大学院統合生命科学研究科

教員要覧 2022

PROFESSORS 2022

広島大学

世界をリードする教育研究拠点を目指して

Striving to become a leading global center of educational and research excellence

研究科長挨拶

Message from the Dean

新しい時代が始まるにあたって、広島大学は従来の概念にとらわれず広い視野をもち、発展・変革し続ける生物学・生命科学の分野で社会に貢献する人材を育成するため、2019年4月「統合生命科学研究科」を創設しました。最近生命科学では大きな変革が起きています。例えば生物の遺伝子がDNAやRNAの配列として解析されてきました。DNAの情報が転写されたRNAはタンパク質を指令し、タンパク質は酵素や細胞制御等の多様な機能を果たしていますが、RNAそれ自身も生命の中核となる様々な機能をもち、またDNAの可塑性やRNAの新機能の発見など生命科学では普遍的な共通機構の元に新しい展開が日々続いています。

これら新しい機構に基づく先端基礎研究もいずれは応用研究に発展し、また応用研究も着実な基礎研究に依っていることになります。そのためには従来の枠組みにとらわれない分野間の融合が必要です。理学、工学、農学、医学の各分野において細分化した生物学・生命科学を有機的に連携し、次代を担う学生が、各専門分野に特化することなくより広い知識と能力を身に付けることができるよう、生物工学、食品生命科学、生物資源科学、生命環境総合科学、基礎生物学、数理生命科学、生命医科学の7つの学位プログラムを一つの専攻として統合した研究科を作りました。

また本研究科は新しく設置された大学院医系科学研究科との連携による生命医科学領域のみならず、人文社会科学系の研究科とも連携し、複合領域や新しい領域で活躍できる若い人が、持続可能な輝かしい未来への発展を導いていくことを期待します。

In April 2019, as Japan embarked on the new era of Reiwa, Hiroshima University launched the Graduate School of Integrated Sciences for Life, with the aim of cultivating human resources capable of seeing the larger picture, thinking outside the box, and contributing to society through the ever-changing and evolving field of biology/life science. The world of life sciences has recently undergone revolutionary changes. For instance, advances in basic research have enabled the genes of organisms to be analyzed as sequences of nucleic acids, a universal feature of living things. RNA is central to cell biology, carrying out a variety of important functions, including the production of proteins such as enzymes, in addition to various regulatory functions. New aspects of DNA and RNA are revealed every year.

Advances in knowledge achieved through basic research can develop over time into applied research, which are founded on constant efforts to pursue new fundamental understanding across disciplines. It is therefore essential to promote interdisciplinary approaches that are not bound by conventional frameworks. The Graduate School of Integrated Sciences for Life offers an integrated course of study that combines seven degree programs-biotechnology, food and agrilife science, bioresource science, life and environmental sciences, basic biology, mathematical and life sciences, and biomedical science-so that today's students, who will be major players in the next generation, can acquire broader knowledge and skills in various science fields, rather than just a specific field of expertise. This is accomplished by having students organically learn biology and life sciences, which are usually fragmented in science, engineering, agricultural science, and medical science.

The Graduate School of Integrated Sciences for Life is also designed to promote coordination with the newly established Graduate School of Biomedical and Health Sciences in the area of medical sciences, and facilitates communication with the humanities and social sciences as well. Our hope and intention is to help young people learn to play leadership roles in new and multidisciplinary research fields, aiming to create a brighter and more sustainable future.

統合生命科学研究科長 Dean, Graduate School of Integrated Sciences for Life

西村 善文 NISHIMURA Yoshifumi

CONTENTS

世界の生命科学を先導する学位プログラム　Programs of Leading Global Life Science

生物工学プログラム　Program of Biotechnology

「生物工学プログラム」では、「バイオと物質科学の融合」による新たな知を創造し、環境保全・環境修復、グリーンエネルギー、健康・長寿など様々な社会的要請を実現するバイオテクノロジー分野のイノベーションの加速化を目指します。このプログラムでは、微生物から高等生物までを含む様々な生物の分子・代謝機能を解明するとともに、異分野との協働の可能性を含めて、その機能を工学的視点から総合的かつ俯瞰的にとらえることにより、グローバル規模での多様な社会的要請に対して柔軟に対応し、迅速な産業応用を可能とする高度職業人を育成します。

The Program of Biotechnology aims to create new knowledge through the merger of bioscience and material science, and thereby accelerate innovation to meet various global social needs, including environmental conservation and remediation, green energy, and health and longevity. This program is designed to produce highly specialized professionals equipped with the ability to elucidate molecular and metabolic functions of various organisms from microorganisms to higher organisms, and also understand research findings comprehensively and interdisciplinarily through a technical and engineering perspective including collaboration with different research fields, thereby respond to diverse social demands on a global scale flexibly through rapid industrial application.

食品生命科学プログラム　Program of Food and AgriLife Science

安全性と機能性に優れた食品を開発するためには、食品科学をはじめ、分子生物学から環境科学に至るまでの基礎および応用生命科学を融合的かつ俯瞰的に理解することが必要です。また食品の高付加価値化を図るとともに、生物圏環境を見据えた食料の安定的かつ持続的な供給を目指すには、食資源を分子・細胞・個体・集団の視点から多角的に捉えることが求められます。「食品生命科学プログラム」では、食品科学・応用生命科学の学問分野をコアとして教育・研究を推進することで、食品開発や人間生活に応用される農業、有用生物の機能解明や開発・生産管理等の分野で貢献できる人材を育成します。

The development of foods superior in safety and functionality requires a holistic and multi-disciplinary approach to basic and applied life science-from food science to molecular biology and environmental science. To create high value-added food products and enable a stable and sustained food supply with an eye toward the biosphere environment, it is necessary to consider food resources from various perspectives-at molecular, cellular, individual and population levels. The Program of Food and AgriLife Science is designed to promote educational and research activities centered on food science and applied life science, and thereby nurture human resources who can play an active role in uncovering the function of beneficial organisms in agriculture, developing such organisms, and controlling their production, so that they can be applied to food development and other aspects of everyday life.

生物資源科学プログラム　Program of Bioresource Science

「生物資源科学プログラム」では、動植物科学と水産海洋学の学問分野をコアとした教育・研究を行います。生物資源である産業動物、植物、そして水域生物は、食料資源として人間生活に必須です。生物資源を持続的に生産するには陸域と水域の生物資源群の相互関係を総合的に理解し、生物圏における多様性と環境調和を維持しなければなりません。本プログラムでは、生物圏を俯瞰した生物資源の機能開発、生産機構の解明、先進技術の開発に係る教育・研究を行い、品質と安全性に優れた食資源の増産および安定的な供給や、自然環境と人間生活の豊かさを向上させるための生物資源の応用等の分野で貢献できる人材を育成します。

The Program of Bioresource Science provides educational and research activities with animal & plant sciences and fisheries & oceanographic sciences as the core. The biological resources of farm animals, plants and aquatic organisms are important food sources for human life. To maintain sustainable yields of biological resources, it is imperative to comprehensively understand the intimate relationships between groups of terrestrial and aquatic biological resources, preserve biodiversity, and achieve harmony with nature. This Program offers learning and research opportunities, from a holistic perspective of the biosphere, in the development of functions of biological resources, the elucidation of production mechanisms, and the development of advanced technology, with the aim of training human resources who can play an active role in increasing the production and securing a stable supply of food resources superior in quality and safety, and in promoting the application of biological resources to protect the natural environment and enrich people's lives.

生命環境総合科学プログラム　Program of Life and Environmental Sciences

「生命環境総合科学プログラム」では、分子レベルから環境・生態までの広い基礎分野と、応用分野としての農学を包含した生命系科学全般への教育を展開するとともに、分野横断型プログラムとして、生命科学の枠を越えた文理融合、学際的な教育・研究を展開します。そして、ミクロ系（分子、ゲノム）、複雑系（脳、共生）、マクロ系（生態、地球表層圏）にわたるバランスの良い教育と、その中の一分野の深い教育・研究、さらに医学、農学、生命工学等の応用分野や社会実装の視点とセンスを涵養することで、総合的・融合的な視野と高い専門性と研究能力を併せ持つ研究者、教育者、分野を超えたリーダーを育成します。

The Program of Life and Environmental Sciences features education that encompasses a wide range of basic fields, from the molecular to ecosystem levels, and education in applied life science in general, including agronomics. Furthermore, the Program provides interdisciplinary educational and research activities that bring together the humanities/arts and sciences, beyond the boundaries of life science. Its well-balanced curriculum covers micro systems (molecules, genomes, etc.), complex systems (brain, symbiosis, etc.) and macro systems (ecosystems, the earth's outer atmosphere, etc.). At the same time, the curriculum is designed for students to develop a high level of specialized knowledge and research capabilities in a specific field. Emphasis is also placed on the development of a multidisciplinary perspective (covering the application fields of medicine, agriculture, and life engineering) and a viewpoint towards social implementation. The Program's objective is to train students as researchers, educators, or multidisciplinary leaders who have holistic perspectives and a high level of specialized knowledge and research abilities.

基礎生物学プログラム
Program of Basic Biology

「基礎生物学プログラム」では、種々の培養細胞やモデル生物、あるいは自然界に自生する動植物を対象にして、ゲノム情報・ゲノム編集・1細胞イメージング・ナノ/マイクロ技術などの最新手法を用いて、生物学の根本的課題の解明をめざす様々な教育・研究が行われており、成果の一部は、すでに医学界・産業界に応用されています。このような経歴を持つ教員陣からなるプログラムでは、学生は生命の謎を解き明かす研究の最前線に加わることができます。これにより、生物学だけでなく幅広い分野の基礎研究から応用研究までシームレスに対応できる人材を育成します。

The Program of Basic Biology provides various educational and research activities aimed at addressing fundamental issues in biology, by applying the latest technologies (genome information, genome editing, single-cell imaging, nanotechnology, microtechnology, etc.) to various cultured cells, model organisms, and animals and plants that grow wild in the world of nature. Some successful results have already been applied to medical science and industry. The education and research provided by experienced faculty members specializing in these research themes provide students the chance to explore the frontiers of the mysteries of life. This Program is designed to develop human resources equipped with the abilities required to engage seamlessly in fundamental and applied research activities in biology and various other fields.

数理生命科学プログラム
Program of Mathematical and Life Sciences

最近の計算科学・データ科学の発展とその諸科学分野への全方面的展開、および生命科学における定量的計測技術の進歩によって、数理科学との協働は生命科学諸分野の研究遂行に不可欠となりつつあります。「数理生命科学プログラム」では、生命・分子・数理科学における幅広い学識と高度な専門性を基に、さらにそれらを融合することにより、新しい学問領域の創成とその教育・研究を目ざします。基礎と応用を包含する幅広い生命科学諸分野と連携することで、世界に類を見ない生命科学の展開を目指し、生命現象を支配する原理を普遍的かつ解析的に捉えることのできる人材を育成します。

Recent decades have seen rapid advances in computing and data science, their wide application to other scientific fields, and the progress of quantitative measurement technology in life science. To respond to such advances, it is imperative for the various life science fields to promote collaboration and cooperation with mathematical science. The Program of Mathematical and Life Sciences aims to create a new academic discipline by merging an extensive knowledge of and advanced expertise in life science, molecular science and mathematical science, and to provide learning and research opportunities in this new academic field. By taking full advantage of synergistic interaction with a wide range of life science-related areas, from the basics to application, this Program is committed to bringing innovation to the life sciences and fostering human resources who can pursue the principles governing life phenomena from a universal and analytical perspective.

生命医科学プログラム
Program of Biomedical Science

超高齢社会を迎えた我が国において、高度先進医療の更なる充実と発展に対する期待は益々高まっています。同時に、基礎生命科学の進展も目覚ましく、それら知見・発見のいち早い臨床応用が求められています。「生命医科学プログラム」では、広島大学の多様な生命科学系・医療科学系教員を結集し、医療科学の現場を意識した基礎生命科学教育を行います。これにより、基礎生命科学から医療科学に渡る広範な生物・生命系研究領域および関連産業分野の知識と研究実践力を習得し、社会的要請に柔軟に対応できる人材を育成します。

As Japan is experiencing a "super-aging" society, the demand for advanced medical care continues to rise. In addition, it is greatly expected that the latest findings of basic life science are rapidly applied to the clinical application. In the Program of Biomedical Science, we bring together various faculty members of Hiroshima University and provide basic life science education from a medical perspective. We aim to develop talented persons who can flexibly respond to social demands with the knowledge and practical research skills acquired from a wide range of biological and life science research fields-from basic life science to medical science-and related industrial fields.

生物工学プログラム｜教員紹介

Program of Biotechnology

秋 庸裕（あき つねひろ） 教授 ／ AKI Tsunehiro Professor

有用**油脂**を生産する**微生物**のゲノム**育種**とその健康食品、化粧品、医薬品、化学品やバイオエネルギー供給への応用展開をめざした研究を行っています。

We are conducting research aimed at genome breeding of microorganisms that produce useful fats and oils and their application to the fields of health foods, health care materials, cosmetics, pharmaceuticals, chemicals, and bioenergy.

keywords: Biorefinery, Biomass, Carbon recycle, Enzyme, Lipid, Microorganism

研究者総覧

1.Improvement of fatty acid productivity of thraustochytrid, *Aurantiochytrium* sp. by genome editing. J. Biosci. Bioeng., 131, 373-380 (2021)
2.Metabolite profile analysis of *Aurantiochytrium limacinum* SR21 grown on acetate-based medium for lipid fermentation. J. Oleo Sci., 68, 541-549 (2019)
3.Isolation of high carotenoid-producing *Aurantiochytrium* sp. mutants and improvement of astaxanthin productivity using metabolic information. J. Oleo Sci., 67, 571-578 (2018)

岡村 好子（おかむら よしこ） 教授 ／ OKAMURA Yoshiko Professor

海洋細菌の多様性と高機能性に注目し、その有用遺伝子利用のための画期的な**遺伝子検出技術・遺伝子合成技術**を開発した。また、生物機能を利用して、廃棄物から**金属結晶合成**や**バイオプラスチック原料生産**も行っている。

We have focused on the diversity and high functionality of marine bacteria, and developed innovative gene detection and gene synthesis technologies in order to utilize their useful genes. In addition, we have studied on metal mineralization, production of biopolymers and chemical building blocks using wastewater and biomass through bioconversion process.

keywords: marine bacteria, RHa-RCA, gene synthesis technology, metal mineralization, biopolymers, chemical building blocks

研究者総覧

1.Screening of Neutrophil Activating Factors from a Metagenome Library of Sponge-Associated Bacteria. Mar. Drugs, 19, 427. (2021)
2.Visualization of gene reciprocity among lactic acid bacteria in yogurt by RNase H-assisted rolling circle amplification - fluorescence in situ hybridization. Microorganisms, 9, 1208. (2021)
3.Direct detection of mRNA expression in microbial cells by fluorescence in situ hybridization using RNase H-assisted rolling circle amplification. Sci.c Rep., 10, 9588. (2020)

加藤 純一（かとう じゅんいち） 教授 ／ KATOU Junichi Professor

微生物の優れた生物機能を活用して**汚染環境の浄化**や、農薬・肥料をなるべく使用しない**環境適合型農業**の確立を図る**環境バイオテクノロジー**の研究を行っている。今注目している生物機能は微生物の物質認識機構である。

I am interested in superior biofunctions and their application to environmental biotechnology and bioproduction of value-added chemicals. I am paying special attention to molecular recognition mechanism of environmental bacteria and its application to establishment of sustainable agriculture.

keywords: environmental biotechnology, applied microbiology, microbe-plant interaction, bioproduction

研究者総覧

1.Characterization of methyl-accepting chemotaxis proteins (MCPs) for amino acids in plant-growth-promoting rhizobacterium *Pseudomonas protegens* CHA0 and enhancement of amino acid chemotaxis by MCP genes overexpression. Biosci. Biotechnol. Biochem. 84:1948-1957 (2020).
2.Identification of boric acid as a novel chemoattractant and elucidation of its chemoreceptor in *Ralstonia pseudosolanacearum* Ps29. Sci. Rep. 7:8609 (2017).
3.Identification of the *mcpA* and *mcpM* Genes, Encoding Methyl-Accepting Proteins Involved in Amino Acid and l-Malate Chemotaxis, and Involvement of McpM-Mediated Chemotaxis in Plant Infection by *Ralstonia pseudosolanacearum* (Formerly *Ralstonia solanacearum* Phylotypes I and III). Appl. Environ. Microbiol. 81:7420-7430 (2015).

研究者総覧

河本 正次（かわもと せいじ） 教授 ／ KAWAMOTO Seiji Professor

健康と医療のバイオテクノロジー:アレルギー発症機構解明と創薬分子標的探索/食と**免疫**による加齢難病制御

My lab focuses on healthcare biotechnology. Ongoing projects are: 1) Immune regulation of age-related disorders, 2) Development of diagnostics and immunotherapeutics for allergy, and 3) Prevention of proinflammatory disorders by food factors.

keywords: allergy, food factors, healthcare biotechnology, immunology

1.Influences of maternal factors over offspring allergies and the application for food allergy. *Front. Immunol*. 10, 1933 (2019)

2.Der f 35: an MD-2-like house dust mite allergen that cross-reacts with Der f 2 and Pso o 2. *Allergy* 72, 1728 (2017)

3.Der f 34, a novel major house dust mite allergen belonging to a highly conserved Rid/YjgF/YER057c/UK114 family of imine deaminases. *J. Biol. Chem.* 291, 21607 (2016)

研究者総覧

黒田 章夫（くろだ あきお） 教授 ／ KURODA Akio Professor

無機固体や有機固体など様々な**界面と結合するペプチド**を選択し、応用すること。具体的には**アスベスト検査**や**エクソソームの単離**、**半導体バイオセンサー**へ展開している。

Creation of new proteins/peptides that bind to inorganic/organic surfaces by evolutionary molecular engineering. For example, we created an asbestos-binding protein and applied it to asbestos detection (biosensing) in environments. We also created a membrane-binding peptide in order to isolate extracellular membrane vesicle (exosome, microvesicles).

keywords: Protein engineering, Evolutionary molecular engineering, Inorganic/organic surfaces, Biosensing, Asbestos, Exosome, Microvesicles

1.Application of peptides with an affinity for phospholipid membranes during the automated purification of extracellular vesicles, Sci. Rep., 10, 18718 (2020)

2.Live-cell imaging of macrophage phagocytosis of asbestos fibers under fluorescence microscopy, Genes Env., 41, 14-25 (2019)

3.Rapid on-site detection of airborne asbestos fibers and potentially hazardous nanomaterials using fluorescence microscopy-based biosensing, Biotechnol J. 11, 757-767 (2016)

研究者総覧

中島田 豊（なかしまだ ゆたか） 教授 ／ NAKASHIMADA Yutaka Professor

カーボンリサイクル社会の実現を目指し、ライフサイクルアセスメントに基づく研究計画を策定し、再生可能資源、および再生可能エネルギーと二酸化炭素を基質とする**バイオリファイナリー**プロセスを開発しています。

Aiming to realize a carbon recycling society, we make research plans based on life cycle assessment and developing several biorefinery processes using biomass, renewable energy and carbon dioxide.

keywords: carbon recycling society, biorefinery, renewable energy

1.Thermophilic ethanol fermentation from lignocellulose hydrolysate by genetically engineered *Moorella thermoacetica*/Bioresour. Technol./2017

2.Semi-continuous methane production from undiluted brown algae using a halophilic marine microbial community/Bioresour. Technol./2016

3.Improved methane fermentation of chicken manure via ammonia removal by biogas recycle/Bioresour. Technol./2010

研究者総覧

水沼 正樹（みずぬま まさき） 教授 ／ MIZUNUMA Masaki Professor

モデル生物（**酵母**と**線虫**）を用いて**寿命メカニズム**の解明に取り組んでいる。特に、代謝産物による老化防止、健康長寿に着目し、その成果を、**医薬**のみならず**食品分野**へと応用展開させることを目的としている。

Using model organisms (yeast and nematode), we are elucidating the mechanism of lifespan. In particular, we focus on the prevention of aging and healthy longevity by metabolites, and aim to apply them not only to medicine but also to the food field.

keywords: S. cerevisiae, C. elegans, aging, lifespan

1.Stimulating *S*-adenosyl-l-methionine synthesis extends lifespan via activation of AMPK. Proc. Natl. Acad. Sci. USA (2016)

2.mTORC2-SGK-1 acts in two environmentally responsive pathways with opposing effects on longevity. Aging Cell (2014)

3.Role of calcineurin and Mpk1 in regulating the onset of mitosis in budding yeast. Nature (1998)

青井 議輝（あおい よしてる） 准教授 ／ AOI Yoshiteru Associate Professor

難培養・未培養微生物の理解・利用を目指して、革新的な**分離培養**手法の開発と未知増殖制御機構（培養できない理由）の解明に取り組んでいます。得られた成果の医薬・環境など幅広い分野への応用展開も図っています。

Most microorganisms in nature are not readily cultivable in the laboratory. This is the biggest impediment for understanding and application of environmental microorganisms. My research focuses on 1) innovations for microbial cultivation, 2) cultivation of uncultivated microorganisms, and 3) puzzling out the mechanism for "microbial uncultivability" of environmental microorganisms.

keywords: uncultivable microorganisms, isolation, microbial dormancy, growth controling network

1.Isolation of sublineage I Nitrospira by a novel cultivation strategy/Environ. Microbiol./2014

2.In Situ Cultivation Allows for Recovery of Bacterial Types Competitive in Their Natural Environment/Microb. Environ./2016

3.Isolation of Microorganisms Using Sub-Micrometer Constrictions/PLOS One/ 2014

研究者総覧

荒川 賢治（あらかわ けんじ） 准教授 ／ ARAKAWA Kenji Associate Professor

放線菌は、多くの有用な**抗生物質**（**二次代謝産物**）を生産する。生化学・有機化学・分子生物学を駆使して、抗生物質の**生合成**遺伝子群を解析・操作し、新規抗生物質の創製や**生産制御機構**の解明などを目指している。

Actinobacteria produces a wide variety of valuable secondary metabolites including antibiotics. Our group focuses on creation of novel bioactive compounds through genetic engineering of their biosynthetic and regulatory genes, using biochemistry, organic chemistry, and molecular biology.

keywords: Biosynthesis, Regulatory gene, Secondary metabolite, Antibiotic, Actinobacteria

1.Functional analysis of P450 monooxygenase SrrO in the biosynthesis of butenolide-type signaling molecules in *Streptomyces rochei*. Biomolecules, 10, 1237 (2020).

2.SrrB, a pseudo-receptor protein, acts as a negative regulator for lankacidin and lankamycin production in *Streptomyces rochei*. Front. Microbiol., 11, 1089 (2020).

3.The genome sequence of *Streptomyces rochei* 7434AN4, which carries a linear chromosome and three characteristic linear plasmids. Sci. Rep., 9, 10973 (2019).

研究者総覧

池田 丈（いけだ たけし） 准教授 ／ IKEDA Takeshi Associate Professor

無機固体である**シリカ**（SiO_2）を細胞内で形成する細菌を発見し、そのメカニズムの解析を進めている。生物のシリカ形成機構を解明し、新たな**バイオ融合マテリアル開発**に応用することを目指している。

My current research focuses on bacterial biosilicification (silica biomineralization), the biological process through which soluble silicic acid, $Si(OH)_4$, is polymerized intracellularly and deposited as insoluble silica, SiO_2. I am also working for the development of new biomaterials by integrating biomolecules with silicon-based materials (including semiconductor devices).

keywords: biosilicification, biomaterial fabrication, silica

1.Bacterial biosilicification: a new insight into the global silicon cycle. Biosci Biotechnol Biochem 85: 1324-1331 (2021)

2.Application of volcanic ash particles for protein affinity purification with a minimized silica-binding tag. J Biosci Bioeng 122: 633-638 (2016)

3.The C-terminal zwitterionic sequence of CotB1 is essential for biosilicification of the *Bacillus cereus* spore coat. J Bacteriol 198: 276-282 (2016)

研究者総覧

北村 憲司（きたむら けんじ） 准教授 ／ KITAMURA Kenji Associate Professor

アミノ酸・オリゴペプチドによる微生物（**酵母**）の生理機能調節について、1）細胞膜**輸送体**の発現・活性制御や基質特異性の研究、2）**増殖阻害**など新規生理作用探索とその作用機構の解明、を調べています。

We investigate how amino acids and oligopeptides regulate physiological function of yeast cells; 1) regulation of amino acid/peptide transporter expression, 2) exploration of novel substrate of transporters, 3) unidentified physiological action of amino acids/dipeptides (e.g. growth inhibition) and its mechanism.

keywords: yeast, amino acid, oligopeptide, transporter, growth inhibtion

1.Critical role of the proton-dependent oligopeptide transporter (POT) in the cellular uptake of the peptidyl nucleoside antibiotic, blasticidin S. Biochim Biophys Acta Mol Cell Res 1864: 393 (2017)

2.Identification of ubiquitin-proteasome system components affecting the degradation of the transcription factor Pap1. Redox Biol 28: 101305 (2020)

3.Inhibition of the Arg/N-end rule pathway-mediated proteolysis by dipeptide-mimetic molecules. Amino Acids 48: 235 (2016)

研究者総覧

田島 誉久（たじま たかひさ） 准教授 ／ TAJIMA Takahisa Associate Professor

バイオ変換を効率的に行う**シンプル酵素触媒**を開発している。中温性酵素を発現させた**低温菌**を中温で熱処理することで宿主の競合反応を抑え、有用物質が高生産される。これまでに**ポリマー素材**の**高収率生産**を実現した。

My research interest is bioconversion using various kinds of enzymes. We have developed psychrophile-based simple biocatalysts (PSCats)to conduct efficient conversions. PSCats can produce the valuable compounds with high yields only by thermostable enzymes, which are heterologously expressed in psychrophilic cells whose metabolism is suppressed by heat treatment.

keywords: Efficient bioconversion, Simple biocatalyst, Psychrophilic bacteria

1.Unexpectedly high thermostability of an NADP-dependent malic enzyme from a psychrophilic bacterium, *Shewanella livingstonensis* Ac10, J Biosci Bioeng, 132:445-450(2021)

2.Accelerating itaconic acid production by increasing membrane permeability of whole-cell biocatalyst based on a psychrophilic bacterium *Shewanella livingstonensis* Ac10, J Biotechnol, 312:56-62(2020)

3.Efficient production of 1,3-propanediol by psychrophile-based simple biocatalysts in *Shewanella livingstonensis* Ac10 and *Shewanella frigidimarina* DSM 12253, J Biotechnol, 323:293-301(2020)

研究者総覧

中ノ 三弥子（なかの みやこ） 准教授 ／ NAKANO Miyako Associate Professor

タンパク質翻訳後修飾の1つである**糖鎖**付加は、細菌やウイルスなどの病原体の感染、癌化、薬物耐性獲得などに関わっている。これらの生物学的な機序を**質量分析**装置などを用いた糖鎖**構造解析**法により解明する。

Glycosylation, which is one of the posttranslational modifications of proteins, is involved in infection by pathogens such as bacteria and viruses, cancer and acquisition of drug-resistance. We investigate these biological mechanisms with detailed analysis of glycan structures by mass spectrometry.

