innovation, Health and Nutrition	Japan	Researcher, Toyama Prefectural Institute for Pharmaceutical Research	Japan
2013.1.1-2016.9.30	Research Fellow, Mechanobiology Institute, National University of Singapore	Singapore	Assistant Professor, Tokyo Medical University	Japan	Lecturer, Tokyo Medical University	Japan
2016.4.1-2018.3.31	PhD student, Graduate School of Medicine, Kyoto University	Japan	Researcher, Kyoto University	Japan		
2015.7.1-2018.6.30	Technical Staff, Immunology Frontier Research Center, Osaka University	Japan	N/A	N/A		
2018.6.16-2018.9.30	PhD student, Graduate School of Medical Sciences, Kyusyu University	Japan	Specially Appointed Researcher(Full-Time), Research Institute for Microbial Diseases, Osaka University	Japan		
2015.4.1-2019.3.15	Researcher, Graduate School of Medicine, Kyoto University	Japan	Lifematics. Inc	Japan		

2018.10.1-2019.3.31	Specially Appointed Researcher(Full-Time), Research Institute for Microbial Diseases, Osaka University	Japan	Specially Appointed Researcher(Full-Time), Research Institute for Microbial Diseases, Osaka University	Japan	Research & Development Scientist RIKEN BioResource Research Center	Japan
2016.4.1-2019.4.30	PhD student, Graduate School of Medicine, Kyoto University	Japan	Specially Appointed Researcher(Full-Time), Graduate School of Medicine, Osaka University	Japan	Specially Appointed Researcher(Full-Time), Graduate School of Medicine, Osaka University	Japan
2018.4.1-2019.7.31	Student, Kumamoto University/Part-time, Immunology Frontier Research Center, Osaka University	Japan	Researcher, Graduate School of Health Sciences, Kumamoto University	Japan		
2018.2.16-2020.2.29	Specially Appointed Researcher(Full-Time), Research Institute for Microbial Diseases, Osaka University	Japan	Assistant Professor, Research Institute for Microbial Diseases, Osaka University	Japan	Assistant Professor, Research Institute for Microbial Diseases, Osaka University	Japan
2019.4.1-2020.3.31	Specially Appointed Researcher(Full-Time), Research Institute for Microbial Diseases, Osaka University	Japan	Researcher, JSPS Postdoctoral Fellowships for Research	Japan	Researcher, JSPS Postdoctoral Fellowships for Research）, Research Institute for Microbial Diseases, Osaka University	Japan
2020.2.1-2020.3.31	Technical Assistant, Research Institute for Microbial Diseases, Osaka University	Japan	N/A	N/A		

2017.4.1-2020.4.30	Technical Staff Immunology Frontier Research Center, Osaka University	Japan	Project Researcher Center for Drug Design Research, National Institute of Biomedical Innovation	Japan	Specially Appointed Assistant Researcher Graduate School of Medicine, Osaka University	Japan
2019.10.16- 2021.3.31	Postdoctoral Researcher Graduate School of Natural Science and Technology, Okayama University	Japan	Research staff Astellas Pharma Inc.	Japan		
2019.4.1-2021.3.31	Ph.D. student Graduate School of Biological Science, Tokyo University of Science	Japan	Postdoctoral researcher Center for Infectious Disease Education and Research, Osaka University	Japan	JSPS PD RIKEN Center for Biosystems Dynamics Research	Japan
2018.11.1- 2021.5.31	Specially Appointed Researcher Research Institute for Microbial Diseases, Osaka University	Japan	Assistant Professor Research Institute for Microbial Diseases, Osaka University	Japan	Assistant Professor Research Institute for Microbial Diseases, Osaka University	Japan
2019.10.1- 2021.6.30	Researcher Center for Drug Design Research, National Institute of Biomedical Innovation	Japan	Specialist Miltenyi Biotec	Japan		
2020.4.1-2022.3.31	Specially Appointed Researcher Graduate School of Medicine, Osaka University	Japan				

2021.4.1-2022.3.31	Researcher Center for Drug Design Research, National Institute of Biomedical Innovation	Japan	Specially Appointed Assistant Professor Graduate School of Medicine, Osaka University	Japan	Assistant Professor United Graduate School of Child Development Molecular Research Center for Children's Mental Development, Osaka University	Japan
2020.4.1-2022.3.31	Specially Appointed Researcher Graduate School of Medicine, Osaka University	Japan				
2021.4.1-2022.3.31	Ph.D. student Graduate School of Frontier Biosciences Osaka University	Japan	Drug discovery research scientist Astellas Pharma Inc.	Japan		
2020.4.1-2023.3.31	Specially Appointed Researcher Research Institute for Microbial Diseases, Osaka University	Japan	Assistant Professor Research Institute for Microbial Diseases, Osaka University	Japan	Assistant Professor Research Institute for Microbial Diseases, Osaka University	Japan
2023.4.1-2023.9.30	Researcher Institute for Life and Medical Sciences, Kyoto University	Japan	Assistant Professor Institute for Life and Medical Sciences, Kyoto University	Japan	Assistant Professor Institute for Life and Medical Sciences, Kyoto University	Japan
2021.3.1-2024.2.29	Researcher Graduate School of Medicine, Osaka City University	Japan	Postdoc Researcher Institute for Advanced Study, Kyoto University	Japan	Postdoc Researcher Institute for Advanced Study, Kyoto University	Japan
2022.4.1-2024.3.31	JSPS RPD Graduate School of Information Science and Technology, Osaka University	Japan				

Overseas Postdocs

Employment period	Position before employed at WPI center		Next position after WPI center		Position as of April 2024*		Nationality
	Position title, organization	Country where the organization is located	Position title, organization	Country where the organization is located	Position title, organization	Country where the organization is located	
2008.3.1-2008.8.15	Research Institute for Microbial Diseases, Osaka University, Specially Appointed Researcher	Japan	Department of Microbiology, Yogi vemana University, Associate Professor	India	Professor, Department of Microbiology, Yogi Vemana University	India	India
2008.1.1-2010.2.28	Graduate school of Medicine, Osaka University, Part-time Technical Staff	Japan	(Pohang University of Science and Technology: POSTECH),Research Assistant Professor	Korea			Korea
2008.8.1-2010.7.15	Blood Research Institute, Blood Center of Wisconsin, Pre-doctoral Fellow	USA	St Jude Children's Research Hospital, (USA)Postdoctoral Fellow	USA	Senior Associate Consultant II MAYO Clinic, Center for Immunology and Immune Therapies	USA	China
2009.5.16-2010.7.19	Become Japan Corporation, Principal Software Engineer	Japan	DeNA Co. Ltd., Engineers	Japan			USA
2008.3.1-2010.8.30	Graduate School of Engineering, Osaka University, JSPS Postdoctoral Fellowship	Japan	Graduate School of Engineering, Osaka University, JSPS Postdoctoral Fellowship for Foreign Researcher	Japan			Korea
2008.4.1-2010.8.30	Graduate School of Medicine Osaka University, Part-time Technical Staff	Japan	RIKEN, Postdoctoral Researcher	Japan	DAIKIN INDUSTRIES, Ltd.	Japan	Korea

