

World Premier International
Research Center

Osaka University

Immunology Frontier Research Center

Annual Report
of IFRc
FY 2014

大阪大学免疫学フロンティア研究センター
2014年度年間レポート ダイジェスト版



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WPI Osaka University
iFRc

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**Immunology
Frontier
Research
Center**

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Message from the Director

As the Director of the Immunology Frontier Research Center (WPI-IFReC) at Osaka University, I am very pleased to present the digest version of IFRc annual report for fiscal 2014.

Since its inception in 2007, IFRc has established itself as a Visible International Research Center of Immunology with the support of many people including the WPI Program Director and the Program Officer.

Although IFRc was created as a part of the WPI program, a national project led by the Japanese Ministry of Education, Culture, Sports, Science and Technology, IFRc's management will be fully moved to Osaka University from FY2017 as a result of the decision in the WPI program committee meeting held in fall 2014. Even though the governing structure will change, our most important mission "Constructing a world-top immunology research center" remains the same.

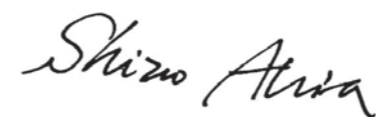
We will make unceasing efforts to develop immunology research to ensure translation to medical science. We are committed to continuing contributions to scientific advances through research and education and the evolvement of a world top immunology research Center.

大阪大学免疫学フロンティア研究センター (WPI-IFReC) の拠点長として、ここに2014年度のIFReC研究年報ダイジェスト版をお届けできることを大変うれしく思います。

2007年の発足以来、IFReCは、WPIプログラムディレクター、プログラムオフィサーなど様々な方々の意見を取り入れ、「目に見える免疫学の国際研究センター」として組織を作って参りました。

文部科学省の主導するWPIプログラムの一環として立ち上がったIFReCでしたが、2014年秋に行われたWPIプログラム委員会の決定により、2017年度からそのマネジメントを大阪大学に全面移行することになりました。運営体制は代わっても世界トップレベルの免疫学研究所を作るという私たちのミッションは変わりません。今後は、医学への応用を見据えた免疫学の研究に不断の努力を続けます。