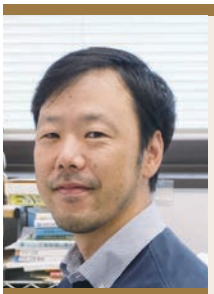
keywords: glycan, mass spectromery, biomarker

1.Structural analysis of the GPI glycan. PLoS One. 16 (9) :e0257435 (2021)

2.MALDI-TOF mass spectrometry imaging for N-glycans on FFPE tissue sections of mouse NASH liver through Sialic acid Benzylamidation. Glycoconj J. 38 (2) :167-175 (2021)

3.Rab11-mediated post-Golgi transport of the sialyltransferase ST3GAL4 suggests a new mechanism for regulating glycosylation. J Biol Chem. 296 :100354 (2021)

研究者総覧



廣田 隆一（ひろた りゅういち） 准教授 ／ HIROTA Ryuichi Associate Professor

生命の必須元素である**「リン」の代謝メカニズム**と、その生物循環における役割を研究している。また、これらの知見を、**リン資源の有効活用**、**効率的な物質生産**や**バイオセーフティ技術**に応用する研究も展開している。

We are interested in the phosphorus metabolism of microorganisms and their contribution to global phosphorus cycling in terrestrial and aquatic environments. Based on the obtained knowledge in combination with synthetic biology, we are developing novel environmental biotechnologies for phosphorous resource management and bacterial cell growth control for biosafety measures.

keywords: phosphate, phosphorous cycling, bacteria, cyanobacteria, environmental biotechnology, synthetic biology, biosafety

1.Synthetic phosphorus metabolic pathway for biosafety and contamination management of cyanobacterial cultivation. ACS Synth. Biol. 7(9): 2189-2198 (2018)

2.A novel biocontainment strategy makes bacterial growth and survival dependent on phosphite. Sci. Rep. 7:44748 (2017)

3.Bacterial phosphate metabolism and its application to phosphorus recovery and industrial bioprocesses. J. Biosci. Bioeng. 109:423-432 (2010)

研究者総覧

藤江 誠（ふじえ まこと） 准教授 ／ FUJIE Makoto Associate Professor

バクテリアやファージ等の微生物と植物の相互作用の研究を行い、病害防除への応用を目指しています。また、有用物質を生産するために、**微細藻類**の**ゲノム編集**技術を開発しています。

We are studying the interaction of microorganisms, such as bacteria and phages, with plants, with the aim of applying them to disease control. We are also developing genome editing technology for algae to produce useful substances, such as biodiesel or EPA.

keywords: algae, microorgnisms, biodiesel, genome-editing

1.Zepp, a LINE-like retrotransposon accumulated in the Chlorella telomeric region. EMBO J. 16:3715-3723. (1997)

2.The involvement of a cysteine proteinase in the nodule development in Chinese milk vetch infected with Mesorhizobium huakuii subsp. rengei. Plant Physiology.124: 1087-1095. (2000)

3.Monitoring growth and movement of Ralstonia solanacearum cells harboring plasmid pRSS12 derived from bacteriophage ϕRSS1. J. Biosci. Bioeng., 109. 153 – 158. (2010).

研究者総覧

研究者総覧

舟橋 久景（ふなばし ひさかげ） 准教授 / FUNABASHI Hisakage Associate Professor

生体分子や生細胞を機能性材料として捉え、**バイオデバイス**としての活用法を開拓する。タンパク質、核酸などを利用した**バイオセンシング分子**開発や、**生細胞応答測定法**、**生細胞機能制御法**の開発などを行っている。

Our research focuses on the utilization of biomolecules and living cells as functional materials to create biodevices. We are developing novel functional molecules such as biosensing molecules with proteins or nucleic acids. We are also exploring new methods to create, evaluate, and manipulate functional living cells.

keywords: Biodevices, Biosensensing molecules, Cellular devices

1.Insulin sensor cells for the analysis of insulin secretion responses in single living pancreatic β cells, Analyst, 144, 3765-3772, 2019

2.Continuous monitoring of specific mRNA expression responses with a FRET-based DNA nano-tweezer technique that does not require gene recombination, Analytical Chemistry, 88, 7894-7898, 2016

3.A split G-quadruplex-based DNA nano-tweezers structure as a signal-transducing molecule for the homogeneous detection of specific nucleic acids, Biosensors & Bioelectronics, 74, 222-226, 2015

研究者総覧

石田 丈典（いしだ たけのり） 講師 / ISHIDA Takenori Associate Professor or Lecturer

生体分子（**ペプチド**など）と固体表面との**界面**を制御して、バイオと異分野を繋ぐ研究を進めている。脂質二重層という有機的界面とペプチドとの相互作用を利用し、**エクソソーム**の精製技術の開発や研究を行っている。

My research connects biotechnology and different fields using biomolecules that interact with the surface of inorganic (asbestos) or organic (lipid bilayer). Recently, we are developing peptides that bind to the lipid bilayer of exosomes, which has the potential to be used in regenerative medicine, and applied it to exosome purification.

keywords: Peptides, Binding peptides, Asbestos, Exosome

1.Application of peptides with an affinity for phospholipid membranes during the automated purification of extracellular vesicles. Sci Rep . 10:18718 (2020)

2.Live-cell imaging of macrophage phagocytosis of asbestos fibers under fluorescence microscopy. Genes Environ. 41:14 (2019)

3.Rapid on-site detection of airborne asbestos fibers and potentially hazardous nanomaterials using fluorescence microscopy-based biosensing. Biotechnol J . 11:757 (2016)

研究者総覧

加藤 節（かとう せつ） 助教 / KATO Setsu Assistant Professor

微生物細胞はどのようにして生存のための恒常性を維持し、そしてどのような過程を経て死滅するのでしょうか。細胞の**生と死の境界**がどこにあるのかを知るため、**1細胞観察**と定量解析を組み合わせて研究しています。

How do microbial cells maintain cellular homeostasis for proliferation? Which kind of processes do they go through when they die? We aim to clarify the boundary of life and death and find the principles of life. These findings will help us to create useful host cells for bioprocess.

keywords: Microbial cells, single-cell observation

1.A constant size extension drives bacterial cell size homeostasis., Cell, 159: 1433-1446, 2014

2.Spatial self-organization resolves conflicts between individuality and collective migration., Nat Commun., 9:2177, 2018

3.Cyclic di-GMP differentially tunes a bacterial flagellar motor through a novel class of CheY-like regulators., eLife, 6: e28842, 2017

研究者総覧

緋田 安希子（ひだ あきこ） 助教 / HIDA Akiko Assistant Professor

環境中での細菌の挙動（病原菌の植物感染など）を制御するために、**細菌運動性**における**物質認識**に着目している。病原菌が植物根から分泌される特定の物質を目印にして植物体を探索し移動することを見出してきた。

Studies on mechanism of chemical recognition involved in directional motility of environmental bacteria and its roles in biological interactions such as infection and symbiosis, and its applications to biotechnology.

keywords: bacteria, motility, plant pathogen

1.Chemotactic disruption as a method to control bacterial wilt caused by *Ralstonia pseudosolanacearum*. Biosci Biotech Biochem (2020)

2.Identification of boric acid as a novel chemoattractant and elucidation of its chemoreceptor in *Ralstonia pseudosolanacearum* Ps29. Sci Rep (2017)

3.Identification of the *mcpA* and *mcpM* genes, encoding methyl-accepting proteins involved in amino acid and L-malate chemotaxis, and involvement of McpM-mediated chemotaxis in plant infection by *Ralstonia pseudosolanacearum* (formerly *Ralstonia solanacearum* phylotype I and III). App Environ Microbiol (2015)

赤尾 健（あかお たけし） 客員教授 / AKAO Takeshi Visiting Professor

醸造用酵母の**菌株の個性の評価**、**醸造特性予測**、**維持管理**を目的とし、変異・系統解析、**醸造特性**（高発酵、香味生成）の機構解析、**遺伝子マッピング**系の開発などの応用ゲノミクス及び遺伝学を展開しています。

We study about industrial yeast for sake and shochu making, based on applied genomics and genetics. For the purpose of characteristic evaluation, property predition, and maintenance of the strains, we advance phylogenetic study, molecular biology of fermentation, stress responses and flavor compound, as well as development of genetic mapping systems.

keywords: sake yeast, genomics, genetics, brewing characteristics

所属

独立行政法人
酒類総合研究所

National Research Institute of Brewing

1.Development of sake yeast haploid set with diverse brewing properties using sake yeast strain Hiroshima no. 6 exhibiting sexual reproduction/J. Biosci. Bioeng./2020

2.A loss-of-function mutation in the PAS kinase Rim15p is related to defective quiescence entry and high fermentation rates in Saccharomyces cerevisiae sake yeast strains/Appl. Environ. Microbiol./2012

3.Whole-genome sequencing of sake yeast Saccharomyces cerevisiae Kyokai no. 7/DNA Res./2011

磯谷 敦子（いそがい あつこ） 客員教授 / ISOGAI Atsuko Visiting Professor

酒類の**香気成分**に関する研究を行っています。**清酒**や**焼酎**のフレーバーに関わる成分の探索、その生成機構の解明や制御方法の開発に取り組んでいます。

The main research theme is aroma of alcoholic beverages. We try to clarify the components responsible for the aroma of Japanese sake and Shochu, elucidate their formation mechanism, and develop the techniques for controlling them.

keywords: Sake, Shochu, Aroma

所属

独立行政法人
酒類総合研究所

National Research Institute of Brewing

1.Construction of sake yeast with low production of dimethyl trisulfide (DMTS) precursor by a self-cloning method, J. Biosci. Bioeng., 2018

2.Study for practical application of supported gold nanoparticles for removal of DMTS responsible for hineka in sake, J. Brew. Soc. Jpn. (2019)

3.Aroma Compounds responsible for the “spicy/4VG” character of sake submitted to Sake Contests, J. Brew. Soc. Jpn. (2016)

岩下 和裕（いわした かずひろ） 客員教授 / IWASHITA Kazuhiro Visiting Professor

人間の感性はとても複雑で、それに挑むのが醸造研究です。原料から麹菌、酵母、日本酒そのもの、さらに人間の感性まで全ての研究が必要で、この広大な世界に**ゲノム**、**メタボローム**、**AI**を使って挑戦をしています。

The essence of brewing study is to challenge to the complicate human sensory and perception. All studies about raw materials, Koji-fungi, yeast, chemistry of sake, and human sensitivity are required. We explore this deep world using genomics and metabolomics, with the support of artificial intelligence.

keywords: Taste, Brewing science, Genomics, metabolomics, artificial intelligence

所属

独立行政法人
酒類総合研究所

National Research Institute of Brewing

1.Investigation of relationship between sake-making parameters and sake metabolites using a newly developed sake metabolome analysis method/ J. Biosci. Bioeng./2019

2.Effect of koji starter on metabolites in Japanese alcoholic beverage sake made from the sake rice Koshitanrei/ Biosci. Biotechnol. Biochem./2020

3.Analysis of metabolites in Japanese alcoholic beverage sake made from the sake rice Koshitanrei/Biosci. Biotechnol. Biochem./2019

北本 大（きたもと だい） 客員教授 / KITAMOTO Dai Visiting Professor

再生可能資源からの機能性学品の製造、および機能利用技術に注目している。特に、微生物が生産する**バイオ界面活性剤**について、**発酵プロセス**、物性・機能解析、化粧品・日用品等への用途開拓を進めている。

We are focusing on the development of functional chemicals using renewable resources. Especially, we are promoting the microbial production of bio-based surfactants and their application in daily necessities and cosmetics.

keywords: Bio-based chemicals, biosurfactant, biopolymer, fermentation process, yeast, cosmetics

所属

国立研究開発法人
産業技術総合研究所

National Institute of Advanced Industrial Science and Technology

1.Mannosylerythritol lipids: Production and Applications, J. Oleo Sci., 64, 133 (2015)

所 属

国立研究開発法人
産業技術総合研究所

National Institute of
Advanced Industrial
Science and Technology

藤井 達也（ふじい たつや） 客員准教授 ／ FUJII Tatsuya Visiting Associate Professor

カビや**酵母**等の**真核微生物**を中心に、これらが示す多彩な表現型（有用物質高生産性、各種ストレス耐性など）のメカニズムを分子レベルで解明し、**再生可能資源**の有効利用に役立てることを目指しています。

To use filamentous fungi and yeasts effectively, we aim to reveal the mechanisms of their various phenotypes such as high-productivity of useful materials and high stress tolerance.

keywords: filamentous fungus, yeast, renewable resources

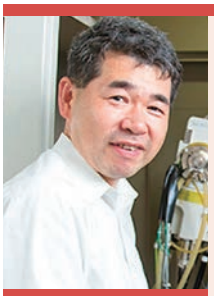
1.The Putative Transcription Factor Gene thaB Regulates Cellulase and Xylanase Production at the Enzymatic and Transcriptional Level in the Fungus *Talaromyces cellulolyticus*. Appl Biochem Biotechnol.（2020）

2.Identification and characterization of a GH30-7 endoxylanase C from the filamentous fungus *Talaromyces cellulolyticus*. Appl Environ Microbiol.（2019）

3.Short-chain ketone production by engineered polyketide synthases in *Streptomyces albus*. Nat Commun.（2018）

食品生命科学プログラム｜教員紹介

Program of Food and AgriLife Science



上野 聡（うえの さとる） 教授 ／ UENO Satoru Professor

チョコレートや**マーガリン**などの**食用固体脂**やマヨネーズ・牛乳などの**エマルション**中の**油脂の結晶化・油脂の結晶構造**の解明。これらの結晶化・結晶構造と食用固体脂などの**おいしさ**との関連性についても調べている。

Clarification of crystallization and crystal structure for edible solid fats such as chocolate and margarine, and emulsion system such as mayonnaise. We are also studying the relationship between these crystallization and/or crystal structure and deliciousness of edible solid fats.

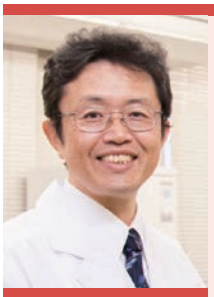
keywords: crystallization, triacylglycerol, ultrasound stimulation, fats, polymorphic crystallization, crystallization, W/O)", winter adaptation, triacylglycero

1.Synchrotron radiation microbeam X-ray analysis of microstructures and the polymorphic transformation of spherulite crystals of trilaurin/ Cryst. Growth Design/2008

2.In-situ studies of ultrasound-stimulated fat crystallisation using synchrotron radiation/J. Phys. Chem. B/2003

3.Fat Bloom Caused by Partial De-Oiling on Chocolate Surfaces after High-Temperature Exposure/J. Am. Oil Chem. Soc./2021

研究者総覧



太田 伸二（おおた しんじ） 教授 ／ OHTA Shinji Professor

海洋生物や**植物**、**昆虫**が生産する新規**生理活性物質**の構造や機能について研究を行っており、新たな抗がん剤、難治性神経変成症治療薬、糖尿病改善薬候補となりうる医薬リード化合物等の開発を目指しています。

My research is to elucidate the structure and function of biologically active compounds derived from marine organisms, plants, and insects. I am aiming to develop new anti-cancer agents, therapeutic agents for intractable neurodegenerative diseases, and drug lead compounds that can be candidates for diabetes improving agents.

keywords: marine sponge, plant, insect, biologically active compound

1.Janohigenins: Long-chain anacardic acid derivatives with neuroprotective activity from Ophiopogon japonicus seeds. Phytochemistry, 191, 112904（2021）

2.Asaroidoxazines from the roots of Asarum asaroides induce apoptosis in human neuroblastoma cells. J. Nat. Prod., 83, 3050（2020）

3.Rare sulfated purine alkaloid glycosides from Bruchidius dorsalis pupal case. Phytochem. Lett., 35, 10（2020）

研究者総覧

川井 清司（かわい きよし） 教授 ／ KAWAI Kiyoshi Professor

食品や生物材料の物理的性状変化（**結晶化**、**融解**、**ガラス-ラバー転移**、**複合体形成**など）を**熱分析**や**レオロジー**測定などを通じて解明し、食品の**加工**性、**保存**性、美味しさ（特に**食感**）、消化性などの設計に役立てる。

To improve and control food processing, preservation, and texture, thermal and rheological property changes（crystallization, melting, glass to rubber transition, and complex formation）of foods and biomaterials are investigated. For example, frozen foods, freeze-dried foods, starch and starchy foods, powders, and lactic acid bacteria are employed as the samples.

keywords: Food processing, Preservation, Texture, Thermal property, Rheological property

1.Effect of sugar composition on the water sorption and softening properties of cookie. Food Chem, 145, 772-776: 2014.

2.Effect of stepwise baking without starch melting on the macroscopic structure, browning, texture, and in vitro starch digestibility of cookie. Food Sci Technol, 66: 384-389, 2016.

3.Effect of glass transition on the hardness of a thermally compressed soup solid. J Food Eng, 247: 38-44, 2019.

研究者総覧

三本木 至宏（さんぼんぎ よしひろ） 教授 ／ SAMBONGI Yoshihiro Professor

微生物の**エネルギー代謝タンパク質**の構造と機能を解明し、生命が生きるための仕組みを知る。エネルギー代謝のひとつである**発酵現象**にも着目し、基礎的な知見を食品産業にも貢献する。

Clarifying the structure and function of proteins required for microbial energy metabolism, thereby learning the mechanism for organisms to live. Also focusing on the fermentation process as a form of energy metabolism, hoping to leverage basic findings in the food industry.

keywords: Energy metabolism protein, Fermentation

1.Expression of two glutamate decarboxylase genes in Lactobacillus brevis. Biosci Biotech Biochem 84:1069-1072.（2020）

2.Response of neutrophilic Shewanella violacea to acid stress: Growth rate, organic acid production, and gene expression. Extremophiles 23:319-326.（2019）

3.Stability of cytochromes c' from psychrophilic and piezophilic Shewanella species: Implications for complex multiple adaptation to low temperature and high hydrostatic pressure. Extremophiles 23:239-248.（2019）

研究者総覧

生物資源科学プログラム兼任（Concurrent post: Bioresource Science）

島田 昌之（しまだ まさゆき） 教授 ／ SHIMADA Masayuki Professor

哺乳類の雌雄の**生殖**機構、特に精巣と卵巣機能の解明を分子生物学的、**分子内分泌学**的に行っている。そして、得られた基礎研究成果を**不妊治療**への応用と**家畜繁殖技術**開発へと展開する**トランスレーショナル研究**を実施している。

My special field is the reproductive biology to clear the testis and ovarian function from the viewpoints of molecular biology and molecular endocrinology. I'm doing the translational study from the basic research to be contributed for the infertility care and animal reproductive technology.

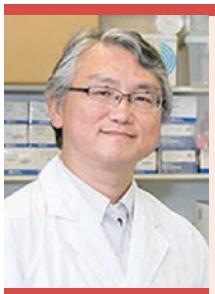
keywords: Reproductive aging, Senescent cell, Epigenetic regulation, Fibrosis, Metabolomic activity

1.ERK1/2 in ovarian granulosa cells are critical for female fertility. Science, 324; 938-941.（2009）

2.Activation of Toll-like receptor 7/8 encoded by the X chromosome alters sperm motility and provides a novel simple technology for sexing sperm. PLoS Biol 17:e3000398.（2019）

3.A simple sperm-sexing method that activates TLR7/8 on X sperm for the efficient production of sexed mouse or cattle embryos. Nat Protoc 15:2645-2667.（2020）

研究者総覧



島本 整（しまもと ただし） 教授 ／ SHIMAMOTO Tadashi Professor

食品衛生の観点から、ビブリオ属細菌など**食中毒細菌**の病原性関連遺伝子の解析、**可動性遺伝因子**を介した**薬剤耐性遺伝子**の細菌間伝播のメカニズム解析および**ノロウイルス**失活法と消毒剤の開発などの研究を行っている。

From the viewpoint of food safety, we are conducting research on the analysis of virulence-related genes of foodborne pathogenic bacteria such as Vibrio spp. and the mechanism of inter-bacterial transmission of antimicrobial resistance genes via mobile genetic elements, as well as the development of norovirus inactivation methods and anti-noroviral disinfectants.

keywords: foodborne pathogenic bacteria, virulence-related genes, antimicrobial resistance genes, mobile genetic elements, norovirus

1.First report of foodborne *Klebsiella pneumoniae* coharboring bla_{VIM-1}, bla_{NDM-1}, and *mcr-9*. Antimicrob. Agents Chemother. 64:e00882-20.（2020）

2.Antiviral effects of persimmon extract on human norovirus and its surrogate, bacteriophage MS2. J. Food Sci. 79:M941-M946.（2014）

3.A novel retron of *Vibrio parahaemolyticus* is closely related to retron-Vc95 of *Vibrio cholerae*. J. Microbiol. 51:323-328.（2013）

研究者総覧

鈴木 卓弥（すずき たくや） 教授 ／ SUZUKI Takuya Professor

腸管機能の破綻が様々な慢性疾患に関わることがわかってきており、疾病予防のターゲットとして注目されている。腸管機能を調節する**食品成分**とその作用機序を探索し、人の**健康増進**に寄与する研究を行っている。

Defects in the intestinal barrier increase the penetration of luminal inflammatory molecules into the intestinal mucosa and are closely associated with both intestinal and extra-intestinal diseases. Our research group investigates the roles of food factors and nutrients in regulation of intestinal barrier and inflammation and explores their therapeutic potentials.

keywords: Dietary fibers, Polyphenols, Intestinal barrier, Microbiota, Tight junction

1.Bioactive factors secreted by Bifidobacterium breve B-3 enhance barrier function in human intestinal Caco-2 cells. Benef Microbes 10: 89（2019）

2.Exopolysaccharides from Leuconostoc mesenteroides attenuate chronic kidney disease in mice by protecting the intestinal barrier. J Functional Foods 52: 276（2019）

3.Dietary Fermentable Fibers Attenuate Chronic Kidney Disease in Mice by Protecting the Intestinal Barrier. J Nutr 148: 552（2018）

研究者総覧

中江 進（なかえ すすむ） 教授 ／ NAKAE Susumu Professor

アレルギー疾患などの慢性炎症疾患に関わる遺伝子の探索、その**遺伝子改編マウス**の作成、および利用により、その遺伝子が疾患の発症にどのように関わるのか、個体・細胞・分子レベルでの解明に取り組んでいます。

Based on the search results for genes involved in acute and chronic inflammatory diseases such as allergy and autoimmunity, our purpose is to elucidate how those genes are involved in the development of such diseases using the mouse models.

keywords: immunology, allergy, autoimmunity, mouse disease model, cytokine

研究者総覧

1.IL-25 exacerbates autoimmune aortitis in IL-1 receptor antagonist-deficient mice. Sci Rep. 9:17067（2019）

2.IL-25 enhances TH17 cell-mediated contact dermatitis by promoting IL-1β production by dermal dendritic cells. J Allergy Clin Immunol. 142:1500-1509（2018）

3.An Interleukin-33-Mast Cell-Interleukin-2 Axis Suppresses Papain-Induced Allergic Inflammation by Promoting Regulatory T Cell Numbers. Immunity. 43:175-186（2015）

長沼 毅（ながぬま たけし） 教授 ／ NAGANUMA Takeshi Professor

応用環境生命科学と称して、深海・地底・火山・南極などの**極限環境**や一般環境の生物の特徴を調べ、その応用の方向性を研究しています。また、**地球外生命**の存在や人間の宇宙進出の可能性も検討しています。

The Applied Environmental Life Science Lab investigates characteristics of lives in extreme environments such as deep sea, deep subsurface, volcanoes and Antarctica as well as in non-extreme environments, and seeks their applicability directions. Possibilities of extraterrestrial lives and human habitations in outer space are also studied.

keywords: Extreme environment, Extraterrestrial life

研究者総覧

1.Enhanced bacterial growth and gene expression of D-amino acid dehydrogenase with D-glutamate as the sole carbon source. Front. Microbiol. 9, 2097（2018）

2.*Oligoflexus tunisiensis* gen. nov., sp. nov., a Gram-negative, aerobic, filamentous bacterium of a novel proteobacterial lineage, and description of *Oligoflexaceae* fam. nov., *Oligoflexales* ord. nov. and *Oligoflexia* classis nov. Intl. J. Syst. Evol. Microbiol. 64, 3353-3359（2015）

3.Phylotype diversity of deep-sea hydrothermal vent prokaryotes trapped by 0.2- and 0.1-μm-pore-size filters. Extremophiles 11, 637-646（2007）

西堀 正英（にしぼり まさひで） 教授 ／ NISHIBORI Masahide Professor

ゲノムDNA情報を基に世界の家畜（ラクダ、ブタ、ニワトリ等）の**起源や伝播の歴史**を解き明かし、それら**動物の遺伝的多様性**を明らかにするとともに、**メタゲノム**や**環境DNA解析**で**動物生態**を**遺伝学**的に解き明かす。

Our goals are to cralify the history of origin and transmission of livestock（camels, pigs, chickens, etc.）in the world based on genomic DNA information, to clarify genetic diversity of those animals, and genetically elucidate animal ecology through metagenomics and environmental DNA analysis.

keywords: genomic DNA, genetic diversity, metagenomics, livestock

研究者総覧

1.Unraveling the history of the genus *Gallus* through whole genome sequencing. Mol Phylogenet Evol, 2020.107044（2021）

2.The complete mitochondrial genome of the Japanese rock ptarmigan（Lagopus muta japonica Clark, 1907）. Mitochondrial DNA Part B, 5:1648-1649.（2020）