2009.11.1-2010.9.30	Graduate School of Frontier Biosciences, Osaka University,JSPS Postdoctoral Fellowship for Foreign Researchers	Japan	Immunology Frontier Research Center, Osaka University, Specially Appointed Assistant Professor (Full-time)	Japan			UK
2008.11.1-2011.3.31	National Institute of Public Health, Researcher	Korea	Childbirth		BBIRIC, Dong-Eui University	Korea	Korea
2008.4.1-2011.3.31	Graduate School of Medicine, Osaka University, Graduate Student	Japan	Immunology Frontier Research Center, Osaka University, Specially Appointed Assistant Professor (Full-time), (Japan)	Japan			China
2008.4.1-2011.3.31	Research Institute for Microbial Diseases, Osaka University,JST Researcher	Japan	Immunology Frontier Research Center, Osaka University, Specially Appointed Assistant Professor (Full-time), (Japan)	Japan			UK
2010.6.16-2011.3.31	University of Hyogo, JST researcher	Japan	Xiamen University, Research Fellow	China			China
2010.10.1-2011.8.8	Graduate School of Computer Science and Systems Engineering, Kyushu Institute of Technology, Graduate Student	Japan	Department of Chemistry, University of Ottawa, Postdoctoral Research Fellow	USA			Cuba
2010.8.16-2011.9.30	Graduate School of Natural Science and Technology, Okayama University, Teaching Assistant	Japan	N/A	N/A	Associate Professor, Aqaba Medical Science University	Jordan	Jordan

2009.4.1-2011.10.31	Laboratory of Allergy and clinical Immunology, Department of Life Science, (Pohang University of Science and Technology: POSTECH), Postdoctoral Fellow	Korea	(Pohang University of Science and Technology: POSTECH),Postdoctoral Research Fellow	Korea			Korea
2010.12.1-2011.10.31	University of Ulsan, Postdoctoral Fellow	Korea	N/A	N/A			Korea
2009.5.16-2011.11.15	Center for High Performance Computing, University of Utah, Visiting Fellow	USA	National Institute of Biological Resources (NIBR),Researcher	Korea	Researcher, National Institute of Biological Resources (NIBR)	Korea	Korea
2008.10.1-2012.3.31	The Institute of Medical Science, the University of Tokyo, Postdoctoral Fellow	Japan	Epidemiology and Public Health, Facultad de Medicina Veterinaria, Ibague Colombia, Universidad del Tolima, Assistant Professor	Columbia	Research Scientist, University of Louisville School of Medicine	USA	Columbia
2010.1.1-2012.3.31	Department of Preventive Veterinary Medicine, Molecular Immunology and Pathogenic Microorganism, Jilin University, Graduate Student	China	Jilin University, Changchu,Associate Professor	China			China
2010.4.1-2012.7.31	Research Institute for Microbial Diseases, Osaka University, Specially Appointed Researcher	Japan	N/A	N/A			Sri Lanka

2009.10.1-2012.7.31	The Institute of Medical Science, the University of Tokyo, Visiting Researcher	Japan	Immunology Frontier Research Center, Osaka University, Specially Appointed Assistant Professor (Full-time)	Japan	Associate Professor, Institute for Life and Medical Sciences, Kyoto University	Japan	Belgium
2011.9.1-2012.9.15	Miller School of Medicine, Diabetes Research Institute, Postdoctoral Fellow	USA	Immunology Frontier Research Center, Osaka University,JSPS Postdoctoral Research Fellow for Foreign Researchers	Japan			Nigeria
2012.8.1-2013.3.31	Guangzhou Institute of Advanced Technology, Chinese Academy of Sciences (GIAT), Principal Investigator	China	N/A	N/A			China
2009.4.1-2013.3.31	Research Institute for Microbial Diseases, Osaka University,JST Postdoctoral Researcher	Japan	N/A	N/A	Post Doc, Program in Molecular Medicine UMass Chan Medical School	USA	China
2009.4.1-2013.3.31	Hanoi University of Science, Lecturer	Vietnam	Immunology Frontier Research Center, Osaka University, Specially Appointed Assistant Professor (Full-time)	Japan	Vice Director, Vietnam Academy of Science and Technology, Institute of Biotechnology	Vietnam	Vietnam
2010.4.1-2013.3.31	Platform Computing Beijing Branch, Senior 2nd-line Technical Support Engineer and Team leader	China	IBM Investment Company Limited, Technical Support Professional	China			China

2009.4.1-2013.3.31	Department of Clinical Pharmacology, Niigata University of Pharmacy and Applied Life Sciences, Postdoctoral Fellow	Japan	Graduate School of Medicine, Osaka University, JSPS Postdoctoral Fellowship for Foreign Researchers	Japan	Professor, Saveetha College of Pharmacy, Saveetha Institute of Medical and Technical Sciences (SIMATS)	India	India
2010.9.1-2013.3.31	Max Planck Institute for Infection Biology, Department of Lymphocyte Development, Postdoctoral Fellow, (Germany)	Germany	Immunology Frontier Research Center, Osaka University, Specially Appointed Assistant Professor (Full-time)	Japan	Junior Research Group Leader, CharitéUniversity Medicine Berlin	Germany	Germany
2009.4.1-2013.3.31	Institute of Pharmacology, Center of Biomedical Medicine and Pharmacology, Medical University of Vienna, Graduate Student	Austria	N/A	N/A	Safety Scientist, Otsuka Pharmaceutical Co., Ltd.	Japan	Austria
2011.9.1-2013.6.30	College of Life Science, East China Normal University, Graduate Student	China	N/A	N/A			China
2010.8.16-2013.8.15	Immunology Division, Indian Institute of Toxicology Research, Scientist	India	N/A	N/A			India
2010.3.1-2013.8.15	Stem Cell and Development Biology, Genome Institute of Singapore, Pre-doctoral Fellow	Singapore	Guangzhou Institutes of Biomedicine and Health, Researcher	China	Associate Professor, Southern University of Science and Technology, Regulatory Genomics and Human Disease Laboratory	China	UK

2010.7.16-2013.9.30	Centre of Biological Resources, Teaching Hospital of Nancy/INSERM U724, Cellular and Molecular Pathologies of Nutrition, School of Medicine, University Henri Poincare, Nancy, Research Assistant	France	RIKEN Center for Life Science Technologies, Researcher	Japan	Research Scientist, Universite de Lorraine	France	France
2012.7.1-2013.11.15	Department of Chemistry, University of California, Irvine, Postdoctoral Researcher	USA	Interdisciplinary Graduate School of Engineering Sciences, Kyushu University, JSPS Postdoctoral Fellowship for Foreign Researchers	Japan			China
2010.7.1-2013.12.31	Graduate School of Frontier Biosciences, Osaka University, Specially Appointed Researcher	Japan	N/A	N/A			China
2011.4.1-2014.3.31	Applied Molecular Biology Lab, School of Life Science, Jawaharlal Nehru University, Graduate Student	India	Hokkaido University, Researcher	Japan	Founder and Scientist, Molelixir Informatics	India	India
2010.4.1-2014.3.31	Immunology Frontier Research Center, Osaka University, Temp staff (Technician)	Japan	N/A	N/A	Software engineer at Factset	Japan	France