私たちは、これからも免疫学の研究と教育を通じて科学の進歩に貢献し、IFReCを「世界を代表する免疫学の研究センター」に発展させていきます。



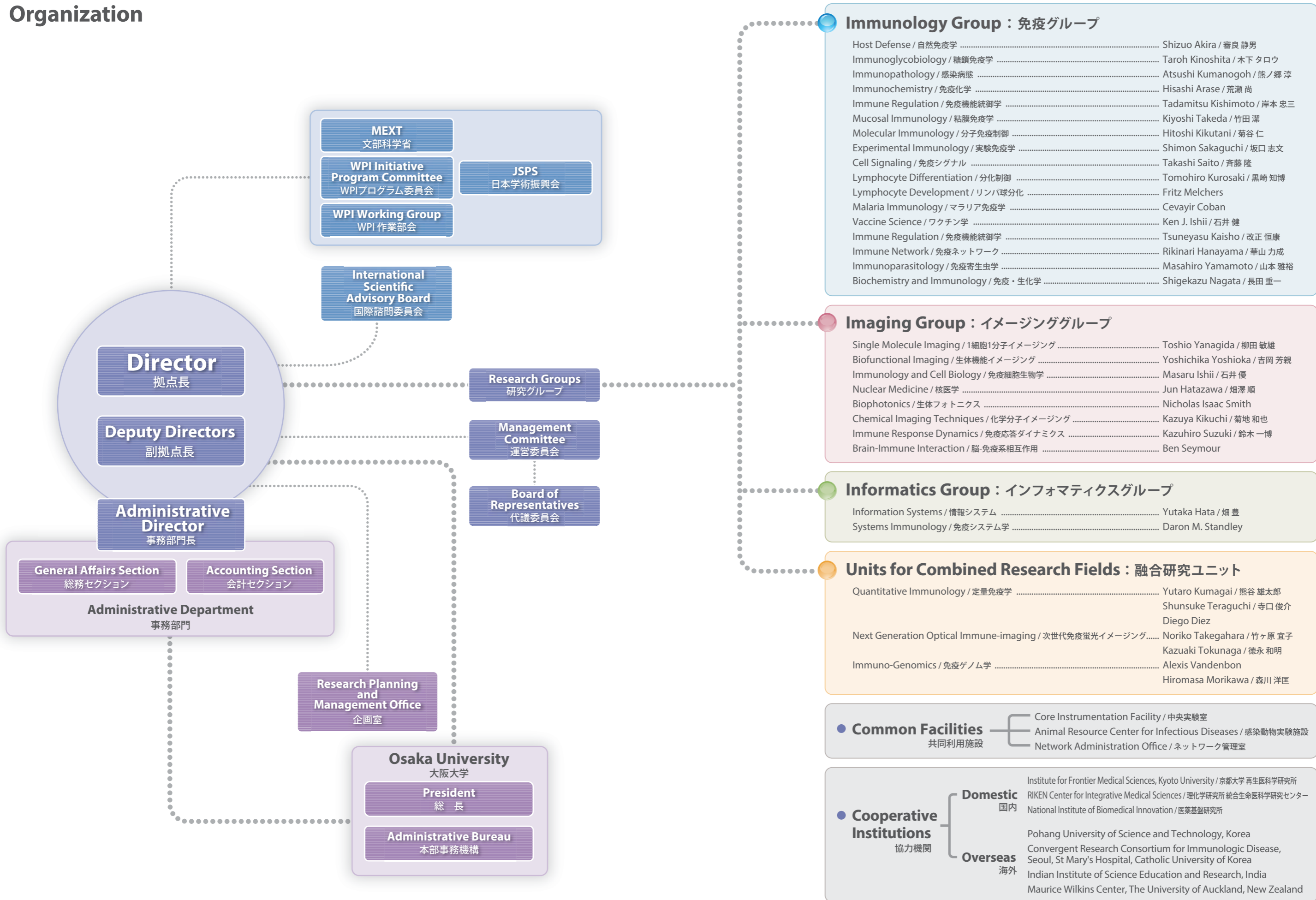
Shizuo Akira, MD/PhD

審良 静男

Director
WPI Immunology Frontier Research Center
大阪大学免疫学フロンティア研究センター拠点長



Organization



Principal Investigators



Akira / 審良



Kinoshita / 木下



Arase / 荒瀬



Kishimoto / 岸本



Kikutani / 菊谷



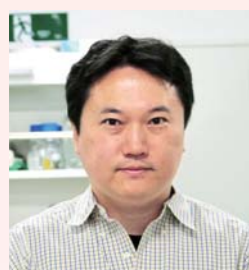
Sakaguchi / 坂口



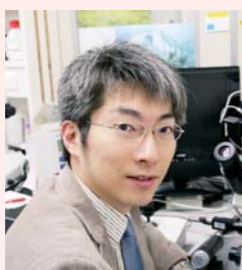
Kuroski / 黒崎



Coban



Hanayama / 華山



Yamamoto / 山本



Nagata / 長田



Yoshioka / 吉岡



Smith



Suzuki / 鈴木



Standley



Quantitative Immunology Unit
定量免疫学ユニット



Immuno Genomics Unit
免疫ゲノム学ユニット



Hankyu Railway
Kita-Senri Station



Kikuchi / 菊地



Kumanogoh / 熊ノ郷



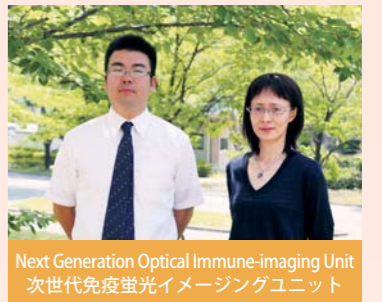
Takeda / 竹田



M. Ishii / 石井 (優)



Hatazawa / 畑澤



Next Generation Optical Immune-imaging Unit
次世代免疫蛍光イメージングユニット



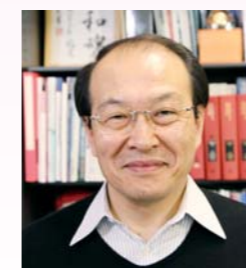
Other Institutions
他の研究機関



Yanagida / 柳田



Seymour



Saito / 齊藤
(RIKEN)



K. Ishii / 石井 (健)
(NIBIO)



Melchers
(Max Planck Inst.)



Kaisho / 改正
(Wakayama Medical University /
和歌山県立医科大学)



Hata / 畑
(University of Hyogo / 兵庫県立大学)

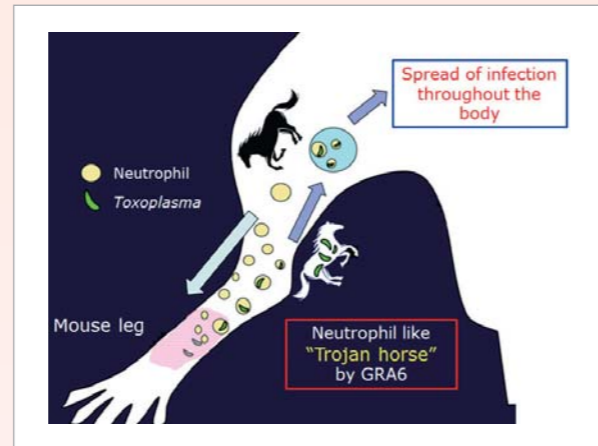
Selected Articles

Selective and strain-specific NFAT4 activation by the *Toxoplasma gondii* polymorphic dense granule protein GRA6

J Exp Med. 211 : 2013-32, 2014.

Ji Su Ma, Miwa Sasai, Jun Ohshima, Youngae Lee, Hironori Bando, Kiyoshi Takeda, Masahiro Yamamoto

Toxoplasma gondii infection results in co-option and subversion of host cellular signaling pathways. This process involves discharge of *T. gondii* effector molecules from parasite secretory organelles such as rhoptries and dense granules. Masahiro Yamamoto and his group reported that the *T. gondii* polymorphic dense granule protein GRA6 regulates activation of the host transcription factor nuclear factor of activated T cells 4 (NFAT4). Their data suggest that GRA6-dependent NFAT4 activation is required for *T. gondii* manipulation of host immune responses to maximize the parasite virulence in a strain-dependent manner.



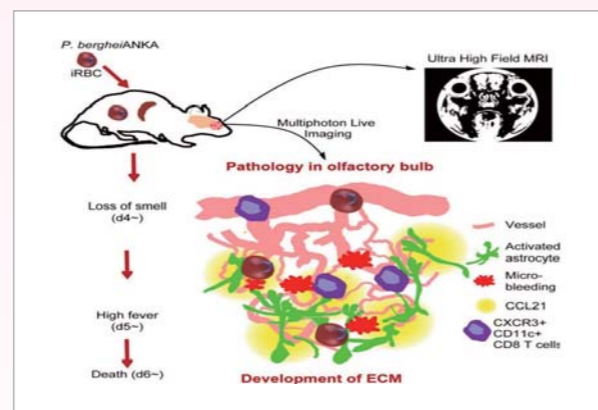
山本雅裕の研究グループは、寄生虫「トキソプラズマ」の病原性因子GRA6が宿主の免疫制御分子であるNFAT4を活性化して宿主自然免疫細胞を強制的に利用（ハイジャック）することが、トキソプラズマ症の重症化の一つの理由であることをつきとめました。

Olfactory plays a key role in spatiotemporal pathogenesis of cerebral malaria

Cell Host & Microbe. 15 : 551-63, 2014.

Zhao H, Aoshi T, Kawai S, Mori Y, Konishi A, Ozkan M, Fujita Y, Haseda Y, Shimizu M, Kohyama M, Kobiyama K, Eto K, Nabekura J, Horii T, Ishino T, Yuda M, Hemmi H, Kaisho T, Akira S, Kinoshita M, Tohyama K, Yoshioka Y, Ishii KJ, Coban C

Coban group showed by ultra-high-field MRI and multiphoton microscopy that the olfactory bulb is physically and functionally damaged (loss of smell) by Plasmodium parasites during ECM. The trabecular small capillaries comprising the olfactory bulb show parasite accumulation and cell occlusion followed by microbleeding, events associated with high fever and cytokine storm. Specifically, the olfactory upregulates chemokine CCL21, and loss or functional blockade of its receptors CCR7 and CXCR3 results in decreased CD8 T cell activation and recruitment, respectively, as well as prolonged survival. Thus, early detection of olfaction loss and blockade of pathological cell recruitment may offer potential therapeutic strategies for ECM.