3.Phylogenetic Studies on Red Junglefowl（*Gallus gallus*）and Native Chicken（*Gallus gallus domesticus*）in Samar Island, Philippines using the Mitochondrial DNA D-Loop Region. J Poult Sci, 56:237-244.（2019）

羽倉 義雄（はぐら よしお） 教授 ／ HAGURA Yoshio Professor

電気物性を利用した食品の製造工程の計測、食品の**材料力学物性**および**テクスチャー**の評価、低温材料力学物性を利用した食品の**機械加工**（凍結粉砕による組織分離、凍結切断）に関する基礎研究と技術開発を行っている。

Both basic and applied research in the Food Engineering is conducted. Particularly, we focus on the following main topics: Measurement of the food manufacturing process using electrical properties, Measurement and evaluation of mechanical properties of foods, including texture, and Mechanical processing of food using low-temperature mechanical properties（e.g., cryo-cutting, cryo-shattering）.

keywords: food manufacturing process, electrical properties, mechanical properties, texture, mechanical processing of food, low-temperature

研究者総覧

1.Nondestructive determination of the rheological properties of liquid food in sealed retort pouches. J. Food Process Preserv, 42: e13651.（2018）

2.Estimation of Hardness of Cooked Rice during Retort Sterilization by Electric Impedance Measurement. Journal of The Japanese Society for Food Science and Technology,66:469（2019）

3.Influence of physical properties on the taste and flavor of strawberry jam. J Texture Stud, e12582.（2021）

研究者総覧

細野 賢治（ほその けんじ） 教授 / HOSONO Kenji Professor

持続的な食料資源の確保と**フード・チェーン**の構造について、社会経済農学の視点から研究している。**フード・チェーンの構造**と**メカニズム**、構成する各主体における**マーケティング戦略**を検討してきた。

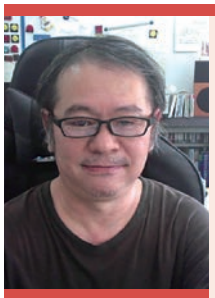
I study food value chain and develop methods of securing sustainable food and resource, from the viewpoint of Socio-economic Agricultural Science. I have studied the structure and mechanism of food value chain, and developed the strategies of food marketing and rural promotion.

keywords: food value chain, food marketing, agricultural structure and mechanism, rural promotion

1.Competitive Advantage Factors in Vertically Diversified Brand Chicken Business: A Partial Value Chain Analysis of a Japanese Poultry Wholesaler, Japan Agricultural Research Quarterly, 54: 327-333.（2020）

2.Constructing the Value Chain for Promotion of Lemon Production in Hiroshima Prefecture, Japan, Agricultural Marketing Journal of Japan, 27: 46-53.（2018）

3.Existence Conditions of Rural Community Business, Journal of Rural Economics, 91: 23-28.（2019）



研究者総覧

堀内 浩幸（ほりうち ひろゆき） 教授 / HORIUCHI Hiroyuki Professor

ニワトリ幹細胞の基礎研究を行い、ここに**ゲノム編集技術**を融合させて様々な研究を展開しています。例えば**性決定機構**、**生殖細胞運命決定機構**、**鳥インフルエンザの宿主応答**、**鶏卵**の**アレルゲンノックアウト・バイオリアクター化**など。また**ニワトリ抗体**を認知症や慢性疾患の**検知技術**に活用する研究も行っています。

Basic research area: Avian stem cell biology, Avian immunobiology, Avian embryogenesis. Applied research area: Production of genetic-modified and genome editing domestic poultry. Study on elucidation of sex determination in chickens, highly pathogenic avian influenza (HPAIV), and development of useful chicken and/or mouse monoclonal antibodies (mAbs).

keywords: genome editing, sex determination, HPAIV, mAbs

1.Prion protein signaling induces M2 macrophage polarization and protects from lethal influenza infection in mice. PLOS Pathog. 1008823（2020）

2.An improved protocol for stable and efficient culturing of chicken primordial germ cells using small-molecule inhibitors. Cytotechnology 72:397-405（2020）

3.Comparison of sex determination mechanism of germ cells between birds and fish: Cloning and expression analyses of chicken forkhead box L3-like gene. Dev. Dyn. 248:826-836（2019）

研究者総覧

矢中 規之（やなか のりゆき） 教授 / YANAKA Noriyuki Professor

食の欧米化に伴い肥満や糖尿病などの**生活習慣病**が大きな社会問題となっています。これら疾病を予防する**栄養素**や**食品成分**に着目し、新たな生理機能の発見、および**作用メカニズムの解明**を目指しています。

A number of people who have obesity, diabetes, and cancers has been increasing with westernization of meal, and it has become a big social problem. We are trying to elucidate nutrients and food factors preventing these illnesses at molecular and genetic levels by using new gene knockout mice.

keywords: food, nutrients, obesity, diabetes

1.The serum amyloid A3 promoter-driven luciferase reporter mice is a valuable tool to image early renal fibrosis development and shows the therapeutic effect of glucosyl-hesperidin treatment. Sci. Rep. 9:14101.（2019）

2.Serum amyloid A3 gene expression in adipocytes is an indicator of the interaction with macrophages. Sci. Rep. 6:38697.（2016）

3.New members of the mammalian glycerophosphodiester phosphodiesterase family: GDE4 and GDE7 produce lysophosphatidic acid by lysophospholipase D activity. J. Biol. Chem. 290:4260-4271.（2015）

研究者総覧

大村 尚（おおむら ひさし） 准教授 / OOMURA Hisashi Associate Professor

鱗翅目昆虫**チョウ**を材料に**化学生態学**を研究している。産卵や交尾など特定の行動を制御する**情報化学物質**（**フェロモン**や**アレロケミカル**）の構造や機能を調べるとともに、その生態学的・進化学的意義を考察する。

Chemical ecology is the interdisciplinary research field to understand the origin, function, and significance of natural products that mediate biological interactions in ecosystem. Using butterflies, I aim to discover bioactive compounds involved in their mating, oviposition, and defense against predation, and to apply these chemicals to crop protection.

keywords: Semiochemical, Pheromone, Allelochemical, Butterfly, Plant, Bioassay, Organic Chemistry, Behavior, Chemical sense, Evolution, Speciation, Chemotaxonomy

1.The male swallowtail butterfly, *Papilio polytes*, uses cuticular hydrocarbons for mate discrimination. Anim Behav 170:133-145.（2020）

2.A cyanogenic glucoside of Trifolium repens deters oviposition by the common grass yellow *Eurema mandarina*. Physiol Entomol 44:222-229.（2019）

3.The role of *N,N,N*-trimethylglycine in oviposition of *Eurema mandarina* on *Albizia julibrissin*. J Chem Ecol 45:371-377.（2019）

沖中 泰（おきなか やすし） 准教授 ／ OKINAKA Yasushi Associate Professor

魚介類の増養殖において魚病による経済的損失は世界的に大きな問題である。**魚病**を抜本的にコントロールする方法を開発するため、その土台となる魚類病原体の宿主への**感染機構の解明**を分子生物学的に進めている。

Fish diseases have caused significant economic losses to the global aquaculture industry. In order to develop a method to control fish diseases drastically, we are investigating host-pathogen interactions in molecular biological aspects.

keywords: fish diseases, host-pathogen interactions

1.Identification of RNA regions that determine temperature sensitivity in betanodaviruses. Arch. Virol. 155: 1597-1606.（2010）
2.Comparisons among the complete genomes of four betanodavirus genotypes. Dis. Aquat. Org. 80: 113-121.（2008）
3.Betanodavirus infection in the freshwater model fish medaka（*Oryzias latipes*）. J. Gen. Virol. 87: 2333-2339.（2006）

研究者総覧

国吉 久人（くによし ひさと） 准教授 ／ KUNIYOSHI Hisato Associate Professor

クラゲの生活環における無性世代（ポリプ）から有性世代（クラゲ）への**変態**に興味を持ち、その分子メカニズムを解明するために、**分子生物学**と**生物有機化学**の2つの手法を用いて研究を進めている。

I am interested in the metamorphosis from asexual stage (polyps) to sexual stage (jellyfish) in the life cycle of jellyfish, and I am studying the molecular mechanisms of metamorphosis in the moon jellyfish using techniques from organic chemistry and molecular biology.

keywords: jellyfish, metamorphosis, bioactive substances

1.Molecular characterization of aspartylglucosaminidase, a lysosomal hydrolase upregulated during strobilation in the moon jellyfish, Aurelia aurita./Biosci. Biotech. Biochem., 81, 938-950./2017
2.Indomethacin induction of metamorphosis from the asexual stage to sexual stage in the moon jellyfish, Aurelia aurita./Biosci. Biotech. Biochem., 76, 1397-1400./2012
3.Molecular cloning and expression profile of sex-specific genes, Figla and Dmrt1, in the protogynous hermaphroditic fish, Halichoeres poecilopterus./Zool. Sci., 29, 690-701./2012

研究者総覧

小泉 晴比古（こいずみ はるひこ） 准教授 ／ KOIZUMI Haruhiko Associate Professor

電場印加や**水和構造**制御を行うことで、生体機能の解明、及び、創薬において重要なタンパク質結晶の**結晶成長**制御技術を確立してきた。今後は、医薬品を含めた食品に関わる物質においても本技術を展開していきたい。

Research on the improvement in the quality of protein crystals, which is important for elucidating biological functions and drug discovery, has been performed by applying an electric field and controlling the hydration structure. In future, this technique will also be applied to materials related to food, including pharmaceuticals.

keywords: Electric field, hydration structure, Crystal growth, Crystal quality

1.Improvement of Hen Egg White Lysozyme Crystal Quality by Control of Dehydration Process Cryst. Growth Des. 19: 5955.（2019）
2.Improvement of Crystal Quality for Tetragonal Hen Egg White Lysozyme Crystals under Application of an External Alternating Current Electric Field J. Appl. Cryst. 46: 25.（2013）
3.Control of Nucleation Rate for Tetragonal Hen-Egg White Lysozyme Crystals by Application of an Electric Field with Variable Frequencies Cryst. Growth Des. 9: 2420.（2009）

研究者総覧

長命 洋佑（ちょうめい ようすけ） 准教授 ／ CHOMEI Yosuke Associate Professor

国内外の現場に軸足を置いた調査を通して、農業生産から食料消費に至る**食と農との連携**、持続可能・循環型社会、環境保全や地域貢献など新たな価値創造を図る**農村・地域社会**の姿、を思考する研究に従事している。

My research theme is about problems and issues from agricultural production to food consumption in agricultural and rural communities, mainly through fieldwork in Japan and overseas (China, Europe…etc.). My major specialty are agricultural management and agricultural economics. The main subjects of the survey are dairy farming and beef cattle farming.

keywords: Dairy management, Beef cattle management, Innovation, Fieldwork, Questionnaire survey

1.酪農経営の変化と食料・環境政策―中国内モンゴル自治区を対象として/養賢堂/2017
2.稲作法人経営における多角化戦略と経営革新/農林業問題研究/2018
3.牛肉の購買行動における消費者意識構造の把握―共分散構造分析を用いた解析―/農林業問題研究/2016

研究者総覧

中山 達哉 准教授 ／ NAKAYAMA Tatsuya Associate Professor

微生物を理解することで**食の安全**を守ることを理念に、**食中毒菌、薬剤耐性菌**および**微生物細菌叢**の3本柱を中心に研究を行っている。研究は民間企業、国内外の大学、国立および地方衛生研究所と幅広いネットワークを活用し進めている。

Our aim is to contribute to food safety by acquiring scientific knowledge of bacteria. Research is promoted through an extensive network of national and international universities and research institutions in three research topics: foodborne pathogens, bacterial resistance and microbiota.

keywords: Food Microbiology, Food Hygiene, Food poisoning bacteria, Antibiotic resistant bacteria, Mirobiota

1.Abundance of colistin-resistant Escherichia coli harbouring mcr-1 and extended-spectrum beta-lactamase-producing E. coli co-harbouring blaCTX-M-55 or -65 with blaTEM isolates from chicken meat in Vietnam, Arch Microbiol, 204, pp. 137（2022）

2.Isolation of carbapenem-resistant Enterobacteriaceae harbouring NDM-1, 4, 5, OXA48 and KPC from river fish in Vietnam, Food Control, pp.108594（2022）

3.Long-term grow-out affects Campylobacter jejuni colonization fitness in coincidence with altered microbiota and lipid composition in the cecum of laying hens, Front Vet Sci, pp.675570（2021）

研究者総覧

船戸 耕一 准教授 ／ FUNATO Kouichi Associate Professor

脂質と**脂質修飾タンパク質**の細胞内局在を決定する**輸送機序**と細胞機能における役割を**遺伝子レベル**で解明するために研究を行っている。また、宿主として**酵母**を用いた脂質の**大量生産**を目指した応用研究も展開している。

We are investigating the transport mechanisms that determine the subcellular localization of lipids and lipid-modified proteins, and their roles in cellular functions at the molecular-genetic level. We are also developing applied researches for mass production of lipids using yeast as a host.

keywords: lipid, lipid-modified protein, transport, cellular function, genetics, yeast, metabolic engineering

1.Tricalbins are required for nonvesicular ceramide transport at ER-Golgi contacts and modulate lipid droplet biogenesis. iScience, 23:101603（2020）

2.Producing human ceramide-NS by metabolic engineering using yeast Saccharomyces cerevisiae. Sci. Rep., 5:16319（2015）

3.Vesicular and nonvesicular transport of ceramide from ER to the Golgi apparatus in yeast. J. Cell Biol., 155:949（2001）

研究者総覧

KUMRUNGSEE Thanutchaporn 准教授 ／ Associate Professor

My research interests are in elucidation of food factors with potent preventive effects on lifestyle-related diseases and their mechanisms. Currently, I am interested in exploring roles of **imidazole dipeptides** in **muscle regeneration** and **brain** functions as well as focusing on regulation of **GABA** metabolism to prevent obesity.

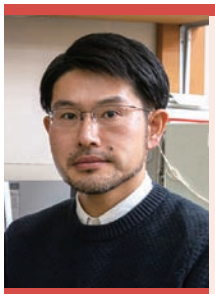
keywords: skeletal muscle, muscle stem cells (satellite cells), muscle regeneration, functional foods, bioactive compounds, carnosine/Homocarnosine, obesity, GABA, vitamin B6

1.Dietary GABA and its combination with vigabatrin mimic calorie restriction and induce antiobesity-like effects in lean mice. Journal of Functional Foods 78:104367.（2021）

2.Dietary GABA induces endogenous synthesis of a novel imidazole peptide homocarnosine in mouse skeletal muscles. Amino Acids 52:743–753.（2020）

3.Novel metabolic disturbances in marginal vitamin B 6 -deficient rat heart. Journal of Nutritional Biochemistry 65:26–34.（2019）

研究者総覧



平山 真 講師 ／ HIRAYAMA Makoto Associate Professor or Lecturer

藻類由来の**糖結合性タンパク質**「**レクチン**」が有するユニークな**糖鎖認識**の分子基盤を解明し、医薬品（**抗がん**、**抗ウイルス**など）、生化学試薬（糖鎖・細胞識別、**腫瘍マーカー検出**）、**健康食品素材**として開発するための研究。

Research to elucidate the molecular basis of the unique glycan recognition of sugar-binding proteins "lectins" from algae and to develop them as pharmaceuticals (anticancer, antiviral, etc.), biochemical reagents (glycan/cell identification, tumor marker detection), and health food materials.

keywords: Lectin, alga, glycan, anticancer, antiviral, tumor marker, health food

1.A novel high-mannose specific lectin from the green alga *Halimeda renschii* exhibits a potent anti-influenza virus activity through high-affinity binding to the viral hemagglutinin. Mar Drugs 15: 255.（2017）

2.High-mannose specific lectin and its recombinants from a carrageenophyta *Kappaphycus alvarezii* represent a potent anti-HIV activity through high-affinity binding to the viral envelope glycoprotein gp120. Mar Biotechnol 18: 144-160.（2016）

3.High mannose-binding lectin with preference for the cluster of α1–2-mannose from the green alga *Boodlea coacta* Is a potent entry inhibitor of HIV-1 and Influenza viruses. J Biol Chem 286: 19446-19458.（2011）

研究者総覧

藤川 愉吉（ふじかわ ゆきち） 講師 ／ FUJIKAWA Yukichi Associate Professor or Lecturer

農作物は**環境ストレス**によって生産ポテンシャルを十分に発揮できていない。そこで**植物**のストレスに関わる**酵素・蛋白質**の発現と機能に関する**生化学的研究**を行っている。

Plants have to compromise their yield potential for their tolerance towards environmental stress. To develop stress-tolerant/resistant plants with the level of their yield potential maintained or improved, we are conducting biochemical research on the expression and function of enzymes and proteins involved in plant stress.

keywords: biochemical research, environmental stress, enzymes, plant

1.Split luciferase complementation assay to detect regulated protein-protein interactions in rice protoplasts in a large-scale format./Rice/2014
2.Luminescence dvetection of SNARE–SNARE interaction in Arabidopsis protoplasts/Plant Mol. Biol./2010
3.Split luciferase complementation assay to study protein-protein interactions in Arabidopsis protoplasts/Plant J./2007

研究者総覧

生谷 尚士（いくたに まさし） 助教 ／ IKUTANI Masashi Assistant Professor

アレルギー疾患などの発症の初期段階に関与する細胞の研究を通じて発症メカニズムの解明に取り組んでいる。**ILC2**や**好酸球**などの免疫細胞、**IL-5**や**IL-33**などのサイトカインを中心に研究している。

Our research team conducts research on immune cells, which are involved in allergic diseases including asthma and atopic dermatitis. To explore the causes of these immune-related diseases, we study dynamics of particular immune cells, such as ILC2 and eosinophil, as well as cytokines that regulate these cells.

keywords: Allergy, ILC2, Eosinophil, Cytokine

1.Elimination of eosinophils using anti-IL-5 receptor alpha antibodies effectively suppresses IL-33-mediated pulmonary arterial hypertrophy, Immunobiology, 223, 486-492（2018）
2.Prolonged activation of IL-5-producing ILC2 causes pulmonary arterial hypertrophy, JCI Insight, 2, e90721（2017）
3.Identification of Innate IL-5-Producing Cells and Their Role in Lung Eosinophil Regulation and Antitumor Immunity, J Immunol, 188, 703-713（2012）

研究者総覧

池田 敦子（いけだ あつこ） 助教 ／ IKEDA Atsuko Assistant Professor

セラミドは細胞の生命活動をコントロールする重要な脂質です。細胞内のさまざまな**オルガネラ間**を介した**セラミドホメオスタシス**の仕組み（合成・輸送・代謝）について、**分子レベル**で解明することを目指しています。

Ceramide is the essential lipid that controls cellular functions. My research interests are the molecular mechanisms of ceramide homeostasis (synthesis, transport, and metabolism) via the various intracellular organelles.

keywords: ceramide, lipid transport, membrane contact site, yeast

1.Tricalbins Are Required for Non-vesicular Ceramide Transport at ER-Golgi Contacts and Modulate Lipid Droplet Biogenesis. iScience, 23:101603（2020）
2.Membrane Contact Sites in Yeast: Control Hubs of Sphingolipid Homeostasis. Membranes, 11:971（2021）
3.Osh proteins regulate COPII-mediated vesicular transport of ceramide from the endoplasmic reticulum in budding yeast. J Cell Sci., 127:376-87（2014）

研究者総覧

田中 若奈（たなか わかな） 助教 ／ TANAKA Wakana Assistant Professor

植物の花や葉、枝分かれなどの**形づくり**のしくみを、**遺伝子の働き**から解明することを目標に研究を行っています。さらには、解明したしくみを活用して、**イネ**をはじめとする農作物の品種改良も目指しています。

I am interested in how plants elaborate their structures such as flowers and branches. My research objective is to elucidate the molecular and genetic mechanisms underlying the control of plant development.

keywords: Branch formation, Flower development, Meristem, Plant stem cells, Rice

1.Antagonistic action of *TILLERS ABSENT1* and *FLORAL ORGAN NUMBER2* regulates stem cell maintenance during axillary meristem development in rice/New Phytol., 225: 974-984/2020
2.Axillary meristem formation in rice requires the *WUSCHEL* ortholog *TILLERS ABSENT1*/Plant Cell, 27: 1173-1184/2015
3.The *YABBY* gene *TONGARI-BOUSHI1* is involved in lateral organ development and maintenance of meristem organization in the rice spikelet/Plant Cell, 24: 80-95/2012

研究者総覧

冨永 淳（とみなが じゅん） 助教 ／ TOMINAGA Jun Assistant Professor

分子から群落のスケールで**光合成**を理解して、**作物生産**の向上を目指します。作物の種類は問わず、植物工場からフィールドまで様々な栽培環境を対象とします。興味のある方は気軽にお話しましょう!

If you are interested in the smart crop production, this is the right place! My lab focuses on photosynthesis for improved crop management and productivity, though I am very interested in the biology of photosynthesis. I also try to address questions involving the climate change, stress physiology, and sustainable agriculture.

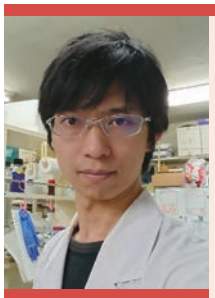
keywords: Photosynthesis, Gas exchange, Phenomics, Physiological ecology of land plants/crops

1.Overexpression of BUNDLE SHEATH DEFECTIVE 2 improves the efficiency of photosynthesis and growth in Arabidopsis. Plant J 102: 129-137.（2020）

2.Direct measurement of intercellular CO2 concentration in a gas-exchange system resolves overestimation using the standard method. J Exp Bot 69: 1981-1991.（2018）

3.Cuticle affects calculations of internal CO2 in leaves closing their stomata. Plant Cell Physiol 56: 1900-1908.（2015）

研究者総覧



藤井 創太郎（ふじい そうたろう） 助教 ／ FUJII Sotaro Assistant Professor

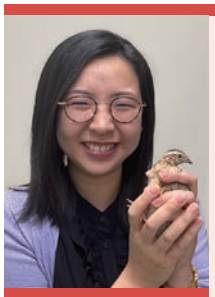
一酸化窒素（**NO**）は生体内でシグナル分子として機能する良い面がある一方、細胞毒性を有する悪い面もある。当研究室では、**微生物**が**NO**を巧みに扱う仕組みに関する研究をしている。

Nitric oxide（NO）has a positive side that functions as a signaling molecule in vivo, but it also has a negative side that is cytotoxic. In our laboratory, we are studying how microorganisms cope with and handle NO.

keywords: Microorganism, Nitrigen cycle, heme protein

1.Structural and functional insights into thermally stable cytochrome c' from a thermophile. Protein Sci 26:737-748.（2017）

研究者総覧



松崎 芽衣（まつざき めい） 助教 ／ MATSUZAKI Mei Assistant Professor

鳥類における**ゲノム編集**を利用した遺伝子改変技術の開発、および医薬品・食品産業への応用を目指す。また、鳥類の**生殖システム**の分子メカニズムを明らかにし、これを基盤とした家禽の繁殖技術開発を行う。

Our goal is to develop genetic modification technology using genome editing in birds, and to apply it to the pharmaceutical and food industries. In addition, we focus on the molecular mechanisms of avian reproductive systems and the development of reproductive technologies based on these mechanisms in poultry.

keywords: genome-editing, avian reproduction

1.Lactic acid is a sperm motility inactivation factor in the sperm storage tubules/Sci. Rep.（2015）

2.Longer and faster sperm exhibit better fertilization success in Japanese quail/Poult. Sci.（2021）

3.Effect of sperm surface oligosaccharides in sperm passage into sperm storage tubules in Japanese quail（*Coturnix japonica*）, Anim. Rep. Sci.（2021）

研究者総覧

山本 祥也（やまもと よしなり） 助教 ／ YAMAMOTO Yoshinari Assistant Professor

食品や**微生物**による**免疫調節作用**を探索し、その機能性を活かして感染症や炎症性疾患、アレルギーを予防・軽減する**機能性食品**の開発を目指しています。

The purpose of our research is to explore the immunomodulatory effects of foods and microorganisms, and then to utilize their function to develp functional foods that prevent and reduce some diseases such as infectious, inflammatory and allergic diseases.

