CMX Annual Report 2024

CMX令和6年度年次報告書

Kobe University Graduate School of Medicine

神戸大学大学院医学研究科

Center for Medical Transformation

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医学研究科メディカルトランスフォーメーション研究センター(CMX: Center for Medical Transformation)は、神戸大学が誇るシグナル伝達研究を深化させニューノーマルDX時代にふさわしい国際メディカルイノベーション創出拠点の形成をめざし研究活動を展開しています。

令和6年度は、センターの組織体制を見直し、難治性がん、代謝疾患、精神・神経疾患、免疫・感染症などの対象疾患研究と再生医学研究、創薬・医療機器研究を柱とする6つの研究グループを、イメージング研究、AI･デジタルヘルス研究の2つのプラットフォームを基盤として加速する構成といたしました(Figure1.参照)。

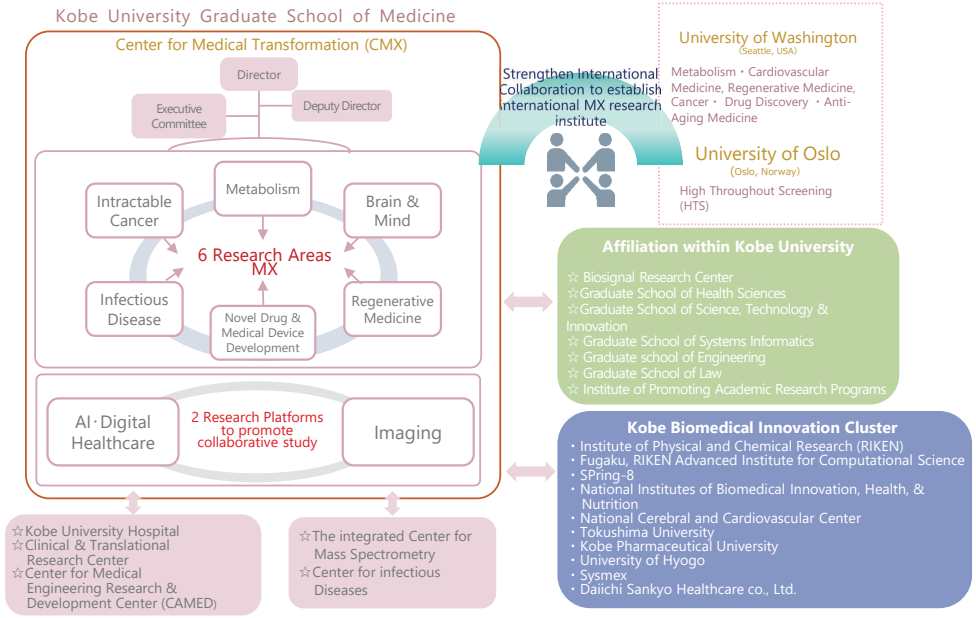
センターの構成員においては、新たに副センター長に森康子教授(臨床ウイルス学分野)にご着任いただいたほか、運営委員の離着任や研究の専門性による所属研究グループの異動等の再編成を行いました(Table 1.参照)。

AI・デジタルヘルス研究においては研究分野からプラットフォームに変更し、村垣義浩教授(精密診断治療機器学)と榛林陽一特命教授(AI･デジタルヘルス科学分野)のお二人にご着任いただきました。また、センター運営委員による厳正な審査を経て二名の特命助教を迎えました。アドバイザリーボードにおいては長く当センターの活動にご尽力くださった米田悦啓先生(阪大微生物行研究会)が離任され、新たに岡部繁男先生(東京大学)にご着任いただきました。

研究支援活動では、若手研究者を対象とした研究費助成事業「若手共同研究プロジェクト」を中心に、次世代の研究者を育成するための支援に力を注ぐとともに、ワークショップ"Emergence Conference"や理研BDRとの合同シンポジウムを通じて学内外の最先端の研究動向を学び、新たな共同研究の契機を提供するなど、学内外の共同研究の充実に重点を置きました。国際連携の強化においては、ワシントン大学との交流事業"Kobe U – UW Alliance Project"や国際共同研究短期派遣・招へい事業等を通じ、国際基準に沿った研究基盤の構築と、国際的な競争力の強化にも取組んでいます。

現在、パンデミック後の生活様式や社会的なニーズの変化に応じて、持続可能な社会の構築や、科学的根拠に基づいたイノベーションの推進が求められています。私たちは、急速に変化する社会状況に柔軟に対応しながら多角的な研究アプローチを通じて、安心・安全でQOLの高い社会の実現に貢献していく所存です。

Figure 1. CMXの組織



CMX(The Center for Medical Transformation) at Kobe University Graduate School of Medicine aims to create an international hub for medical innovation that aligns with the New Normal and digital transformation (DX) era by advancing research in signal transduction, a proud legacy of Kobe University.

In the fiscal year 2024, we restructured the Center to establish a framework where six key research units—intractable cancers, metabolic diseases, psychiatric and neurological disorders, immunology and infectious diseases, regenerative medicine, and pharmaceutical and medical device research—are supported and advanced through two foundational platforms: Imaging Research and AI & Digital Health Research (see Figure 1). Additionally, there has been significant reorganization of members, including the appointment of Professor Yasuko Mori, Div. of Clinical Virology, as the Deputy Director, along with changes in the executive committee and shifts in research group memberships based on specific areas of expertise. As part of the transition, the AI & Digital Health Research unit was redefined as a platform, with Professors Yoshihiro Muragaki, Div. of Precision Therapeutic Devices, and Yoichi Kurebayashi, Div. of AI & Digital Health Science, joining as new members. The Center also welcomed two specially appointed assistant professors after rigorous selection by the executive committee. Regarding the Advisory Board, while Dr. Yoshihiro Yoneda, the Research Foundation for Microbial Diseases of Osaka University, who contributed greatly to our activities, has stepped down, Dr. Shigeo Okabe, The University of Tokyo, has been newly appointed.

The research support activities in this year are dedicated to fostering the next generation scientists through initiatives like the "Young Collaborative Research Project." We also have emphasized enhancing collaborative research both within and outside the university by organizing workshops such as the "Emergence Conference" and joint symposiums with RIKEN BDR, providing opportunities to learn about cutting-edge research trends and fostering new collaborative projects. In strengthening international collaboration, we have undertaken initiatives such as the "Kobe U – UW Alliance Project" with the University of Washington and short-term international research exchange programs, striving to develop research infrastructure aligned with global standards and boost international competitiveness.

Amid evolving lifestyles and societal needs following the pandemic, there is an increasing demand for the construction of a sustainable society and the promotion of innovation based on scientific evidence. By adapting flexibly to rapidly changing social conditions and adopting multifaceted research approaches, we are committed to contributing to the realization of a safe, secure, and high-QOL society.

Table 1. CMXの構成員

Intractable Cancer	Metabolism	Brain & Mind	Infectious Disease	Regenerative Medicine	Novel Drug & Medical Device Development	Imaging Platform	AI･Digital Platform
Suzuki (Med)	Nitta (Med) DepDir	Takumi (Med) Director	Mori (Med) DepDir	Aoi (Med)	Fukumoto (Med)	Nitta (Med)	Kurebayashi (Med)
Kakeji (Med)	Ogawa (Med)	Sasayama (Med)	Kubo (Med)	Enomoto (Med)	Sasaki (Med)	Furuyashiki (Med)	Muragaki (Med)
Nibu (Med)	Sakisaka (Med)	Nakamura (Med)	Kodama (Med)	Kuroda (Med)	Yano (Med)	Kikuta (Med)	
Y. Minami (Med)	Shinohara (Med)	Hishimoto (Med)	Shoji (Med)		H. Minami (Med)	Tadokoro (CMX)	
Murata (Med)		Furuyashiki (Med)	Nozu (Med)		Miyake (Med)		
Ito (Biosignal)		Matsumoto (Med)	Kameoka (Med)		Shima (Innovation)		
		Ueyama (Biosignal)					
		Kowa (Health Sci)					
		Shirafuji (CMX)					
		Yamaguchi (CMX)					

Advisory Board
OSUMI Noriko (Tohoku Univ.)
OKABE Shigeo (The Univ. of Tokyo)
KASUGA Masato (Asahi Life Foundation)
NAKAGAMA Hitoshi (National Cancer Center Japan)
NISHIDA Eisuke (RIKEN BDR)

Full-time Faculty　Concurrently-Appointed Faculty　Unit Head

Steering Committee Members　*blue underlined
a director and two deputy directors

三宅　秀明　外科系講座腎泌尿器科学分野　教授

2023年12月より腎泌尿器科学分野教授を拝命しております。この度CMXの創薬・医療機器研究分野の一員に加えていただくことになりました。私自身留学時代に開発した薬剤が、複数の大規模第三相試験での検証に至った経験を有しております。また、当教室はhinotoriの開発、ブラッシュアップなどに中心的役割を果たしており、さらに現在ではhinotoriを使用した遠隔手術システムの確立にも取り組んでおります。これらの経験を活かして、CMXの活動に少しでも貢献できるよう積極的に取り組んで参りたいと考えておりますので、ご指導、ご鞭撻の程よろしくお願い致します。