2011.9.1-2014.4.30	Kyushu University,JSPS Postdoctoral Research Fellow for Foreign Researchers	Japan	N/A	N/A	Associate Professor, Head of School of Materials Science and Innovation, Faculty of Science, Mahidol University	Thailand	Thailand
2008.2.1-2014.5.15	N/A	N/A	Institute for Genetic Medicine, Hokkaido University, Postdoctoral fellow	Japan	Specially Appointed Lecturer, Hokkaido University Institute for Genetic Medicine	Japan	China
2013.4.1-2014.6.15	Graduate School of Medicine, Osaka University, Graduate Student	Japan	School of Medicine, University of Pennsylvania Postdoc researcher	USA			Korea
2013.1.1-2014.9.30	Graduate School of Frontier Sciences, The University of Tokyo, Specially Appointed Researcher	Japan	Institute for Virus Research, Kyoto University, Specially Appointed Researcher	Japan	Bioinformatics Scientist, StemRIM, Inc. & COMIT Osaka University	Japan	Indonesia
2014.4.1-2014.9.30	Graduate School of Medicine, Osaka University, Assistant Professor	Japan	Graduate School of Medicine, Division of Health Sciences, Osaka University, Assistant Professor	Japan			Taiwan
2014.10.1-2014.11.15	Immunology Frontier Research Center, Osaka University,JSPS Postdoctoral Research Fellow for Foreign Researchers	Japan	Dana Farber Cancer Institute, Harvard University Instructor/Research Fellow	USA			Nigeria

2011.1.1-2014.12.31	Postdoctoral fellow, Department of Dermatology, Seoul National University College of Medicine	Korea	Research Institute for Microbial Diseases, Osaka University, Specially Appointed Researcher	Japan	Associate Professor, Department of Mathematical Sciences, College of Natural Sciences, UNIST	Korea	Korea
2011.4.16-2015.1.15	Immunology Frontier Research Center, Osaka University, Research Fellow	Japan	Ewha Woman's University Mokdong Hospital, Research Professor/Clinical Assistant Professor	Korea			Korea
2011.4.1-2015.3.31	Postdoctoral Researcher, Department of Microbiology and Immunology National Cheng Kung University	Taiwan	Immunology Frontier Research Center, Osaka University,JSPS Postdoctoral Research Fellow for Foreign Researchers	Japan	Assistant Professor, Graduate School of Medicine, Osaka University	Japan	Taiwan
2012.1.16-2015.3.31	Graduate School of Life and Environmental Sciences, University of Tsukuba, Graduate Student	Japan	Researcher, Riken	Japan	Researcher, Riken	Japan	Tunisia
2014.5.1-2015.4.30	Research Institute for Microbial Diseases, Osaka University, Specially Appointed Researcher	Japan	Research Institute for Microbial Diseases, Osaka University,JSPS Postdoctoral Research Fellow for Foreign Researchers	Japan	Assistant Professor, Research Institute for Microbial Diseases, Osaka University	Japan	China
2014.12.16-2015.7.31	Graduate student, University of Texas Medical Branch	USA	N/A	N/A			Taiwan
2015.2.1-2015.7.31	Ph.D. Student, Middle East Technical University (METU)	Turkey	N/A	N/A	Research Group Leader, IZMIR BIOMEDICINE AND GENOME CENTER (IBG)	Turkey	Turkey

2015.4.1-2015.10.31	Institute for Virus Research, Kyoto University, Technical Staff	Japan	LINE Fukuoka Software, Engineer	Japan			Swiss
2014.11.16-2015.11.15	Immunology Frontier Research Center, Osaka University,JSPS Postdoctoral Research Fellow for Foreign Researchers	Japan	Novartis, Researcher	Slovenia	Associate Director, Global Drug Development in Bioanalytics	Slovenia	Slovenia
2013.1.16-2015.12.31	N/A		Institute for Virus Research, Kyoto University, Specially Appointed Assistant Professor	Japan	Associate Professor, Research Institute for Microbial Diseases, Osaka University	Japan	China
2015.4.1-2015.12.31	Graduate School of Biomedical Science, Tokyo Medical and Dental University, Graduate Student	Japan	National Institutes of Health Postdoctoral, fellow	USA			Egypt
2012.7.1-2016.6.30	Research Associate, Division of Bacteriology, National Institute of Cholera and Enteric Diseases	India	University of Washington School of Medicine、Postdoctoral researcher	USA	Research Associate in Pediatrics, Boston Children's Hospital	USA	India
2014.9.1-2016.6.30	Cancer Biology and Inflammatory Disorder Division, Indian Institute of Chemical Biology	India	TATA MEDICAL CENTER、PI	India	Senior Scientific Officer, Chittaranjan National Cancer Institute	India	India
2014.4.1-2016.9.30	Researcher, Laboratory of Adjuvant Innovation, National Institute of Biomedical Innovation	Japan	N/A	N/A			China

2012.11.1-2016.10.31	Research Associate, DNA Fingerpringing Unit, National Bureau of Animal Genetic Resources	India	N/A	N/A			India
2016.6.1-2016.10.31	Lecturer of Clinical and Chemical Pathology/Faculty of Medicine, Fayoum University	Egypt	N/A	N/A	Lecturer and Head of Blood Bank, Faculty of Medicine, Fayoum University	Egypt	Egypt
2015.4.16-2016.11.30	Research Associate/Department of Brain Behaviour and Mental Health, Neuroscience and Psychiatry Unit, School of Health Sciences, University of Manchester	UK	Elekta Limited、Senior Physicist-MR	UK			Australia/UK
2014.4.1-2017.3.15	Specially Appointed Researcher, Immunology Frontier Research Center, Osaka University	Japan	N/A	N/A	Translational Immunology Team Lead, Cancer Research UK National Biomarker Centre	UK	UK
2014.4.1-2017.3.31	PhD student, Graduate School of Comprehensive Human Sciences, University of Tsukuba/Tsukuba Branch, RIKEN	Japan	Washington University、Research Associate	USA	Senior Scientist, Pfizer	USA	Bangladesh
2014.10.1-2017.3.31	Attending physician, Rheumatoid Immune Medicine, Department of Rheumatology, First Hospital of Jilin University, Jilin Province	China	Attending physician, Rheumatoid Immune Medicine, Department of Rheumatology, First Hospital of Jilin University	China			China