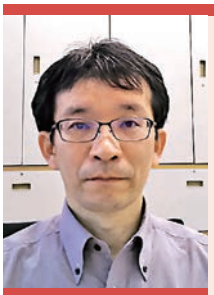
keywords: Food immunology, Microorganism, Functional food, Mice, Cell culture, Oral administration

1.Class A CpG Oligonucleotide Priming Rescues Mice from Septic Sock via Activation of Platelet-Activating Factor Acetylhydrolase. Front Immunol.（2017）

2.Oral Administration o Flavonifractor plautii Strongly Suppresses Th2 Immune Responses in Mice. Front Immunol.（2020）

3.Inhibitory/Suppressive Oligodeoxynucleotide Nanocapsules as Simple Oral Delivery Devices for Preventing Atopic Dermatitis in Mice. Mol Ther.（2015）

研究者総覧



所 属
独立行政法人
酒類総合研究所
National Research
Institute of Brewing

奥田 将生（おくだ まさき） 客員教授 ／ OKUDA Masaki Visiting Professor

美味しい**お酒**（**日本酒・焼酎**）を造るために重要な原料の**お米**や**水**について特性解明を行っている。お酒の製造工程に及ぼすイネ遺伝子型や栽培時の**気象条件**の影響、品質に影響する**原料成分**を明らかにしてきた。

Our research focus is the understanding of the properties of the ingredient rice grains and water for sake making to make high quality of sake and shochu. We are investigating the influences of the meteorological conditions during rice growing on sake making process, and the compounds affecting sake quality.

keywords: sake, shochu, rice, water, meteorological condition

1.Relationship between flavor compounds in sake exhibited at the Annual Japan Sake Awards and meteorological conditions during grain filling and the properties of rice starch,J.Brew.Soc.,116, 839-852（2021）in Japanese
2.Rice used for Japanese sake making, Biosci. Biotechnol. Biochem., 83,1428-1441（2019）
3.Analysis of protein composition in cultivar rice used for sake brewing, and their effects on nitrogen compounds in sake, Cereal Chem.95,320-329（2018）

所 属
独立行政法人
酒類総合研究所
National Research
Institute of Brewing

正木 和夫（まさき かずお） 客員准教授 ／ MASAKI Kazuo Visiting Associate Professor

醸造に関わる微生物（**酵母**、**麹菌**）の機能解明、育種、醸造環境で働く**酵素**の研究をしています。また、微生物由来の酵素の機能を明らかとし、新しい利用方法や大量生産する技術についても研究しています。

I am studying microbiology（yeast and koji-mold）for the brewing. In particular, the main targets are elucidation of functions, breeding, and enzymatic research. I am also interested in exploring new enzymes, developing new uses, and mass-producing enzymes.

keywords: enzyme, yeast, koji-mold, brewing microbiology

1. *Aspergillus oryzae* acetamidase catalyzes degradation of ethyl carbamate, J Biosci Bioeng,130, 577（2020）
2.Construction of a new recombinant protein expression system in the basidiomycetous yeast *Cryptococcus* sp strain S-2 and enhancement of the production of a cutinase-like enzyme, Appl Microbiol Biotechnol, 93, 1627（2012）
3.Cutinase-like enzyme from the yeast *Cryptococcus* sp strain S-2 hydrolyzes polylactic acid and other biodegradable plastics, Appl Environ Microbiol, 71, 7548（2005）

生物資源科学プログラム｜教員紹介

Program of Bioresource Science

研究者総覧

磯部 直樹（いそべ なおき） 教授 ／ ISOBE Naoki Professor

良質な**牛乳**生産を目指して、反芻動物の**乳房炎**を防除するために乳房の**自然免疫**に着目している。乳房内の**抗菌物質**（defensin, S100, cathelicidin, lactoferrin）等の免疫物質を最大限利用して、感染を防御する手法を検討している。

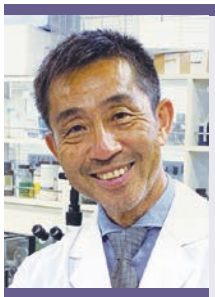
My study focuses on innate immune function in mammary gland to prevent and treat mastitis. I try to establish the appropriate methods to maximize the amount of antimicrobial components (defensin, S100, cathelicidin, lactoferrin)in milk. Mastitis caused by the bacterial components translocated from uterus was identified.

keywords:mastitis, mammary gland, antimicrobial component

1.Effect of temporary cessation of milking on the innate immune components in goat milk. Journal of Dairy Science 104:10374-10381（2021）

2.Effects of intrauterine infusion of bacterial lipopolysaccharides on the mammary gland inflammatory response in goats. Veterinary Immunology and Immunopathology 219: 109972（2020）

3.Effect of oral administration of colostrum whey to peripartum goat on antimicrobial peptides in postpartum milk. Animal Science Journal 91（1）:e13365（2020）



研究者総覧

海野 徹也（うみの てつや） 教授 ／ UMINO Tetsuya Professor

瀬戸内海の重要種を対象に、**種苗放流**や**資源管理**によって、資源を**増殖**し、持続的に利用するための研究を行っている。特に、**クロダイ**は研究の代表種で、最近では産卵生態や移動回遊の解明に取り組んでいる。

My current research focuses on sustainable use for commercially important fish using by stock enhancement and resource management. Black sea bream is representative fish of my research, I want to pursue studies to clarify all of the mysteries of this fish as my life work.

keywords:fish, black sea bream, stock enhancement, resource management, sustainable use

1.The role of the isolation of the marginal seas during the Pleistocene in the genetic structure of black sea bream *Acanthopagrus schlegelii*（Bleeker, 1854）in the coastal waters of Japan. PeerJ 9（24）:e11001（2021）

2.Estimating the spawning season of black sea bream *Acanthopagrus schlegelii* in Hiroshima Bay, Japan, based on temporal variation in egg density. Fish Sci, 86:645-653（2020）

3.Infestation of the parasitic isopod *Mothocya parvostis* on Juveniles of the black sea bream *Acanthopagrus schlegelii* as an optional intermediate host in Hiroshima Bay. Zool Sci,1-10（2020）

研究者総覧

大塚 攻（おおつか すすむ） 教授 ／ OHTSUKA Susumu Professor

海洋動物プランクトンとして最も重要な**カイアシ類**、**クラゲ類**、魚介類に寄生する**カイアシ類**の**系統分類**、**進化**、**生活史**、**動物地理**、**生態**について世界トップレベルの研究成果を世に送り出している。

The systematics, evolutionary biology and ecology of zooplankters such as copepods and jellyfish have been most intensively investigated in the world. Recently, the life cycle of symbiotic copepods such as sea lice have been studied.

keywords:Copepods, Ecology, Evolution, Life cycle, Jellyfish, Symbiosis, Systematics

1.Evolutionary transformation of mouthparts from particle-feeding to piercing carnivory in viper copepods: review and 3D analysis of a key innovation using advanced imaging techniques. Front Zool 16:35（2019）

2.Symbionts of marine medusae and ctenophores. Plankton Benthos Res, 4（1）: 1-13.（2009）

3.Sexual dimorphism in calanoid copepods. Hydrobiologia 453/454: 441-466.（2001）

小櫃 剛人（おびつ たけと） 教授 ／ OBITSU Taketo Professor

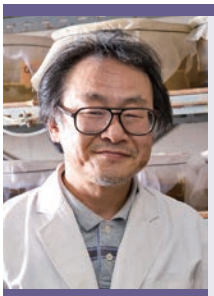
飼料資源の有効利用（**副産物飼料**）、環境負荷の低減（ウシからの**温室効果ガス**）、栄養代謝調節（**アミノ酸代謝**）などを目標にして、**反芻家畜**（ウシ、ヤギ、ヒツジ）の飼料と栄養代謝に関する研究を行っている。

In order to establish sustainable and healthy ruminant production system, I am studying on the by-product feed utilization, mitigation of enteric methane emission from ruminants, and regulation of amino acid metabolism in cattle and sheep by the natural functional compounds in forage.

keywords: Forage, digestion, metabolism, protein, amino acid, cow, sheep, milk, meat.

研究者総覧

1.Phytol supplementation alters plasma concentrations of formate, amino acids, and lipid metabolites in sheep. Animal 15:100174.（2021）
2.Effects of ensiling treatment for tuber crop forages and grain source on carbohydrate digestion, nitrogen utilization, and urea metabolism in sheep. Anim Feed Sci Technol 243: 140-149.（2018）
3.Effects of nitrogen fertilizer and harvesting stage on photosynthetic pigments and phytol contents of Italian ryegrass silage. Anim Sci J 88: 1513 – 1522.（2017）



河合 幸一郎（かわい こういちろう） 教授 ／ KAWAI Kouichirou Professor

強かに暮らしている動物たちの**生き残り**戦略を、**生理・生態**、**行動**、**分子**レベルで解明し、**人類存続**のための戦略を模索する。

To seek some strategies on sustainable human activities by physiological, ecological, behavioral and molecular clarification of survival by tough creatures.

keywords: strategy, survival, tough creature

研究者総覧

1.An association between head-spot types and genetic types in char distributed in the Chugoku region, Japan. Environ Biol Fishes 103:339-347.（2020）
2.Genetic relationships of cichlid fishes from Lake Malawi based on mitochondrial DNA sequences. Limnology 21:151-163（2020）
3.Population genetics and taxonomic signatures of wild *Tilapia* in Japan based on mitochondrial DNA control region analysis. Hydrobiologia 847: 1491-1504.（2020）

小池 一彦（こいけ かずひこ） 教授 ／ KOIKE Kazuhiko Professor

単細胞藻類を専門とし、その**環境適応性**、**光合成機能**等を培養実験・フィールド調査両面から探っています。彼らが支える生態系（海洋の**生物生産システム**、**マングローブ・サンゴ礁生態系**）の保全に役立てたいと考えています。

Microalgae, or single-cell algae, especially their diversity, environmental adaptation and photosynthetic mechanisms are investigated both from field studies and laboratory culture experiments. Goal of the study is to apply these knowledges for conserving characteristic ecosystems（e.g. coastal biological production, mangrove ecosystem, coral reef ecosystem, etc）whose basis are microalgae.

keywords: Microalgae, aquatic ecosystem, coast, mangrove, coral reef

研究者総覧

1.Fecal pellets of giant clams as a route for transporting Symbiodiniaceae to corals/ PLoS ONE/2020
2.Zooxanthellal genetic varieties in giant clams are partially determined by species-intrinsic and growth-related characteristics/ PLoS ONE/ 2017
3.Aplication of a pulse-amplitude-modulation（PAM）fluorometer reveals its usefulness and robustness in the prediction of Karenia mikimotoi blooms: A case study in Sasebo Bay, Nagasaki, Japan/ Harmful Algae/ 2017

坂井 陽一（さかい よういち） 教授 ／ SAKAI Yoichi Professor

サンゴ礁などリーフ環境に棲む**魚類**の**採餌生態**や**産卵生態**に注目する**フィールド調査**から、生存戦略や繁殖戦略を解明する研究を進めている。

Behavioral ecology of reef fishes focusing on survival and reproductive strategies（e.g. foraging and mating tactics, social and mating system, and sex change patters）by use of the methodology of animal sociology including field observation and demographic survey in nature.

keywords: Underwater observation, field survey, function of behaviors, intra- and interspecific relationships, individual-level data, reproductive succes

研究者総覧

1.Reversed sex change in the haremic protogynous hawkfish *Cirrhitichthys falco* in natural conditions. Ethology 118: 1-9（2012）
2.Effect of changing harem on timing of sex change in female cleaner fish *Labroides dimidiatus*. Anim Behav 62: 251-257（2001）
3.Alternative spawning tactics of female angelfish according to two different contexts of sex change. Behav Ecol 8: 372-377（1997）

研究者総覧

杉野 利久（すぎの としひさ） 教授 ／ SUGINO Toshihisa Professor

乳牛の**哺育期**および**分娩移行期**など**栄養管理**に起因する疾病リスクの高いステージに着目し、被害軽減に向けた**栄養生理学的研究**に取り組んでいる。初乳給与と**消化管ホルモン**、小腸発達との関連性などを明らかにしている。

It is focusing on the nutrition and metabolism at transition periods for weaning and calving in dairy cattle. Especially, it has the study that the relationship between dietary nutrition and metabolic hormone action.

keywords: gastro-intestinal hormone, dairy cow, dairy calf, nutritional management

1.Effects of feeding hay and calf starter as a mixture or as separate components to Holstein calves on intake, growth, and blood metabolite and hormone concentrations. J. Dairy Sci. 103 : 4423-4434（2020）

2.Effects of feeding a moderate-or high-energy close-up diet to cows on response of newborn calves to milk replacer feeding and intravenous injection of glucagon-like peptide 1.Domest. Anim. Endocrinol. 74: 106528（2021）

3.Exposure to blue LED light before the onset of darkness under a long-day photoperiod alters melatonin secretion, feeding behaviour and growth in female dairy calves. Anim. Sci. J. 91: e13353（2020）

研究者総覧

冨永 るみ（とみなが） 教授 ／ TOMINAGA Rumi Professor

植物の**表皮細胞分化**に関わる**転写因子**の研究を行っている。表皮細胞は**根毛**のような特殊な器官に分化する。分化制御ネットワークの解明により、植物の形態形成や細胞分化の仕組みを分子レベルで理解する事を目指す。

The aim of our study is to elucidate the mechanism of epidermal cell differentiation in plants, by using epidermal cells form specialized organs, such as root hairs. By focusing on the function of transcription factors, we aim to understand plant morphogenesis and cell differentiation at the molecular level.

keywords: Arabidopsis, root hair, transcription factor

1.Identification of six CPC-like genes and their differential expression in leaves of tea plant, Camellia sinensis. J. Plant Physiol. 263: 153465（2021）

2.Function of the TRY C-terminal region artificially fused with its homologous transcription factors inducing root hair differentiation in Arabidopsis.B.B.B. 85: 1114-1120（2021）

3.Extended C-termini of CPC-LIKE MYB proteins confer functional diversity in Arabidopsis epider- mal cell differentiation. Development 144: 2375-2380（2017）

研究者総覧

浅岡 聡（あさおか さとし） 准教授 ／ ASAOKA Satoshi Associate Professor

環境分析化学を活用して、幅広い**水環境問題**の解決に挑戦しています。特にリサイクル材料を有効活用した**沿岸環境の修復**、生活・産業**排水処理技術**の開発、水環境を評価するための**分析法**の開発について研究しています。

I am an aquatic environmental scientist with a broad perspective-wastewater treatment, restoration of coastal seas etc. on the basis of my analytical chemistry background. My specialties and skills are as follows: (1) Coastal environment restoration using industrial recycled materials, (2) Development of analytical methods to evaluate aquatic environment.

keywords: Aquatic environment, Environmental analytical chemistry, Environmental remediation, SDGs, Wastewater treatment

1.Throughfall and stemflow chemical dynamics of Satoyama, traditional secondary forest systems under threat in Japan, J. Forest. Res. 33, 813-826.（2022）

2.Terrestrial anaerobic digestate composite for fertilization of oligotrophic coastal seas. J. Environ. Manage., 293, 112944.（2021）

3.Adsorption of phosphate onto lanthanum-doped coal fly ash—Blast furnace cement composite. J. Hazard. Mater., 406, 124780.（2021）

研究者総覧

上田 晃弘（うえだ あきひろ） 准教授 ／ UEDA Akihiro Associate Professor

世界に広がる**塩害**土壌でも栽培可能な作物品種の育成や**遺伝子組換え**による**耐塩性作物**の創出を行っています。また、植物の生育を促進する**善玉菌**の単離とその実用化技術、**肥料資源の節約**技術の開発を行っています。

Our research focuses on molecular physiological analysis of environmental stress（high salinity, nutrient deficiency, etc.）tolerance in higher plants for sustainable crop production. We also study plant growth promoting bacteria to increase crop production through improving bacterial fitness in the rhizosphere and identifying bioactive compounds useful for crop growth.

keywords: Sustainable crop production, Rice, Salinity stress, Nutrient deficiency, Plant nutrition, Plant growth promoting bacteria

1.Contribution of two different Na^+ transport systems to acquired salinity tolerance in rice. Plant Sci 297: 110517.（2020）

2.Identification of the genes controlling biofilm formation in the plant commensal *Pseudomonas protegens* Pf-5. Arch Microbiol 202: 2453-2459.（2020）

3.Characterization of Na^+ exclusion mechanism in rice under saline-alkaline stress. Plant Sci 287: 110171.（2019）

加藤 亜記（かとう あき） 准教授 ／ KATO Aki Associate Professor

沿岸生態系の**生物多様性**の維持に欠かせない**藻場**や**海藻養殖**で顕在化する、**気候変動**の影響に注目している。海藻類の**系統分類**や**海藻相**研究を行う一方、**食用海藻**や**石灰藻**について実験下での**生育特性**を把握してきた。

Seaweeds benefit human life by providing food and indirectly by maintaining biodiversity in coastal ecosystems. Focusing on the impacts of climate change on seaweed aquaculture and seaweed forests, I have examined molecular phylogeny and ecophysiology of key species of macroalgae and conducted empirical research relevant for aquaculture.

keywords: coralline algae, edible seaweeds, optimum growth conditions, rhodolith, taxonomy

研究者総覧

1.Morphological and molecular assessment of *Lithophyllum okamurae* with the description of *L. neo-okamurae sp. nov.*（Corallinales, Rhodophyta）. Phycologia 61(2):117-131（2022）

2.Effects of water temperature, light and nitrate on the growth of sporelings of the non-geniculate coralline alga *Lithophyllum okamurae*（Corallinales, Rhodophyta）. J Appl Phycol 32: 1923 - 1931（2020）

3.Western Pacific. In Rhodolith/Maërl Beds: a global perspective. Springer, Switzerland. pp. 335-347.(2017)

河上 眞一（かわかみ しんいち） 准教授 ／ KAWAKAMI Siniti Associate Professor

主に**ニワトリ**をモデル動物として用い、**本能行動**（摂食行動・飲水行動・**攻撃行動**など）の脳内メカニズムについて、**間脳視床下部**を中心に研究しています。

Research of the brain mechanisms of innate behavior such as feeding, drinking, and aggressive behavior in chickens.

keywords: feeding behavior, drinking behavior, aggressive behavior, hypothalamus, chicken

研究者総覧

1.Screening of the behavioral tests for monitoring agonistic behavior of layer chicks. J.Poult.Sci. 54:296-302.（2017）

2.Blood testosterone concentration and testosterone-induced aggressive behavior in male layer chicks: Comparison between isolated- and grouped-raising. J.Poult.Sci. 56:290-297.（2019）

3.Effects of testicular and non-testicular testosterone on territorial and isolation-induced aggressive behavior of male layer chicks. J.Poult. Sci. 57:236-240.（2020）

黒川 勇三（くろかわ ゆうぞう） 准教授 ／ KUROKAWA Yuuzou Associate Professor

乳牛の**生産寿命**（泌乳開始から除籍までの期間の長さ）に影響を及ぼす要因の解明を目的として、血液中**抗酸化物質**（グルタチオン、ビタミンCなど）濃度、初産分娩月齢などと、様々な疾病発症率や、繁殖指標、除籍率との関連性を明らかにする研究を行っている。

In order to improve the productive lifespan（the period from beginning of milk production to culling）of dairy cows, I research the relation of blood antioxidants（Vitamin C, glutathione, etc.）concentrations and age at first calving with disease incidence, reproductive performances and culling incidence.

keywords: Dairy cows, Productive lifespan, Milk production, Antioxidants, Lifecycle

研究者総覧

1.Effect of relationships among clinical mastitis incidence, reproductive performance, and culling rate on the lifetime of dairy cows at Hiroshima University Farm./Anim. Sci. J. /2021

2.Changes of photosynthetic pigments and phytol content at different levels of nitrogen fertilizer in Italian ryegrass fresh herbage and hay./ Grassl. Sci./2022

3.A comparison of plasma glucose and oxidative status in lactating dairy cows in summer and autumn/Anim. Sci. J./2016

斉藤 英俊（さいとう ひでとし） 准教授 ／ SAITOU Hidetoshi Associate Professor

釣り餌として利用される多毛類やエビ類を対象とした生態学的研究、とくに**外来種**としての分布状況や生物多様性に及ぼす影響、および**希少在来種**の保全と有効活用を目的とした生活史の解明について研究している。

My research interests are ecological researches on aquatic organisms, especially understanding of life history aimed at the dispersal mechanism of alien species and the conservation of threatened species.

keywords: Benthos, Fishing bait, Freshwater, Intertidal flat, polychaete, shrimp

研究者総覧

1.Population genetics of the alien freshwater shrimp Palaemon sinensis（Sollaud, 1911）in Japan based on mitochondrial 16S rRNA sequence analysis Aquat. Invasions 16:710-720（2021）

2.Population Dynamics of Lancelet *Branchiostoma japonicum* in the Seto Inland Sea, Japan. Zool Sci 37:331-337（2020）

3.Seasonal occurrence of the alien freshwater shrimp *Palaemon sinensis*（Sollaud, 1911）in lower reaches of a river in western Japan. BioInvasions Rec. 8:369–378（2019）

研究者総覧

冨山 毅（とみやま たけし） 准教授 / TOMIYAMA Takeshi Associate Professor

瀬戸内海を中心に、日本沿岸における魚介類の**資源生態**を研究している。特に稚魚期の摂食や成長に関する研究のほか、地球温暖化など環境の変化に対する**水産資源**の応答に関する研究を進めている。

I am studying the fisheries biology in Japan, especially in the Seto Inland Sea, to contribute to the sustainable coastal fisheries. My research interests are mainly in the life history traits of commercially important species, predator-prey interactions, and the response of fishes to climate change.

keywords: Aquatic ecology, Fisheries, Life history, Thermal biology, Tidal flat

1.Seasonal bathymetric distributions of three coastal flatfishes: estimation from logbook data for trawl and gillnet fisheries. Fish Res 233: 105733.（2021）

2.Importance of experienced thermal history: effect of acclimation temperatures on the high-temperature tolerance and growth performance of juvenile marbled flounder. J Therm Biol 97: 102831.（2021）

3.Food availability before aestivation governs growth and the winter reproductive potential in the capital breeding fish, *Ammodytes japonicus*. PLoS ONE 14: e0213611.（2019）

研究者総覧

長岡 俊徳（ながおか としのり） 准教授 / NAGAOKA Toshinori Associate Professor

持続可能な植物生産を目指し、**土壌**の機能を解析・活用するための研究を行っています。堆肥などの**有機物**施用による植物への**養分供給**（特に**リン**）と**土壌微生物**への影響を解析しています。

Aiming for sustainable plant production, I am conducting researches to analyze and utilize soil functions. Current researches are focused on analysis of the effects of application of organic matter such as compost on nutrient supply（especially phosphorus） to plants and on relating soil microorganisms.

keywords: Soil, Organic matter, Nutrient cycling, Phosphorus, Soil microorganisms

1.Phytate degradation by fungi and bacteria inhabiting sawdust and coffee residue composts. Microbes Environ.（2013）

2.Isolation and characterization of cellulose-decomposing bacteria inhabiting sawdust and coffee residue composts. Microbes Environ.（2012）

3.Compost amendment enhances population and composition of phosphate solubilizing bacteria and improves phosphorus availability in granitic regosols. Soil Sci. Plant Nutr.（2011）

研究者総覧

橋本 俊也（はしもと としや） 准教授 / HASHIMOTO Toshiya Associate Professor

持続的な漁業生産可能な海洋環境を維持・管理するために、コンピュータによる**データ解析**、**生態系モデル解析**や海洋調査により沿岸海域の**物質循環機構**と**低次生物生産構造**を明らかにするための研究を行っている。

My main purpose of the study is to maintain and manage the marine environment that is available for sustainable fishery production. For the purpose, I perform a study about the material circulation system in the coastal seas by computer data analysis, numerical ecosystem model and field observations.

keywords: sustainable fishery production, computer data analysis, numerical ecosystem model

1.Primary Production and Physical Structure of the Seto Inland Sea, Japan / Bull. Coastal Oceanogr.（1997）

2.Analysis of Primary Production in the Seto Inland Sea, Japan, Using a Simple Ecosystem Model/ J. Oceanogr. 54: 123-132.（1998）

3.Optical Properties of Sea Water in Hiroshima Bay, Japan / Oceanography in Japan（1997）

研究者総覧

生命医科学プログラム兼任（Concurrent post: Biomedical Science）

吉田 将之（よしだ まさゆき） 准教授 / YOSHIDA Masayuki Associate Professor

生物学的心理学を専門とする。**動物の心**を生物学的な機能のひとつとして考える。**脳**を含む身体という有形物から、心という形のないものがいかにして生じるのかを探究している。

Biological psychology and behavioral neuroscience. Studying animal mind as a biological function. My research involves quantitative observation of behavior and manipulation of underlying neural activities to evaluate emotional states of animals.

keywords: behavior, biological psychology, brain, emotion

1.Recording the ventilation activity of free-swimming zebrafish and its application to novel tank tests. Physiology & Behavior, 244, 113665（2022）

2.Measurement of emotional states of zebrafish through integrated analysis of motion and respiration using bioelectric signals. Scientific Reports 11:187（2021）

3.Relationship between brain morphology and life history in four bottom-dwelling gobiids. Zoological Science, 37, 168-176（2020）

若林 香織（わかばやし かおり） 准教授 ／ WAKABAYASHI Kaori Associate Professor

海産無脊椎動物の**初期生活史**に関して分類・発生・生態の観点から研究している。最近は養殖候補種である甲殻類や棘皮動物の安定的な**種苗生産**や畜養の技術開発に取り組んでいる。

The main research interest is the early life history of marine invertebrates particularly from the viewpoints of taxonomy, developmental biology, and ecology. Applied aquaculture sciences in crustaceans and echinoderms are also the research topics that we focus on.

keywords: Lobster, Larvae, Jellyfish, Hatchery, Land-based aquaculture

研究者総覧

1. The final phyllosoma, nisto, and first juvenile stages of the slipper lobster *Petrarctus brevicornis* (Holthuis, 1946) (Decapoda: Achelata: Scyllaridae). J Crustac Biol 40: 237–246. (2020)
2. Culture of slipper lobster larvae (Decapoda; Achelata; Scyllaridae) fed jellyfish as food. In Lobsters: Biology, Fisheries and Aquaculture. Springer Singapore, Singapore, pp. 519–540. (2019)
3. Amended larval recruitment model for the Japanese spiny lobster *Panulirus japonicus* from new larval records and population genetic data in Taiwan. J Oceanogr 75: 273–282. (2019)

LIAO Lawrence Manzano（リアオ ローレンス マンザーノ） 准教授 ／ Associate Professor

My research deals with the taxonomy of macroalgae around Southeast Asia, including their use as bioindicators of environmental change. Students are trained in practical taxonomic and communication skills to prepare them for jobs in research, teaching and international science journalism.

keywords: algae, freshwater Rhodophyta, museum studies, phycology, phytogeography, seaweeds

研究者総覧

1. The Ulvophyceae (Chlorophyta) of eastern Sorsogon, Philippines, including *Halimeda magnicuneata* sp. nov. (Bryopsidales). Botanica Marina 63: 439-453 (2020)
2. Satellite image analysis reveals changes in seagrass beds at Van Phong Bay, Vietnam during the last 30 years. Aquatic Living Resources 33: 1-10. (2020)
3. *Dictyota adnata* Zanardini (Phaeophyceae) – a new record from the Sundarbans mangrove forests, Bangladesh. Bangladesh J. Bot. 49: 407-412 (2020)

梅原 崇（うめはら たかし） 助教 ／ UMEHARA Takashi Assistant Professor

子どもができる仕組みについて、**代謝と内分泌**に焦点を当て、モデル動物を用いた基礎研究から、家畜を用いた実用化研究まで行っている。この成果を基盤にした"**効率よく家畜生産ができる繁殖技術開発**"を目指している。

Our aim is to develop the reproductive technology in animal production. To achieve this aim, we are focusing on mammalian reproductive biology of both female and male, such as ovary, oocyte, testis and sperm, especially focusing on metabolism, endocrine and immune system.

keywords: animal reproduction, reproductive technology, endocrine, metabolism

研究者総覧

1. A simple sperm-sexing method that activates TLR7/8 on X sperm for the efficient production of sexed mouse or cattle embryos. Nature protocols, (2020)
2. Activation of Toll-like receptor 7/8 encoded by the X chromosome alters sperm motility and provides a novel simple technology for sexing sperm. PLoS Biol., (2019)
3. The acceleration of reproductive aging in *Nrg1flox/flox; Cyp19-Cre* female mice. Aging cell, 16, 1288-1299. (2017)