Olfactory bulb is the Achilles' heel during experimental cerebral Malaria

Cevayir Coban のグループは世界最高精度 (11.7テスラ、大阪大学) のMRIを用いることで、マラリア感染時に脳の臭いを感じ取る重要な部位「嗅球」にて早期に変化が起こることを世界に先駆けて発見しました。また、嗅球の微細構造を二光子顕微鏡を用いて生きたまま観察し、嗅球でのマラリア原虫と免疫細胞の相互作用や毛細血管が出血する瞬間の動画を撮影することに成功しました。

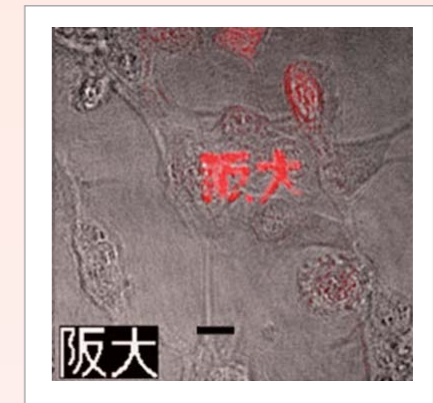
Laser-targeted photofabrication of gold nanoparticles inside cells

Nat Commun. 5 : 5144, 2014.

Nicholas I. Smith, Kentaro Mochizuki, Hirohiko Nioka, Satoshi Ichikawa, Nicolas Pavillon, Alison J. Hobro, Jun Ando, Katsumasa Fujita, Yutaro Kumagai

Smith group showed that by infusing gold ion solution, focused laser light-induced photoreduction allows in-situ fabrication of gold nanoparticles at precise locations. The resulting particles are pure gold nanocrystals, distributed throughout the laser focus at sizes ranging from 2 to 20 nm, and remain in place even after removing the gold solution.

They demonstrate the spatial control by scanning a laser beam to write characters in gold inside a cell. Plasmonically enhanced molecular signals are then detected from nanoparticles, allowing their use as nano-chemical probes at targeted locations inside the cell, with intracellular molecular feedback.



Microscopic imaging of photofabricated characters of gold particles inside a cell (Scale bar, 12 micrometers). The red characters mean "Osaka University" by kanji characters.

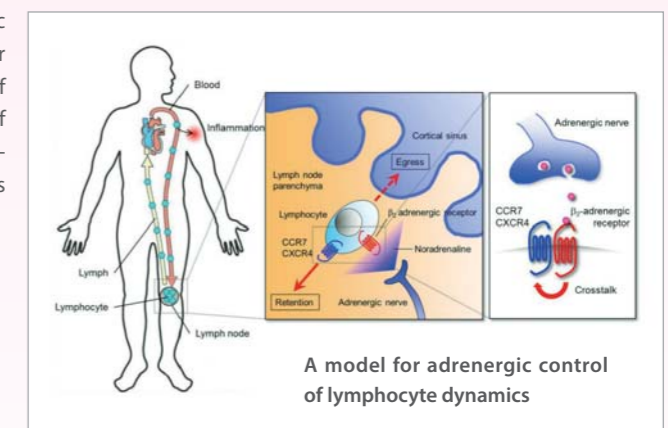
Nicholas Smith らの研究グループは、細胞内に取り込まれた金イオンに外部からレーザー光を照射することで金のナノ粒子（結晶）を作成することに成功しました。さらに結晶の空間配置を制御し、一つの細胞中に「阪大」という文字を描きました。

Control of lymphocyte egress from lymph nodes through β 2-adrenergic receptors

J Exp Med. 211 : 2583-98, 2014.

Akiko Nakai, Yuki Hayano, Fumika Furuta, Masaki Noda, Kazuhiro Suzuki

Kazuhiro Suzuki and his group revealed that β 2-adrenergic receptors (β 2ARs) expressed on lymphocytes regulate their egress from lymph nodes by altering the responsiveness of chemokine receptors CCR7 and CXCR4. In mouse models of inflammation, signals through β 2ARs were shown to inhibit trafficking of pathogenic lymphocytes and reduce their numbers recruited into inflamed tissues.



A model for adrenergic control of lymphocyte dynamics

鈴木一博の研究グループは、交感神経から分泌される神経伝達物質ノルアドレナリンが、 β 2アドレナリン受容体を介してリンパ球の体内動態を制御する仕組みを分子レベルで解明し、このメカニズムが炎症性疾患の病態にも関わることを突き止めました。「病は気から」の根拠を実験的に証明したことになります。

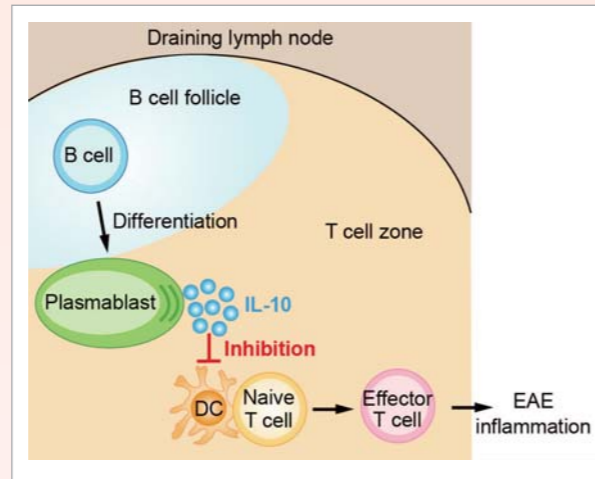
Interleukin-10-producing plasmablasts exert regulatory function in autoimmune inflammation

Immunity 41 : 1040-51, 2014.