村垣　善浩　医療創成工学専攻医療機器学講座精密診断治療機器学分野　教授

2023年4月より大学院医学研究科に設置された医療創成工学専攻の教授を拝命しています。課題を解決し事業化できる国産医療機器を開発する創造的開発人材の育成を目指すとともに、雑品から治療機器そしてプログラム医療機器まで研究開発を行っています。神経関連では脳波記録装置や悪性脳腫瘍治療用レーザー保持装置等を開発してきました。
研究者、医師としての専門は脳神経外科篠山隆司教授と同じ専門の悪性脳腫瘍に関するもので、留学時は神経成長因子受容体の遺伝子導入による小児脳腫瘍の分化誘導療法の研究、臨床では機能MRIによる“文法中枢”の同定や覚醒下手術による脳機能マッピングや皮質-皮質誘発電位の臨床研究を行っており、現在自家腫瘍ワクチンの医師主導治験を実施しています。
今回、CMXに参加する機会を頂いたことに感謝すると共に、皆様とヒト脳機能研究や基礎研究での発見や方法を医療機器を通じて実用化する開発研究等を連携して開始できればと思います。今後ともご指導ご鞭撻の程宜しくお願い致します。

樽林　陽一　地域社会医学・健康科学講座　ＡＩ・デジタルヘルス科学分野　特命教授

地域社会医学・健康科学講座AI・デジタルヘルス科学分野 特命教授を拝命しております。私たちの研究室では、国・自治体をはじめ、製薬、医療機器、情報関連企業など多様なステークホルダーとの密接な連携体制を築き、医療ビッグデータとAIを活用したデータ駆動型研究を推進しています。これにより、疾患の重症化予測や診断支援、医療の質の向上といった実課題への貢献を目指すとともに、研究成果の社会実装を通じた持続的なイノベーション創出に取り組んでいます。
CMXにおいては、これまで培ってきたビッグデータ分析基盤を活かし、医学と情報科学のさらなる融合と発展に取り組んでいきたいと考えています。今後ともご指導ご鞭撻のほど、何卒よろしくお願い申し上げます。

田所　慶誠　CMX特命助教/未来医学講座　免疫学分野

2024年4月より現職を拝命しております。これまで、口腔がんに対する新規治療法の開発および口腔感染症の予後予測に関する研究を行ってまいりました。現在、臨床現場で生じた疑問をもとに、基礎的な研究を進め、病態の発症・増悪のメカニズムの解明に邁進しております。特に、加齢関連疾患における免疫細胞の動態に焦点を当て、これらの疾患に対する最適な治療法を創出することを目指しております。
今後は、さまざまな基礎・臨床の先生方と連携させていただくことで、限局性疾患が全身に及ぼす影響や臓器特異性について、多角的な視点から解明を進めたいと考えております。引き続きご指導・ご鞭撻のほど、何卒よろしくお願い申し上げます。

山口　勇太　CMX特命助教/生化学・分子生物学講座　薬理学分野

2023年4月より現職を拝命いたしました。これまで、感染症や炎症などに対して最前線で生体防御を担う自然免疫系の研究に従事してまいりました。この経験を活かし、精神的・身体的ストレスが引き起こす免疫応答や炎症反応に着目することで、うつ病や不安障害などの精神神経疾患の病態メカニズム解明と新規治療法の開発を目指しております。さらに2024年4月からはCMXにも参画し、免疫学、神経科学を融合した異分野横断的な研究やトランスレーショナル研究にも積極的に取り組んでおります。今後も、患者さんの生活の質向上やよりよい治療戦略の確立に貢献できるよう研究を推進してまいりますので、ご指導ご鞭撻のほどよろしくお願い申し上げます。

MIYAKE Hideaki, Professor, Div. of Urology, Dept.of Surgery Related

In December, 2023, I was appointed as Professor in Division of Urology, and it is a great pleasure for me to join the CMX as one of the members in the field of drug discovery and medical device development. I had been involved in the development of a novel anticancer agent, which was evaluated in the phase 3 clinical trials. In addition, our division has played the central role in the development of the surgical robot, hinotori, and we have recently tried to establish the system of telesurgery using hinotori. I would like to contribute the activity of CMX as much as possible by utilizing such my previous experiences.

MURAGAKI Yoshihiro, Professor, Div. of Medica Devices, Dept. of Medical Device Engineering

In April 2023, I was honored to take on the role of professor at the newly established Department of Medical Device Engineering. My mission is to nurture innovative professionals who can tackle complex challenges and contribute to commercialization of domestically-produced medical devices. My research encompasses a range of components, therapeutic devices, and program-based medical devices. In the field of neurology, I have developed devices such as EEG recording systems and laser-holding devices for treating malignant brain tumors.
As a researcher and physician, my specialization aligns with Professor Takashi Sasayama in neurosurgery, focusing on malignant brain tumors. During my overseas studies, I explored differentiation induction therapy for pediatric brain tumors through the genetic introduction of neurotrophic factor receptors. Clinically, I have identified the brain's "grammar center" using functional MRI, conducted brain function mapping through awake surgery, and pursued clinical research on cortico-cortical evoked potentials. Currently, I am leading physician-directed clinical trials on autologous tumor vaccines.
Joining CMX is an exciting opportunity, and I am enthusiastic about collaborating with all of you on development research to translate discoveries and methodologies from human brain function studies and fundamental research into practical medical devices. I sincerely appreciate your support as we embark on this journey together.

KUREBAYASHI Yoichi, Professor, Div. of AI & Digital Health Science, Dept. of Social/Community Medicine & Health Science

I serve as Professor in the Department of AI and Digital Health Science. At our laboratory, we conduct data-driven research by integrating medical big data with artificial intelligence, working closely with a diverse range of stakeholders—including national and local governments, as well as pharmaceutical, medical device, and IT companies.
Our mission is to tackle real-world healthcare challenges such as predicting disease progression, supporting diagnostics, and improving the quality of care. We also strive to translate our research outcomes into real-world applications to drive continuous innovation in the medical field.
Through our participation in CMX, we aim to further advance the integration of medicine and information science by leveraging our experience and infrastructure in big data analytics. We appreciate your continued interest and support.

TADOKORO Yoshiaki, CMX Project Assistant Professor Div. of Immunology, Dept. of Future Medical Sciences

Since April 2024, I have been serving in my current position. Until now, my research has focused on the development of novel therapeutic strategies for oral cancer and prognostic prediction in oral infectious diseases. Currently, I am engaged in basic research inspired by questions that arise in clinical practice, with the aim of elucidating the mechanisms underlying the onset and progression of various disease states. In particular, I am investigating the dynamics of immune cells in age-related diseases to contribute to the development of optimal treatment approaches.
Moving forward, I hope to collaborate with researchers and clinicians across both basic and clinical fields to gain multifaceted insights into how localized diseases affect systemic health and to further explore organ-specific pathological responses. I sincerely appreciate your continued guidance and support.

YAMAGUCHI Yuta, CMX Project Assistant Professor , Div. of Pharmacology, Dept. of Biochemistry & Molecular Biology

I was appointed as a Project Assistant Professor in the Department of Pharmacology in April 2023. My previous research focused on the innate immune system, particularly its crucial role in frontline defense against infections and inflammatory conditions. Building upon this experience, I am currently investigating how immune responses and inflammatory processes triggered by psychological and physiological stress contribute to the pathology of psychiatric and neurological disorders, such as depression and anxiety, aiming to uncover disease mechanisms and develop innovative therapeutic strategies. Furthermore, since April 2024, I have been a member of the Center for Medical Transformation (CMX), actively engaging in cross-disciplinary and translational research integrating immunology and neuroscience. Through my ongoing research, I hope to establish more effective treatment approaches and improve patients' quality of life. I greatly appreciate your continued guidance and support.

1．CMX若手共同研究プロジェクト CMX Young Scientists Collaborative Research Project

1）令和5年度採択課題 研究進捗発表会　令和6年6月25日(火)　神緑会館記念ホール
Progress Review Meeting for Selected Project of FY 2023

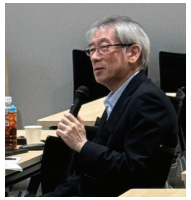
研究分野を横断した若手研究者の共同研究を支援する競争的共同研究費助成事業「若手共同研究プロジェクト」の令和5年度採択課題6件の進捗発表会を開催した。この発表会は、採択課題の中間審査も兼ねており、センターのアドバイザリーボードにより、優れた点、推進すべき点、疑問点等について後日、書面によるコメントをいただき、発表者へフィードバックしている。このように、採択課題の進捗を評価すると同時に、具体的な改善点を示す取組は、他にあまり例がなく、センターの特色ある優れた活動として評価されている。

発表会後はセンターのアドバイザリーボードである岡部繁男先生(東京大学大学院医学系研究科教授)に"Imaging synapse and neural circuit in development and disease"と題した特別講演をいただいた。この講演では、神経回路の形成やシナプスの再構成の重要性について、独自の研究成果を交えてご解説いただいたほか、統合失調症モデルマウスを例に超解像イメージングや二光子顕微鏡を用いた解析を紹介され、精神疾患患者の神経回路機能障害との関連性を示唆する可能性があると説明された。講演内容は、参加者の多くにとって有益な知見となった。

The progress presentation for six projects selected in the FY 2023 under the "Young Researchers Collaborative Research Project," a competitive grant program supporting interdisciplinary joint research by young researchers, was held. This presentation also served as an interim review of the selected projects, where the Center's Advisory Board later provided written feedback to the presenters, including commendable aspects, points to be advanced, and questions. Such efforts to evaluate the progress of selected projects while indicating specific points for improvement are rare and have been recognized as a distinctive and excellent activity of the Center.