河合 賢太郎（かわい けんたろう） 助教 ／ KAWAI Kentaro Assistant Professor

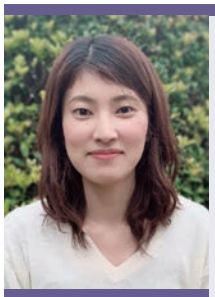
クロダイ属、**キジハタ**など**沿岸性魚類**の**産卵生態**を中心に研究。研究アプローチは成熟魚の解剖、**浮性卵**の時空間分布、**遺伝解析**（**DNAバーコーディング**、**環境DNA**、**分子系統解析**）、**バイオテレメトリー**など。

My main research interests are the spawning biology of coastal marine fishes (*Acanthopagrus species and Epinephelus akaara*). The research approaches are fish dissection, spatio-temporal distribution of pelagic eggs, genetic analysis (DNA barcoding, environmental DNA, and molecular phylogeny), and biotelemetry.

keywords: Acanthopagrus, biotelemetry, coastal marine fish, DNA barcoding, environmental DNA, Epinephelus akaara, molecular phylogeny, pelagic egg, spawning biology

研究者総覧

1. Oyster farms are the main spawning grounds of the black sea bream *Acanthopagrus schlegelii* in Hiroshima Bay, Japan / PeerJ / e11475 (2021)
2. The role of the isolation of the marginal seas during the Pleistocene in the genetic structure of black sea bream *Acanthopagrus schlegelii* (Bleeker, 1854) in the coastal waters of Japan / PeerJ / e11001 (2021)
3. Estimating the spawning season of black sea bream *Acanthopagrus schlegelii* in Hiroshima Bay, Japan, from temporal variation in egg density / Fish. Sci. / 645-653 (2020)



菊田 真由実（きくた まゆみ） 助教 ／ KIKUTA Mayumi Assistant Professor

イネやトウモロコシといった**主要作物**の**安定生産**と**生産性向上**を目指し、**栽培環境**の評価や**栽培管理技術**の開発に取り組んでいる。主に、東アフリカや東南アジアの不良環境を対象に研究を行っている。

In our laboratory, we are working on the evaluation of cultivation environments and the development of cultivation management techniques in order to improve the stability and productivity of major crops such as rice and corn. Our research is mainly focused on poor environments in East Africa and Southeast Asia.

keywords: Rice, Stability and productivity, Cultivation management

研究者総覧

1.A method for evaluating cold tolerance in rice during reproductive growth stages under natural low-temperature conditions in tropical highlands in Kenya. Plant Prod Sci 23: 466-476.（2020）

2.Effects of different water management practices on the dry matter production process and characteristics in NERICAs. Plant Prod Sci 22: 168-179.（2019）

3.Effects of slope-related soil properties on upland rice growth and yield under slash-and-burn agriculture in South Konawe Regency, Southeast Sulawesi Province, Indonesia. Trop Agr Develop 62: 60-67.（2018）

秦 東（シン トウ） 助教 ／ QIN Dong Assistant Professor

植物生産性の向上と生理機能の解析に関する研究を行っています。特にダイズの**低リン酸耐性**機構や**フィチン酸合成経路**を解明することに挑戦しています。

My research wants to improve the productivity and quality of crops and understand the physiological function of phytic acid. I am investigating the mechanism of low phosphorus tolerance and analyzing the biosynthesis process of phytic acid.

keywords: Low phosphorus tolerance, Biosynthesis process of phytic acid

研究者総覧

1.Seedling growth, physiological characteristics, nitrogen fixation, and root and nodule phytase and phosphatase activity of a low-phytate soybean line, Plant Physiol. Biochem. 149, 225-232（2020）

2.Physiological characteristics, phytase activity, and mineral bioavailability of a low-phytate soybean line during germination, Plant Foods Hum. Nutr. 75, 383_389（2020）

3.Characteristics and quality of Japanese traditional fermented soybean（Natto）from a low-phytate Line, Plant Foods Hum. Nutr. 75, 651-655（2020）

鈴木 直樹（すずき なおき） 助教 ／ SUZUKI Naoki Assistant Professor

反芻動物乳房への細菌感染成立機序解明を基盤として、**乳房炎制御**による食（乳）の安定供給と**生乳衛生の向上**による食（乳）の安全に貢献することを目指している。また、**乳房炎迅速診断技術開発**も行っている。

The aim of my studies is to contribute food（milk）supply and food（milk）safety by elucidating mechanisms of bacterial intramammary infection in dairy animals.

keywords: Dairy animals, Intramammary infection, zoonosis, diagnosis

研究者総覧

1.Seasonal variations in the concentration of antimicrobial components in milk of dairy cows. Anim Sci J. 91（1）.（2020）

2.Outcome prediction from the first examination in clinical mastitis using ultrasonography in dairy cows. Anim Sci J. 91（1）.（2020）

3.Rapid determination of pathogens in mastitic milk of dairy cows using Gram staining. J Vet Med Sci. in press.（2022）

妹尾（せお） あいら 助教 ／ SEO Aira Assistant Professor

伴侶動物、家畜、野生動物、動物園動物などを対象として、**人間と動物の共生**の観点から**動物の福祉**（アニマルウェルフェア）の向上を目指したフィールド研究を行っている。

My research aims for the improvement of animal welfare, especially the welfare of free-roaming cats, from the view point of the symbiotic relationships between humans and animals.

keywords: Animal Welfare, Human-Animal Relationships, Free-roaming cats

研究者総覧

1.Health status of 'community cats' living in the tourist area of the old town in Onomichi City, Japan. J Appl Anim Welf Sci: 1-17.（2021）

2.The effect of communal litter box provision on the defecation behavior of free-roaming cats in old-town Onomichi, Japan. Appl Anim Behav Sci 224: 104938.（2020）

3.Three-year route census study on welfare status of free-roaming cats in old-town Onomichi, Japan. J Appl Anim Welf Sci 21: 203-210.（2018）

研究者総覧

津上 優作（つがみ ゆうさく） 助教 ／ TSUGAMI Yusaku Assistant Professor

乳房炎は畜産分野で経済損失の大きい疾病である。乳腺には乳房炎の病原体を排除するため、**抗菌因子産生**と**細胞間密着結合**による防御機構が存在する。これら乳腺防御機構に着目した乳房炎対策の提案を目指している。

I investigate mammary gland defense system, such as antimicrobial components and tight junction, using cultured mammary epithelial cells or mammary glands of ruminants. Mastitis causes a decrease of milk production and large economic loss in dairy industry. If defense system can be improved, it is possible to prevent mastitis.

keywords: antimicrobial components, mastitis, tight junction

1.Adverse effects of LPS on membrane proteins in lactating bovine mammary epithelial cells/Cell Tissue Res/435-448（2021）

2.Phytoestrogens weaken the blood-milk barrier in lactating mammary epithelial cells by affecting tight junctions and cell viability/J Agric Food Chem/11118-11124（2017）

3.Local heat treatment of goat udders influences innate immune functions in mammary glands/J Mammary Gland Biol Neoplasia/387-397（2021）

研究者総覧

中村 隼明（なかむら よしあき） 助教 ／ NAKAMURA Yoshiaki Assistant Professor

鳥類とほ乳類の**生殖幹細胞**を対象として、**培養・凍結保存・移植**等の操作技術を開発・改善し、動物の遺伝資源を細胞レベルで保存すること、ヒト不妊治療技術を開発することに挑戦している。

My research group aim to develop culture, cryopreservation and transplantation of germ cells including primordial germ cells and spermatogonial stem cells in birds and mammals, and to apply germ cell manipulation technologies from conservation of biological diversity to human infertility treatment.

keywords: germ cells, chicken, mouse, genetic coneservation, infertility treatment

1.Transient suppression of transplanted spermatogonial stem cell differentiation restores fertility in mice. Cell Stem Cell 28:1-14.（2021）

2.Efficient system for preservation and regeneration of genetic resources in chicken: concurrent storage of primordial germ cells and live animals from early embryos of a rare indigenous fowl（Gifujidori）. Reprod Fertil Dev 22:1237-1246.（2010）

3.Germline replacement by transfer of primordial germ cells into partially sterilized embryos in the chicken. Biol Reprod 83:130-137.（2010）

研究者総覧

新居 隆浩（にい たかひろ） 助教 ／ NII Takahiro Assistant Professor

ニワトリの健康と安全な卵の生産を目指して、**粘膜バリア機能**の強化と**産卵機能**改善に関する研究に取組んでいる。特に、**腸内環境**を中心として、肝臓や脳、卵管といった周辺の組織とのネットワークに注目している。

I work on the research about enhancement of mucosal barrier function and improvement of egg production for health and secure poultry production of chickens. In particular, I focus on the intestinal environment and the network between intestine and surrounding organs such as liver, brain and reproductive organs.

keywords: Avian, mucosal immunity, digestive tract cellular immunity, reproductive organ, egg laying function, probiotics

1.Slight Disruption in Intestinal Environment by Dextran Sodium Sulfate Reduces Egg Yolk Size Through Disfunction of Ovarian Follicle Growth. Front Physiol. 11:607369.（2021）

2.Intestinal inflammation induced by dextran sodium sulphate causes liver inflammation and lipid metabolism disfunction in laying hens. Poult Sci. 99:1663-1677.（2020）

3.Effects of avian infectious bronchitis virus antigen on eggshell formation and immunoreaction in hen oviduct. Theriogenology. 81: 1129-1138.（2014）

研究者総覧

PANAKKOOL THAMBAN Aneesh（パナッキュール サムバン アニーシュ） 助教 ／ Assistant Professor

The systematics, moult and reproductive physiology, ecology of parasitic crustaceans（especially Isopods and Copepods）infesting the marine fauna including fishes, crustaceans and other invertebrates. Defined the protandric hermaphroditism in parasitic cymothoids, successfully tracked the lifecycle of cymothoids.

keywords: Parasitic Crustaceans, Cymothoids, Copepods, Ecology, Taxonomy & Systematics, Life cycle, Physiology

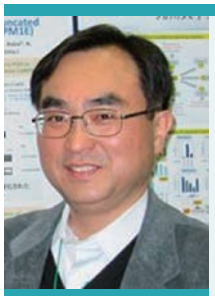
1.Review on the global distribution and hosts of the external fish parasitic isopod genus Renocila Miers, 1880,（Crustacea: Cymothoidae）, with the description of a new species from Andaman Islands, India, and notes on new host record of Renocila bijui Aneesh & Bruce 2020. J. Nat. Hist. 55:43_44, 2761_2785（2022）

2.A taxonomic review of the buccal-attaching fish parasite genus Lobothorax Bleeker, 1857（Crustacea: Isopoda: Cymothoidae）with description of a new species from southwestern India. Zool. Stud. 60:13, 1-13（2021）

3.Polychaete worm- a passive carrier for Enterocytozoon hepatopenaei in shrimp. Aquaculture, 545: 737187: 1_13（2021）

生命環境総合科学プログラム｜教員紹介

Program of Life and Environmental Sciences



生命医科学プログラム兼任（Concurrent post: Biomedical Science）

石田 敦彦（いしだ あつひこ） 教授 ／ ISHIDA Atsuhiko Professor

細胞内情報伝達、特に**タンパク質リン酸化・脱リン酸化**に興味を持ち、具体的には**Ca^{2+}情報伝達**で重要な役割を果たす多機能性**CaMキナーゼ**及び、その制御に関わる**CaMキナーゼホスファターゼ**を研究しています。

I am interested in intracellular signal transduction, especially protein phosphorylation and dephosphorylation. I am studying multifunctional CaM kinases, which play important roles in Ca^{2+} signaling, and CaM kinase phosphatase (PPM1F) involved in their regulation. The latter has been found to be involved in various diseases such as cancer and depression.

keywords: phosphorylation, dephosphorylation, biochemistry, molecular biology, chemical biology, enzyme inhibitor

1.Autoactivation of C-terminally truncated Ca^{2+} /calmodulin-dependent protein kinase (CaMK) I δ via CaMK kinase-independent autophosphorylation Arch. Biochem. Biophys. 668 29 - 38 (2019)

2.Functions and dysfunctions of Ca^{2+} /calmodulin-dependent protein kinase phosphatase (CaMKP/PPM1F) and CaMKP-N/PPM1E Arch. Biochem. Biophys. 640 83 - 92 (2018)

3.The phosphatase-resistant isoform of CaMKI, Ca^{2+} /calmodulin-dependent protein kinase I δ (CaMKI δ), remains in its 'Primed' form without Ca^{2+} stimulation. Biochemistry 54 3617 - 3630 (2015)

研究者総覧

生命医科学プログラム兼任（Concurrent post: Biomedical Science）

浮穴 和義（うけな かずよし） 教授 ／ UKENA Kazuyoshi Professor

私たちは、脳内の新しい調節因子を同定し、生体機能調節（特に**食欲**などの本能行動や**エネルギー代謝調節**）の**脳内分子メカニズム**を解明しようとしています。**神経代謝調節学**分野での新発見を目指しています。

I have identified novel neuropeptides in the avian and rodent brain and elucidate their molecular mechanisms, especially instinctive behavior such as appetite and regulation of energy metabolism. I am aiming for discoveries in the field of neurometabolic and neuroendocrine regulations.

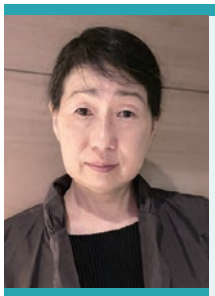
keywords: Neuropeptide, Energy metabolism, Neurometabolism, Neuroendocrinology

1.Avian and murine neurosecretory protein GL participates in the regulation of feeding and energy metabolism. Gen. Comp. Endocrinol. 260:164-170 (2018)

2.Neurosecretory protein GL stimulates food intake, de novo lipogenesis, and onset of obesity. eLife 6:e28527 (2017)

3.Neurosecretory protein GL, a hypothalamic small secretory protein, participates in energy homeostasis in male mice. Endocrinology 158:1120-1129 (2017)

研究者総覧



久我（くが） ゆかり 教授 ／ KUGA Yukari Professor

菌根共生における**物質交換**（植物C⇔菌根菌P,N,Cdなど）について様々な**表面分析・細胞学的手法**により明らかにしてきた。**果樹類白紋羽病**の**温水治療**における**土壌微生物**の**相乗作用**について明らかにしてきた。

My research themes are the symbioses between plants and soil fungi. Major topics are the mycorrhizal cellular functions using stable isotope tracers and nanoscale map SIMS and the decline mechanisms of the white root rot fungal pathogen associated with changes of soil microbial communities by the hot water treatment.

keywords: Symbioses, Soil-borne plant disease, Orchid mycorrhiza, Arbuscular mycorrhiza, Soil microbial community, Ultrastructure, Secondary ion mass spectrometry

1.Allocation of Carbon from an Arbuscular Mycorrhizal Fungus, Gigaspora margarita, to Its Gram-Negative and Positive Endobacteria Revealed by High-Resolution Secondary Ion Mass Spectrometry. Microorganisms (2021)

2.From imaging to functional traits in interactions between roots and microbes. In: Methods in Rhizosphere Biology Research. Springer (2019)

3.Uptake and intraradical immobilization of cadmium by arbuscular mycorrhizal fungi as revealed by stable isotope tracer and synchrotron radiation μX-ray fluorescence analysis. Microbes Environ (2018)

研究者総覧

佐藤 明子（さとう あきこ） 教授 ／ SATOH Akiko Professor

細胞内における膜タンパク質の局在を決定する**選別輸送**機構の研究を行っています。**ゴルジ体**という細胞小器官が重要な役割を果たしますが、その分子機構について解明しようとしています。

Organelles maintain their shapes and functions as the equilibrium of membrane flow into and out of them. We are trying to identify the dynamics of Golgi apparatus, and understand its function on the biogenesis of the secretory and membrane proteins.

keywords: Golgi stacks, cisternae, Trans Golgi Network（TGN）

研究者総覧

1.Rab6 is required for multiple apical transport pathways but not for basolateral transport pathway in Drosophila photoreceptors/PLOS Genetics/2016

2.Recycling endosomes are attached to trans-side of Golgi units both in Drosophila and mammalian cells/J. Cell Sci./2020

3.Sec71 separates Golgi stacks in *Drosophila* S2 cells/J. Cell Sci./2020

竹田 一彦（たけだ かずひこ） 教授 ／ TAKEDA Kazuhiko Professor

環境中の**微量物質**、**活性酸素**、**マイクロプラスチック**などの分析方法の確立とそれらの**地球環境**に対する影響評価。主に**分析化学**的プローチによる手法開発と、海洋や河川、大気などの**フィールド調査**の融合による研究。

I am a professional environmental scientist based on analytical chemistry in the aquatic environments and atmosphere. The current works are focused on photochemistry and their dynamics of 1) microplastics, 2) iodine, 3) reactive oxygen species, and 4) pollutants in environments. We are approaching these themes with laboratory work and fieldwork.

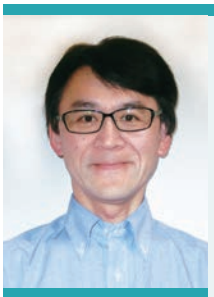
keywords: Analytical Chemistry, Environmental Chemistry, Microplastics, Iodine, Reactive Oxygen Species

研究者総覧

1.Factors controlling the degradation of hydrogen peroxide in river water, and the role of riverbed sand. Sci Total Environ 716: Article 136971.（2020）

2.Hydroxyl radical generation with a high power ultraviolet light emitting diode（UV-LED）and application for determination of hydroxyl radical reaction rate. J Photochem Photobiol A 340: 8-14.（2017）

3.The iodide and iodate distribution in the Seto Inland Sea, Japan. Aquat Geochem 23: 315-330.（2017）



中坪 孝之（なかつぼ たかゆき） 教授 ／ NAKATSUBO Takayuki Professor

河川流域、**北極ツンドラ**、**硫気荒原**などをフィールドに、**生態系**における個々の生物の役割を明らかにすることによって、生態系の構造と機能の理解、**環境変動**が生態系に与える影響の予測を目指しています。

My research fields are ecosystem ecology and plant ecology. Recent research subject of my laboratory is the impact of alien species on the structure and function of ecosystems. In addition, I have been working on the impact of climate change on the Arctic terrestrial ecosystem for more than 20 years.

keywords: Alien species, Arctic, Climate change, Ecosystem ecology, Plant ecology

研究者総覧

1.Effects of climate warming on the production of the pioneer moss *Racomitrium japonicum*: seasonal and year-to-year variations/J. Plant Res./2021

2.Annual respiration of Japanese mud snail *Batillaria attramentaria* in an intertidal flat: its impact on ecosystem carbon flows/Landsc. Ecol. Eng./2019

3.Distribution and stress tolerance of *Fimbristylis dichotoma* subsp. *podocarpa*（Cyperaceae）growing in highly acidic solfatara fields/Ecol. Res./2018

生命医科学プログラム兼任（Concurrent post: Biomedical Science）

古川 康雄（ふるかわ やすお） 教授 ／ FURUKAWA Yasuo Professor

脳神経系の機能素子である**イオンチャネル**の機能や**シナプス**伝達の可塑性に関する研究を行っている。現在は、主として**ペプチド**作動性Na^+チャネルと電位依存性K^+チャネルを対象とした研究を進めている。

We are interested in the structure and function of ion channels, which are membrane proteins permitting passive ion transport across the cell membrane. Ion channels are important determinants of neuronal excitability and plasticity. Currently, we are conducting research mainly on the peptide-gated Na^+ channel and the voltage-gated K^+ channels.

keywords: channel peptide excitability synapse

研究者総覧

1.Modulation of the FMRFamide-gated Na^+ channel by external Ca^{2+}, Pflugers Arch, 469:1335-1347（2017）

2.Serotonin modulates the excitatory synaptic transmission in the dentate granule cells, J Neurophysiol, 115:2997-3007（2016）

3.Electrostatic charge at position 552 affects the activation and permeation of FMRFamide-gated Na^+ channels, J Physiol Sci, 64:141-150（2014）

研究者総覧

生命医科学プログラム兼任（Concurrent post: Biomedical Science）

山崎 岳（やまざき たけし） 教授 ／ YAMAZAKI Takeshi Professor

1）脳で合成されるステロイドホルモン（**ニューロステロイド**）の生理機能。特に女性ホルモン（**エストラジオール**）の神経保護作用について。2）**メチル水銀**の神経毒性に対する脂質の神経保護作用。

1) Physiological functions of steroid hormones synthesized in the brain (neurosteroids). Neuroprotective effect of sex steroid hormones. 2) Neuroprotective effect of polyunsaturated fatty acids on the neurotoxicity of methylmercury.

keywords: Neurosteroid, neuroprotection, estradiol

1.DHA and Its metabolites have a protective role against methylmercury-induced neurotoxicity in mouse primary neuron and SH-SY5Y cells. Int J Mol Sci 22(6):3213 (2021)

2.Potentiation of 17β-estradiol synthesis in the brain and elongation of seizure latency through dietary supplementation with docosahexaenoic acid. Sci. Rep. 7:6268 (2017)

3.De novo synthesized estradiol protects against methylmercury-induced neurotoxicity in cultured rat hippocampal slices. Pros One. 8:e55559 (2013).

研究者総覧

山田 俊弘（やまだ としひろ） 教授 ／ YAMADA Toshihiro Professor

主に、**インドネシア**や**マレーシア**、**ミャンマー**などの**熱帯林**で研究をしています。熱帯林は**生物多様性**が高いことで知られています。私は、どの程度生物多様性が高いのか?、や、なぜ生物多様性が高いのか?について調べています。また、熱帯域は**生物多様性の喪失**が大きいことも知られています。**生物多様性を保全**する方策に関する研究も行っています。

I mainly study in tropical forests in Indonesia, Malaysia, Myanmar and so on. Tropical forests are known for their mega-biodiversities. At the same time, they are known for a large loss of biodiversity. I am conducting research on measures to conserve tropical biodiversity.

keywords: biodiversity, conservation biology, tropical rain forests

1.The Forest Observation System, building a global reference dataset for remote sensing of forest biomass. Scientific data 6 (2019)

2.TRY plant trait database – enhanced coverage and open access. Global Change Biology (2020)

3.Dynamics of Tree Species Diversity in Unlogged and Selectively Logged Malaysian Forests. Scientific Reports 8:1024 (2018)

研究者総覧

生物資源科学プログラム兼任（Concurrent post: Bioresource Science）

和崎 淳（わさき じゅん） 教授 ／ WASAKI Jun Professor

植物の養分動態に関する研究を行っています。特に資源の枯渇が懸念される**リン**に注目し、リン欠乏で形成される**クラスター根**や**根分泌物**による吸収機構の解明、リン利用効率の改善を目指した研究に取り組んでいます。

Main research topic is plant nutrition (especially phosphorus) and the dynamics in the rhizosphere.Strategies of P mobilization by plants are actively investigating, such as cluster root formation, root exudates, and plant-microbial interactions. We are also trying to apply the strategy on improvement of P use efficiency.

keywords: Rhizosphere, Phosphorus, Root Exudates, Cluster Roots

1.AtALMT3 is involved in malate efflux induced by phosphorus deficiency in *Arabidopsis thaliana* root hairs. Plant Cell Physiol. 60: 107-115 (2019).

2.P and N deficiency change the relative abundance and function of rhizosphere microorganisms during cluster root development of white lupin (*Lupinus albus* L.). Soil Sci. Plant Nutr. 64: 686-696. (2018)

3.Formation of dauciform roots by Japanese native Cyperaceae and their contribution to phosphorus dynamics in soils. Plant Soil, 461:107-118 (2021).

研究者総覧

ヴィレヌーヴ 真澄美（ま すみ） 教授 ／ VILLENEUVE Masumi Professor

界面に注目して**熱力学**と**ダイナミクス**の観点から生命・環境の研究を行っています。具体的には、**界面張力**測定を主な手法として**脂質膜**の**相図**を明らかにし、**表面光散乱**を測定して膜のダイナミクスを研究しています。

My research area is colloid and interface science. From materials to biomembranes, what we call soft matter is the subject of my research. Currently, I study the thermodynamics and dynamics of self-assembled monolayers at interfaces and the swelling mechanism of gluten-free, additive-free rice bread.

keywords: Colloid, Interface, Thermodynamics, Rheology, Surfactants, Lipids, Starch

1.Roles of a-methyl trans-cyclopropane groups in behavior of mixed mycolic acid monolayers/BBA-Biomembrane 1861: 441 (2019)

2.Uptake of iron (III)-ethylenediamine-N,N,N',N'-tetraacetic acid complex by phosphatidylcholine lipid film. Part II. Effect of film curvature/Chem. Phys. Lipids 210: 14 (2018)

3.Development of gluten-free rice bread: Pickering stabilization as a possible batter-swelling mechanism/LWt-Food Sci. Tech. 79: 632 (2017)

研究者総覧

岩本 洋子（いわもと ようこ） 准教授 ／ IWAMOTO Yoko Associate Professor

大気中に浮遊する微粒子（**エアロゾル**）の研究を行っています。エアロゾルが地球の**気候**や**物質循環**に与える影響を把握するため、海洋、山岳、都市、郊外などさまざまな場所で**大気観測**を行っています。

We are working on atmospheric aerosols. Aerosol particles can act as nuclei of cloud droplets, or can be a source of nutrients for plants on the sea/land surface. To understand the effects of aerosols on the global climate and biogeochemical cycles, we conduct atmospheric observations in various environments.

keywords: Aerosol, Climate, Cloud, Biogeochemical cycles

1.Contribution of oceanic aerosol particles to cloud condensation nuclei, Earozoru Kenkyu, 35(3), 192-198, 2020

2.Simultaneous measurement of CCN activity and chemical composition of fine-mode aerosols at Noto Peninsula, Japan, in autumn 2012/ Aerosol Air Qual. Res./2016

3.Spatial variation of biogenic and crustal elements in suspended particulate matter from surface waters of the North Pacific and its marginal seas/Progr. Oceanogr./2014

研究者総覧

土谷 彰男（つちや あきお） 准教授 ／ TSUCHIYA Akio Associate Professor

アマゾンの土地利用変化と地表面熱収支。林分の幹内蒸散流と牧場の蒸発散量。天然林とプランテーション林の分光放射特性。アマゾンの開発と**環境**。アマゾン生物圏大気圏大規模実験計画の研究誌。

Land use changes and heat balance components. Sap flow of *capoeira* and evapotranspiration over a pasture. Irradiance under a primary forest and an agricultural forest. Historical changes in Amazonian environemnts and the roles of Large-scale Biosphere-Atmosphere Experiments in Amazonia (LBA).

keywords: Amazon, Amazonia, environment, ambiente

1.Differences in irradiance characteristics between Syzygium malaccense and Magnifera indica caused by their tree forms. Eco-habitat 27 (1): 65-74. (2021).