2015.10.1-2017.3.31	Researcher, JSPS Postdoctoral Fellowships for Research in Japan/Immunology Frontier Research Center, Osaka University	Japan	Researcher, JSPS Postdoctoral Fellowships for Research in Japan	Japan	Postdoctoral Researcher, Baker Heart and Diabetes Institute	Australia	Australia
2015.4.1-2017.3.31	PhD Student, Universitat Pompeu Fabra, Barcelona	Spain	LPM, Formation as Psychotherapist	Germany	Research Staff, Clinical Psychology and Psychological Treatment, LMU Munich	Germany	Germany/Japan
2013.9.1-2017.3.31	Tutor/Postdoc, Department of Physics and Astronomy, University of Canterbury	New Zealand	Karolinska Institutet、Bioinfomatician	Sweden	Lead Analyst, Energy Logistics	Norway	Germany
2013.10.1-2017.7.15	Ph.D. Student, Doctoral Course in Genetics, Faculty of Biotechnology, University of Ljubljana	Slovenia	LEK d.d、Researcher	Slovenia			Slovenia
2015.10.16-2017.10.15	Ph. D. student, John Curtin School of Medical Research, Immunology Department, Australian National University	Australia	N/A	N/A			Australia
2017.5.1-2018.6.30	Researcher, JSPS Postdoctoral Fellowships for Research in Japan	Japan	N/A	N/A	Science teacher, Epping School	Australia	Australia
2014.12.1-2019.4.8	Specially Appointed Researcher(Full-Time), Immunology Frontier Research Center, Osaka University	Japan	N/A	N/A			China

2014.5.1-2019.4.30	Specially Appointed Researcher(Full-Time), Research Institute for Microbial Diseases, Osaka University	Japan	Specially Appointed Researcher(Full-Time), Research Institute for Microbial Diseases, Osaka University	Japan	Assistant Professor, Research Institute for Microbial Diseases, Osaka University	Japan	China
2016.4.1-2019.10.31	PhD Student, Autoimmunity and Immune Regulation, Department of Clinical and Experimental Medicine, Linkö ping University	Sweden	City of Hope、Researcher	USA			Nepal
2019.4.16-2020.3.31	University of Lübeck, Germany, Department for Psychiatry and Psychosomatics Resident Physician	Germany	University of Hamburg、Physician	Germany	Medical Doctor, University of Hamburg	Germany	Germany
2018.6.1-2020.10.31	Postdoctoral Fellow Institute of Molecular and Cell Biology, Cell Division and cancer Laboratory	Singapore	Senior Research Scientist Institute of Molecular and Cell Biology The Agency of Science Technology and Research (ASTAR)	Singapore	SRA Product Health Scientific Manager Japan Tobacco International	Switzerland	Argentina
2017.2.1-2021.1.31	Tutor PrepWorks Malaysia	Malaysia	Postdoc Researcher Max Planck Institute for infection Biology	Germany	Postdoctoral Researcher, BioMed X Institute	Germany	Malaysia
2019.4.1-2021.3.31	Ph.D. student Graduate School of Frontier Biosciences Osaka University	Japan					USA

2020.4.1-2021.3.31	Ph.D. student Graduate School of Medicine, Osaka University	Japan			Senior Research Fellow GSI Lab	Indonesia	Indonesia
2020.10.1- 2021.3.31	Lecturer Mongolian National University of Medical Sciences	Mongolia	Postdoctoral researcher Center for Infectious Disease Education and Research, Osaka University	Japan			Mongolia
2020.11.1- 2021.3.31	Senior Research Specialist karolinska Institute, Science for Life laboratory	Sweden	Postdoctoral researcher Center for Infectious Disease Education and Research, Osaka University	Japan	Specially Appointed Assistant Professor Center for Infectious Disease Education and Research, Osaka University	Japan	Denmark
2019.12.1- 2021.4.30	Ph.D. Student Faculty of Natural Sciences, University of Salzburg	Austria	Postdoctoral researcher Max Planck Institute	Germany	Marie Skłodowska-Curie Fellow Max Planck Institute for Multidisciplinary Sciences	Germany	Malaysia
2018.10.1- 2021.4.30	Ph.D. student Graduate School of Frontier Biosciences Osaka University	Japan	Postdoctoral Fellow Mass General Hospital and Harvard Medical School	USA	Postdoctoral Fellow Mass General Hospital and Harvard Medical School	USA	Ethiopia
2019.4.1-2021.7.31	Ph.D. student Graduate School of Medicine, Osaka University	Japan			Postdoctoral Researcher Division of Nephrology, Harvard Medical School and Massachusetts General Hospital	USA	Turkey
2021.6.1-2021.8.31	Ph.D. student Graduate School of Science, Osaka University	Japan	Postdoctoral researcher UT Southwestern Medical Center	USA	Postdoctoral Researcher UT Southwestern Medical Center	USA	Malaysia

2019.10.1- 2021.12.31	Ramalingaswami Fellow All India Institute of Medical Sciences	India	Assistant Staff Scientist Oklahoma Medical Research Foundation	USA	Postdoctoral Fellow Medical College of Wisconsin	USA	India
2020.10.1- 2022.3.31	Research Scientist KOTAI Biotechnologies, Inc.	Japan	Research Scientist KOTAI Biotechnologies Inc.	Japan	Research Scientist KOTAI Biotechnologies Inc.	Japan	Taiwan
2021.11.1- 2022.9.30	Ph.D. student Graduate School of Engineering, Osaka University	Japan	Senior scientist ICHNOS SCIENCES SA	Switzerland			Egypt
2020.12.21- 2022.11.15	Administrator Hang Xanh International Clinic	Vietnam	Senior Researcher Gene Solutions	Viet Nam			Vietnam
2020.7.1- 2022.12.31	Ph.D. student Graduate School of Frontier Biosciences Osaka University	Japan	Research Associate Professor Institute of Process Engineering, Chinese Academy of Science	China			China
2021.4.1-2023.3.31	Ph.D. student Graduate School of Frontier Biosciences Osaka University	Japan	Research Fellow Genomik Solidaritas Indonesia Inc.	Indonesia			Indonesia
2015.10.1- 2023.3.31	Postdoctoral fellow John Curtin School of Medical Research, Pathogens & Immunity Department, Australian National University	Australia	Postdoctoral Researcher Baker Heart and Diabetes Institute	Australia	Postdoctoral Researcher Baker Heart and Diabetes Institute	Australia	Australia

2019.4.1-2023.3.31	Postdoctoral Researcher Laboratory for Systems Biology, RIKEN	Japan	Specially Appointed Researcher Research Institute for Microbial Diseases, Osaka University	Japan	Specially Appointed Researcher Research Institute for Microbial Diseases, Osaka University	Japan	USA
2020.4.1-2023.3.31	Ph.D. student Graduate School of Medicine, Osaka University	Japan	Researcher Regcell CO., Ltd	Japan			China
2021.8.1-2023.3.31	Research Fellow Ragon Institute of MGH, MIT and Harvard	USA	Assistant Professor Graduate School of Medicine, Kobe University	Japan	Program-specific assistant professor The Hakubi Project, Kyoto University	Japan	Indonesia
2019.6.1-2023.8.31	Postdoctoral fellow Department of Microbiology and immunology, University of Melbourne	Australia					USA
2020.6.1-2024.2.15	Consultant Addenbrooke's Hospital (UK)	UK	Macau University of Science and Technology	Macau	Macau University of Science and Technology	Macau	UK
2022.4.25- 2024.2.29	Research Student Immune Sinai Unit, Okinawa Institute of Science and Technology Graduate University	Japan					UK
2020.4.1-2024.3.31	Ph.D. student Graduate School of Frontier Biosciences Osaka University	Japan					China
2023.4.1-2024.3.31	Ph.D. student Graduate School of Medicine, Osaka University	Japan					Myanmar