Following the presentations, Professor Shigeo Okabe from the Graduate School of Medicine at the University of Tokyo, a member of the Center's Advisory Board, delivered a special lecture titled "Imaging Synapse and Neural Circuit in Development and Disease." In the lecture, the importance of synaptic remodeling and neural circuit formation was explained, incorporating original research findings. Analyses using super-resolution imaging and two-photon microscopy were introduced, taking schizophrenia model mice as an example, and potential links to neural circuit dysfunction in patients with mental disorders were suggested. The content of the lecture provided valuable insights for many participants.

若手共同研究プロジェクト令和５年度採択課題	
新規	「SAMD4Bによる癌進展機構の全貌解明と治療薬開発」 "Molecular mechanism of cancer progression by SAMD4B and development of therapeutic agents." (研究代表者)大谷 淳二 OTANI Junji　(共同研究者)西森 誠 NISHIMORI Makoto
新規	「膵癌におけるWnt5a-Ror1シグナルの機能解析」 "Functional analysis of Wnt5a-Ror1 signaling in pancreatic cancer." (研究代表者)紙崎 孝基 KAMIZAKI Koki　(共同研究者)辻前 正弘 TSUJIMAE Masahiro
新規	「母体免疫活性化が引き起こす概日リズム破綻メカニズムの解明」 "Investigation of circadian rhythm of maternal immune activation model mice." (研究代表者)玉田 紘太 TAMADA Kota　(共同研究者)益子 尚久 MASUKO Naohisa
新規	「麻酔と覚醒の変遷過程における生体マルチセンシング」 "In vivo multi-sensing during the transition between anesthesia and awareness." (研究代表者)中井 信裕 NAKAI Nobuhiro　(共同研究者)西村 太一 NISHIMURA Taichi
新規	「時計蛋白質PERIOD2 (PER2)のリン酸化スイッチによる気分、糖・脂質代謝、概日リズムの制御機構の解明」 "Elucidation of the Mechanism by which Phosphorylation Switches of Clock Protein PERIOD2 (PER2) Control Mood, Glucose and Lipid Metabolism, and Circadian Rhythms." (研究代表者)平田 悠 HIRATA Yu　(共同研究者)白藤 俊彦 SHIRAFUJI Toshihiko
新規	「臨床検体を用いた新規Rasシグナル伝達阻害剤の開発研究」 "Development of novel RAS signalling inhibitors using primary human acute myeloid leukemia cells." (研究代表者)槇野 義輝 MAKINO Yoshiteru　(共同研究者)森本 耕平 MORIMOTO-Kohei

研究進捗発表会での質疑応答の様子

特別講演のQ＆A

2）令和6年度若手共同研究プロジェクト
Selection for Research Project in FY 2024

令和6年5月2日から6月10日までの期間で実施した「令和6年度若手共同研究プロジェクト」の公募には7件の応募があった。アドバイザリーボードおよびセンター運営委員から選ばれた審査員による厳正な審査を経て、最終的に3件の継続課題と2件の新規課題が採択された。

From May 2nd to June 10th, 2024, the call for proposals for the "FY2024 Young Researchers Collaborative Research Project" was conducted, resulting in seven submissions. Following a rigorous review by the Advisory Board and judges selected from and the Center's Steering Committee, three ongoing projects and two new projects were selected.

若手共同研究プロジェクト令和6年度採択課題	
継続	「SAMD4Bによる癌進展機構の全貌解明と治療薬開発」 "Molecular mechanism of cancer progression by SAMD4B and development of therapeutic agents." (研究代表者)大谷 淳二 OTANI Junji　(共同研究者)西森 誠 NISHIMORI Makoto
継続	「膵癌におけるWnt5a-Ror1シグナルの機能解析」 "Functional analysis of Wnt5a-Ror1 signaling in pancreatic cancer." (研究代表者)紙崎 孝基 KAMIZAKI Koki　(共同研究者)辻前 正弘 TSUJIMAE Masahiro
継続	「麻酔と覚醒の変遷過程における生体マルチセンシング」 "In vivo multi-sensing during the transition between anesthesia and awareness." (研究代表者)中井 信裕 NAKAI Nobuhiro　(共同研究者)西村 太一 NISHIMURA Taichi
新規	「がん早期診断を実現する革新的診断システムの開発」 "Developing innovative diagnostic systems for early cancer diagnosis." (研究代表者)田所 慶誠 TADOKORO Yoshiaki　(共同研究者)武田 大介 TAKEDA Daisuke
新規	「抗SIRPα抗体を用いた神経芽腫・骨肉腫・ユーイング肉腫に対する抗GD2抗体の作用増強法開発」 "Development of a method to enhance the activity of anti-GD2 antibodies against neuroblastoma, osteosarcoma, and Ewing's sarcoma by anti-SIRPα antibodies." (研究代表者)田村 彰広 TAMURA Akihiro　(共同研究者)松本 咲季 MATSUMOTO Saki

2．ワシントン大学交流事業 KU-UW Alliance Project

令和6年9月18日～9月20日　ワシントン大学(米国 シアトル)

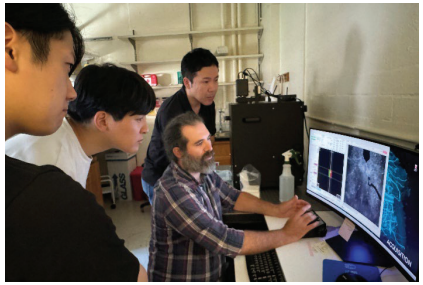
令和6年9月、米国ワシントン大学のJohn.D. Scott教授の招待を受け、Department of Pharmacology主催のリトリートに参加した。本学からは内匠CMXセンター長が"Towards an understanding of the pathophysiology of autism"というタイトルで講演を行い、大学院生を含む5名がポスター発表を行った。また、リトリート前日には自身でラボビジットを調整し4つの研究室を訪問し情報収集を行った。

In Septemver 2024, CMX menbers participated in the annual retreat hosted by the Department of Phamacology at the University of Washington, USA, upon the invitation of Professor John D. Scott. Representing the center, Director Takumi delivered a lecture titled "Towards an understanding of the pathophysiology of autism," while five members, including graduate students, presented posters. Additionally, prior to the retreat, arrangements were made to visit four research labs for valuable information gathering.

参加者の報告書

NAKAI Nobuhiro, Project Assosiate Professor in Physiology

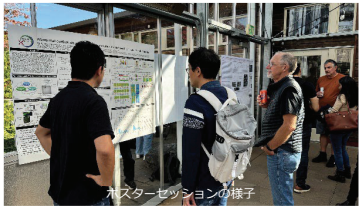
As part of the KU-UW Alliance Project, my colleagues and I visited both the Golden and Stuber labs at the University of Washington. At the Golden Lab, we were guided by Dr. Sam Golden himself, who introduced research involving implantable vital sensors and light-sheet microscopy, and explained tools like SimBA, a leading platform for automated analysis of mouse behavior. At the Stuber Lab, Dr. Kentaro Ishii kindly guided us through the lab, and we were introduced to research using two-photon calcium imaging as well as a custom-built behavioral setup designed to study mouse taste responses. Both labs were conducting cutting-edge research, and I was impressed by the high quality of their work and the active engagement of students and staff. I also had a productive discussion with Dr. Ishii about our ongoing collaborative project, particularly focusing on strategies for whole-brain imaging in autism model mice.
During our stay, we also participated in the Department of Pharmacology retreat, where I presented a poster and engaged in lively discussions with researchers. I was especially struck by how actively students asked questions and initiated discussions, something not often seen at conferences in Japan. I also had the opportunity to join a lunch conversation among several PIs at UW, where speaking with Dr. Michael Bruchas was especially insightful. He shared valuable experiences about running a lab in the U.S. and mentoring students. This visit deepened our connection with UW and provided valuable insights that will benefit our future research. I sincerely hope the collaboration between our institutions continues to grow and foster mutual development.



ラボ ツアーの様子

SHINTANI Yusuke, Project Assistant Professor in Physiology

From September 18 to 22, 2024, I participated in the KU-UW Alliance Project, a researcher exchange program between Kobe University and the University of Washington.
During my visit, I had the opportunity to explore the research conducted in laboratories within the Department of Pharmacology at the University of Washington, including the Stuber Lab, Golden Lab, and Bruchas Lab. Specifically, I observed cutting-edge neuroscience experiments, such as single-cell live imaging using two-photon microscopy and automated behavioral analysis systems utilizing deep learning. This visit provided valuable insights into the practical implementation of these techniques.
Additionally, I had a dinner meeting with Professor Scott, Professor Land, and Assistant Professor Soden, where we exchanged opinions on education and laboratory management at the University of Washington. In particular, I got valuable insights into research funding strategies and the decision-making process for student research projects.
Furthermore, I presented a poster at the symposium organized by the Department of Pharmacology. The presentation led to active discussions based on specific experimental data, allowing me to receive valuable feedback.
The KU-UW Alliance Project was an great opportunity for deepening my understanding of research methodologies and technologies. In addition, through this project, I managed to strengthen my network with international researchers. I intend to apply the knowledge and experience gained from this project to my future research, leading to further advancements in my work.