2.Changes in CO_2 concentration within shallow soils originating from solar radiation and rainwater in Central Amazonia. Jpn. J. Biometeor. 53-2: 93-93 (2016)

3.Short-term responses of tree growth rings in natural gaps for forest management. In: F.M.B. Romero, R.B. Castro & J.C.R. Tello (eds), Estudos dendrológicos e ecológicos na Amazônia: oportunidades e experiências, 66-86. INPA, Manaus, Brazil. (2022)

研究者総覧

根平 達夫（ねひら たつお） 准教授 ／ NEHIRA Tatsuo Associate Professor

有機合成化学と**構造有機化学**を基盤に、生命科学への貢献を目指している。酵素を機能特異的に認識する蛍光プローブの合成、円二色性を利用した分子の立体構造解析、天然有機化合物の構造解析をしている。

Life science is explored by organic chemistry, specifically, organic synthesis and organic structure analysis. Synthesis of useful probes, chirality analysis by circular dichroism, and structure elucidation of natural products are conducted.

keywords: Organic synthesis, Structural organic chemistry, Natural product chemistry, Circular dichroism

1.Development of a Universal Ellipsoidal Mirror Device for Fluorescence Detected Circular Dichroism (FDCD) – Elimination of Polarization Artifacts, Appl Spectr 59: 121-125 (2005)

2.A sensitive method based on fluorescence-detected circular dichroism for protein local structure analysis, Anal Biochem 430: 179-184 (2012)

3.Natural Dolapyrrolidone: Isolation and Absolute Stereochemistry of a Substructure of Bioactive Peptides, Chirality 32: 1152-1159 (2020)

研究者総覧

彦坂 暁（ひこさか あきら） 准教授 ／ HIKOSAKA Akira Associate Professor

無腸動物を用いて**動物の初期進化**、**個体発生の進化**、**藻類との共生進化**、等を研究している。同時に瀬戸内海産の無腸動物ナイカイムチョウウズムシを実験に使いやすくするための基盤整備も進めている。

We are studying the early evolution of animals, the evolution of ontogeny, and the evolution of endosymbiosis with microalgae using an acoel flatworm, *Praesagittifera naikaiensis*, living in the Seto Inland Sea.

keywords: Acoela, Evolution, Endosymbiosis, Seto Inland Sea, *Praesagittifera naikaiensis*

1.Geographical Distribution and Genetic Diversity of *Praesagittifera naikaiensis* (Acoelomorpha) in the Seto Inland Sea, Japan. Zool Sci 37:314–9. (2020)

2.Multiple massive domestication and recent amplification of Kolobok superfamily transposons in the clawed frog *Xenopus*. Zoological Lett 4:17. (2018)

3.Genome evolution in the allotetraploid frog *Xenopus laevis*. Nature 538:336–343. (2016)

戸田 求（とだ もとむ） 講師 ／ TODA Motomu Associate Professor or Lecturer

主要研究課題:森林生態系を対象としたエネルギー・炭素循環　**研究手法**:野外観測、数値モデルシミュレーション、デジタル画像解析など　**近年の研究課題**:(a)気候変動に関連する自然撹乱からの生態系応答(b)老齢林の高い炭素吸収量を生み出すメカニズム解明 (c)デジタル画像処理を駆使した森林生態系の機能・構造評価

My research interests are biosphere-atmosphere interaction, carbon and water cycle in terrestrial ecosystems, Digital visualisation of canopy structure, near-surface remote sensing operations and process-based ecosystem modeling.

keywords:Terrestrial carbon cycle, Macro- and micro-climates; Atmosphere–forest dynamics modeling, Climate change

研究者総覧

1.A Bayesian framework to evaluate parameter and predictive inference of a simple soil respiration model in a temperate forest in western Japan. *Ecological Modelling*（2020）

2.Estimation of plant area index and phenological transition dates from digital repeat photography and radiometric approaches in a hardwood forest in the Northeastern United States. *Agricultural and Forest Meteorology*（2017）

3.Single level turbulence measurements to determine roughness parameters of complex terrain. *Journal of Geophysical Research*（*Atmosphere*）(2003)

勝山 千恵（かつやま ちえ） 助教 ／ KATSUYAMA Chie Assistant Professor

土壌微生物による物質動態に関する研究:**菌根菌**、その**内生細菌**、**植物病原菌**およびこれら真菌の**菌糸周辺土壌微生物**を対象に、**安定同位体トレーサー法**により物質変換・移動機構と生物間相互作用の解明を目指しています。

My research themes are element cycles and dynamics caused by soil microorganisms. I am trying to elucidate the interactions between soil microorganisms, such as a mycorrhizal fungus, endobacteria, a fungal pathogen, and soil bacteria and fungi around fungal hyphae (hyphosphere), by using stable isotope tracers and microbial ecological methods.

keywords:Soil microorganisms, White root rot fungal pathogen, Mycorrhiza, Endobacteria, Hyphosphere, Element cycle, Stable isotope tracer, Gas chromatography/mass spectrometry (GC/MS), Microbial ecology

研究者総覧

1.Overview of recent researches on nitrifying microorganisms in soil. Soil Sci Plant Nutr 67: 619-632.（2021）

2.Occurrence and potential activity of denitrifiers and methanogens in groundwater at 140 m depth in Pliocene diatomaceous mudstone of northern Japan. FEMS Microbiol Ecol 86: 532-543.（2013）

3.Allocation of carbon from an arbuscular mycorrhizal fungus, *Gigaspora margarita*, to its gram-negative and positive endobacteria revealed by high-resolution secondary ion mass spectrometry. Microorganisms 9: 2597.（2021）

小林 勇喜（こばやし ゆうき） 助教 ／ KOBAYASHI Yuuki Assistant Professor

受容体は細胞膜に発現するのが当たり前?百年以上忘れ去られた**一次繊毛**というオルガネラに発現する**摂食・情動・睡眠**等に関係する受容体に着目し研究を行っています。細胞から個体を通して真の生命現象に迫ります。

Although G protein-coupled receptors (GPCRs) play important roles as receptors that mediate various life phenomena, a detailed understanding of their functions is limited. Main recent research topic is analysis of GPCRs localized in primary cilia. We are aiming for a breakthrough in the field of neuroscience.

keywords:GPCR, primary cilia, endocrinology, neuroscience

研究者総覧

1.Properties of primary cilia in melanin-concentrating hormone receptor 1-bearing hippocampal neurons in vivo and in vitro. Neurochem Int 142 : 104902.（2021）

2.New perspectives on GPCRs: GPCR heterodimer formation（melanocortin receptor）and GPCR on primary cilia（melanin concentrating hormone receptor）. Gen Comp Endocrinol 293 : 114474.（2020）

3.Characterization of functional primary cilia in human induced pluripotent stem cell-derived neurons. Neurochem Res 44 : 1736–1744.（2019）

中川 直樹（なかがわ なおき） 助教 ／ NAKAGAWA Naoki Assistant Professor

植物のミトコンドリア機能が変化した変異体と植物成長調節剤を用い、これまでミトコンドリアとの関連が見落とされていた様々な形質とミトコンドリアの関連を明らかにし、役立てることを目標にしている。

Using mutants with altered plant mitochondrial function and plant growth regulators, we aim to clarify the relationship between mitochondria and various traits that have been overlooked.

keywords:plant hormone

研究者総覧

1.The putative peptide gene FEP1 regulates iron deficiency response in Arabidopsis. Plant Cell Physiol. 59: 1739-52（2018）.

2.Sugar treatment inhibits IAA-induced expression of endo-1,3:1,4-β-glucanase EI transcripts in barley coleoptile segments Physiol. Planta. 139: 413-420（2010）.

3.A mutation in At-nMat1a, which encodes a nuclear gene having high similarity to group II intron maturase, causes impaired splicing of mitochondrial NAD4 transcript and altered carbon metabolism in Arabidopsis thaliana. Plant Cell Physiol. 47: 772 - 83（2006）.

研究者総覧

平野 哲男（ひらの てつお） 助教 ／ HIRANO Tetsuo Assistant Professor

謎の多い存在「**ノンコーディングRNA**」の一つである**CCDC26**-RNAについて、**骨髄性白血病**細胞のがん化に関係があることや赤血球細胞の発生段階特異的な**遺伝子制御**に関連していることを明らかにしました。

I have discovered that CCDC26-RNA, one of the enigmatic "non-coding RNAs", is involved in the oncogenic transformation of myeloid leukemia cells. Interestingly, I have recently found that this molecule is also involved in developmental stage-specific gene regulation of erythroid cells.

keywords: tumorigenesis, double minute chromosomes, gene amplification, leukemia, mt DNA, HL-60

1.Long noncoding RNA CCDC26 as a modulator of transcriptional switching between fetal and embryonic globins./BBA- MCR/2021

2.Long noncoding RNA, CCDC26, controls myeloid leukemia cell growth through regulation of KIT expression./Mol.Cancer/2015

3.Genes encoded within 8q24 on the amplicon of a large extrachromosomal element are selectively repressed during the terminal differentiation of HL-60 cells./Mutat.Res./2008

研究者総覧

渡邊 千穂（わたなべ ちほ） 助教 ／ WATANABE Chiho Assistant Professor

物質的な側面から生命や疾病を読み解くことを目指し、生体膜を模倣した**リポソーム**や高分子液滴（**エマルション**）などの***in vitro*細胞モデル**（人工細胞）を用いたプロジェクトに取り組んでいます。

I work on projects using *in vitro* cell models (artificial cells) such as polymer solutions, polymer droplets (emulsions), and liposomes (lipid membranes). My aim is to understand “life” from materials and explore connections between them. I am currently interested in neurodegenerative disease and lipid roles in liquid-liquid phase separation.

keywords: lipid membrane, artificial cell, polymer solutions, liposomes, emulsions

1.Membrane Surface Modulates Slow Diffusion in Small Crowded Droplets /Langmuir/2021

2.Quantitative Analysis of Membrane Surface and Small Confinement Effects on Molecular Diffusion/J. Phys. Chem. B/2020

3.On the possible structural role of single chain sphingolipids Sphingosine and Sphingosine 1-phosphate in the amyloid-β peptide interactions with membranes. Consequences for Alzheimer’s disease development/Colloids Surf. A/2016

基礎生物学プログラム｜教員紹介

Program of Basic Biology

生命医科学プログラム兼任（Concurrent post: Biomedical Science）

荻野 肇（おぎの はじめ） 教授 ／ OGINO Hajime Professor

専門は**発生**生物学、ゲノム**進化**学。**ツメガエル**、ナメクジウオ、ニワトリ、哺乳類培養細胞等を用いて、**転写制御**・エピジェネティクスの側面から、脳・感覚器の発生や**再生**、進化の分子機構を研究しています。

My main research areas are developmental biology and evolutionary genomics. Using clawed frogs (*Xenopus*), lancelet, chicken, and mammalian culture cells, I am investigating molecular mechanisms of development, regeneration, and evolution of the brain and sensory organs with a focus on transcriptional and epigenetic gene regulation.

keywords: development, regeneration, evolution, genome, transcriptional regulation, epigenetics, brain, eye, *Xenopus*

1.Genome evolution in the allotetraploid frog Xenopus laevis. Nature, 538: 336-343 (2016)

2.Evolution of a tissue-specific silencer underlies divergence in the expression of pax2 and pax8 paralogues. Nature Communications 3: 848 (2012)

3.The genome of the western clawed frog Xenopus tropicalis. Science 328: 633-636 (2010).

研究者総覧

生命医科学プログラム兼任（Concurrent post: Biomedical Science）

菊池 裕（きくち ゆたか） 教授 ／ KIKUCHI Yutaka Professor

生命科学の課題（**器官形成・がん生物学**）に対して、ヒト・マウスの生体内・生体外モデルを実験系として用いると共に、**画像・オミックス解析**や**人工知能**（**AI**）を積極的に活用して研究を行っている。

I am studying the following biological questions; “How do tissues and organs form and mature (Development)?” and “How do failure of tissues and organs occur (Carcinogenesis)?”. My research goal is understanding the common mechanisms and systems underlying these biological phenomena by using Bioimage Informatics and Machine Learning.

keywords: Bioimage Informatics, Medical Image, Cancer, Machine Learning

1.Leucine/glutamine and v-ATPase/lysosomal acidification via mTORC1activation are required for position-dependent regeneration. Scientific Reports (2018).

2.Nuclear movement regulated by non-Smad Nodal signaling via JNK is associated with Smad signal transduction during zebrafish endoderm specification. Development (2017).

3.Nipbl and mediator cooperatively regulate gene expression to control limb development. PLOS Genetics (2014).

研究者総覧

草場 信（くさば まこと） 教授 ／ KUSABA Makoto Professor

二倍体野生ギク・**キクタニギク**の純系系統を同質六倍体の栽培ギク対するモデル系統として開発し、**分子遺伝学**的な研究を行っています。また、**シロイヌナズナ**などを用いて**葉老化**の制御の分子機構を研究しています。

My research centers around molecular genetic study of higher plants. I have two projects: (i) Molecular analysis of leaf senescence using the model plant *Arabidopsis thaliana*; (ii) Analysis of natural variation in the genus *Chrysanthemum* using a model strain as a reference, whole genome sequence of which we determined recently.

keywords: Molecular genetics, Arabidopsis, Chrysanthemum, Leaf senescence

1.Genetic analysis of chlorophyll synthesis and degradation regulated by BALANCE of CHLOROPHYLL METABOLISM/Plant Physiol./189:431-444(2022)

2.A chromosome-level genome sequence of Chrysanthemum seticuspe, a model species for hexaploid cultivated chrysanthemum /Commun. Biol. /4:1167(2021)

3.Mendel's green cotyledon gene encodes a positive regulator of the chlorophyll-degrading pathway/Proc. Natl. Acad. Sci. USA/104: 14169-14174 (2007)

研究者総覧

山口 富美夫（やまぐち とみお） 教授 ／ YAMAGUCHI Tomio Professor

コケ植物の**分類**と**多様性**が研究テーマ。専門の分類群はシラガゴケ属蘚類。その他、各地で野外調査を実施して、琉球列島や小笠原諸島でのコケ植物の多様性を明らかにした。

I study the taxonomy and diversity of bryophytes. My taxonomical specialty is the genus Leucobryum and also conducting research on the diversity of bryophytes in the southern part of Japan, including the Ryukyu Islands and the Ogasawara Islands.

keywords: Bryophytes, Taxonomy, Diversity

1.A revision of the genus Leucobryum（Musci）in Asia. J. Hattori Bot. Lab. 73: 1-123.（1993）
2.Filibryum（Hypnaceae）, a new moss genus with a new species from East Asia. J. Bryol. 39: 152-160.（2017）
3.Bryocrumia vivicolor, new localites in Japan and Taiwan. Bry. Div. Evo. 42: 56-60.（2020）

研究者総覧

植木 龍也（うえき たつや） 准教授 ／ UEKI Tatsuya Associate Professor

海産動物**ホヤ**類のもつ特異な**バナジウム**濃縮機構に関連するタンパク質・遺伝子の発見、濃縮・還元プロセスの生化学的解明、バナジウム濃縮に関連する**共生細菌**の単離同定など分子・細胞レベルの研究を行ってきた。

I have been working on molecular biological mechanisms of unique phenomena in marine animals, mainly on the isolation of proteins and genes related to the vanadium accumulation by ascidians, molecular and cell-level research for vanadium accumulation and reduction, and the identification of symbiotic bacteria related to vanadium accumulation.

keywords: vanadium, ascidians, symbiotic bacteria

1.Vanadium-binding proteins（vanabins）from a vanadium-rich ascidian *Ascidia sydneiensis samea*. Biochim. Biophys. Acta 1626, 43-50（2003）.
2.A novel vanadium transporter of the Nramp family expressed at the vacuole of vanadium-accumulating cells of the ascidian *Ascidia sydneiensis samea*. Biochim. Biophys. Acta 1810, 457-464（2011）.
3.Bioaccumulation of vanadium by vanadium-resistant bacteria isolated from the intestine of *Ascidia sydneiensis samea*. Mar. Biotech. 18, 359-371（2016）.

研究者総覧

嶋村 正樹（しまむら まさき） 准教授 ／ SHIMAMURA Masaki Associate Professor

コケ植物について系統分類学・生態学・形態学・細胞生物学などの視点で研究を行っています。コケ植物の紡錘体形成様式の多様性に注目し、**陸上植物の細胞分裂機構の進化**についての研究も行っています。

We are conducting research on bryophytes from the perspectives of taxonomy, ecology, morphology, and cell biology. Focusing on the diversity of mitotic spindle formation, we are also conducting research on the evolution of cell division mechanisms in land plants.

keywords: Bryophytes, Marchantia, hornworts, cell division, cytoskeleton, evolution

1.Anthoceros genomes illuminate the origin of land plants and the unique biology of hornworts. Nature Plants 6: 259–272.（2020）
2.Marchantia polymorpha; Taxonomy, phylogeny and morphology of a model system. Plant Cell Physiol. 57:230–256.（2016）
3.γ-Tubulin in basal land plants: characterization, localization, and implication in the evolution of acentriolar microtubule organizing centers. Plant Cell 16: 45–59.（2004）

研究者総覧

鈴木 厚（すずき あつし） 准教授 ／ SUZUKI Atsushi Associate Professor

私たちの体の形づくりの基本となる中胚葉・神経組織の形成機構、および幹細胞の形成・維持や組織再生の機構を調べています。**誘導因子シグナル**に着目して、動物の**発生・再生現象**を解明することを目指しています。

We are studying the molecular mechanisms for mesodermal and neural development in the body axis formation of vertebrates and for the regulation of stem cells and tissue regeneration. We are particularly interested in the roles of cell signaling mediated by growth factors and downstream transcription factors.

keywords: induction and patterning of mesoderm and neural tissue, tissue regeneration, inducing factors, growth factor signaling

1.Coordinated regulation of the dorsal-ventral and anterior-posterior patterning of *Xenopus* embryos by the BTB/POZ zinc finger protein Zbtb14. Dev Growth Differ 60:158-173.（2018）
2.Cdc2-like kinase 2（Clk2）promotes early neural development in *Xenopus* embryos. Dev Growth Differ 61: 365-377.（2019）
3.TGF-β1 signaling is essential for tissue regeneration in the *Xenopus* tadpole tail. Biochem Biophys Res Commun 565: 91-96.（2021）

研究者総覧

研究者総覧

田川 訓史（たがわ くにふみ） 准教授 / TAGAWA Kunifumi Associate Professor

半索動物**ヒメギボシムシ**や珍無腸動物**ナイカイムチョウウズムシ**の発生・再生・進化に関する研究。分子生物学的・ゲノム科学的手法を用いて他の動物群と比較解析し、**脊索動物や左右相称動物の起源や進化**に迫りたい。

I have been conducting the research on development, regeneration, and evolution of the marine invertebrate deuterostome, an eneteropneust hemichordate, Ptychodera flava, and an acoel flatworm, Praesagittifera naikaiensis. I would like to approach the origin and evolution of chordates and bilaterians by comparative analyses using molecular biological and genome scientific techniques.

keywords: hemichordate, acoel flatworm, Evo-Devo, regeneration, comparative analyses

1.Regeneration in the enteropneust hemichordate, *Ptychodera flava*, and its evolutionary implications, Dev. Growth Differ.60:400-408(2018).
2.Hemichordate modles, Curr. Opin. Genet. Dev.39:71-78(2016).
3.Hemichordate genomes and deuterostome origins, Nature 527(7579)459-465(2015).

研究者総覧

坪田 博美（つぼた ひろみ） 准教授 / TSUBOTA Hiromi Associate Professor

植物の系統・分類および**瀬戸内海沿岸**地域の**植物相・植生**、**隔離環境**下で起こる現象に関する研究を行っている。とくに**世界遺産宮島**の植物相や植生とその**遷移**、**植物食動物**の影響、**保全**や**移入種**の対策等を研究している。

My research focuses on plant systematics based on molecular phylogeny, flora and vegetation of coastal areas of the Seto Inland Sea, Japan, and phenomena occurring in isolated environments, in particular, on Miyajima Island registered as a World Heritage Site, its conservation and impact of phytophagous animals and invasive plants.

keywords: Bryophytes, algae, lichen, cryptogams, sea grasses, phytosociology, molecular phylogeny, phytogeography, phenology, allelopathy

1.Systematics of the family Pottiaceae (Bryophyta) with special reference to the familial and subfamilial circumscriptions. Hikobia 17: 117-129. (2016)
2.On the systematic position of the genus *Timmiella* (Dicranidae, Bryopsida) and its allied genera, with the description of a new family Timmiellaceae. Phytotaxa 181: 151–162. (2014)
3.Systematic position of the enigmatic liverwort *Mizutania* (Mizutaniaceae, Marchantiophyta) inferred from molecular phylogenetic analyses. Taxon 59: 448-458. (2010)

研究者総覧

生命医科学プログラム兼任 (Concurrent post: Biomedical Science)

濱生 こずえ（はまお） 准教授 / HAMAO Kozue Associate Professor

細胞骨格の細胞内機能に注目して研究を行っている。**細胞質分裂**中の**DAPK3**による**収縮環収縮**の機構を明らかにした。また、**変異ダイナミン**による**微小管制御異常**を介した**神経障害**の機構についても研究している。

I am focusing on the intracellular function of the cytoskeleton. I elucidated the roles of DAPK3 in the regulation of a contractile ring during cytokinesis. I am also studying the abnormal regulation of microtubules by dynamin-2 mutations to understand the mechanism of neuropathy.

keywords: cytoskeleton, cytokinesis, DAPK3, dynamin, microtubules, neuropathy

1.Impairment of cytokinesis by cancer-associated DAPK3 mutations. Biochem Biophys Res Commun. 533:1095-1101 (2020)
2.ZIP kinase phosphorylated and activated by Rho kinase/ROCK contributes to cytokinesis in mammalian cultured cells. Exp Cell Res. 386:111707. (2020)
3.Phosphorylation of myosin II regulatory light chain by ZIP kinase is responsible for cleavage furrow ingression during cell division in mammalian cultured cells. Biochem Biophys Res Commun. 459:686-691. (2015)

研究者総覧

古野 伸明（ふるの のぶあき） 准教授 / FURUNO Nobuaki Associate Professor

減数分裂や**初期胚**では、特殊な**細胞周期**を行います。例えば、DNA複製をスキップしたり、G1期やG2期がありません。私は、この特殊な細胞周期の機構を、遺伝学的、生化学的な手法を用いて解析しています。

Oocytes and embryos have a unique cell cycle. Oocytes are arrested at G2 phase for a long time. Moreover, oocyte skips the S phase and arrests again at M phase. After fertilization, embryo has only one G2 phase in first cleavage. I study a unique mechanism of these cell cycles.

keywords: Cell cycle, oocyte, embryo, Xenopus, meiosis

1.Suppression of DNA replication via Mos function during meiotic division in Xenopus oocytes. EMBO J. 13, 2399-2410,1994
2.Human Cyclin A Is Required for Mitosis until Mid Prophase. J. Cell Biol., 147, 295-306,1999
3.Involvment of Myt1 kinase in the G2 phase of the first cell cycle in Xenopus laevis. Biochemocal and Biophysical Research Communications 515, 139-145,2019

三浦 郁夫（みうら いくお） 准教授 ／ MIURA Ikuo Associate Professor

生物の進化にはオスとメスの交配によるゲノムの組み替えが重要な働きを担っている。そこで、**野生ガエル**を用いて、生物進化の鍵となるオスとメスの**性の決定や性染色体**の進化に関する研究を行なっている。

Sexual reproduction, which recombines nuclear genomes between individuals to produce biodiversity, plays a critically important role for adaptation and evolution of eukaryotes. My research theme is to unveil evolutionary mechanisms of the sex determination and sex chromosomes, which are key parts for the sexual reproduction.

keywords: Sex determination, sex chromosome, evolution

研究者総覧

1.Evolution of a multiple sex-chromosome system by three-sequential translocations among potential sex-chromosomes in the Taiwanese frog Odorrana swinhoana. Cells, 10(3), 661; Doi.org/10.3390/cells10030661.（2021）

2.Reconstruction of female heterogamety from admixture of XX-XY and ZZ-ZW sex chromosome systems within a frog species. Mol Ecol（2018）.

3.An evolutionary witness: the frog Rana rugosa, underwent change of heterogametic sex from XY male to ZW female. Sex Dev（2007）.