2020.4.1-2024.3.31	Specially Appointed Assistant Professor Research Institute for Microbial Diseases, Osaka University	Japan	Scientist Medical Center of the Johannes Gutenberg University Mainz Gemeinnutzige GmbH	Germany	Scientist Medical Center of the Johannes Gutenberg University Mainz Gemeinnutzige GmbH	Germany	The Netherlands

Project Expenditures FY2023

(Thousand yens)

	Amount	Details	Operational subsidies to National University Corporations/Incorporated Administrative Agency		Funding by WPI Academy		Government Subsidies except Funding from WPI Academy		Donations		Indirect funding		Joint research projects		Competitive funding		Others	
			Total costs	Details (no. of persons)	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details
Personnel	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency		Center director									3,035	Center director 1				
	13,049	Funding by WPI Academy		Administrative director									12,168	Administrative director 1				
	-	Government Subsidies except Funding from WPI Academy	-	Principal investigator 0	-	Principal investigator 0	-	0	-	0	-	0	70,225	10	-	0	-	0
	53,738	Donations		・Full-time／Japanese		・Full-time／Japanese							67,790	・Full-time／Japane 8				
	-	Indirect funding		・Concurrent／Japanese		・Concurrent／Japanese							2,435	・Concurrent／Japa 2				
	648,160	Joint research projects		・Full-time／Overseas		・Full-time／Overseas								・Full-time／Overseas				
	-	Competitive funding		・Concurrent／Overseas		・Concurrent／Overseas								・Concurrent／Overseas				
	-	Others	-	Other researchers 0	-	Other researchers 0	-	0	-	0	-	0	217,438	Other researchers 101	-	0	-	0
				・Associate professor /Assistant professor		・Associate professor /Assistant professor							181,556	・Associate professor /Assistant professor 30				
				・Others		・Others							35,882	・Others 71				
				Postdocs	13,049	Postdocs 2		Postdocs	30,795	Postdocs 7			91,866	Postdocs 18				
				Research support staffs		Research support staffs		Research support staffs	17,264	Research support staffs 8			124,142	Research support staffs 45				
				Administrative staffs		Administrative staffs		Administrative staffs	5,679	Administrative staffs 1			129,286	Administrative staffs 31				
Subtotal	714,947		-	0	13,049	2	-	0	53,738	16	-	0	648,160	207	-	0	-	0
Project activities	45,484	Operational subsidies to National University Corporations/Incorporated Administrative Agency	45,484		3,108						131,138		200,636	Cost of consumables				
	3,108	Funding by WPI Academy											106,421	Cost of utilities				
	-	Government Subsidies except Funding from WPI Academy											202,086	Other costs				
	-	Donations																
	131,138	Indirect funding																
	509,143	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	688,873		45,484		3,108		-		-		131,138		509,143		-		-	
Travel	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency			101	Domestic travel costs							1,195	Travel cost for scientists on secondment				
	7,497	Funding by WPI Academy			7,396	Overseas travel costs												
	-	Government Subsidies except Funding from WPI Academy																
	-	Donations																
	-	Indirect funding																
	1,195	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	8,692		-		7,497		-		-		-		1,195		-		-	
Equipment	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency			4,994								605	Comprehensive Molecular Modeling Software				
	4,994	Funding by WPI Academy											8,451	Single Cell Analysis Software				
	-	Government Subsidies except Funding from WPI Academy											79,930	FACSAria Fusiont sorter				
	-	Donations											6,930	Quick Start Package				
	-	Indirect funding											2,079	Small Animal MRI System Software				
	97,995	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	102,989		-		4,994		-		-		-		97,995		-		-	
Research projects	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency							98,293				377,564		172,934	Grants-in-Aid for Scientific Research, etc.	6,179	
	-	Funding by WPI Academy													277,350	Commissioned research projects, etc.		
	-	Government Subsidies except Funding from WPI Academy																
	98,293	Donations																
	-	Indirect funding																
	377,564	Joint research projects																
	450,284	Competitive funding																
	6,179	Others																
Subtotal	932,320		-		-		-		98,293		-		377,564		450,284		6,179	
Others	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency			2,101	Consumption tax							56,857	Consumption tax				
	2,101	Funding by WPI Academy																
	-	Government Subsidies except Funding from WPI Academy																
	-	Donations																
	-	Indirect funding																
	56,857	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	58,958		-		2,101		-		-		-		56,857		-		-	
Total	2,506,779		45,484		30,749		-		152,031		131,138		1,690,914		450,284		6,179	

Operational subsidies to National University Corporations/Incorporated Administrative Agency	運営費交付金
Funding by WPI Academy	WPIアカデミー国際頭脳循環の加速・拡大事業
Government Subsidies except Funding from WPI Academy	機関補助金（WPIアカデミー国際頭脳循環の加速・拡大事業を除く
Donations	寄付金
Indirect funding	間接経費
Joint research projects	共同研究費
Competitive funding	競争的資金
Others	その他

Project Expenditures FY2022

(Thousand yens)