Masanori Matsumoto, Akemi Baba, Takafumi Yokota, Hiroyoshi Nishikawa, Yasuyuki Ohkawa, Hisako Kayama, Axel Kallies, Stephen L. Nutt, Shimon Sakaguchi, Kiyoshi Takeda, Tomohiro Kurosaki, Yoshihiro Baba

Kurosaki and Baba group found that plasmablasts in the draining lymph nodes (dLNs), but not splenic B lineage cells, predominantly expressed IL-10 during experimental autoimmune encephalomyelitis (EAE). These plasmablasts were generated only during EAE inflammation. Mice lacking plasmablasts by genetic ablation of the transcription factors Blimp1 or IRF4 in B lineage cells developed an exacerbated EAE.

馬場義裕、黒崎知博らの研究グループは、抑制性サイトカインであるインターロイキン-10 (IL-10)がプラズマブラストと呼ばれるB細胞集団から分泌され、多発性硬化症の悪化を抑制することを解明しました。

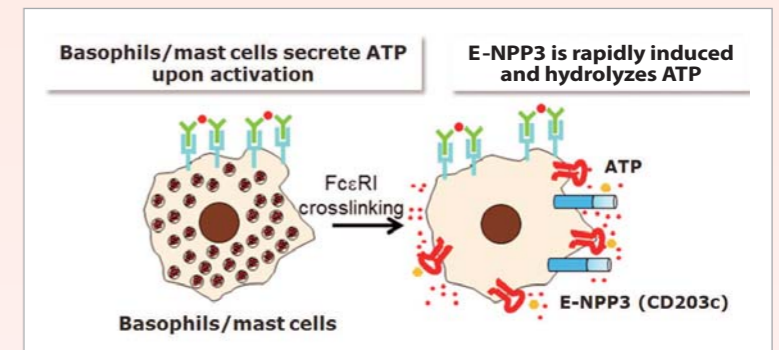


The ectoenzyme E-NPP3 negatively regulates ATP-dependent chronic allergic responses by basophils and mast cells

Immunity 42 : 279-93, 2015.

Shih Han Tsai, Makoto Kinoshita, Takashi Kusu, Hisako Kayama, Ryu Okumura, Kayo Ikeda, Yosuke Shimada, Akira Takeda, Soichiro Yoshikawa, Kazushige Obata-Ninomiya, Yosuke Kurashima, Shintaro Sato, Eiji Umemoto, Hiroshi Kiyono, Hajime Karasuyama, Kiyoshi Takeda

Kiyoshi Takeda and his group showed that ectonucleotide pyrophosphatase-phosphodiesterase 3 (E-NPP3), also known as CD203c, rapidly induced by FcεRI crosslinking, negatively regulated chronic allergic inflammation. Basophil and mast cell numbers increased in *Enpp3*^{-/-} mice with augmented serum ATP concentrations. *Enpp3*^{-/-} mice were highly sensitive to chronic allergic pathologies, which was reduced by ATP blockade. FcεRI crosslinking induced ATP secretion from basophils and mast cells, and ATP activated both cells. ATP clearance was impaired in *Enpp3*^{-/-} cells. *Enpp3*^{-/-}*P2rx7*^{-/-} mice showed decreased responses to FcεRI crosslinking. Thus, ATP released by FcεRI crosslinking stimulates



basophils and mast cells for further activation causing allergic inflammation. E-NPP3 decreases ATP concentration and suppresses basophil and mast cell activity.

竹田潔のグループは、アレルゲンで活性化された好塩基球で発現が高くなる酵素 E-NPP3 (CD203c) を欠損したマウスを作成し、マスト細胞・好塩基球が活性化状態になり、皮膚アレルギー、食物アレルギー、喘息が悪化することを見出しました。

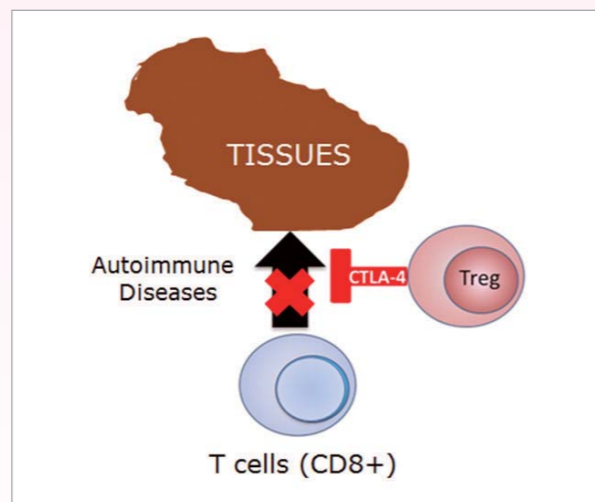
Detection of self-reactive CD8+ T cells with an anergic phenotype in healthy individuals

Science 346 : 1536-40, 2014.

Yuka Maeda, Hiroyoshi Nishikawa, Daisuke Sugiyama, Danbee Ha, Masahide Hamaguchi, Takuro Saito, Megumi Nishioka, James B. Wing, Dennis Adegbe, Ichiro Katayama, Shimon Sakaguchi

Shimon Sakaguchi and his group found Treg can render self-reactive human CD8+ T cells anergic (i.e., hypoproliferative and cytokine hypoproducing upon antigen restimulation) in vitro, likely by controlling the costimulatory function of antigen-presenting cells. Anergic T cells were naïve in phenotype, lower than activated T cells in T cell receptor affinity for cognate antigen, and expressed several coinhibitory molecules, including cytotoxic T lymphocyte-associated antigen-4 (CTLA-4).

坂口志文の研究グループは、CD4陽性制御性T細胞が自己免疫反応（自己免疫疾患）を回避するために自己に反応するCD8陽性T細胞に安定的な免疫不応答状態（アネルギー）を誘導することを明らかにしました。



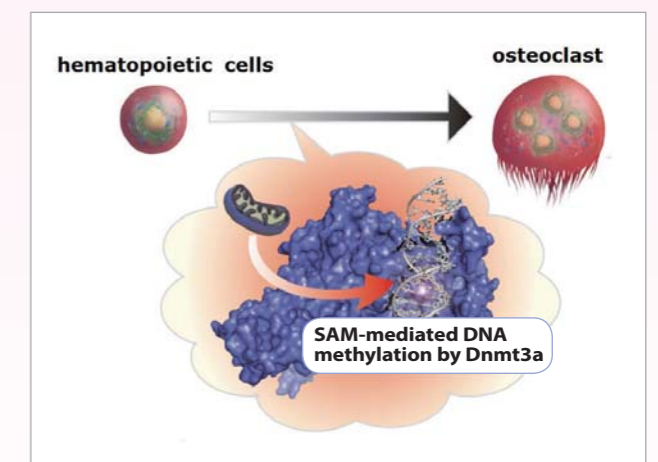
Tregs render self-reactive human CD8+ T cells anergic.