守口 和基（もりぐち かずき） 講師 ／ MORIGUCHI Kazuki Associate Professor or Lecturer

バクテリアの四型分泌系による**遺伝子の水平伝播**を解析し、移行を促進することによる**遺伝子導入法**としての応用と、移行を阻害することによる**抗生物質耐性遺伝子等の拡散防止法**としての応用を目指している。

Our group is working on an analysis of horizontal gene transfer mediated by type-4 secretion system in bacteria. Through the analysis, we aim to apply it as a gene introduction tool by promoting the transfer, and as a prevention method of the spread of antibiotic resistance genes by blocking it.

keywords: horizontal gene transfer（HGT), type-4 secretion system（T4SS), gene introduction tool, antibiotics resistance gene

研究者総覧

1.Targeting Antibiotic Resistance Genes Is a Better Approach to Block Acquisition of Antibiotic Resistance Than Blocking Conjugal Transfer by Recipient Cells: A Genome-Wide Screening in Escherichia coli/Front. Microbiol./2020

2.Trans-Kingdom Horizontal DNA Transfer from Bacteria to Yeast Is Highly Plastic Due to Natural Polymorphisms in Auxiliary Nonessential Recipient Genes/PLoS ONE/2013

3.The complete nucleotide sequence of a plant root-inducing（Ri）plasmid indicates its chimeric structure and evolutionary relationship between tumor-inducing（Ti）and symbiotic（Sym）plasmids in rhizobiaceae/J. Mol. Biol./2001

有本 飛鳥（ありもと あすか） 助教 ／ ARIMOTO Asuka Assistant Professor

生物の**形態形成**に関わる分子機構の進化や多様性を理解するため,次世代シークエンス技術を駆使して海産無脊椎動物や藻類など様々な生物の**全ゲノム解読**やゲノムワイド解析に取り組んでいる。

My current area of interest is comparative genomics among various marine organisms. I focus on differences and/or similarities of the molecular mechanisms associated with morphogenesis in the research. Omics approaches including genome decoding help our comprehensive understanding of the evolution of the mechanisms.

keywords: Comparative genomics, Genome assembly, Development, Evolution

研究者総覧

1.A siphonous macroalgal genome suggests convergent functions of homeobox genes in algae and land plants / DNA Res 26:183-192 / 2019

2.A draft genome assembly of the acoel flatworm *Praesagittifera naikaiensis* / GigaScience 8:1-8/ 2019

3.A draft genome of the brown alga, *Cladosiphon okamuranus*, S-strain: a platform for future studies of 'mozuku' biology / DNA Res 23:561-570 / 2016

生命医科学プログラム兼任（Concurrent post:Biomedical Science）

井川 武（いがわ たけし） 助教 ／ IGAWA Takeshi Assistant Professor

多様な生態を持つ**両生類**を対象に**適応進化**をもたらす**遺伝子機能**と**ゲノム変異**に興味がある。モデル生物であるツメガエル類と野生種の利点を生かし、**次世代シークエンサー**などの先端的ツールを用いて研究を進めている。

My interests are gene function and genome differentiation of amphibian species which have diversified ecology. I am studying genome evolution and adaptation on both model（clawed frogs in the genus Xenopus）and non-model amphibians by ecology and genomics.

keywords: amphibian, molecular evolution, genome evolution, whole genome sequencing, population genetics

研究者総覧

1.Fine-scale demographic processes resulting from multiple overseas colonization events of the Japanese stream tree frog, *Buergeria japonica*. J Biogeogr 44: 1586-1597（2017）

2.Inbreeding ratio and genetic relationships among strains of the Western clawed frog, *Xenopus tropicalis*. PLoS One 10: e0133963（2015）

3.Population structure and landscape genetics of two endangered frog species of genus *Odorrana*: different scenarios on two islands. Heredity 106: 131-137（2013）

研究者総覧

生命医科学プログラム兼任（Concurrent post: Biomedical Science）

高橋 治子（たかはし はるこ） 助教 ／ TAKAHASHI Haruko Assistant Professor

生体外（***in vitro***）で「**3次元**的な**がん**組織」を再構築・**モデル化**し、画像やオミックスデータを合わせた統合的な解析により、がん悪性化の分子メカニズムの解明や、創薬・診断ツールなどへの応用を目指す。

By reconstructing and modeling "three-dimensional (3D) cancer tissues" *in vitro*, I aim to understand the molecular mechanisms of cancer malignancy and develop drug discovery or diagnostic tools through integrated analysis combining images and omics data.

keywords: *in vitro*, 3D, cancer, modeling

1.Amphiphilic polymer therapeutics: An alternative platform in the fight against antibiotic resistant bacteria, Biomater. Sci., 9: 2758–2767 (2021)

2.Anticancer polymers designed for killing dormant prostate cancer cells, Sci. Rep., 9: 1096 (2019)

3.Visualizing dynamics of angiogenic sprouting from a three-dimensional microvasculature model using stage-top optical coherence tomography, Sci. Rep., 7: 42426 (2017)

研究者総覧

田澤 一朗（たざわ いちろう） 助教 ／ TAZAWA Ichiro Assistant Professor

両生類を使って、**変態**の仕組みとその**進化**について研究しています。特に**四肢**の**形成**と**再生**に関することに興味があります。

I study the relationship between amphibian metamorphosis and fish-to-amphibian evolution. Evolution of hind limb development is my best interest.

keywords: amphibian, metamorphosis, land invasion, fish-to-amphibian

1.Homeotic transformation of tails into limbs in anurans. Dev Growth Differ 60:365-376. (2018)

2.Vitamin A induced homeotic hindlimb formation on dorsal and ventral sides of regenerating tissue of amputated tails of Japanese brown frog tadpoles. Dev Growth Differ 59:688-700. (2017)

3.A novel Xenopus laevis larval keratin gene, xlk2: its gene structure and expression during regeneration and metamorphosis of limb and tail. Biochim Biophys Acta 1759:216-24. (2006)

研究者総覧

中島 圭介（なかじま けいすけ） 助教 ／ NAKAJIMA Keisuke Assistant Professor

変態は殆どの動物門で見られる大規模な形態変化であり、生息範囲の拡大、繁殖機会の増大などに役立つ。動物にとって普遍的かつ優れた生存戦略である**変態**を、**両生類**の**尾の消失**を材料に**分子**レベルで明らかにする。

I am studying the mechanisms of amphibian metamorphosis. Metamorphosis is induced by thyroid hormone. There are two receptors for thyroid hormone, and I have an interesting in the differences of roles and functions of them. I want to uncover the molecular mechanisms of metamorphosis, especially about tail regression.

keywords: metamorphosis, thyroid hormone, thyroid hormone receptor, tail regression, amphibian, Xenopus, tropicalis, gene knockout, CRISPR/Cas9, TALEN

1.Comprehensive RNA-Seq analysis of notochord-enriched genes induced during *Xenopus tropicalis* tail resorption/Gen. Com. Endocrinol.287: 113349 (2020)

2.Thyroid Hormone Receptor α– and β–Knockout *Xenopus tropicalis* Tadpoles Reveal Subtype-Specific Roles During Development/Endocrinol.159: 733-743. (2018)

3.Dual Mechanisms Governing Muscle Cell Death in Tadpole Tail During Amphibian Metamorphosis. Dev. Dyn. 227: 246-255 (2003)

研究者総覧

信澤 岳（のぶさわ たかし） 助教 ／ NOBUSAWA Takashi Assistant Professor

主に**植物の発生制御機構**について、モデル植物シロイヌナズナを用いた分子生理学的手法から研究している。**植物脂質科学**の視点を加えた研究や、ソテツなど非モデル植物を対象にした研究にも取り組んでいる。

I have been studying the regulatory mechanisms that control plant development (especially organ formation and senescence) using a model plant, Arabidopsis. In addition, I'm also going to study the plant physiology by the point of view from the lipid metabolism.

keywords: plant development, lipid metabolism

1.Highly pleiotropic functions of CYP78As and AMP1 are regulated in non-cell autonomous/organ-specific manner. *Plant Physiol*. 186:767–781. (2021)

2.Differently localized lysophosphatidic acid acyltransferases crucial for triacylglycerol biosynthesis in the oleaginous alga *Nannochloropsis*. *Plant J*. 90:547–559.(2017)

3.Synthesis of Very-Long-Chain Fatty Acids in the Epidermis Controls Plant Organ Growth by Restricting Cell Proliferation. *PLoS Biol*. 11:e1001531. (2013)

研究者総覧

花田 秀樹（はなだ ひでき） 助教 ／ HANADA Hideki Assistant Professor

研究目的は二つ、一つは長期間培養でき、生体レベルと同等の感度を持つ両生類心臓の**器官培養法**の開発を行うこと、もう一つは**培養心臓**に対する様々な化学物質の反応を調べるための、新しいアッセイ系の開発です。

This research objective is to develop two methods: One is to develop long-term-culturable amphibian organ heart with high-sensitivity similar to biological level, and the other is new testing technique-development for investigating reaction of various chemicals to the cultured organ heart.

keywords: Heart-organ-culture, amphibian, testing technique-development

1.Cyclosporin A inhibits thyroid hormone-induced shortening of the tadpole tail through membrane permeability transition, COMPARATIVE BIOCHEMISTRY AND PHYSIOLOGY B-BIOCHEMISTRY & MOLECULAR BIOLOGY, 135, pp. 473-483.（2003）

2.Do reactive oxygen species underlie the mechanism of apoptosis in the tadpole tail?, Free Radical Biology and Medicine, 23, pp. 294-301.（1997）

3.Phenolic antioxidant 2,6-di-tert-butyl-p-cresol（vitamin E synthetic analogue）does not inhibit 1,1 '-dimetyl-4,4 '-bipyridium dichloride（paraquat）-induced structural chromosomal damage in cultured leukocytes of the dark-spotted-frog Pelophylax（Rana）nigromaculatus, HEREDITAS, 149, pp. 173-177.（2012）

研究者総覧

深澤 壽太郎（ふかざわ じゅたろう） 助教 ／ FUKAZAWA Jutarou Assistant Professor

植物ホルモンの信号伝達機構の解析:**複数の植物ホルモン**による**クロストーク**が**遺伝子発現調節**を介して、**発芽**、**伸長成長**、**花成**を制御し、環境に応答するのかを分子生物学、遺伝学、生化学的手法を用いて研究しています。

Study of signal transduction and biosynthesis of plant hormones Using molecular biology, genetics, and biochemical techniques, we study how crosstalk between multiple plant hormones regulates germination, elongation growth, and flowering through the regulation of gene expression and response to the environment.

keywords: plant hormone, gibberellin, signal transduction, transcription factor, flowering, germination, Arabidopsis

1.DELLA degradation by gibberellin promotes flowering via GAF1-TPR-dependent repression of floral repressors in Arabidopsis. Plant Cell, 33: 2258-2272,（2021）

2.DELLA-GAF1 complex is a main component in gibberellin feedback regulation of GA 20-oxidase 2. *Plant Physiol*., 175: 1395-1406（2017）

3.DELLAs function as coactivators of GAI ASSOCIATED FACTOR1 in regulation of GA homeostasis and signaling in Arabidopsis. *Plant Cell*, 26: 2920-2938,（2014）

研究者総覧

森下 文浩（もりした ふみひろ） 助教 ／ MORISHITA Fumihiro Assistant Professor

軟体動物腹足類のアメフラシとイボニシを中心に、**神経ペプチド**の構造と機能を調べています。アメフラシから、**D型トリプトファン**をもつ心拍動増強ペプチド、NdWFamideを同定しました。

Bioactive peptides are key molecules for regulation of homeostasis and behaviors in animals. I am a peptide hunter in gastropod mollusks. My research provides fundamental information on the structure and function of bioactive peptides, which are basis for understanding the neuronal and hormonal systems in the animal.

keywords: Aplysia, marine snail, HPLC, Mass spectrometry, Neuron, Precursor protein, Molecular biology

1.Physiological Functions of Gastropod Peptides and Neurotransmitters. In: Physiology of Molluscs.（Eds. Saleuddin S, Mukai ST）, Apple Academic Press, Oakville, pp 379-476（2017）

2.Molecular cloning of precursors for TEP-1 and TEP-2: The GGNG peptide-related peptides of a prosobranch gastropod, *Thais clavigera*. Peptides, 68:72-82（2015）

3.Molecular cloning of two distinct precursor genes of NdWFamide, a D-tryptophan-containing neuropeptide of the sea hare, *Aplysia kurodai*. Peptides, 38:291-301（2012）

数理生命科学プログラム｜教員紹介

Program of Mathematical and Life Sciences

研究者総覧

飯間 信（いいま まこと） 教授 ／ IIMA Makoto Professor

生物の**飛翔**や**遊泳**、集団運動等を**生物流体力学**や非線形数理の手法により解析することで生命活動の秘密に迫り、また生物運動の素晴らしい機能を抽出して**数理科学**的な意味を探り、応用に貢献することを目指しています。

We study bio-fluid mechanics and related problems such as flight and swimming of animals, collective behaviors of microorganisms, and transportation inside body, by using mathematical analysis. Our aim is to extract essential behavior of biological activity, movements and functions in terms of mathematics for future applications.

keywords: fluid mechanics, biofluid, swimming, flight, collective behavior, mathematical structure

1.Phase reduction technique on a target region, Phys Rev E, 103: 053303（2021）

2.Active lift inversion process of heaving wing in uniform flow by temporal change of wing kinematics, Phys Rev E, 99: 043110（2019）

3.The flux of Euglena gracilis cells depends on the gradient of light intensity, PLoS ONE, 11:e0168114（2016）

研究者総覧

泉 俊輔（いずみ しゅんすけ） 教授 ／ IZUMI Syunsuke Professor

MALDIというイオン化法は、「**質量情報**」と「**位置情報**」を同時に取得できるが、これをマトリックスを用いないMALDI法と組み合わせることにより、「**マイクロ天然物化学**」とでも呼ぶべき新しい天然物化学の展開を始めている。

The ionization method called MALDI can acquire “mass information” and “position information” at the same time, but by combining this with the MALDI method that does not use a matrix, we would like to start the development of “micro natural product chemistry.”

keywords: MALDI, mass information, position information

1.Mass spectrometric characterization of histone H3 Isolated from in-Vitro reconstituted and acetylated nucleosome core particle/Mass Spectrometry/2020

2.3-Hydroxy-4-nitrobenzoic Acid as a MALDI Matrix for In-Source Decay/ Analytical Chemistry / 2016

3.Alkylated Trihydroxyacetophenone as a MALDI Matrix for Hydrophobic Peptides/ Analytical Chemistry/ 2013

研究者総覧

坂本 敦（さかもと あつし） 教授 ／ SAKAMOTO Atsushi Professor

環境応答を担う因子や**代謝機能**、それらの制御機構の解明を通じて植物の成長生存戦略を理解し、**ストレス耐性**や過酷環境への適応ポテンシャルの増大、藻類バイオ燃料創成等の植物機能開発と高度化研究を展開している。

My research interests lie in plant science, primarily elucidating molecular mechanisms of how plants respond to and survive in changing environments. Applied research is also conducted to exploit the capabilities of plants, including microalgae, for better performance under stress and towards the practical production of useful substances such as biofuels.

keywords: Plant molecular physiology, Plant hormone, Plant metabolite, Stress response, Stress tolerance, Biotechnology

1.Dynamics of the leaf endoplasmic reticulum modulate ß-glucosidase-mediated stress-activated ABA production from its glucosyl ester, J Exp Bot, 71: 2058-2071（2020）

2.Allantoin, a stress-related purine metabolite, can activate jasmonate signaling in a MYC2-regulated and abscisic acid-dependent manner, J Exp Bot, 67: 2519-2532（2016）

3.The purine metabolite allantoin enhances abiotic stress tolerance through synergistic activation of abscisic acid metabolism, Plant Cell Environ, 37: 1022-1036（2014）

生命医科学プログラム兼任（Concurrent post:Biomedical Science）

楯 真一（たて しんいち） 教授 ／ TATE Shinichi Professor

ヒト・タンパク質の50%を占める安定な立体構造をとらない領域がもつ構造・機能を、**物理計測**、**細胞生物学的解析**、**計算器シミュレーション**を駆使して研究しています。新たな**タンパク質構造科学**の構築を目指します。

My research focus is on the structure and function relations of intrinsically disordered proteins (IDPs) that constitute about 50% of human proteins with combinatorial use of theoretical and experimental approaches including NMR, molecular dynamics simulation, biochemistry, and cell biology. Students with a physics diploma are very welcome.

keywords:Biophysic, Structural Biology, Protein, IDP

研究者総覧

1.Ultrasensitive Change in Nucleosome Binding by Multiple Phosphorylations to the Intrinsically Disordered Region of the Histone Chaperone FACT/J.Mol.Biol./2020

2.Non-RVD mutations that enhance the dynamics of the TAL repeat array along the superhelical axis improve TALEN genome editing efficacy/ Sci. Rep./2016

3.Allosteric breakage of the hydrogen bond within the dual-histidine motif in the active site of human Pin1 PPIase/Biochemistry/2015

中田 聡（なかた さとし） 教授 ／ NAKATA Satoshi Professor

自然界や生体系では、リズムやパターンを形成する現象をよく見かける。このような時空間発展現象は、**非平衡下**における**非線形現象**又は**自己組織化**とよばれる。私の研究は、非生物のモデル実験系を構築し、自己組織化の機構解明を研究目的とする。具体的には、特徴的な運動様相を示す自己駆動体や化学振動反応を用いた実験を行う。

Rhythm and pattern observed in living organisms and nature are called “self-organization”Artificial experimental systems are developed to physicochemically elucidate the mechanism of self-organziation. Characteristic features of motion, such as collective motion and synchronized sailing, and oscillatory motion of self-propelled objects and chemical oscillation are examined actually.

keywords:self-organization, oscillation, pattern formation, synchronization

研究者総覧

1.Evolution of self-propelled objects – From the viewpoint of nonlinear science, Chem. A Euro. J., 2018.

2.Self-propelled motion of a coumarin disk characteristically changed in couple with hydrolysis on an aqueous phase, J. Phys. Chem. B, 2019.

3.Chemical wave propagation in the Belousov-Zhabotinsky reaction controlled by electrical potential, J. Phys. Chem. A, 2019.

本田 直樹（ほんだ なおき） 教授 ／ HONDA Naoki Professor

動的かつ複雑な生命現象の背後に潜む規則性やメカニズムを理解するために、**数理モデリング**と**機械学習**を組み合わせることで、生命現象を司る支配方程式を**データ駆動的**に解読する研究を展開している。

To understand the mechanisms behind dynamic and complex biological phenomena, we are combining mathematical modeling and machine learning for decoding the governing rules or equations that govern biological system.

keywords:Data-driven biology, Mathematical modeling, Machine learning

研究者総覧

1. Model-based prediction of spatial gene expression via generative linear mapping. Nature Communications（2021）

2.Noise-resistant developmental reproducibility in vertebrate somite formation. PLoS Comput Biol（2019）

3.Identification of animal behavioral strategies by inverse reinforcement learning. PLoS Comput Biol（2018）

生命医科学プログラム兼任（Concurrent post:Biomedical Science）

山本 卓（やまもと たかし） 教授 ／ YAMAMOTO Takashi Professor

様々な生物で利用可能な**ゲノム編集**技術の開発と産業利用を目指した研究を進めています。

We are developing genome editing technologies that can be used in various organisms and trying their use in various fields.

keywords:genome editing, developmental biology

研究者総覧

1.Biased genome editing using the local accumulation of DSB repair molecules system, NATURE COMMUNICATIONS, 9:3270（2018）

2.Single-Molecule Nanoscopy Elucidates RNA Polymerase II Transcription at Single Genes in Live Cells, CELL, 78:491-506.e28（2019）

3.Zinc-finger nuclease-mediated targeted insertion of reporter genes for quantitative imaging of gene expression in sea urchin embryos, PNAS, 109:10915-20（2012）

研究者総覧

粟津 暁紀（あわづ あきのり） 准教授 / AWAZU Akinori Associate Professor

真核生物の**ゲノム動態による遺伝子制御機序**とその**発生過程**との関係、細胞内**高次分子構造体**および多細胞生物の**形態の形成機序と機能**、等に関する**数理と実験**による研究。

We progress theory-experimant hybrid studies for i) structural dynamics of biomolecular populations, ii) genome dynamics and gene regulation, iii) development and morphogenesis of multi-cellular organisms.

keywords: Mathematical model, Biological and medical data analysis, Experiment for molecular and developmental biology

1.Partial exogastrulation due to apical-basal polarity of F-actin distribution disruption in sea urchin embryo by omeprazole. / Genes to Cells / 1-17 (2022)

2.Mathematical model of chromosomal dynamics during DNA double strand break repair in budding yeast. / Biophys. Physicobiol. / 19, e190012 (2022)

3.Self-Organization of Diverse Directional Hierarchical Networks in Simple Coupled Maps with Connection Changes. / J. Phys. Soc. Jpn. / 91, 023801 (2022)

研究者総覧

大西 勇（おおにし いさむ） 准教授 / OHNISHI Isamu Associate Professor

植物とシアノバクテリアの不思議な機能をヒントにして、数理科学的に抽象化された”機能と構造”の問題を**数理解析**すること。

Mathematical analysis of issues of mathematically scientifically abstracted "function and structure", as using the mysterious function of plants and cyanobacteria as a hint.

keywords: Mathematical Analysis

1.A mathematical study of the one dimenional Keller and Rubinou model for Liesegang bands / J. Stat. Phys. Vol. 135, 107-132 (2009)

2.Bifurcation analysis to the Lugiato–Lefever equation in one space dimension, Physica D: Nonlinear Phenomena Volume 239, 2066-2083 (2010)

3.Standard model of a binary digit of memory with multiple covalent modifications in a cell, J. of pure and applied math., 2 (1), p1 – 11 (2018)

研究者総覧

片柳 克夫（かたやなぎ かつお） 准教授 / KATAYANAGI Katsuo Associate Professor

蛋白質や核酸などの生体高分子の**X線結晶構造解析**による分子構造の解明に取り組んできた。それら蛋白質の由来はヒト、黄色ブドウ球菌、植物、海藻など多様で、さらに立体構造からみた**分子進化**にも興味を持っている。

Structure and function analysis of protein by X-ray crystallography. Target proteins are DNA-repair enzyme; toxin proteins from staphylococcus aureus; lectin from algae; proteins relating to cancer and Parkinson's disease; proteins from plant; glucokinase, and so on. Molecular evolution of protein is also analyzed from X-ray structure of artificial proteins.

keywords: protein, crystallography, structural biology, chemistry, physics, data science, synchrotron radiation, pharmacy

1.Three-dimensional structure of ribonuclease H from E. coli./Nature 347, 306–309/1990

2.X-ray structure of T4 endonuclease V: An exision repair enzyme specific for a pyrimidine dimer./Science 256, 523-526/1992

3.Structure-function relationship of assimilatory nitrite reductases from the leaf and root of tobacco based on high resolution structures./Prot. Sci. 21, 383-395/2012

研究者総覧

斉藤 稔（さいとう ねん） 准教授 / SAITO Nen Associate Professor

動的で複雑な生命現象を対象として、**数理生物・生物物理学**の観点から理論的研究を行う。**数理モデル**解析や**大規模数値計算**、**機械学習**解析を通して様々な生物種に共通する普遍的な性質の理解を目指す。

The aim of our research group is to understand dynamic and complex biological phenomena from the perspective of biophysics and mathematical biology, and to elucidate the underlying mechanisms universal to various biological species through mathematical modeling, machine learning analysis, and large scale numerical computation.

keywords: mathematical biology, biophysics, machine learning, complex systems

1.Three-dimensional morphodynamic simulations of macropinocytic cups/iScience/16 (2021)

2.Advantage of Leakage of Essential Metabolites for Cells/Phys. Rev. Lett./6 (2020)

3.Theoretical analysis of discreteness-induced transition in autocatalytic reaction dynamics/Phys. Rev. E/7 (2015)

生命医科学プログラム兼任（Concurrent post:Biomedical Science）

坂本 尚昭（さかもと なおあき） 准教授 ／ SAKAMOTO Naoaki Associate Professor

ウニの発生をモデルとして分子生物学的手法およびゲノム編集により、**形態形成**の分子メカニズムの解明、発生過程における**遺伝子・クロマチン・染色体の動態**の解明、**インスレーター**の作用機構の解明を目指す。

Using the sea urchin development as a model, I aim to elucidate the molecular mechanisms for transcriptional regulation of morphogenetic genes, nuclear dynamics of gene, chromatin and chromosome during development, and insulator activity with molecular biology techniques and genome editing.

keywords:sea urchin development, transcription, nuclear dynamics

研究者総覧

1.Establishment of knockout adult sea urchins by using a CRISPR-Cas9 system. Dev Growth Differ 61:378-388.（2019）

2.Dynamic changes in the interchromosomal interaction of early histone gene loci during development of sea urchin. J Cell Sci 130:4097-4107.（2017）

3.Cilia play a role in breaking left–right symmetry of the sea urchin embryo. Genes Cells 21:568-578.（2016）

生命医科学プログラム兼任（Concurrent post:Biomedical Science）

佐久間 哲史（さくま てつし） 准教授 ／ SAKUMA Tetsushi Associate Professor

ゲノム編集の新規ツールや新規手法、また**転写調節**や**エピゲノム編集**など、ゲノム編集に関連する基盤的技術の開発を進めると共に、医歯薬学や農水畜産学など、さまざまな分野でのゲノム編集の応用研究を推進している。

My research focuses on the development of new tools and methods of genome editing and epigenome editing. I also investigate the application of genome editing and related technologies in various fields of research such as medicine, dentistry, pharmacy, and agricultural science.

keywords:Genome editing, Epigenome editing, CRISPR-Cas9, TALEN

研究者総覧

1.Biased genome editing using the local accumulation of DSB repair molecules system. Nat Commun 9: 3270.（2018）

2.MMEJ-assisted gene knock-in using TALENs and CRISPR-Cas9 with the PITCh systems. Nat Protoc 11: 118:133.（2016）

3.Microhomology-mediated end-joining-dependent integration of donor DNA in cells and animals using TALENs and CRISPR/Cas9. Nat Commun 5: 5560.（2014）

島田 裕士（しまだ ひろし） 准教授 ／ SHIMADA Hiroshi Associate Professor

地球温暖化ガスである**CO_2の削減**や世界的な食糧危機対策に寄与すると考えられる光合成の活性上昇機構に注目している。複数の光合成タンパク質酸化抑制機構を明らかにし、**光合成活性上昇植物の育種**に成功した。

We are studying the mechanisms of increase of photosynthesis activity, which may contribute to the reduction of CO_2 as greenhouse gas, and countermeasures against the global food crisis. We have revealed several mechanisms of inhibition of photosynthetic protein oxidation and have succeeded in breeding plants with increased photosynthetic activity.

keywords:photosynthesis, Rubisco, redox, oxidative stress

研究者総覧

1.Overexpression of BUNDLE SHEATH DEFECTIVE 2 improves the efficiency of photosynthesis and growth in *Arabidopsis*.（2020）*Plant J*. 102: 129-137.

2.Arabidopsis BSD2 reveals a novel redox regulation of Rubisco physiology *in vivo*.（2020）*Plant Signal*. *Behav*. 15

3.Overexpression of the protein disulfide isomerase AtCYO1 in chloroplasts slows dark- induced senescence in Arabidopsis.（2018）*BMC Plant Biology* 18: 1-9.

藤原 好恒（ふじわら よしひさ） 准教授 ／ FUJIWARA Yoshihisa Associate Professor

20万ガウスの超伝導磁石～数百ガウスの永久磁石の**磁場**と、一方で、**超伝導磁石が造り出す地上の重力制御環境場**のそれぞれが、**光化学反応**や最近では**麹菌**の生体反応に及ぼす効果や影響を研究しています。

Research fields consist of (1) effect of steady high magnetic fields up to 200,000 gauss and (2) effect of magnetically regulated gravitational fields, especially microgravity and hypergravity, on photochemical reactions and biological phenomena of *Aspergillus oryzae*.