	Amount	Details	Operational subsidies to National University Corporations/Incorporated Administrative Agency		Funding by WPI Academy		Government Subsidies except Funding from WPI Academy		Donations		Indirect funding		Joint research projects		Competitive funding		Others	
			Total costs	Details (no. of persons)	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details
Personnel	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency		Center director									3,029	Center director 1				
	12,997	Funding by WPI Academy		Administrative director									11,825	Administrative director 1				
	25,004	Government Subsidies except Funding from WPI Academy	-	Principal investigator 0	-	Principal investigator 0	-	0	-	0	-	0	77,171	10	-	0	-	0
	63,215	Donations		・Full-time／Japanese		・Full-time／Japanese							74,741	・Full-time／Japane 8				
	-	Indirect funding		・Concurrent／Japanese		・Concurrent／Japanese							2,430	・Concurrent／Japa 2				
	620,926	Joint research projects		・Full-time／Overseas		・Full-time／Overseas								・Full-time／Overseas				
	-	Competitive funding		・Concurrent／Overseas		・Concurrent／Overseas								・Concurrent／Overseas				
	-	Others	-	Other researchers 0	12,997	Other researchers 2	-	0	-	0	-	0	218,345	Other researchers 107	-	0	-	0
				・Associate professor /Assistant professor ・Others	12,997	・Associate professor /Assistant professor 2 ・Others							180,756	・Associate professor /Assistant professor 25				
													37,589	・Others 82				
				Postdocs		Postdocs		Postdocs	44,404	Postdocs 10			91,612	Postdocs 16				
				Research support staffs		Research support staffs	25,004	Research support staffs 7	12,456	Research support staffs 6			113,594	Research support staffs 36				
				Administrative staffs		Administrative staffs		Administrative staffs	6,355	Administrative staffs 2			105,350	Administrative staffs 24				
Subtotal	722,142		-	0	12,997	2	25,004	7	63,215	18	-	0	620,926	195	-	0	-	0
Project activities	52,532	Operational subsidies to National University Corporations/Incorporated Administrative Agency	52,532		7,962		118				246,536		218,492	Cost of consumables				
	7,962	Funding by WPI Academy											195,338	Cost of utilities				
	118	Government Subsidies except Funding from WPI Academy											107,535	Other costs				
	-	Donations																
	246,536	Indirect funding																
	521,365	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	828,513		52,532		7,962		118		-		246,536		521,365		-		-	
Travel	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency			74	Domestic travel costs							3,400	Travel cost for scientists on secondment				
	6,856	Funding by WPI Academy			6,782	Overseas travel costs												
	-	Government Subsidies except Funding from WPI Academy																
	-	Donations																
	-	Indirect funding																
	3,400	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	10,256		-		6,856		-		-		-		3,400		-		-	
Equipment	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency											10,993	Microfocus X-ray CT System				
	-	Funding by WPI Academy											4,467	Bio Turing Browser				
	-	Government Subsidies except Funding from WPI Academy											10,890	Nano Particle Size/Zeta Potential Analyzer				
	-	Donations											11,946	MVE Fusion Freezer				
	-	Indirect funding											36,960	Extracellular Flux Analyzer				
	208,569	Joint research projects											58,991	Mass cytometer				
	-	Competitive funding											22,990	Biomolecular Interaction Analyzer				
	-	Others											2,033	Flow Cell Monitor				
													10,799	Bio-Plex 200 HTF Complete System				
													38,500	Next Generation Sequencer				
Subtotal	208,569		-		-		-		-		-		208,569		-		-	
Research projects	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency							213,287				323,301		113,960	Grants-in-Aid for Scientific Research, etc.	11,351	
	-	Funding by WPI Academy													489,994	Commissioned research projects, etc.		
	-	Government Subsidies except Funding from WPI Academy																
	213,287	Donations																
	-	Indirect funding																
	323,301	Joint research projects																
	603,954	Competitive funding																
	11,351	Others																
Subtotal	1,151,893		-		-		-		213,287		-		323,301		603,954		11,351	
Others	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency			2,184	Consumption tax							53,975	Consumption tax				
	2,184	Funding by WPI Academy																
	-	Government Subsidies except Funding from WPI Academy																
	-	Donations																
	-	Indirect funding																
	53,975	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	56,159		-		2,184		-		-		-		53,975		-		-	
Total	2,977,532		52,532		29,999		25,122		276,502		246,536		1,731,536		603,954		11,351	

Operational subsidies to National University Corporations/Incorporated Administrative Agency	運営費交付金
Funding by WPI Academy	WPIアカデミー国際頭脳循環の加速・拡大事業
Government Subsidies except Funding from WPI Academy	機関補助金（WPIアカデミー国際頭脳循環の加速・拡大事業を除く
Donations	寄付金
Indirect funding	間接経費
Joint research projects	共同研究費
Competitive funding	競争的資金
Others	その他

Project Expenditures FY2021

(Thousand yens)

	Amount	Details	Operational subsidies to National University Corporations/Incorporated Administrative Agency		Funding by WPI Academy		Government Subsidies except Funding from WPI Academy		Donations		Indirect funding		Joint research projects		Competitive funding		Others	
			Total costs	Details (no. of persons)	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details
Personnel	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency		Center director									3,025	Center director 1				
	18,803	Funding by WPI Academy		Administrative director									11,816	Administrative director 1				
	30,921	Government Subsidies except Funding from WPI Academy	-	Principal investigator 0	-	Principal investigator 0	-	0	-	0	-	0	83,929	9	-	0	-	0
	62,204	Donations		・Full-time／Japanese		・Full-time／Japanese							81,442	・Full-time／Japane 7				
	-	Indirect funding		・Concurrent／Japanese		・Concurrent／Japanese							2,487	・Concurrent／Japa 2				
	618,902	Joint research projects		・Full-time／Overseas		・Full-time／Overseas								・Full-time／Overseas				
	-	Competitive funding		・Concurrent／Overseas		・Concurrent／Overseas								・Concurrent／Overseas				
	-	Others	-	Other researchers 0	18,803	Other researchers 3	-	0	-	0	-	0	225,987	Other researchers 110	-	0	-	0
				・Associate professor /Assistant professor ・Others	18,803	・Associate professor /Assistant professor 3 ・Others							161,390	・Associate professor /Assistant professor 23				
													64,597	・Others 87				
				Postdocs		Postdocs		Postdocs	37,992	Postdocs 9			92,128	Postdocs 16				
				Research support staffs		Research support staffs	30,921	Research support staffs 6	12,798	Research support staffs 6			111,274	Research support staffs 35				
				Administrative staffs		Administrative staffs		Administrative staffs	11,414	Administrative staffs 2			90,743	Administrative staffs 24				
Subtotal	730,830		-	0	18,803	3	30,921	6	62,204	17	-	0	618,902	196	-	0	-	0
Project activities	38,904	Operational subsidies to National University Corporations/Incorporated Administrative Agency	38,904		11,914		109				164,848		213,628	Cost of consumables				
	11,914	Funding by WPI Academy											58,187	Cost of utilities				
	109	Government Subsidies except Funding from WPI Academy											207,877	Other costs				
	-	Donations																
	164,848	Indirect funding																
	479,692	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	695,467		38,904		11,914		109		-		164,848		479,692		-		-	
Travel	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency											1,113	Travel cost for scientists on secondment				
	-	Funding by WPI Academy																
	-	Government Subsidies except Funding from WPI Academy																
	-	Donations																
	-	Indirect funding																
	1,113	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	1,113		-		-		-		-		-		1,113		-		-	
Equipment	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency			16,759								2,850	Bio Turing Browser				
	16,759	Funding by WPI Academy											106,612	Multi-Color Cell Sorter System				
	-	Government Subsidies except Funding from WPI Academy											2,153	Air Conditioner				
	-	Donations											27,379	Multicolor Cell Analyzer				
	-	Indirect funding											77,990	High Resolution Mass Spectrometer				
	216,984	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	233,743		-		16,759		-		-		-		216,984		-		-	
Research projects	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency					1,393		155,176				257,239		153,301	Grants-in-Aid for Scientific Research, etc.	6,308	
	-	Funding by WPI Academy													527,994	Commissioned research projects, etc.		
	1,393	Government Subsidies except Funding from WPI Academy																
	155,176	Donations																
	-	Indirect funding																
	257,239	Joint research projects																
	681,295	Competitive funding																
	6,308	Others																
Subtotal	1,101,411		-		-		1,393		155,176		-		257,239		681,295		6,308	
Others	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency			2,524	Consumption tax							53,593	Consumption tax				
	2,524	Funding by WPI Academy																
	-	Government Subsidies except Funding from WPI Academy																
	-	Donations																
	-	Indirect funding																
	53,593	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	56,117		-		2,524		-		-		-		53,593		-		-	
Total	2,818,681		38,904		50,000		32,423		217,380		164,848		1,627,523		681,295		6,308	

Operational subsidies to National University Corporations/Incorporated Administrative Agency	運営費交付金
Funding by WPI Academy	WPIアカデミー国際頭脳循環の加速・拡大事業
Government Subsidies except Funding from WPI Academy	機関補助金（WPIアカデミー国際頭脳循環の加速・拡大事業を除く
Donations	寄付金
Indirect funding	間接経費
Joint research projects	共同研究費
Competitive funding	競争的資金
Others	その他