DNA methyltransferase 3a regulates osteoclast differentiation by coupling to an S-adenosylmethionine-producing metabolic pathway

Nat Med. 21 : 281-7, 2015.

Keizo Nishikawa, Yoriko Iwamoto, Yasuhiro Kobayashi, Fumiki Katsuoka, Shin-ichi Kawaguchi, Tadayuki Tsujita, Takashi Nakamura, Shigeaki Kato, Masayuki Yamamoto, Hiroshi Takayanagi, Masaru Ishii

Masaru Ishii and his group identified the de novo DNA methyltransferase Dnmt3a to be a transcription factor that couples metabolic changes to osteoclast differentiation. Receptor activator of nuclear factor-κB ligand (RANKL) is an essential cytokine for osteoclastogenesis that induces a metabolic shift toward oxidative metabolic processes, accompanied by an increase in S-adenosyl methionine (SAM) production. They found that SAM-mediated DNA methylation by Dnmt3a regulates osteoclastogenesis via epigenetic repression of the anti-osteoclastogenic gene and that Dnmt3a-deficient osteoclast precursor cells do not undergo osteoclast differentiation efficiently.



石井優らの研究グループは、免疫に関するマクロファージ系細胞の一つで関節リウマチなどの慢性炎症で骨を破壊・吸収する破骨細胞への分化・運命決定が、サイトカインだけでなく、その細胞の置かれた環境（特に代謝状態）が細胞内のエピジェネティクスを調節することで巧妙に操作されるという新しい概念を明らかにしました。

Looking back on IFReC's activities

Jun Sakanoue (Research Planning and Management Office, IFReC)

Here, I would like to assess IFReC's research performance over the past period subject to evaluation by the WPI committee. Since the establishment of IFReC, around 10% of the total papers have been published in high-impact journals such as Science, Nature, Cell and their affiliated journals (Table 1). More than 800 papers have been published over this time period. The average number of citations of these papers was 30.45 and the h-index of IFReC as a whole was 66 (Table 2). IFReC's paper productivity compares favorably with that of the La Jolla Institute for Allergy & Immunology in

the USA, which is one of only a few non-profit biomedical research institutes in the world focused on immunology and infectious diseases. In the field of "Immunology", the number of papers, citation impact, and h-index by IFReC's researchers are significantly higher than those by other researchers in Osaka University (Table 3). Osaka University was ranked 1st in citation impact among the top institutions in immunology all over the world in 2003-2013 (DATA not shown). IFReC undoubtedly contributes to the rise in the stature of Osaka University as a research university.

Table 1 | Number of papers in High-Impact Journals in each Fiscal Year

Journals	Cell	Immunity	JEM	Science	New Eng J Med	Nature	Nature					High-Impact Journals Total
							Immunol	Cell Biol	Med	Neurosci	Rev Immunol	
IF	33.1	19.7	13.9	31.5	54.4	42.4	25.0	20.1	28.1	15.0	33.8	-
2008	1	4	0	1	0	4	5	2	0	0	0	17/84
2009	3	3	7	0	0	2	4	1	0	0	0	20/99
2010	1	5	3	0	0	5	3	0	0	0	1	18/155
2011	1	9	3	1	0	0	4	0	2	0	0	20/153
2012	1	9	3	1	0	3	2	0	1	0	1	21/179
2013	2	3	1	1	1	2	2	0	0	1	3	16/181
2014	1	5	3	4	0	1	2	0	1	0	0	17/195

Data from WEB OF SCIENCE™ by Thomson Reuters
Each IF (Impact Factor) was calculated in 2013.

Table 2 | Performance Comparison between the Two Institutes

	WPI Osaka University IFReC	La Jolla Institute FOR ALLERGY AND IMMUNOLOGY
Papers	818	809
Citation Number	24,911	19,578
Citation Impact	30.45	24.20
h-index	66	65
Number of papers cited > 50	91	85

Essential Science Indicators™ for 2008-2013 by ©THOMSON REUTERS
Published in 2008 to 2013, Citation number as of September 4, 2014

Table 3 | Contribution of IFReC to Osaka University

	Whole Osaka University	IFReC	Outside of IFReC
Paper Numbers In Immunology Field	751	234	527
Citation Impact	29.7	57.3	17.0
h-index	64	53	43

Essential Science Indicators™ for 2008-2013 by ©THOMSON REUTERS
Published in 2008-2013, Citation as of March 5, 2015

IFReCの研究活動を振り返る

ここでは、IFReCが“世界レベルの研究所”にふさわしい業績をあげているのかを、客観データを用いて示そうと思います。IFReCは設立以来10%前後の論文をScience, Nature, Cellおよびそれらの姉妹紙を代表とするトップジャーナルに掲載してきました (Table 1)。IFReCの研究者によって800編以上の論文が出版され、平均被引用数30.45、h-index 66を記録しました (Table 2)。こうした数値は、世界的な感染症・免疫学研究機関であり、研究者の規模においてほぼ同程度であるラジョイア免疫アレルギー

坂野上 淳 (IFReC 企画室)

研究所 (米国) と同等以上のものです。また、免疫学分野において論文数、平均被引用数、h-index は、大阪大学の他の部局より著しく高くなっています (Table 3)。大阪大学は免疫学分野の2003年から2013年にかけての平均被引用数において世界一にランクされました (表省略)。このことから、IFReCは大阪大学の研究型大学としての地位獲得に貢献してきたといえます。

Research Projects

Support Program for Fusion Researches

As one of the goals of WPI program, IFReC aims to create innovative immunology fields by combining with imaging and bioinformatics technologies. In order to promote this challenge, we launched the following two programs.