ポスターセッションの様子

西村さん(左)とVitanza先生(中央)とラボのみなさん

NISHIMURA Akihiro, Docrtal Student in Pediatrics

By participating in the KU-UW Alliance Project, I was able to gain valuable insights not only into the advanced research and facilities at the University of Washington, but also into the latest treatments for brain tumors at Seattle Children's Hospital. In particular, the visit to Dr. Vitanza's lab—renowned for its groundbreaking publications on CAR-T therapy for brain tumors—was especially meaningful. I had the rare opportunity to receive a direct explanation from Dr. Vitanza about the lab's research overview. Moreover, I was able to learn about the most up-to-date treatment approaches that have yet to be published, as well as the potential downsides of CAR-T therapy. This kind of knowledge and experience could only be gained by physically visiting the research site—not through academic conferences, emails, or online meetings.
I also had the opportunity to briefly introduce the research we are currently working on, and was even able to secure a positive response regarding the possibility of future collaboration. If such a joint project were to materialize, it would not only benefit Kobe University but could also bring significant advantages to all pediatric brain tumor patients across Japan. This was undoubtedly the most valuable outcome of the visit.
While the development of the internet has certainly brought the world closer, this experience reaffirmed the importance of face-to-face interactions, as demonstrated by the KU-UW Alliance Project.
In closing, I would like to express my heartfelt gratitude to everyone who made this project possible.

KUNO Hiroto, Docrtal Student in Physiology

I had an opportunity to participate in the KU-UW Alliance Project exchange program held at the University of Washington in Seattle from September 18 to 22, 2024. On September 18 and 19, I visited the Golden Lab, Stuber Lab, and Bruchas Lab, and all of these labs are at the forefront of the neuroscience research field. It was very educational for me to observe their advanced equipments and tools. On September 20, I participated in the UW Pharmacology Retreat. After attending symposium talks by various labs in UW Pharmacology, I gave a poster presentation on my research. I am studying the pathophysiology of tic disorders using the model mice. While there were not researchers working on similar topics, the students and faculties of UW were very interested in my presentation, and actively asked questions about my research. It helped me clarify the issues and points for improvement in my research.
I think opportunities directly visit overseas laboratories, observe their facilities, and interact with their members are rare but deeply enriching experiences.

SUZUKI Mao, Docrtal Student in Physiology

As part of this program, we visited the University of Washington. During the visit, we participated in lab tours, a symposium, and a poster session. One of the most valuable experiences was visiting the Sam Golden Lab and the Garret Stuber Lab. We were given an overview of their research facilities and experimental techniques, with a particular focus on light sheet imaging using SmartSPIM. We observed the actual equipment in use while receiving a detailed explanation of the measurement techniques, as well as data management and statistical analysis. Additionally, We were introduced to two-photon imaging and custom-built experimental devices, gaining insight into their characteristics and practical applications.
This experience not only deepened my technical understanding but also provided practical knowledge on research methodologies and data handling. In particular, discussions on appropriate resolution settings for data analysis and the application of efficient statistical methods were highly relevant and directly applicable to my future research.
Another significant aspect of the visit was the opportunity to interact with researchers and students at the University of Washington. These exchanges broadened my perspective on research and provided valuable insights for considering future international collaborations and study abroad opportunities.

3．CMXリトリート「若手道場」 CMX Retreat "Wakate Dojo"

令和6年10月10日～10月11日　淡路夢舞台国際会議場 レセプションホールB

メディカルトランスフォーメーション研究センター(CMX)・リトリート「若手道場」は令和6年10月10日・11日の2日間にわたり、南 康博オーガナイザーのもと、若手教員中心の実行委員会の運営により実施されました。今回で7回目となる本リトリートでは、当センターに所属する若手研究者や学生が交流を深める場を提供し、新たな共同研究の創出や当センターの活性化を促すことを目的として開催されました。

本年度は10研究室から総勢58名の研究者および学生が参加しました。昨年度に続き、今回も「ゆとり」をテーマに掲げ、2日目の午前中にはエクスカーションの時間を設けました。サイクリング、テニス、花桟敷や夢舞台の散策など、自由な時間を他研究室の研究者と過ごすことで、親睦を深めることができました。

The Center for Medical Transformation (CMX) Retreat, "Wakate Dojo," was held over two days on October 10 and 11, 2024, under the leadership of Prof. Yasuhiro Minami and operated by an executive committee composed primarily of young faculty members. This is the seventh retreat, aiming to provide a platform for young researchers and students affiliated with our center to interact, promote new collaborative research, and revitalize our center.

This year, 58 researchers and students from 10 laboratories participated. Continuing from last year, the theme was "Yutori (leeway)," and an excursion was organized on the morning of the second day. Participants enjoyed activities such as cycling, tennis, and exploring the Hanakasumi Plateau and the Yumebutai, as well as spending free time with researchers from other laboratories to foster camaraderie..

エクスカーションの様子　左から大野先生と夢舞台周辺散策チーム　菊地先生とサイクリングチーム　花桟敷散策チーム

令和6年度オーガナイザー(敬称略)：南 康博
実行委員会 (敬称略)：紙崎孝基、石丸華子、遠藤光晴
加藤亮彬、篠原亮太、辻前正弘
長嶋宏明、松井千絵子

特別講演には理化学研究所 生命医科学研究センター(IMS)副センター長/粘膜システム研究チーム チームリーダーの大野 博司 先生と、大阪大学 感染症総合教育研究拠点 特任教授の菊池 章 先生をお招きいたしました。大野先生には「宿主—腸内細菌相互作用」というタイトルで、腸内細菌叢が宿主の生体防御・免疫系・疾患にどのように関与しているかについて解説していただきました。菊池先生には「Lessons from Experiments ～神戸大学医学部で学んだこと～」というタイトルで、これまで先生が研究を通して学ばれたことをご紹介いただくとともに、生物学・生命科学・医学研究の変遷と今後の展望についてお話しいただきました。ご両名とも若手研究者や将来研究を志す学生に向けた大変勉強になる御講演であり、本講演を聞いた若手研究者・学生は強く鼓舞されたことと思われます。

参加した学生全員が口頭発表・ポスター発表・フラッシュトークのいずれかの形式で発表を行うことで、学生が主体的に関与し議論できる機会が持てるようにしました。事前にどの発表形式が良いかアンケートをとったところ、皆様のモチベーションが非常に高く、予想以上に口頭発表を希望する方が多かったため、発表スケジュールがタイトになってしまいましたが、いずれの発表も質の高い内容でした。

最後に、センター長の内匠透先生から交流を深めることができたことは有意義であったとの総評をいただくとともに、菊池先生からもこのような若手主体の会は大変意義のあるものであるとの講評をいただき、盛況のうちに幕を閉じました。

We were pleased to welcome two special guest speakers: Dr. Hiroshi Ohno, Deputy Director of the RIKEN Center for Integrative Medical Sciences (IMS) and Team Director of the Laboratory for Intestinal Ecosystem, and Dr. Akira Kikuchi, Project Professor at the Center for Infectious Disease Education and Research, Osaka University. Dr. Ohno delivered a lecture titled "Host-Gut Microbial Interactions," covering a wide range of topics on how the gut microbiota is involved in the host's biological defense, immune system, and diseases. Dr. Kikuchi gave a lecture titled "Lessons from Experiments: What I Have Learned at the Faculty of Medicine, Kobe University," sharing insights gained through his research and discussing the transition and future prospects of biological, life science, and medical research. Both lectures provided valuable insights for young researchers and students aspiring to pursue research, and we believe they greatly inspired the young researchers and students who attended.

All participating students were allowed to present in one of the following formats: oral presentation, poster presentation, or flash talk, to encourage active participation and discussion among students. A survey was conducted beforehand to determine the preferred presentation format, and the results showed that motivation was very high, with more participants than expected expressing a preference for oral presentations. As a result, the presentation schedule became tight, but all presentations were of high quality.

Finally, Professor Toru Takumi, the Center Director, provided a closing evaluation, noting that the event was meaningful for fostering deeper connections. Dr. Kikuchi also commented that such a young-researcher-led event is highly significant, and the conference concluded successfully.

令和6年度実行委員長　紙崎 孝基　細胞生理学分野 助教
KAMIZAKI Koki, Assistant Professor, Div. of Cell Physiology

優秀発表賞受賞者による参加感想文
Participation Reflection from the Best Presentation Awardees

KUNO Hiroto, Doctoral Student in Div. of Physiology

I would like to express my gratitude to Prof. Minami, the organizing committee members, and Ms. Haneda and Ms. Amo from the Research Support Division for planning and hosting the 'Wakate-dojo' workshop.
I had the opportunity to present in both the oral session and the poster session during this workshop. It was my first time giving an oral presentation as a graduate student, so I was quite nervous. However, I am honored to have received such a prestigious award. I received many questions and valuable advice from a variety of perspectives thanks to the participation of researchers from diverse fields. This feedback was highly informative and enlightening. Additionally, I had the chance to listen to fascinating research presentations by fellow graduate students of a similar age, which greatly inspired my motivation for research.
During this event, I spent a relaxing and fulfilling two days in a natural environment away from the city. During the excursion, I visited Awaji Hanasajiki and thoroughly enjoyed the breathtaking view of flowers. I was also able to deepen my connections with researchers from various laboratories at Kobe University through this program. As I will still be a graduate student next year, I would love to participate in the 'Wakate-dojo' workshop again.