Project Expenditures FY2020

(Thousand yens)

	Amount	Details	Operational subsidies to National University Corporations/Incorporated Administrative Agency		Funding by WPI Academy		Government Subsidies except Funding from WPI Academy		Donations		Indirect funding		Joint research projects		Competitive funding		Others	
			Total costs	Details (no. of persons)	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details
Personnel	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency		Center director									3,000	Center director 1				
	19,070	Funding by WPI Academy		Administrative director									9,875	Administrative director 1				
	36,789	Government Subsidies except Funding from WPI Academy	-	Principal investigator 0	-	Principal investigator 0	-	0	-	0	-	0	85,755	9	-	0	-	0
	48,135	Donations		・Full-time／Japanese		・Full-time／Japanese							74,984	・Full-time／Japane 6				
	-	Indirect funding		・Concurrent／Japanese		・Concurrent／Japanese							2,467	・Concurrent／Japa 2				
	539,496	Joint research projects		・Full-time／Overseas		・Full-time／Overseas							8,304	・Full-time／Overse 1				
	-	Competitive funding		・Concurrent／Overseas		・Concurrent／Overseas								・Concurrent／Overseas				
	-	Others	-	Other researchers 0	-	Other researchers 0	-	0	-	0	-	0	212,254	Other researchers 98	-	0	-	0
				・Associate professor /Assistant professor ・Others		・Associate professor /Assistant professor ・Others							151,232	・Associate professor /Assistant professor 24				
													61,022	・Others 74				
				Postdocs	19,070	Postdocs 3		Postdocs	25,403	Postdocs 7			69,955	Postdocs 15				
				Research support staffs		Research support staffs	36,789	Research support staffs 7	13,056	Research support staffs 6			87,614	Research support staffs 36				
				Administrative staffs		Administrative staffs		Administrative staffs	9,676	Administrative staffs 3			71,043	Administrative staffs 26				
Subtotal	643,490		-	0	19,070	3	36,789	7	48,135	16	-	0	539,496	186	-	0	-	0
Project activities	31,560	Operational subsidies to National University Corporations/Incorporated Administrative Agency	31,560		4,386		11				172,406		198,078	Cost of consumables				
	4,386	Funding by WPI Academy											53,700	Cost of utilities				
	11	Government Subsidies except Funding from WPI Academy											193,192	Other costs				
	-	Donations																
	172,406	Indirect funding																
	444,970	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	653,333		31,560		4,386		11		-		172,406		444,970		-		-	
Travel	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency											2,398	Travel cost for scientists on secondment				
	-	Funding by WPI Academy																
	-	Government Subsidies except Funding from WPI Academy																
	-	Donations																
	-	Indirect funding																
	2,398	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	2,398		-		-		-		-		-		2,398		-		-	
Equipment	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency			26,328								4,206	Software Licensing				
	26,328	Funding by WPI Academy											4,992	High Sensitivity Spectroscopic Detectors				
	-	Government Subsidies except Funding from WPI Academy											1,648	Laminar Wash Mini100				
	-	Donations											7,794	Cell Analyzer System				
	-	Indirect funding											4,983	Real-time PCR System				
	268,598	Joint research projects											29,436	Research Slide Scanner				
	-	Competitive funding											1,452	High Throughput Universal Tabletop Centrifuge				
	-	Others											34,430	Genome Data Storage System				
													6,798	TychoNT.6 System				
													53,130	Bioinformatics Server				
													14,960	CytoFLEX S System				
													1,000	Safety cabinet				
													1,348	Freeze Dryer				
													31,339	Laser microdissection system				
													1,276	Centrifugal concentrator				
													69,311	Light sheet microscope system				
													495	Vacuum pumps				
Subtotal	294,926		-		26,328		-		-		-		268,598		-		-	
Research projects	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency							296,856				338,335		155,699	Grants-in-Aid for Scientific Research, etc.	7,840	
	-	Funding by WPI Academy													433,412	Commissioned research projects, etc.		
	-	Government Subsidies except Funding from WPI Academy																
	296,856	Donations																
	-	Indirect funding																
	338,335	Joint research projects																
	589,111	Competitive funding																
	7,840	Others																
Subtotal	1,232,142		-		-		-		296,856		-		338,335		589,111		7,840	
Others	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency			2,036	Consumption tax							46,916	Consumption tax				
	2,036	Funding by WPI Academy																
	-	Government Subsidies except Funding from WPI Academy																
	-	Donations																
	-	Indirect funding																
	46,916	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	48,952		-		2,036		-		-		-		46,916		-		-	
Total	2,875,241		31,560		51,820		36,800		344,991		172,406		1,640,713		589,111		7,840	

Operational subsidies to National University Corporations/Incorporated Administrative Agency	運営費交付金
Funding by WPI Academy	WPIアカデミー国際頭脳循環の加速・拡大事業
Government Subsidies except Funding from WPI Academy	機関補助金（WPIアカデミー国際頭脳循環の加速・拡大事業を除く）
Donations	寄付金
Indirect funding	間接経費
Joint research projects	共同研究費
Competitive funding	競争的資金
Others	その他

Appendix 4 Outreach Activities and Their Results

List up to three of the Center's outreach activities carried out during the period between FY 2020 and 2023 that have contributed to enhancing the brand or recognition of your Center and/or the brand of the overall WPI program, and describe its concrete contents and effect in narrative style. (Where possible, indicate the results in concrete numbers.)

Examples:
- As a result of using a new OO press-release method, a OO% increase in media coverage was obtained over the previous year.
- By holding seminars for the public that include people from industry, requests for joint research were received from companies.
- We changed our public relations media. As a resulting of using OO to disseminate information, a OO% increase in inquiries from researchers was obtained over the previous year.
- As a result of vigorously carrying out OO outreach activity, ¥OO in external funding was acquired.

Enter a list of your outreach activities in Attachment 4a.

Activity 1: Complete website renewal

In 2022, the IFReC website underwent a complete renewal that enhanced security, improved user-friendliness, and increased accessibility. This renewal resulted in a 20% increase in website traffic per fiscal year between FY2020 and 2023 compared to the previous reporting period (FY2017-2019). Furthermore, inquiries to IFReC have increased by 60% per fiscal year, including many inquiries from companies seeking collaborative research opportunities.

Activity 2: Promotional video featuring young researchers

IFReC created 14 promotional videos featuring its young researchers (assistant professors and associate professors) and posted these videos on both the IFReC website and YouTube. Since 2022, three of the featured researchers have been promoted, one to professor at the University of Tokyo, another to professor at Osaka University, and the third to manager at a Swiss biotech company.

Activity 3: Events for high school teachers and students

In collaboration with other WPI centers, IFReC held a total of eight online seminars for high school teachers (two in FY2020, three in FY2021, and three in FY2023) to help incorporate the latest WPI research into their classes. Additionally, after the COVID-19 pandemic subsided, IFReC organized events that combine tours of IFReC facilities with lectures by researchers. Several of the participants of these events have gone on to apply to medical and life sciences programs at Osaka University.