Research Support Program for Combined Research Fields

This program effectively encourages interaction and fusion among different groups. The projects are selected by screening proposals submitted by applicants. So far, 25 projects have received financial support from IFReC and some of them have reached the publication stage.

Dual Mentor Program

This program focuses on graduate students or young post-doctoral fellows engaging in interdisciplinary projects under the supervision of two PIs from different disciplines. The program was introduced as a platform to foster young pioneers in the fusion field and to further promote interdisciplinary research at IFReC.



融合研究促進のためのプログラム

IFReCはバイオイメージングとバイオインフォマティクスを駆使して、新しい免疫学研究を創成することを重要なミッションとしてきました。そのために2つのプログラムを独自に創設し、若手研究者を支援しています。「異分野融合プログラム」は、IFReCの中で異なるバックグラウンドを持つ研究者が複数組むことにより新たな研究の発展を目指します。「デュアルメンタープログラム」は、若手研究者に2名の異なる分野の指導者がつきます。いずれのプログラムもIFReC内で公募・審査され、採用となった研究者には定期的に公開の研究発表が義務づけられています。

IFReC Colloquia

IFReC colloquia are a series of discussion meetings for IFReC members, held once every other month. At each colloquium, three speakers from IFReC laboratories give talks about their latest research progress followed by intensive discussion. After the colloquium, a small social gathering is held to further the discussions in an informal setting. These events serve as a platform to promote fusion researches among IFReC members.



IFReC コロキウム

このセミナーシリーズは、2ヶ月に1回開催されるもので、未発表データを含め最新の研究成果をIFReCの研究者全体で討議します。コロキウム終了後は、毎回親睦を深める場を設けています。



Symposia

The 6th International Symposium of IFReC: Immunology at the Forefront



This symposium provided a forum for the newest developments in wide-ranging areas of immunology. Seventeen leading scientists from institutions around the world presented their recent achievements.

本シンポジウムでは、免疫学の最先端で活躍する研究者が最新の研究成果を披露しディスカッションしました。



Date : February 23-24, 2015
Venue : KNOWLEDGE THEATER, Grand Front Osaka
Speakers :

Yumiko Imai (Akita University, Japan)
Yukinori Okada (Tokyo Medical and Dental University, Tokyo, Japan)
Magnus Rattray (University of Manchester, UK)
Gabriel D. Victora (Whitehead Institute for Biomedical Research, USA)
Kenji Kabashima (Kyoto University, Japan)
Paola Di Meglio (MRC National Institute for Medical Research, UK)
Markus Feuerer (German Cancer Research Center)
Daniel Gray (The Walter and Eliza Hall Institute of Medical Research, Australia)
Hiroyoshi Nishikawa (Osaka University, Japan)
Ryu Okumura (Osaka University, Japan)
Takashi Satoh (Osaka University, Japan)
Sho Yamasaki (Kyushu University, Japan)
Joseph C. Sun (Memorial Sloan Kettering Cancer Center, USA)
Hisashi Arase (Osaka University, Japan)
Yeonseok Chung (Seoul National University, Korea)
Neil Harrison (Brighton and Sussex Medical School, UK)
Ben Seymour (Osaka University, Japan)

Cancer Immunotherapy Forum

IFReC and Bristol-Myers K.K co-organized this Forum. All the sessions were facilitated by Shimon Sakaguchi and Hiroyoshi Nishikawa.

Bristol-Myers社とIFReCの共催で行われたこのフォーラムでは、癌免疫療法の最前線を聴くことができました。

Date : November 21, 2014
Venue : Rihga Royal Hotel Osaka

- Gerd Ritter (Ludwig Cancer Center, USA)
- Jill O'Donnell-Tormey (Cancer Research Institute, USA)
- Carl H. June (Perelman School of Medicine University of Pennsylvania, USA)
- Guido Kroemer (University of Paris Descartes, France)
- Glenn Dranoff Harvard (Medical School, USA)



The First CiNet Conference -New Directions in Pain Neuroscience

This conference chaired by Ben Seymour (Brain-Immune Interaction Lab of IFReC) highlighted some of the most innovative new ideas, and created a free space for lively and creative discussion. The audience had a special lecture from Seiji Ogawa, who is the inventor of functional MRI.

IFReCのBen Seymour教授が中心となって開かれたこのシンポジウムでは、神経科学領域における斬新なアイデアが披露されました。fMRIの創始者、小川誠二博士の記念講演も行われました。

Date : December 2-5, 2014
Venue : Center for Information and Neural Networks (CiNet), Osaka, Japan



Events

NIF Winter School on Advanced Immunology

The 4th Winter School on Advanced Immunology was jointly organized with Singapore Immunology Network (SigN). Fifty young researchers, who were competitively selected from 180 applicants, and 16 world leading immunologists got together in Singapore. The participants shared intriguing insights and findings in immunology, discussed new ideas and forged friendships that will fuel networking and future collaborations.

IFReCとSigNが共催する第4回免疫学ウィンタースクールがシンガポールで開催されました。世界中の応募者から選ばれた50名の若い研究者が、合宿形式で免疫学の展望や将来の共同研究などについてディスカッションしました。

Date : January 18-23, 2015
Venue : Grand Copthorne Waterfront Hotel, Singapore



The Immunology Lecture Series

This lecture series was initiated as staff development to provide fundamental knowledge of immunology to IFReC research support staff. A young researcher of IFReC is invited as a speaker to give a talk about the basics of their research up to cutting-edge research in an easy-to-understand manner. The lecture is open to all Osaka University members and held in the evening so that the participants can attend after work.

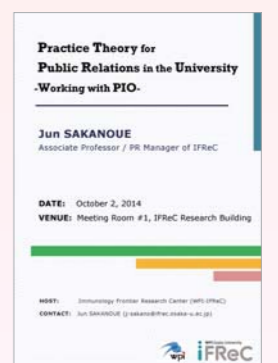
免疫学講座は、IFReCの若手研究者が職員(技術職員・秘書含)向けに行うものです。IFReCだけでなく大阪大学の職員に公開されるため、毎回職員のみならず学生や教員も聴衆として参加します。



SD Seminar : Public Relations and PIO

The PIO (Public Information officers) in research institutes are responsible for issuing press releases, answering queries from the media. In this seminar, Dr. Sakanoue (RPMO, IFReC) explained how researchers and staff in the University should work with PIOs.