FUJIMA Shuhei, Doctoral Student, Div. of Physiology

I am honored to have received the Best Presentation Award at the CMX Retreat "Wakate-Dojo."
This event provided an invaluable opportunity to share my research on the role of parvalbumin neurons in the insular cortex (IC) in processing social information. Presenting my findings to a diverse audience of researchers allowed me to receive constructive feedback and engage in stimulating discussions that will help refine my work. Throughout the retreat, I was particularly impressed by the breadth of research topics and the depth of scientific discussions. The environment fostered open exchange, which was both intellectually stimulating and inspiring. I sincerely appreciate the insightful questions and comments from both the faculty and fellow participants, which helped me view my research from different perspectives.
Receiving this award has reinforced my motivation to further explore the neural circuits
underlying social behavior. I am grateful for the support and encouragement from my mentors, colleagues, and the CMX community. Moving forward, I hope to build on this experience and contribute further to the field of neuroscience.
I would like to express my gratitude to the organizers of the CMX Retreat for creating such an enriching platform for young researchers. I look forward to future opportunities to engage in similar academic exchanges.


実行委員長の紙崎先生(右)と
実行委員の長嶋先生(左)


ポスターセッションの様子


左からRsiさん、久野さん、奥田さん、藤間さん、南先生

Gede Ngurah Rsi Suwardana,
Doctoral Student, Div. of Infectious Disease Control

It is a huge experience to participate in the CMX Retreat "Wakate Dojo", held on October 10th-11th 2024. The scientific discussion is very alive and wonderful. I've got so many new lessons, valuable insight, and constructive feedback for our research project on the Hepatitis B virus. Not only the scientific side, the nature and surrounding area around our hotel on Awaji Island is also very fascinating.
I feel honored to receive the Best Presenter Award. Although I think almost all the research presented by students and staff was inspiring. I've been attending this retreat three times from 2022 to 2024. This time would be my last participation. Allow me to sincerely express my gratitude to all of the teachers, staff, and students who organized this meeting. I would also express my sincere gratitude to Prof. Ikuo Shoji, M.D., Ph.D., and all my mentors in the Division of Infectious Disease Control for always supporting my research activity. With my utmost gratitude, GN Rsi Suwardana

OKUDA Yuki, PhD Student, Division of Pharmacology

I am Yuki Okuda, a fourth-year PhD student in the Division of Pharmacology. I am sincerely grateful to the administrative staff, the organizer Dr. Minami, the executive committee chair Dr. Kamizaki, Dr. Furuyashiki, and the other members of the executive committee for organizing the CMX retreat "Wakate Dojo" at the Awaji Yumebutai International Conference Center on October 10th. Receiving the poster presentation award at this event was a great honor and a deeply rewarding experience. Participating in "Wakate Dojo" has always been a highlight of my academic journey. As this was my third time attending, I appreciated the chance to engage with fellow researchers and graduate students from various disciplines within the Center for Medical Transformation at Kobe University. Events like these are rare opportunities to connect with individuals from research groups I don't often interact with, making each session a unique experience. The informal social gatherings, paired with wonderful meals, created the perfect environment to share updates with colleagues and form new connections. The poster session stood out as a particularly valuable part of the retreat. Receiving insightful questions and constructive advice from researchers with diverse perspectives significantly enriched my understanding of my own work. In turn, attending other participants' presentations and engaging in casual discussions was equally enjoyable and informative. The lectures also made a profound impact. Dr. Kikuchi's passionate approach to research was inspiring, while Dr. Ohno's discussion of the host-microbiota interactions, a field of increasing significance, was enlightening. Hearing from such esteemed experts has left me with new ideas and perspectives to explore. Overall, this retreat reaffirmed the importance of interdisciplinary exchanges in advancing research. I am grateful for the chance to participate and look forward to continuing to be part of such enriching opportunities.

4．CMXワークショップ Emergence Conference CMX Workshop "Emergence Conference"

令和6年11月18日　神戸大学医学部福利厚生施設 神緑会館記念ホール

令和6年11月18日、神緑会館記念ホールにて「第5回Emergence Conference」を開催致しました。
本カンファレンスは、「国内を代表する研究者をお招きし、その独創性の高い研究成果をご発表頂くことで最先端の研究動向を学び、臨床応用を含む新たな研究の着眼点を得ることで新たな共同研究が生まれる契機となる」ことを目的として企画されています。第5回のテーマは、「バイオイメージング最前線 ～新たな技術開発と生物学への応用～」とし、現在目覚ましい進展を遂げているバイオイメージング分野に焦点を当てました。バイオイメージングは、生体構造や生命現象を可視化する技術として、生物学・医学における基礎研究から臨床応用に至るまで、幅広い領域で革新をもたらしています。

冒頭では、オーガナイザーである神戸大学大学院医学研究科 免疫学分野の菊田順一教授より開会の辞とともに、「バイオイメージング研究の最前線」と題したミニレクチャーが行われ、分野全体の研究動向と展望が示されました。その後の講演では、名古屋大学の湯川博先生より「ナノ量子センサーによる最先端イメージング診断・治療技術」について、東京大学の合田圭介先生より「細胞のウォーリーを探せ！ Where is Wally in the cells?」と題したユニークな切り口で、細胞内構造のイメージング手法をご紹介いただきました。続く順天堂大学の大友康平先生は「生体組織の内部微細形態を可視化する3D蛍光顕微鏡技術開発」について、東京大学の佐藤守俊先生からは「生命現象の光操作技術の創出」というテーマで、オプトジェネティクス等の先進的な技術を解説頂きました。

後半では、大阪大学の森田梨津子先生より「皮膚・毛包の1細胞解像度ライブイメージング」、北海道大学の大場雄介先生からは「バイオイメージング技術の臨床応用」について、それぞれ最先端の研究成果をご講演頂きました。最後に、特別講演として大阪大学産業科学研究所の永井健治先生により「『外れ値』の探求序章 ― トランススケールスコープの開発と生命科学研究への応用」と題し、革新的な顕微鏡技術とそれによって切り拓かれる新たな生命科学の可能性について熱のこもったご講演を頂きました。

On November 18, 2024, the 5th Emergence Conference took place at Shinryoku Kaikan Memorial Hall at Kobe University. This conference aimed to bring together leading researchers in Japan to share their highly original research findings, gain insights into the latest research trends, explore novel perspectives including clinical applications, and foster opportunities for new collaborative research. The theme of the 5th conference, "Frontiers in Bioimaging: Novel Technological Developments and Biological Applications," focused on the rapidly advancing field of bioimaging, a crucial discipline for visualizing biological structures and life phenomena. This field drives innovation across a wide spectrum, from basic biological and medical research to clinical applications.

The conference began with opening remarks and a mini-lecture by Professor Junichi Kikuta (Department of Immunology), who also served as the organizer. He provided an overview of the current state and future prospects of bioimaging research. This was followed by presentations from Professor Hiroshi Yukawa of Nagoya University, who discussed advanced imaging diagnostic and therapeutic technologies leveraging nano quantum sensors, and Professor Keisuke Goda from the University of Tokyo, who delivered a uniquely creative talk titled *"Where is Wally in the cells?"* that introduced innovative imaging techniques for cellular structures. Next, Professor Kohei Otomo of Juntendo University showcased cutting-edge advancements in the 3D fluorescence microscopy for visualizing fine structures within biological tissues. Finally, Professor Moritoshi Sato of the University of Tokyo provided an in-depth explanation of optogenetics and other pioneering technologies in the context of creating optical manipulation methods for life phenomena.

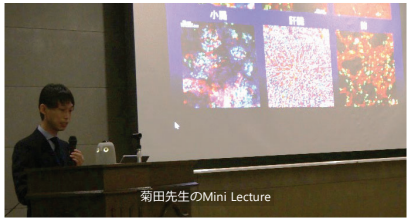
In the latter part of the conference, Professor Ritsuko Morita from Osaka University and Professor Yusuke Ohba from Hokkaido University presented their groundbreaking research. To close the event, Professor Takeharu Nagai from the Institute of Scientific and Industrial Research at Osaka University delivered an inspiring special lecture titled *"Introduction to the Quest for 'Outliers' – Development of the Trans-Scale Scope and Its Application to Life Science Research."* This highlighted a revolutionary microscopy technology with the potential to transform life sciences.

本カンファレンスを通じて、バイオイメージングにおける基盤技術の進化からその臨床応用に至るまで、幅広い観点から活発な議論・意見交換がなされ、本会の目的を今年度も無事果たすことができました。講演者、参加者の皆様、また本会の開催にご尽力いただいた全ての関係者の皆様に、改めて心より感謝申し上げます。

Throughout the event, dynamic discussions and exchanges of ideas unfolded, encompassing topics from fundamental bioimaging technologies to their clinical applications. We are pleased to report that the conference successfully achieved its objectives, and we extend our heartfelt gratitude to all the speakers, participants, and contributors who made this event a success.