Appendix 4a　State of Outreach Activities from FY 2020 to FY 2023

* For each activity, enter the number of times that the activity was held each fiscal year.

Activities	FY 2020 (number of activities, times held)	FY 2021 (number of activities, times held)	FY 2022 (number of activities, times held)	FY 2023 (number of activities, times held)
PR brochure, pamphlet	2	2	3	2
Lectures, seminars for general public	3	6	5	6
Teaching, experiments, training for elementary, secondary and high school students	0	1	1	1
Science café	0	0	1	1
Open house	0	0	1	2
Participating, exhibiting in events	1	1	2	2
Press releases	8	19	18	22
Publications of popular science books	2	4	2	1
Others (original message video)	8	5	3	3

*If there are activities that the center hasn’t implemented, delete those lines. If you have other activities, list them in the space between parentheses after “Others” and state the number of times they were held in the spaces on the right. Another line under “Others” can be added, if needed.

<Notes>

WPI Academy

Submittal of List of Center's Research Results

1. Refereed Papers published from 2020 to 2023 (Free format)

A. WPI papers

No	Article
1	Wu TH, Lu YJ, Chiang MR, Chen PH, Lee YS, Shen MY, Chiang WH, Liu YC, Chuang CY, Lin HCA, Hu SH. Lung metastasis-Harnessed in-Situ adherent porous organic nanosponge-mediated antigen capture for A self-cascaded detained dendritic cells and T cell infiltration. Biomaterials 305:122443 (2024).
2	Shibata K, Fujimori N, Oono T, Motooka D, Okuzaki D, Sonoda KH, Ogawa Y, Yamasaki S. Single-cell analysis for identification of T-cell clonotypes associated with IgG4 production of autoimmune pancreatitis. Gastroenterology Report 11:goad071 (2023).
3	Reja SI, Minoshima M, Hori Y, Kikuchi K. Recent advancements of fluorescent biosensors using semisynthetic probes. Biosensors & Bioelectronics 247:115862 (2024).
4	Tomiyasu N, Takahashi M, Toyonaga K, Yamasaki S, Bamba T, Izumi Y. Efficient lipidomic approach for the discovery of lipid ligands for immune receptors by combining LC-HRMS/MS analysis with fractionation and reporter cell assay. Analytical and Bioanalytical Chemistry : (2023).
5	Palacpac NMQ, Ishii KJ, Arisue N, Tougan T, Horii T. Immune tolerance caused by repeated P. falciparum infection against SE36 malaria vaccine candidate antigen and the resulting limited polymorphism. Parasitology international 99:102845 (2024).
6	Liu L, Ito T, Li B, Tani H, Okuzaki D, Motooka D, Miyazaki H, Ogino T, Nakamura S, Takeda K, Kayama H. The UDP-glucose/P2Y14 receptor axis promotes eosinophil-dependent large intestinal inflammation. International Immunology 36:155-166 (2024).
7	Torii K, Benson S, Hori Y, Vendrell M, Kikuchi K. No-wash fluorogenic labeling of proteins for reversible photoswitching in live cells. Chemical Science 15:1393-1401 (2024).
8	Otaki N, Motomura Y, Terooatea T, Kelly ST, Mochizuki M, Takeno N, Koyasu S, Tamamitsu M, Sugihara F, Kikuta J, Kitamura H, Shiraishi Y, Miyanohara J, Nagano Y, Saita Y, Ogura T, Asano K, Minoda A, Moro K. Activation of ILC2s through constitutive IFNγ signaling reduction leads to spontaneous pulmonary fibrosis. Nature Communications 14:8120 (2023).
9	Sonoda Y, Fujita A, Torio M, Mukaino T, Sakata A, Matsukura M, Yonemoto K, Hatae K, Ichimiya Y, Chong PF, Ochiai M, Wada Y, Kadoya M, Okamoto N, Murakami Y, Suzuki T, Isobe N, Shigeto H, Matsumoto N, Sakai Y, Ohga S. Progressive myoclonic epilepsy as an expanding phenotype of NGLY1-associated congenital deglycosylation disorder: A case report and review of the literature. European Journal of Medical Genetics 67:104895 (2024).
10	Kusumoto T, Chubachi S, Namkoong H, Tanaka H, Lee H, Otake S, Nakagawara K, Fukushima T, Morita A, Watase M, Asakura T, Masaki K, Kamata H, Ishii M, Hasegawa N, Harada N, Ueda T, Ueda S, Ishiguro T, Arimura K, Saito F, Yoshiyama T, Nakano Y, Mutoh Y, Suzuki Y, Edahiro R, Murakami K, Sato Y, Okada Y, Koike R, Kitagawa Y, Tokunaga K, Kimura A, Imoto S, Miyano S, Ogawa S, Kanai T, Fukunaga K. Characteristics of patients with COVID-19 who have deteriorating chest X-ray findings within 48 h: a retrospective cohort study. Scientific Reports 13:22054 (2023).
11	Yoshimura J, Togami Y, Ebihara T, Matsumoto H, Mitsuyama Y, Sugihara F, Hirata H, Okuzaki D, Ogura H. Classification of patients with COVID-19 by blood RNA endotype: a prospective cohort study. Microbiology Spectrum 11:e02645-23 (2023).
12	Naga S, Hinogam T, Ogosh S, Hoshimoto Y. N-Borane-Substituted Cyclic Phosphine Imides (BCPIs). Bulletin of the Chemical Society of Japan 96:1346-1353 (2023).

13	Lusiany T, Terada T, Kishikawa J, Hirose M, Chen DV, Sugihara F, Ismanto HS, van Eerden FJ, Li S, Kato T, Arase H, Yoshiharu M, Okada M, Standley DM. Enhancement of SARS-CoV-2 Infection via Crosslinking of Adjacent Spike Proteins by N-Terminal Domain-Targeting Antibodies. Viruses-Basel 15:2421 (2023).
14	Saiki R, Edahiro R, Sonehara K, Wang QS, Namkoong H, Hasegawa T, Tanaka H, Azekawa S, Chubachi S, Namba S, Yamamoto K, Kakiuchi N, Shiraishi Y, Chiba K, Tanaka H, Makishima H, Nannya Y, Koike R, Takano T, Ishii M, Kimura A, Imoto S, Miyano S, Kanai T, Fukunaga K, Okada Y, Ogawa S. Clonal Hematopoiesis Is Associated with Severe COVID-19 Enhancing Inflammatory Responses in Myeloid Cells. Blood 142: (2023).
15	Tomofuji Y, Kishikawa T, Sonehara K, Maeda Y, Ogawa K, Kawabata S, Oguro-Igashira E, Okuno T, Nii T, Kinoshita M, Takagaki M, Yamamoto K, Arase N, Yagita-Sakamaki M, Hosokawa A, Motooka D, Matsumoto Y, Matsuoka H, Yoshimura M, Ohshima S, Nakamura S, Fujimoto M, Inohara H, Kishima H, Mochizuki H, Takeda K, Kumanogoh A, Okada Y. Analysis of gut microbiome host genetics and plasma metabolites reveals gut microbiome-host interactions in the Japanese population. Cell Reports 42:113324 (2023).
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B. WPI-related papers

None