PIOとはメディア対応など研究の広報に責任を持つ職種です。IFReC企画室の坂野上准教授が研究者や事務職員がいかにしてPIOと仕事を共にするべきかを解説しました。



Date : October 2, 2014
Venue : Meeting Room 1, IFReC Research building

Reference
"Working with Public Information Officers" Dennis Meredith, North Carolina: Glyphus, 2010



Major Awards

Shimon Sakaguchi The Gairdner International Award

The Canada Gairdner International Award is one of the most prestigious awards in biomedical sciences. The Gairdner Foundation commented "Prof. Sakaguchi is awarded for his discovery of regulatory T cells, characterization of their role in immunity and application to the treatment of autoimmune diseases and cancer." Prof. Shizuo Akira (Director of IFRc) was also awarded the Gairdner Award in 2011 by his groundbreaking discoveries in the field of innate immunity.

坂口志文教授（副拠点長）が、生命科学において特に権威があるとされるガードナー国際賞を受賞しました。受賞テーマは、「制御性T細胞の発見と免疫における役割の解明、さらに自己免疫疾患、癌治療への応用」です。IFReCでは、2011年の審良拠点長に続く栄誉でした。



Shizuo Akira The Member of the Japan Academy

審良 静男 日本学士院会員



Toshio Yanagida Honorary Member of the Physical Society of Japan

柳田 敏雄 物理学会名誉会員



Ken Ishii Osaka Science Prize, Fellow of the International Society for Vaccines

石井 健 大阪科学賞, 国際ワクチン学会フェロー



Atsushi Kumanogoh Elected Membership, American Society for Clinical Investigation (ASCI)

熊ノ郷 淳 米国臨床医学会特別会員



Masaru Ishii JSPS Award

石井 優 日本学術振興会賞



Takashi Satoh Young Investigator Award, Japanese Society for Immunology

佐藤 荘 日本免疫学会研究奨励賞

Kazutaka Katoh Young Scientist Initiative Award, Society of Evolutionary Studies, Japan

加藤 和貴 日本進化学会研究奨励賞

In FY 2014, many IFRc researchers were awarded by the Osaka University President for their recent acquisition of research grants. 2014年度、多くのIFReCの研究者が研究費獲得の功績により大阪大学総長から表彰されました。

Outreach Activities

Science Cafe / サイエンスカフェ

The series of science cafes is a long lasting IFRc outreach activity to promote communication among researchers and the general public. It also enhances people's understanding of immunology researches and the researchers involved in them. About 140 people in total participated in our science cafes in FY2014. A unique attempt was achieved in the 14th Science Cafe on the Edge. Guest speakers of the 6th IFRc international symposium kindly joined the cafe as guests.

サイエンスカフェは、IFReCがアウトリーチ活動を始めてから定期的で開催しているイベントです。2014年度も合計140名のお客様をお迎えしました。第14回サイエンスカフェ・オンザエッジにおいては、シンポジウムのために来日した外国人研究者に話題提供をお願いしました。



Science Cafe at Icho Festival / 大阪大学いちょう祭サイエンスカフェ

The Cleaner in Our Body : Various functions of the macrophage

Date : May 3, 2014

Guest : Rikinari Hanayama (Immune Network, IFRc)

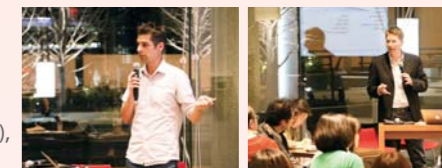


Science Cafe on the Edge 14 / 第14回 サイエンスカフェ・オンザエッジ

Immune System : Cancer immunity and autoimmune disease

Date : Feb 24, 2015

Guest : Daniel Gray (The Walter and Eliza Hall Institute of Medical Research, Australia), Markus Feuerer (German Cancer Research Center)

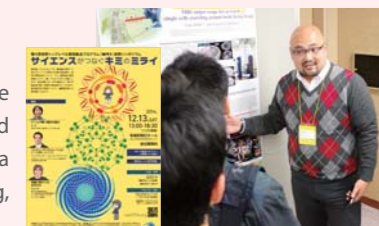


Annual WPI Joint Symposium / WPI 合同アウトリーチシンポジウム

Date : Dec 13, 2014

Venue : Yurakucho Asahi Hall (Tokyo)

The 4th WPI joint symposium entitled "Science: a bridge to your future" was held in Tokyo. The program included talks by WPI scientists, presentations by high school students. IFRc opened a booth to introduce its research activities to encourage students to consider entering Osaka University and immunology research as a career at IFRc. Yuki Mori (Biofunctional Imaging, IFRc) joined the symposium and presented his research with a poster and an iPad.



第4回WPI合同アウトリーチシンポジウムは「サイエンスがつなぐキミのミライ」と題し東京で行われました。プログラムは研究者と高校生の発表からなり、IFReCの森勇樹助教（生体機能イメージング）がポスター、iPadを用いてビジュアルな研究紹介をしました。

Super Science High School Student Fair / スーパーサイエンスハイスクール生徒研究発表会

Date : Aug 6-7, 2014

Venue : PACIFICO Yokohama

In the 2014 annual Super Science High Schools symposium, more than 200 schools held booths with posters to present their researches. Aya Nakae (Brain-Immune Interaction, IFRc) delivered a presentation at "Researchers' mini live talk". She introduced her research interests and her career as a basic researcher with the work experience of medical doctor.