田所 慶誠　免疫学分野　CMX特命助教
TADOKORO Yoshiaki, CMX Project Assistant Professor, Div. of immunology


永井健治先生の特別講演


菊田先生のMini Lecture


活発な質疑応答の様子

13:00	Opening Remarks and Mini Lecture 菊田　順一　神戸大学大学院医学研究科免疫学分野　教授 Junichi Kikuta　Professor, Div. of Immunology, Graduate School of Medicine, Kobe University
13:15	Lecture 1 ナノ量子センサーによる最先端イメージング診断・治療技術 Advanced imaging diagnosis and treatment technology using nano quantum sensors 湯川　博　名古屋大学 量子化学イノベーション研究所　特任教授 Hiroshi Yukawa　Designated professor, Institute of Innovation for Future Society, Nagoya University
13:45	Lecture 2 細胞のウォーリーを探せ！ Where is Wally in the cells? 合田　圭介　東京大学大学院理学系研究科　教授 Keisuke Goda　Professor, Department of Chemistry, Graduate School of Science, The University of Tokyo
14:30	Lecture 3 生体組織の内部微細形態を可視化する3D蛍光顕微鏡技術開発 Novel 3D fluorescence microscopy to visualize internal microstructures of biological tissues 大友　康平　順天堂大学 大学院医学研究科　准教授 Kohei Otomo　Associate Professor, Graduate School of Medicine, Juntendo University
15:00	Lecture 4 生命現象の光操作技術の創出 Manipulating biological processes by light 佐藤　守俊　東京大学大学院総合文化研究科　教授 Moritoshi Sato　Graduate School of Arts and Sciences, The University of Tokyo
15:45	Lecture 5 皮膚・毛包の1細胞解像度ライブイメージング Single-cell resolution live imaging of skin and hair follicles 森田　梨津子　大阪大学大学院生命機能研究科　准教授 Ritsuko Morita　Associate Professor, Graduate School of Frontier Biosciences, Osaka University
16:15	Lecture 6 バイオイメージング技術の臨床応用 Clinical application of bioimaging technique 大場　雄介　北海道大学大学院医学研究院　教授 Yusuke Ohba　Professor, Graduate School of Medicine Division of Medicine, Hokkaido University
17:00	Special Lecture 「外れ値」の探求序章―トランススケールスコープの開発と生命科学研究への応用 Introduction to the Quest for "Outliers" ―Development of the Trans-Scale Scope and its Application to Life Science Research― 永井　健治　大阪大学 産業科学研究所　教授 Takeharu Nagai　Professor, SANKEN (The Institute of Scientific and Industrial Research), Osaka University
18:00	Closing Remarks 内匠　透　メディカルトランスフォーメーション研究センター　センター長 神戸大学大学院医学研究科　生理学・細胞生物学講座　生理学分野　教授 Toru Takumi　Director, Center for Medical Transformation, Graduate School of Medicine, Kobe University Professor, Div. of Phisiology, Graduate School of Medicine, Kobe University

5．神戸大学-理研BDR合同シンポジウム　Kobe University-RIKEN BDR Joint Symposium

令和7年2月3日　神戸大学医学部福利厚生施設 神緑会館記念ホール

第５回神戸大学－理研BDR合同シンポジウムは、神戸大学および理研BDRから、前回よりも多い総勢102名の研究者が参加して行われた。口頭発表は、講演９名のうち若手4名、また女性４名とした。

具体的には理研BDRからの若手枠としては佐久間知佐子先生と大字亜沙美先生の発表をお願いし、PI枠では、荻沼政之先生、大浪修一先生にお願いした。一方、神大の若手枠としては、小児科の堀之内智子先生、小森里美先生の発表をお願いし、PI枠では、最近教授に就任した篠原正和先生、菊田順一先生にお願いした。また最後の講演では、先端医療研究センターの村松正道先生からご講演をいただき、今後の先端医療研究センターとの連携も期待された。

ポスター発表も前回よりも多い４５演題（理研１９演題、医学研究科２６演題）を数え、活発な議論が展開された。

今回は、コロナウイルス感染流行が収束を迎えてからはじめての懇親会を開催することができた。対面ならではの交流が進み、今後の神戸大学医学研究科と理研BDR（神戸）、及び先端医療研究センターとのさらなる研究交流が推進される一助になることが期待できるシンポジウムとなったと思われる。

令和6年度オーガナイザー(敬称略)
神戸大学：鈴木聡、内匠透（神戸大学）
理研BDR：平谷伊智朗、大浪修一、Yoo Sa Kan、宮道和成

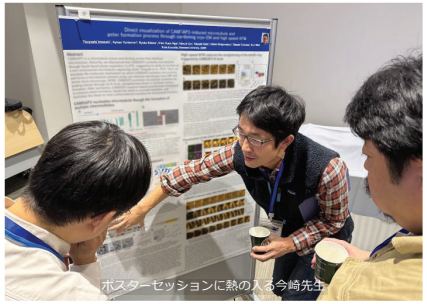
The joint symposium was attended by a total of 102 researchers from Kobe University and RIKEN BDR, and these participants were larger than those of the previous symposium. Nine oral presentations were given, including four by young researchers and four by women researchers.

Specifically, we asked Dr. Chisako Sakuma and Dr. Asami Oaza from RIKEN BDR to make presentations as young researchers, and Dr. Masayuki Oginuma and Dr. Shuichi Onami as PIs. In addition, we asked Dr. Tomoko Horinouchi and Dr. Satomi Komori from Kobe University to make presentations as young researchers, and Dr.Masakazu Shinohara and Dr. Junichi Kikuta as PIs. Finally, we asked Dr. Masamichi Muramatsu from the Institute of Biomedical Research and Innovation to make a presentation as PI.

There were totally 45 poster presentations (19 from RIKEN BRD and 26 from Kobe University), and actively discussed to each other. The number of poster presentations was also higher than that of the previous symposium.

We were able to have a first reception after the coronavirus epidemic has subsided. The symposium might become a good opportunity for face-to-face exchanges and is expected to promote further research exchanges between Kobe University, RIKEN BDR, and the Institute of Biomedical Research and Innovation in the future.

令和6年度オーガナイザー　鈴木 聡　分子細胞生物学分野 教授
SUZUKI Akira, Professor, Div. of Molecular and Cellular Biology


ポスターセッションに熱の入る今崎先生


口頭発表中の堀之内先生


break中の宮西先生(KU)と清成先生(BDR)


内匠CMXセンター長

13:00	Opening Remarks Takamichi Murakami, Dean of the Graduate School of Medicine, KU Toru Takumi, Director of Center for Medical Transformation, KU	
Session 1 chair: Ichiro Hiratani(BDR), Shuichi Onami(BDR)		
13:05	Comprehensive understanding of blood-feeding process from initiation to completion in the dengue mosquito, Aedes aegypti Chisako Sakuma (Laboratory for Nutritional Biology, BDR)	
13:25	Chrono-Developmental Biology: Decoding the Enigma of Embryonic Time Masayuki Oginuma (Chrono-Developmental Biology RIKEN ECL Research Team, BDR)	
Session 2 chair: Kazunari Miyamichi(BDR), Sa Kan Yoo (BDR)		
13:45	Biological image data science: its resources and applications Shuichi Onami (Laboratory for Developmental Dynamics, BDR)	
14:05	Proper nuclear compartment organization is required for DNA replication control Asami Oji (Laboratory for Developmental Epigenetics, BDR)	
14:25	Stress-induced stenotic vascular remodeling via reduction of plasma omega-3 fatty acid metabolite 4-oxoDHA reduction by noradrenaline Masakazu Shinohara (Div. of Molecular Epidemiology , KU)	
15:00	**Poster Session**	
Session 3 chair: Yoji Murata(KU), Jyunji Otani(KU)		
16:30	Molecular genetic studies in Hereditary kidney diseases and Nephrotic syndrome Tomoko Horinouchi（Div. of Pediatorics/ Center for Perinatal Care, KU)	
16:50	SIRPα promotes the survival of cDC2s by preventing their activation and induction of Nr4a3 expression Satomi Komori (Div. of Molecular and Cellular Signaling, KU)	
Session 4 Chair: Ikuo Shoji(KU), Ryo Nitta, (KU)		
17:10	Dynamic analysis of tissue remodeling and fibrosis by intravital imaging techniques Junichi Kikuta (Div. of Immunology, KU)	
17:30	How Hepatitis B virus establishes a viral nuclear episome, covalently closed circular (ccc)DNA in infected hepatocytes? Masamichi Muramatsu (Div. of Infectious Disease Controle, KU / Dept. of Infectious Disease Research,FBRI)	
17:50	Closing Remarks Eisuke Nishida, Director of RIKEN BDR	

6．国際共同研究短期派遣招へい事業 CMX Short-term Dispatch/Invitation Program for International Collaborative Research

CMXではセンターのミッションである国際共同研究の推進を目的とし、センターの将来を担い発展的研究を行うことのできる優秀な若手研究者を海外へ派遣、または海外から招へいするための渡航費助成事業を展開している。令和6年度からは、世界トップレベルの研究者の招へいする支援も新たに開始し、派遣2件、招へい4件の計6件の支援を実施した。

CMX undertakes an initiative to support travel expenses for sending outstanding young reseachers, who have the potential to shape the center's future and engage in progressive research, abroad or invitinting them from oversease. From FY 2024, it has newly started a support program to invite world-class researchers, conducting a total of six projects – two dispatches and four invitations.

category	name	affiliation	to / from	Duration
dispatch	INOUE Junko	Diagnostic Rediology	to University Hospital of Zurich, Switzerland	Jun. 28- Jul. 4, 2024
Invitation (world-class)	Colleen A McClung	Physiology & Cell Biology	from Unicersity of Pittsburgh School of Medicine, USA	Nov. 11 -14, 2024
invitation	Behzad Najafian	Nephrology	from the University of Washington, the USA	Sept. 4 – 6, 2024
invitation	Michell McNulty	Pediatrics	from the Boston Children's Hospital, the USA	Oct. 1 – 9, 2024
invitation	Jiwon M. Lee	Pediatrics	from YongSan District Public Healthcare Center Seoul, Republic of Korea	Feb. 17 – Mar.2, 2025
invitation	OBATA Yuki	Neural Differentiation & Regeneration	from UT Southwestern Medical Center, the USA	March 21 – 31, 2024

参加者の報告書

井上 純子 放射線診断学分野 IVR部門 医員　INOUE Junko, Div. of IVR, Dept. of Radiology diagnosis

2024年6月、国際共同研究短期派遣・招へい事業の助成を受け、スイスのチューリッヒ大学を訪問しました。私は核医学という医療画像診断の分野を専門としており、特にPET/MRという最先端の装置で撮影された画像の研究に取り組んでいます。チューリッヒ大学は、2011年に世界で初めてPET/MR装置を導入した先進的な施設で、同じ装置を有する神戸大学と共同研究を進める上で、非常に適した環境と言えます。

今回の訪問では、共同研究の実施に向けて、両大学の設備や研究体制・制度を確認する目的で視察しました。チューリッヒ大学のPET/MR装置はより新しいバージョンであり、当院でのアップデートの必要性を再認識しました。また、スイスでは個人情報保護が非常に厳しく、データ共有には高いハードルがあることも明らかになりました。こうした課題を把握できたことは大きな収穫であり、現地の研究者と率直な意見交換ができたことで、共同研究への意欲が一層高まりました。

その結果、2025年3月にチューリッヒ大学への短期留学が実現し、複数の研究に取り組むこととなりました。今回の助成が貴重な一歩となり、心より感謝申し上げます。

In June 2024, I visited the University of Zurich in Switzerland with support from the International Joint Research Short-Term Dispatch and Invitation Program. I specialize in nuclear medicine, a field of diagnostic imaging, and my research focuses particularly on images acquired using PET/MR, an advanced hybrid imaging technology. The University of Zurich was the first institution in the world to introduce a PET/MR system in 2011, making it an ideal partner for collaborative research with Kobe University, which also has the same system.

The purpose of this visit was to assess the feasibility of future joint research by reviewing the facilities and research frameworks at both institutions. I found that the PET/MR system at the University of Zurich is a more recent version, which highlighted the need for an update at our own institution. I also learned that Switzerland has very strict data protection regulations, presenting significant challenges for data sharing. Identifying these issues was highly valuable, and engaging in open discussions with local researchers further strengthened my motivation for international collaboration.

As a result, I was able to undertake a short-term research stay at the University of Zurich in March 2025, during which I engaged in multiple collaborative studies. I am deeply grateful for the support that made this important step possible.


チューリッヒの街並み


PET/MR

内匠 透 生理学分野 教授　TAKUMI Toru, Div. of Physiology

メディカルトランスフォーメーション研究センター「国際共同研究短期派遣・招へい事業」により、米国ピッツバーグ大学医学部よりColleen A. McClung教授を招へいした（招へい期間：2024年11月7日～1日）。McClung教授は、生物時計と精神疾患との関連に関する研究で国際的に高く評価されている、精神医学分野の世界的権威である。

滞在期間中は、生理学分野のみならず、精神医学、薬理学、神経分化・再生等、複数の研究室を訪問し、研究者および大学院生との間で活発な学術交流が行われた。11月12日には神緑会館記念ホールにおいて、「Circadian Genes, Rhythms and the Biology of Psychiatric Disorders」と題する講演会を実施し、多くの学内関係者が参加した(写真１)。講演後の質疑応答・意見交換も活発に行われ、教育・研究の双方において有意義な機会となった。 また、姫路へのエクスカーション（写真２）や学内の懇談会を通じて、分野横断的な人的ネットワークが形成され、国際共同研究体制の拡充につながる成果が得られた。本招へいは、国際的な学術交流の推進に大きく貢献したものであり、今後の継続的な協力関係の礎となるものと評価される。

As part of the International Collaborative Research Short-Term Invitation Program of the Center for Medical Transformation, Professor Colleen A. McClung from the University of Pittsburgh School of Medicine was invited to visit Kobe from November 7 to 14, 2024. Professor McClung is an internationally renowned expert in the field of psychiatry and chronobiology, highly recognized for her pioneering research on the relationship between circadian rhythms and psychiatric disorders.

During her stay, Professor McClung visited multiple laboratories, including physiology, psychiatry, pharmacology, and neurodevelopment and regeneration, where she engaged in active academic discussions with faculty members and graduate students. On November 12, she delivered a lecture titled "Circadian Genes, Rhythms and the Biology of Psychiatric Disorders" at the Shinryoku-kaikan Hall, attracting a large audience from across the school. The event concluded with a lively Q&A session and open discussion, providing a valuable opportunity for educational and research exchange. In addition to academic engagements, Professor McClung also participated in a cultural excursion to Himeji Castle and joined on-campus social gatherings. These activities helped foster interdisciplinary networking and contributed to the expansion of frameworks for international collaborative research. This invitation significantly promoted international academic exchange and is expected to serve as a foundation for continued collaboration in both research and education.

Photo 1, from left
Colleen McClung (Left), Toru Takumi (Right)


Photo 2, from left
Urs Albrecht, Colleen McClung, Kana Yamamoto

藤井 秀樹 腎臓内科学分野 准教授　FUJII Hideki, Div. of Nephrology

X染色体連鎖性の遺伝性疾患であるファブリー病では、αガラクトシダーゼ酵素の活性低下により globotriaosylceramide（Gb3）が生体内臓器に蓄積し、進行してくると臓器不全に陥る。我々は、解析ソフトを用いた病理組織学的な詳細な解析を行い、それらと血液、尿のバイオマーカー、生理検査のデータとの関連を調べ、ファブリー病における臓器障害を反映する適切な手法は何かを見出すこと、および臓器障害進展のメカニズムを考えることを我々は考えている。研究を円滑に進めるために、この度、ワシントン大学よりこの分野での世界的権威であるNajafian教授をお招きした。

Najafian先生らは、腎臓などの病理組織を用いて臓器障害をコンピューターソフトを用いて3次元的に定量的に評価している。今回の研究では、電子顕微鏡標本を用いて、ポドサイトの容積及びGb3 の蓄積量を画像イメージングより解析ソフトを用いて測定し、Gb3 の糸球体のポドサイトの容積密度を計算する。

Fabry disease is an X-linked genetic disorder characterized by a deficiency of α-galactosidase A, leading to the accumulation of globotriaosylceramide (Gb3) in various organs. As the disease progresses, this accumulation can result in multiorgan failure. Our objective is to identify optimal methods for assessing organ damage in Fabry disease by performing detailed histopathological analyses using image analysis software, and to examine the correlation of these findings with blood and urinary biomarkers as well as physiological test results. We also aim to elucidate the underlying mechanisms of organ damage progression. To facilitate the smooth execution of this research, we invited Professor Najafian from the University of Washington, a world-renowned expert in this field.

Professor Najafian and his team, have developed a method to quantitatively and three-dimensionally evaluate organ damage using pathological specimens of organs such as the kidney through computer-assisted image analysis. In this study, we will use electron microscopy specimens to analyze podocyte volume and Gb3 accumulation using imaging software, and calculate the volume density of Gb3 within glomerular podocytes.


Najafian先生と腎臓内科の皆さん

また、各臓器の血管内皮細胞、血管平滑筋細胞においてもこの評価を行い、光顕標本を用いた障害の定量および半定量評価を画像イメージングによる解析、尿中ポドサイト数のフォローサイトメトリーによる測定、尿中lyso-Gb3 の測定も行うことを計画している。

我々はファブリー病および腎疾患患者に関しての病理学的な専門的意見をもらうために、症例カンファレンスを開催した。若手～中堅の医師による英語でのプレゼンテーションおよびディスカッションは貴重な経験となり、Najafian先生からは意義のあるコメントを頂いた。また、ファブリー病に関する研究についての詳細な知見を得るため、特別講演を行って頂いた。院外からも多数の医師が参加し、ファブリー病に関する最先端の研究内容を聞かせて頂き、非常に参考になった。また、共同研究の遂行に関して、リサーチミーティングを開催し、今後、どのように研究を進めていくかをディスカッションした。医局のメンバーに対して、国際交流の重要性、英語を用いてのカンファレンスなどの経験、国際共同研究の遂行など刺激になることが多い、実りのある数日であったと考える。可能であれば、このような機会を定期的にサポートして頂ければ、姉妹校であるワシントン大学とのつながりがなお一層強まり、定期的な留学、共同研究の継続につながるのではないかと考える。

Similar evaluations will be performed on vascular endothelial cells and vascular smooth muscle cells in various organs. Additionally, we plan to carry out quantitative and semi-quantitative analyses of damage using light microscopy specimens, flow cytometric measurement of urinary podocyte count, and measurement of urinary lyso-Gb3 levels.

To obtain expert pathological opinions on Fabry disease and kidney pathology, we held a case conference. English-language presentations and discussions by junior to mid-career physicians provided valuable experience and were met with meaningful feedback from Professor Najafian. Furthermore, he delivered a special lecture offering in-depth insights into current Fabry disease research. Many physicians from outside our institution also attended, gaining exposure to cutting-edge findings in the field.

We also held a research meeting to discuss the future direction of our collaborative project. This visit was a fruitful experience for our department members, reinforcing the importance of international exchange, communication in English, and the execution of global collaborative research.

We believe that regular support for similar opportunities would further strengthen our relationship with the University of Washington, our sister institution, and promote continued academic exchange and collaborative research including recurring international fellowships.