スーパーサイエンスハイスクールの全国大会が夏休みを利用しパシフィコ横浜で行われ、IFReCの中江文准教授（脳-免疫相互作用）による一般向け講演が好評を博しました。

AAAS 2015 Annual Meeting / 全米科学振興機構 2015 年次大会

Date : Feb 12-16, 2015

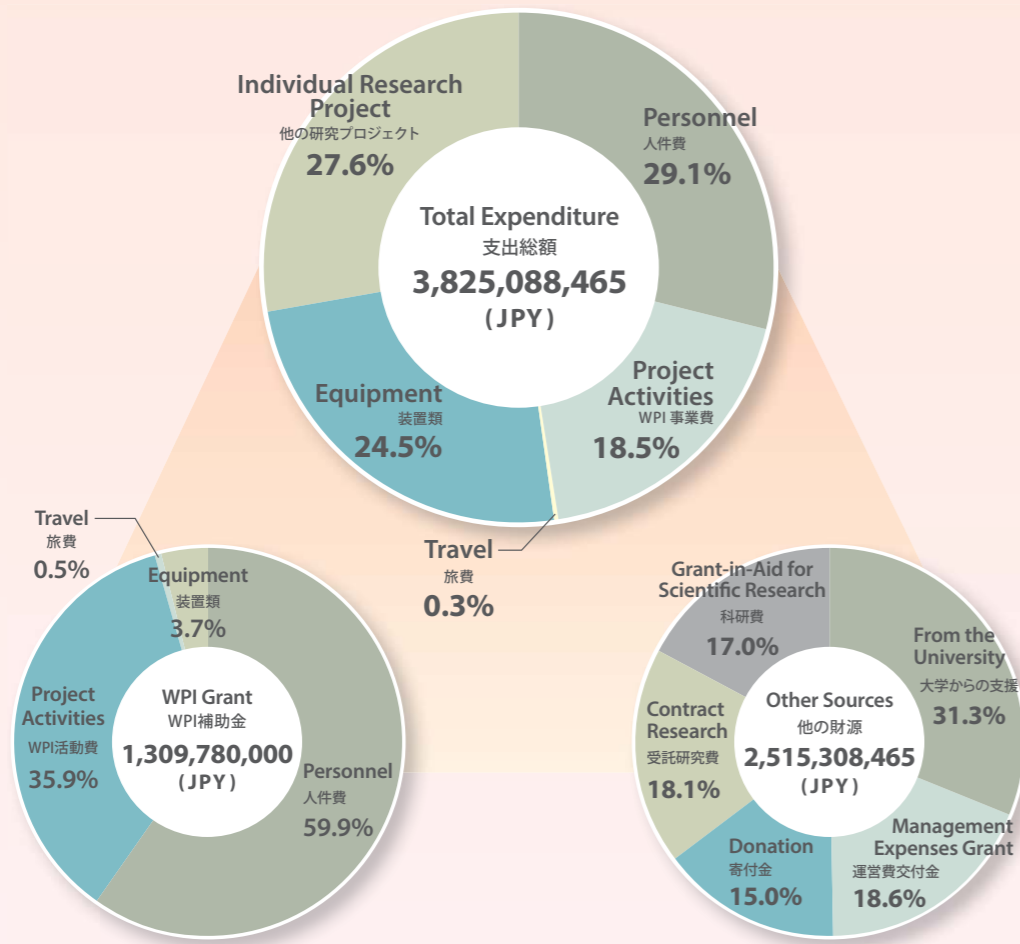
Venue : San Jose McEnery Convention Center (U.S.A)

The AAAS (American Association for the Advancement of Science) Annual Meeting assembles diverse participants, including scientists, science policymakers, and the media etc. In the 2015 AAAS Meeting, more than 360 participants visited the Japan booth and gained interest in WPI program and world leading researches in Japan.



全米科学振興機構 (AAAS) の年次大会にIFReCは他のWPI拠点とともに出展し、日本の科学界をリードするWPIについて解説しました。期間中360名の現地参加者をブースにお迎えしました。

Finance break down at IFRcC



IFReCは、人件費や施設の整備に用いられる「WPI交付金」と研究者が獲得した「競争的研究資金」、ならびに大阪大学の支援によって運営されています。このシステムを「マッチングファンド」といいます。

Yearly Schedule in FY 2015

DATE	EVENT
May 2	Science Cafe at Icho Festival サイエンスカフェ (大阪大学いちょう祭)
August 5 - 6	Super Science High-school Fair in Osaka スーパーサイエンスハイスクール生徒研究発表会 (INTEX 大阪)
September 8	WPI On-site Inspection WPI 拠点訪問
October 14 - 16	WPI Program Committee for Follow up WPI フォローアップ委員会
December 26	Outreach Symposium by WPI in Kyoto WPI 合同アウトリーチシンポジウム (京都大学)
January	17 - 22 The 5th NIF Winter School in Awaji island 第5回免疫学ウィンタースクール (淡路夢舞台国際会議場)
	21 - 22 International Symposium at GFO Osaka 国際シンポジウム (グランフロント大阪)
February	22 Science Cafe at GFO Osaka サイエンスカフェ (グランフロント大阪)
	11 - 15 AAAS Annual Meeting in Washington DC アメリカ科学振興協会年次大会 (ワシントン DC)

Books for General Public

IFReC の研究者による一般読者向けの著作です。
書店等で見かけた際は、手に取ってご覧ください。

- 新しい免疫入門 — 自然免疫から自然炎症まで
審良静男/黒崎知博 著 (講談社)
- 現代免疫物語 — 花粉症や移植が教える生命の不思議
岸本忠三/中嶋彰 著 (講談社)
- 現代免疫物語 — 「抗体医薬」と「自然免疫」の驚異
岸本忠三/中嶋彰 著 (講談社)
- 新版 千客万来 — ライフサイエンスのトップランナー16人と語る
岸本忠三 著 (千里ライフサイエンス振興財団)
- 新しい自然免疫学 — 免疫システムの真の主役
坂野上淳 著, 審良静男研究室 監修 (技術評論社)
- 免疫学の巨人イエルネ
宮坂昌之 監修 (医学書院)
- 「ゆらぎ」のカーはやぶさの帰還 宇宙の始まり 高次元生命機能
柳田敏雄 他 著 (化学同人)
- 実験医学 — 生きたままの姿を見る4Dイメージング
石井優 編 (羊土社)



Online Education



授業紹介ビデオより (株式会社ゼニス制作・一部改変)

IFReCの研究者が、免疫学の基礎知識から最新の研究までをインターネットで授業配信しています。'edX OsakaUx' で検索してみてください。

edX <OsakaUx> The Immune System: New Developments in Research
Part 1 - 2015年7月7日 配信開始
Part 2 - 2016年 配信予定