長野 智那 小児科学分野 特定助教　NAGANO China, Div. of Pediatrics

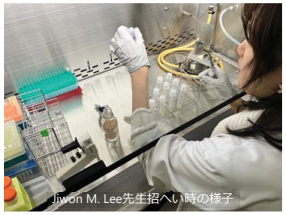
この度、CMX 国際共同研究短期派遣・招へい事業のご支援により、2024年11月14日から28日にかけて、米国ボストン小児病院Sampson Labより Michelle McNulty博士を神戸大学にお迎えすることができました。McNulty博士は生物統計学の専門家であり、ネフローゼ症候群に関する国際的なゲノム解析研究において中心的な役割を果たしておられます。

With the generous support of the CMX International Collaborative Short-Term Invitation Program, we had the honor of inviting Dr. Michelle McNulty from the Sampson Lab at Boston Children's Hospital to Kobe University from November 14 to 28, 2024. Dr. McNulty is a specialist in biostatistics and has played a central role in international genome analysis studies on nephrotic syndrome.

招へい期間中は、ゲノムデータの解析手法の共有や、ネフローゼ症候群の原因解明に向けた新たな研究計画の策定、日本人患者データとの比較解析体制の構築など、今後の共同研究に向けた重要な議論を重ねることができました。

During her visit, we engaged in meaningful discussions on various topics essential to our collaborative research. These included methodologies for handling genome data, the formulation of new research plans aimed at elucidating the causes of nephrotic syndrome, and the development of a comparative analysis framework incorporating Japanese patient data.


長野先生, McNulty先生と小児科学分野の皆さん


Jiwon M. Lee先生招へい時の様子

また、若手研究者や大学院生との意見交換の場も設けていただき、統計解析の観点や国際研究の進め方について多くの学びを得る貴重な機会となりました。

今後は、日米両国のコホートを統合したゲノム解析をさらに推進し、抗ネフリン抗体陽性例に特徴的な遺伝的マーカーの同定を目指すことで、診断精度の向上や個別化医療の実現に貢献していきたいと考えております。

In addition, Dr. McNulty kindly participated in a discussion session with our junior researchers and graduate students, offering valuable insights into statistical analysis and the practicalities of conducting international collaborative research. These exchanges provided an enriching learning experience for all participants.

Moving forward, we aim to further advance genome analyses by integrating cohorts from both Japan and the United States. Our goal is to identify genetic markers characteristic of nephrin autoantibody-positive cases, contributing to improved diagnostic accuracy and the realization of personalized medicine.

堀之内 智子 小児科学分野 講師　HORINOUCHI Tomoko, Div. of Pediatrics

小児ネフローゼ症候群に関する国際共同研究の進展

小児ネフローゼ症候群は、腎臓の機能が低下し、尿中に大量のたんぱくが漏れ出す難病です。小児ネフローゼ症候群患者ではその多くがステロイド治療に反応しますが、再発を繰り返す患者も多く、根本的な治療法の開発が求められています。私たちはこれまでに、日本人小児患者を対象とした大規模な遺伝子解析（GWAS）により、病気の発症に関わる遺伝子「*NPHS1*」を同定し、この遺伝子に異常があるとネフローゼ症候群のリスクが高まることを発見しました。

近年、この*NPHS1*が作る「ネフリン」というたんぱくに対する自己抗体（抗ネフリン抗体）が、病気の発症や再発に関与している可能性が示され、世界的に注目されています。私たちはすでに、日本国内の患者さんでの抗体陽性率の検索を行い、また抗体を迅速に検出する新しい染色法の開発にも成功しています。

今回、韓国の研究者と連携し、同様の検査や遺伝子解析、腎組織の解析を行う国際共同研究を開始しました。これにより、日韓のデータを比較することで、病気の原因や治療への応用がさらに進むことが期待されます。

Progress in International Collaborative Research on Childhood Nephrotic Syndrome

Childhood nephrotic syndrome is a rare kidney disease characterized by impaired kidney function and excessive protein loss in the urine. Most cases respond to steroid treatment, but many patients experience frequent relapses, highlighting the urgent need for more fundamental treatment strategies. Through large-scale genome-wide association studies (GWAS) in Japanese pediatric patients, we identified *NPHS1* as a susceptibility gene associated with the onset of the disease. We also found that abnormalities in this gene increase the risk of developing nephrotic syndrome.

Recently, autoantibodies targeting "nephrin," the protein encoded by *NPHS1*, have been implicated in disease onset and relapse, attracting global attention. We have already investigated the prevalence of these anti-nephrin antibodies among Japanese patients and successfully developed a novel staining technique that allows for their rapid detection.

In collaboration with researchers in Korea, we have now launched an international study to conduct similar antibody testing, genetic analyses, and kidney tissue examinations. By comparing data from Japan and Korea, we hope to further elucidate the disease mechanisms and contribute to the development of more effective treatments.

榎本 秀樹 神経分化・再生分野 教授　ENOMOTO Hideki, Div. of Neural Differentiation & Regeneration

この度、CMX国際共同研究短期派遣・招へい事業により、UT Southwestern Medical Centerの尾畑祐樹博士をお招きする機会をいただきました（2025年２月17日～26日）。尾畑氏はDepartments of Immunology and Neuroscienceで研究室を主催するAssistant Professorであり、腸を起点とした生体恒常性維持機構の分野で注目されている若き研究リーダーです。

神戸大学滞在時は、医学研究科の関連研究分野の研究室を訪問し、情報交換とともに共同研究の可能性について議論を行いました。また、2月21日に行われた第11回Neuroscience Network in Kobe Symposiumで招待講演者として最新の成果についてご講演いただきました。シンポジウムでは神経を介した生体恒常性の維持機構の分野で活躍する内外の研究者が先進的な成果を供覧し、活発な議論はシンポジウムおよびその後の懇親会まで続きました。今回の招へいがこの研究領域での国際交流に大きく寄与したことを実感しました。CMXによるサポートに心より感謝申し上げます。

Thanks to the CMX International Collaborative Research Short-Term Invitation Program, we had the opportunity to invite Dr. Yuki Obata from UT Southwestern Medical Center (February 17–26, 2025). Dr. Obata is an Assistant Professor heading a laboratory in the Departments of Immunology and Neuroscience, and is a rising research leader in the field of gut-mediated regulation of bodily homeostasis.

During his stay at Kobe University, Dr. Obata visited several laboratories in related fields within the Graduate School of Medicine, engaging in fruitful exchanges and discussions on potential collaborative research. On February 21, he gave an invited lecture presenting his latest findings at the 11th Neuroscience Network in Kobe Symposium. At the symposium, researchers from Japan and abroad working in the field of neural regulation of homeostasis shared advanced results, and lively discussions continued through to the reception. I truly felt that this invitation significantly contributed to international exchange in this area of research. I sincerely appreciate CMX's support for making this possible.

1．共同研究・受託研究・イノベーションの創出に資する成果
Collaborative and Contract Researches, and Results that Contribute to Iinnovation Creations

区　分 / Category	件　数 / Number of Projects	金 額（千円）※直接経費 Amount (1000yen) ※direct cost
AMED	43件	451,250
JST	22件	278,974
共同 / Collaborative Research	47件	195,162
受託 / Contract Research	43件	16,457
計 / Total	**155件**	**941,843**

2．主要論文一覧
Major Papers

難治性がん　Intractable Cancers

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感染症 × 創薬・医療機器

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脳こころ × AI・デジタルヘルス

Shunsuke Yamanishi, Hiroaki Nagashima, Kazuhiro Tanaka, Takiko Uno, Yusuke Ikeuchi, Hirofumi Iwahashi, Mitsuru Hashiguchi, Shintaro Horii, Tomoo Itoh, Yoshihiro Muragaki, Takashi Sasayama. **Association of preoperative seizures with reduced expression of soluble CD163, an M2 macrophage marker, in the cerebrospinal fluid in isocitrate dehydrogenase wild-type glioblastoma.** *J Neurooncol. 2025 Jan; 171(1):95-103. DOI: 10.1007/s11060-024-04837-6. PMID: 39377994.*

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3．受賞・報道
Awards and Press

■受賞

賞　名	授与機関	授与年月	氏　名
令和６年度科学技術分野の文部科学大臣表彰科学技術賞（開発部門） （業績名）「吸収性スペーサーを用いた体内空間可変粒子線治療の開発」	文部科学省	令和6年4月	佐々木　良平 SASAKI Ryohei 福本　巧 FUKUMOTO Takumi
CINP住友ファーマブレインヘルス基礎研究賞 CINP AsCNP Brain Health Basic Research Award	国際神経精神薬理学会	令和6年5月	古屋敷　智之 FURUYASHIKI Tomoyuki
アジアコンピュータ支援外科学会2024 最高発表賞 ACCAS 2024 best paper award	Asian Conference of Computer-Aided Surgery 2024	令和6年9月	村垣　善浩 MURAGAKI Yoshihiro

■報道

タイトル/内容	媒　体	報 道 月 日	対象者
放送番組「ドクターサロン」 長島型掌蹠角化症	ラジオNIKKEI第一放送	令和6年11月14日	久保　亮治 KUBO Akiharu
「IgG4関連疾患（多様な臓器で発症 指定難病）」	神戸新聞	令和7年1月27日	児玉　裕三 KODAMA Yuzo
「Q 手首に赤い斑 汗孔角化症」	読売新聞	令和7年3月14日朝刊	久保　亮治 KUBO Akiharu

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