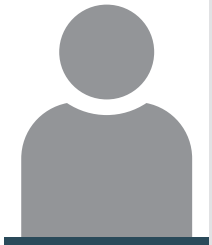
keywords:Magneto-Science, Magnetic field, Magnetically regulated gravitational field, Microgravity, Hypergravity, Photochemical reation, *Aspergillus oryzae*

研究者総覧

1.Effect of High Magnetic Fields on the Reverse Electron Transfer Process in an α-Cyclodextrin Inclusion Complex of Phenothiazine-Viologen Chain-Linked Compound / *Chem*. *Phys*. *Lett*., 259, 361-367 / 1996.

2.Effect of Horizontal Strong Static Magnetic Field on Swimming Behavior of *Paramecium caudatum* / *Mol*. *Phys*., 104, 1659-1666 / 2006.

3.Effect of Hypergravity Created by Strong Magnetic Force on Orientation of Porphyrin Nanorods / *J*. *Magn*. *Magn*. *Mater*., 310, 2859-2861 / 2007.



研究者総覧

芦田 嘉之（あしだ よしゆき） 助教 ／ ASHIDA Yoshiyuki Assistant Professor

研究者総覧

大前 英司（おおまえ えいじ） 助教 ／ OOMAE Eiji Assistant Professor

深海微生物の細胞内温度や圧力は外部の環境と同じであるため、**深海**微生物が産生する**酵素**は同じ条件下で機能している。**深海**微生物由来**酵素**は、水との相互作用の制御により**高圧力**に適応していることを明らかにした。

Since the internal and external hydrostatic pressures of deep-sea microorganisms are the same, their enzymes must work under high hydrostatic pressure and have some kind of pressure-adaptation mechanisms. Elucidation of such pressure-adaptation mechanisms of deep-sea enzymes make contributions to basic bioscience and industrial applications.

keywords:deep sea enzyme, high pressure, hydration, molecular adaptation, partial molar volume.

1.Functional, structural, and thermodynamic characteristics of enzymes from deep-sea microorganisms. Microbial Catalysts Volume 1: 325-343 (2019).

2.Stability, flexibility, and function of dihydrofolate reductases from *Escherichia coli* and deep-sea bacteria. Current Research in Microbiology: 1-36 (2018).

3.Similar structural stabilities of 3-isopropylmalate dehydrogenases from the obligatory piezophilic bacterium *Shewanella benthica* strain DB21MT-2 and its atmospheric congener *S. oneidensis* strain MR-1. Biocim. Biophys. Acta 1866: 680-691 (2018).

研究者総覧

清水 直登（しみず なおと） 助教 ／ SHIMIZU Naoto Assistant Professor

ゲノムDNAは、放射線や化学物質などから損傷を絶えず受けている。**DNA損傷**は**がん**を誘発するため、速やかに修復される必要がある。ヒトB細胞（TK6）を用いて、DNA損傷の**修復機構**に関して研究している。

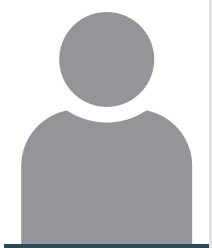
We focus on the mechanisms of DNA repair.

keywords:DNA damage, DNA repair, radiation, anti-cancer drug, cancer

1.The MRE11 nuclease promotes homologous recombination not only in DNA double-strand break resection but also in post-resection in human TK6 cells_/ GIAD/ 184-196 (2020)

2.Distinct DNA Damage Spectra Induced by Ionizing Radiation in Normoxic and Hypoxic Cells_/ Radiation Research / 442-448 (2015)

3.Repair pathways for radiation DNA damage under normoxic and hypoxic conditions: Assessment with a panel of repair-deficient human TK6 cells /JRR / 999-1004 (2021)



研究者総覧

高橋 美佐（たかはし みさ） 助教 ／ TAKAHASHI Misa Assistant Professor

生物は常に大気に曝され体内に取り込んで生きています。大気中に含まれているさまざまな物質は何かしら生物に影響を及ぼしています。私は**大気中の微量成分**である**窒素酸化物**（**NOx**、主に**一酸化窒素NO**と**二酸化窒素NO_2**）に対する**植物**の応答を分子生理学手法を用いて研究しています。**NOx**は**植物**の**成長促進作用**を有しており生産量を約2倍に増加します。この作用機構の解明と作用を利用した**生産量増加**について研究しています。

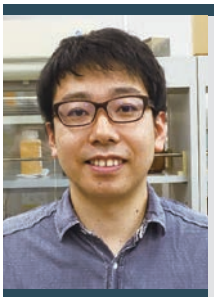
Nitrogen dioxide is a trace component of atmosphere, and is used to be known as a pollutant. I have found that nitrogen dioxide is a positive regulator for plants to nearly double organ size and shoot biomass. I have been studying the molecular mechanism how nitrogen dioxide acts on plants.

keywords:Nitrogen dioxide, Nitrogen oxide, Plant, Arabidopsis, Environment

1.Dual selective nitration in Arabidopsis: Almost exclusive nitration of PsbO and PsbP, and highly susceptible nitration of four non-PSII proteins, including peroxiredoxin II E/Electrophoresis/2015

2.Nitrogen dioxide regulates organ growth by controlling cell proliferation and enlargement in Arabidopsis/New Phytol/2014

3.Atmospheric nitrogen dioxide gas is a plant-vitalization signal to increase plant size and the contents of cell constituents/New Phytol/2005



生命医科学プログラム兼任（Concurrent post:Biomedical Science）

津田（つだ） 雅貴（まさたか） 助教 ／ TSUDA Masataka Assistant Professor

細胞のDNAは頻繁に損傷を受けており、修復されなければ、**発がん**や**遺伝病**が誘発される。**DNA損傷**を**可視化**し、損傷の生物影響と対応する生体の修復機構を**原子・分子レベル**で解明する研究を行なっている。

DNA is continuously subject to damage by endogenous and environmental agents. If not repaired, DNA damage interferes with DNA replication and transcription, resulting in cell death and mutations. My current research interests focus on elucidating the elaborate DNA repair mechanism to mitigate the deleterious effects of superbulky DNA lesions.

keywords:DNA damage, DNA repair mechanism

研究者総覧

1.Repair pathways for radiation DNA damage under normoxic and hypoxic conditions: Assessment with a panel of repair-deficient human TK6 cells. J Radiat Res. 62: 999-1004（2021）

2.XRCC1 prevents toxic PARP1 trapping during DNA base excision repair. Mol Cell. 81:3018-3030（2021）

3.Tyrosyl-DNA phosphodiesterase 2（TDP2）repairs topoisomerase 1 DNA-protein crosslinks and 3′-blocking lesions in the absence of tyrosyl-DNA phosphodiesterase 1（TDP1）. DNA Repair. 91-92: 102849（2020）

中坪（光永）敬子（なかつぼ みつなが けいこ） 助教 ／ MITSUNAGA−NAKATSUBO Keiko Assistant Professor

多細胞動物の形態の多様性と保存性を理解するために、**発生過程**における**形態形成**とその**調節機構**を種間で比較解析してきた。多細胞体制の構築に不可欠な**細胞外基質**の**分子環境**、**機能**と**進化**に関する研究を行っている。

To understand the morphological diversity and conservation of multicellular animals, I have been studying the regulatory mechanisms for morphogenesis during development using sea urchin, medaka and mouse. I am currently investigating on the molecular environment, function and evolution of novel extracellular matrix, which is indispensable for constructing multicellular systems.

keywords:morphogenesis, development, extracellular matrix, cell differentiation

研究者総覧

1.Cell-surface arylsulfatase A and B on sinusoidal endothelial cells, hepatocytes, and Kupffer cells in mammalian livers. Med Mol Morphol 42:63-69.（2009）

2.Sea urchin arylsulfatase, an extracellular matrix component, is involved in gastrulation during embryogenesis. Dev Genes Evol 219:281-288.（2009）

3.Distributions of H^+,K^+-ATPase and Cl^-,$HCO_3^{(-)}$-ATPase in micromere-derived cells of sea urchin embryos. Differentiation 35:190-196.（1987）

藤井（ふじい） 雅史（まさし） 助教 ／ FUJII Masashi Assistant Professor

数理モデリングと**データ解析**を駆使して、**生命現象の理解**を目指しています。最近では特に分子・細胞内小器官や細胞の形・動きと機能の連関や細胞内の情報伝達に注目しています。

We aim to understand the biological phenomena by using the mathematical modeling and the data analysis. Recently, we are focusing on the relationship among structure, movement and function of molecules, subcellular organelles and cells.

keywords:Mathematical Modeling, Statistics, Biophysics, Systems Biology, Bioinformatics

研究者総覧

1.Logical design of oral glucose ingestion pattern minimizing blood glucose in humans/npj Syst. Biol. Appl. 5:31/2019

2.Robustness against additional noise in cellular information transmission/Phys. Rev. E 100:042403/2019

3.Small-Volume Effect Enables Robust, Sensitive, and Efficient Information Transfer in the Spine/Biophys. J. 112:813/2017

藤原（ふじわら） 昌夫（まさお） 助教 ／ FUJIWARA Masao Assistant Professor

常磁性、反磁性などの磁気的性質（**磁性**）は、万物の有する普遍的な性質である。この磁性による**分子集団制御**の重要性に着目し、10−20 T級の**強磁場**が物理変化、化学反応に与える影響について研究を行っている。

Analyzing the dynamic behavior of a group composed of molecules and ions under magnetic microgravity fields, viz., (1) magnetic orientation of crystals and carbon nanotubes, (2) magnetic movement and separation of transition-metal ions, (3) growth of protein crystals in microgravity space.

keywords:Magnetic microgravity field

研究者総覧

1.Magnetic Orientation of Benzophenone Crystals in Fields up to 80.0 kOe. J. Phys. Chem. B 103, 2627-2630（1999）.

2.Magnetic Orientation and Magnetic Properties of a Single Carbon Nanotube. J. Phys. Chem. A 105, 4383-4386（2001）.

3.Formation of Protein Crystals（Orthorhombic Lysozyme）in Quasi-Microgravity Environment Obtained by Superconducting Magnet. J. Cryst. Growth 270, 184-191（2004）.

生命医科学プログラム兼任（Concurrent post：Biomedical Science）

安田 恭大（やすだ きょうた） 助教 ／ YASUDA Kyota Assistant Professor

生物が生物“らしい”振る舞いをするには、細胞中で**「どのような分子が、いつ、どこで、どのように」**機能を発揮するかが制御されている必要があります。**細胞内分子の局所的振る舞い**に興味を持って研究しています。

My research interest is in the mechanisms of cell-polarization, and how it contributes the bilological events, including human disease.

keywords：Cell polarity, Biomolecular condensates, Local translation, Bio-imaging

1.“The RNA-binding protein Fus directs translation of localized mRNAs in APC-RNP granules.” eLife, 2019

2.“FUS inclusions disrupt RNA localization by sequestering kinesin-1 and inhibiting microtubule detyrosination.” J. C. Biol., 2017.

3.“Translation regulation of protrusion-localized RNAs involves silencing and clustering after trasnport..” J. C. Biol., 2013.

研究者総覧

山田 恭史（やまだ やすふみ） 助教 ／ YAMADA Yasufumi Assistant Professor

コウモリの超音波センシングの運用法について、**数理学・動物行動学・工学**にわたる包括的な視点から研究をしています。彼らの行動パターンを**数理モデル化**し、**ドローン**等の実機を用いて検証しています。

We investigate about the bio-sonar strategy employed by bats from the mathematical, neuro ethological and engineering point of views. Our purpose is to understand the unique sensing strategy and also to apply the bio-inspired techniques into the engineering system.

keywords：Echolocation, simple design navigation, biomimetics, ultrasonic sensing, autonomus flying drone

1.Ultrasound navigation based on minimally designed vehicle inspired by the bio-sonar strategy of bats, Adv. Robot., 33(3-4), 169-182 (2019)

2.Modulation of acoustic navigation behaviour by spatial learning in the echolocating bat Rhinolophus ferrumequinum nippon, Sci. Rep., 10 (1), 1-15 (2020)

3.Species-specific control of acoustic gaze by echolocating bats, Rhinolophus ferrumequinum nippon and Pipistrellus abramus, during flight, J. Comp. Physiol. A, 202(11), 791-801 (2016)

研究者総覧

TIWARI Sandhya Premnath（ティワリ サンデヒャ パレマナト） 助教 ／ Assistant Professor

Through the analysis of large-scale slow dynamics, atomic level dynamics using **molecular dynamics** in PyrR proteins, their control via allostery and RNA-binding function can be better understood and therefore targeted in antibiotic-resistant bacteria. Furthermore, through the large- scale analysis of structural data across different experimental sources, and large- scale slow dynamics via coarse-grained normal mode analysis, I will build a platform that will provide fresh insight into how biological shapes inform biological mechanisms.

keywords：Molecular dynamics, coarse-grained modeling, structual bioinformatics

1.Evolution of Oligomeric State through Allosteric Pathways That Mimic Ligand Binding. Science 346: 6216: 1254346. (2014)

2.Similarity in Shape Dictates Signature Intrinsic Dynamics Despite No Functional Conservation in TIM Barrel Enzymes. PLoS Comput. Biol. 12: 3: e1004834. (2016)

3.Searching for 3D Structural Models from a Library of Biological Shapes Using a Few 2D Experimental Images. BMC Bioinform. 19: 1: 320. (2018)

研究者総覧

生命医科学プログラム｜教員紹介

Program of Biomedical Science

基礎生物学プログラム兼任（Concurrent post:Basic Biology）

今村 拓也（いまむら たくや） 教授 ／ IMAMURA Takuya Professor

タンパク質をコードしないRNA（**ノンコーディングRNA**）を操り、特定の**遺伝子活性化**を促すメカニズムとその細胞を超えた効果を明らかにすることで、**ヒト脳**の特徴を理解するための研究を推進している。

Our Lab aims to understand the epigenetic mechanisms that underlie human brain development. We employ genome-wide analyses, combined with wide variety of functional analyses. We are now focusing on the involvement of long non-coding RNAs in the gene-specific epigenetic regulation that can shape species-dependent cellular networking in the cerebral cortex.

keywords: non-coding RNA, epigenome, DNA methylation/demethylation, gene activation, brain, neural stem cell, human, primate, mouse, rodent, species-specific, biodiversity, adaptation, evolution, bioinformatics

1.Evolutionary acquisition of promoter-associated non-coding RNA（pancRNA）repertoires diversifies species-dependent gene activation mechanisms in mammals. BMC Genomics, 18:285（2017）

2.Bidirectional promoters link cAMP signaling with irreversible differentiation through promoter-associated non-coding RNA（pancRNA）expression in PC12 cells. Nucleic Acids Research, 44: 5105（2016）

3.Gene activation-associated long noncoding RNAs function in mouse preimplantation development. Development, 142: 910（2015）

研究者総覧

基礎生物学プログラム兼任（Concurrent post:Basic Biology）

千原 崇裕（ちはら たかひろ） 教授 ／ CHIHARA Takahiro Professor

ショウジョウバエの遺伝学的手法を活用し、①**嗅覚**が個体**行動・免疫・寿命**を制御する仕組み、②**睡眠**と神経**シナプス**の関係、③栄養環境による**組織サイズ**調節機構、④**ヒト疾患関連因子**の生理機能、を研究しています。

We are studying the following topics by using Drosophila genetic methods. How does the sense of smell control individual behavior, immunity, and longevity? How does sleep regulate synaptic function? What is the mechanism of tissue size control by nutrition? How is the topology of membrane protein regulated?

keywords: Drosophila, olfaction, longevity, aging, innate immunity, behavior, sleep, synapse, tissue size, membrane protein topology

1.Multiple functions of the ER-resident VAP and its extracellular role in neural development and disease/J Biochem/165/391-400/2019

2.Dendritic Eph organizes dendrodendritic segregation in discrete olfactory map formation in Drosophila/Genes Dev/31/1054-1065/2017

3.The Strip-Hippo pathway regulates synaptic terminal formation by modulating actin organization at the Drosophila neuromuscular synapses/Cell Rep/16/2289-2297/2016

研究者総覧

基礎生物学プログラム兼任（Concurrent post:Basic Biology）

林 利憲（はやし としのり） 教授 ／ HAYASHI Toshinori Professor

両生類のイモリは極めて強い**再生能力**を持ち、体の様々な部位を再生できます。私達はイモリ再生能力を支える原理の解明を目指しています。また、研究者に**イベリアトゲイモリ**を提供する**バイオリソース**を運営しています。

The amphibian newt has the remarkable ability to regenerate various body parts. Our laboratory aims to elucidate the mechanisms of organ regeneration using newts as experimental model. We are also working on the development and maintenance of a bioresource of the Iberian ribbed newts.

keywords: Newt, Regeneration, Bioresource

1.A comprehensive reference transcriptome resource for the Iberian ribbed newt Pleurodeles waltl, an emerging model for developmental and regeneration biology/ DNA Res. 217-229（2019）

2.Cas9 ribonucleoprotein complex allows direct and rapid analysis of coding and noncoding regions of target genes in Pleurodeles waltl development and regeneration/ Dev. Biol. 127-136（2018）

3.Molecular genetic system for regenerative studies using newts/ Dev. Growth Differ. 229-236（2013）

研究者総覧

研究者総覧

数理生命科学プログラム兼任（Concurrent post：Mathematical and Life Sciences）

坊農 秀雅（ぼうのう ひでまさ） 特任教授 ／ BONO Hidemasa Professor（Special Appointment）

データ駆動型ゲノム育種（デジタル育種）に向けて、**バイオDX**と呼ばれる**バイオインフォマティクス**を駆使した遺伝子機能解析を中心に、**ゲノム編集**に必須のデータ解析基盤技術を開発している。

Toward data-driven genome breeding（digital breeding）, we are developing data analysis infrastructure technology essential for genome editing, focusing on gene function analysis using bioinformatics called BioDX.

keywords：BioDX, bioinformatics, genome editing, transcriptome analysis, functional annotation, public database, open source software, hypoxia, oxidative stress, meta-analysis

1.Multi-Omic Meta-Analysis of Transcriptomes and the Bibliome Uncovers Novel Hypoxia-Inducible Genes. Biomedicines, 9:582（2021）
2.Reference Transcriptome Data in Silkworm Bombyx mori. Insects, 12:519（2021）
3.De novo transcriptome analysis for examination of the nutrition metabolic system related to the evolutionary process through which stick insects gain the ability of flight（Phasmatodea）. BMC Res Notes 14:182（2021）

研究者総覧

生命環境総合科学プログラム兼任（Concurrent post：Life and Environmental Sciences）

石原 康宏（いしはら やすひろ） 准教授 ／ ISHIHARA Yasuhiro Associate Professor

PM2.5や農薬など環境中の**化学物質の神経系への影響**を調べています。特に発達期影響（胎児期に曝露すると成長後に何が起こるか）や疾患との相互作用（曝露により疾患発症率や重篤度が変わるか）について焦点を当てています。

Our research topics are on the effects of environmental chemicals such as pesticides and PM2.5 on the central nervous system（CNS）. We focus on an action of the brain immune cell, microglia. We are also interested in the interaction of chemical exposure and CNS disorders like stroke and epilepsy.

keywords：Neurotoxicology, Environmental chemicals, Microglia

1.Interleukin 33 expression induced by aryl hydrocarbon receptor in macrophages. Toxicol Sci. 170:404-414（2019）.
2.Neuroprotective activation of astrocytes by methylmercury exposure in the inferior colliculus. Sci Rep. 9:13899（2019）.
3.Retinoid X receptor-mediated neuroprotection via CYP19 upregulation and subsequent increases in estradiol synthesis. J Steroid Biochem Mol Biol. 193:105421（2019）.

研究者総覧

生物工学プログラム兼任（Concurrent post：Biotechnology）

上野 勝（うえの まさる） 准教授 ／ UENO Masaru Associate Professor

染色体末端**テロメア**の維持機構を中心に、染色体全体の安定な維持機構、**DNA修復機構**などの解析とその**がん治療**への応用を目指している。最近は**ライブイメージング**による**染色体動態**の**定量解析**にも取り組んでいる。

Study about telomere maintenance, chromosome stability, and DNA repair and their application to anti-aging and anti-cancer research. We also take fluorescence live cell imaging and analyze them quantitatively to study the role for dynamics of proteins and chromatin in nuclear function.

keywords：telomere, chromosome stability, DNA repair, anti-aging, anti-cancer, fluorescence live cell imaging, dynamics of proteins, nuclear function

1.Spindle pole body movement is affected by glucose and ammonium chloride in fission yeast. Biochem Biophys Res Commun.（2019）.
2.A diffusion model for the coordination of DNA replication in Schizosaccharomyces pombe. Sci Rep.（2016）.
3.Chromosome passenger complex is required for the survival of cells with ring chromosomes in fission yeast PLoS One.（2018）.

研究者総覧

基礎生物学プログラム兼任（Concurrent post：Basic Biology）

奥村 美紗子（おくむら みさこ） 准教授 ／ OKUMURA Misako Associate Professor

目を持たない**線虫**がどのように**光**を感知しているのか、また光環境が線虫の**形態形成**や**行動**にどのように影響しているのか、分子メカニズムの解明を目指して研究を行っています。

Although nematodes do not have eyes, worms can detect light and show light avoidance behavior. We try to reveal the molecular and neural mechanisms of how light is detected by the nematode, and how the light environment affects development and behaviors.

keywords：nematode, light, behavior, development, genetics, evolution, phenotypic plasticity, polyphenism

1.“Serotonin Drives Predatory Feeding Behavior via Synchronous Feeding Rhythms in the Nematode Pristionchus pacificus” G3: Genes, Genomes, Genetics 7:3745-3755（2017）
2.“Screening for CRISPR/Cas9-induced mutations using a co-injection marker in the nematode Pristionchus pacificus” Development Genes and Evolution, 230, 257–264（2020）
3.“Linking cell surface receptors to microtubules: Tubulin folding cofactor D mediates Dscam functions during neuronal morphogenesis” J Neurosci 35:1979-1990（2015）

数理生命科学プログラム兼任（Concurrent post: Mathematical and Life Sciences）

落合 博（おちあい ひろし） 准教授 ／ OCHIAI Hiroshi Associate Professor

遺伝子発現は主に**転写**によって制御されているが、その制御機構は複雑で、遺伝子によって大きく異る。現在、**マウスES細胞**を利用して転写、特に**転写バースト**と呼ばれる現象の制御機構解明を目指して研究を行っている。

Gene expression is mainly regulated at the transcriptional stage, but the transcriptional regulation mechanism is complex and varies greatly from gene to gene. We are currently conducting research using mouse embryonic stem cells to elucidate the regulatory mechanisms of transcription, particularly the phenomenon known as transcriptional bursting.

keywords: Gene expression, transcription, embryonic stem cells, transcriptional bursting

1.Genome-wide kinetic properties of transcriptional bursting in mouse embryonic stem cells. Sci Adv 6 eaaz6699.（2020）
2.Simultaneous live imaging of the transcription and nuclear position of specific genes, Nucleic Acids Res 43 e127.（2015）
3.Stochastic promoter activation affects Nanog expression variability in mouse embryonic stem cells, Sci Rep 4, 7125.（2014）

研究者総覧

生物工学プログラム兼任（Concurrent post: Biotechnology）

久米 一規（くめ かずのり） 准教授 ／ KUME Kazunori Associate Professor

真核細胞の機能を保証する**細胞構造**の制御メカニズムに関する研究を進めている。具体的には、「**核サイズ**を制御する仕組み」と「**細胞の形**を制御する仕組み」の分子レベルでの解明を目指している。

Study on the control mechanism of intracellular structure that ensures eukaryotic cellular function. Our research is currently focused on nuclear size, establishment and maintenance of cell polarity, and organization of the cytoskeletons such as actin and microtubule. We use fission yeast as a model organism for eukaryotic cells.

keywords: intracellular structure, nuclear size, cell polarity, cytoskeleton, cell growth, organelle size, fission yeast, cell biology

1.Nuclear membrane protein Lem2 regulates nuclear size through membrane flow. Nat. Commun.（2019）
2.A systematic genomic screen implicates nucleocytoplasmic transport and membrane growth in nuclear size control. Plos Genet.（2017）
3.Calcineurin ensures a link between the DNA replication checkpoint and microtubule-dependent polarized growth. Nat. Cell Biol.（2011）

研究者総覧

数理生命科学プログラム兼任（Concurrent post: Mathematical and Life Sciences）

杉 拓磨（すぎ たくま） 准教授 ／ SUGI Takuma Associate Professor

生物集団の**行動の原理**や、行動を支配する**脳神経回路の老化機構**の研究を行っています。そのため線虫C. エレガンスをモデル動物にした**行動実験**と、最先端の光技術を用いた**顕微鏡開発**や**数理モデリング**を駆使し、原子から個体集団レベルまでの全階層を対象にした解析を進めています。

Living things exhibit clever information processing to cope with environmental changes at individual and population level. I seek physical rules governing individual and population level behaviors and neural circuit aging. For this purpose, I have taken interdisciplinary approaches between neuroscience, ethology, engineering and nonlinear physics.

keywords: Biophysics, collective behavior, aging, optics

1.Regulation of behavioral plasticity by systemic temperature signaling in Caenorhabditis elegans, Nature Neurosci, 2011
2.C. elegans collectively forms dynamical networks, Nature Commun, 2019
3.High-throughput optical quantification of mechanosensory habituation reveals neurons encoding memory in Caenorhabditis elegans, PNAS, 2014

研究者総覧

下出 紗弓（しもで さゆみ） 助教 ／ SHIMODE Sayumi Assistant Professor

我々のゲノムの中には、「**内在性レトロウイルス**」と呼ばれるウイルス様配列が潜んでいる。ネコを中心とした哺乳類における内在性レトロウイルスの機能や獲得メカニズムについての研究を行っている。

Part of our genome is composed of sequences with viral origin, namely "endogenous retroviruses（ERVs）". We are studying the function and acquisition mechanism of ERVs in mammals.

keywords: endogenous retroviruses

1.Establishment of CRFK cells for vaccine production by inactivating endogenous retrovirus with TALEN technology/Scentific Reports（2022）
2.Multiple invasions of an infectious retrovirus in cat genomes/Scientific Reports（2015）
3.Characterization of feline ASCT1 and ASCT2 as RD-114 virus receptor/Journal of General Virology（2013）

研究者総覧

基礎生物学プログラム兼任（Concurrent post:Basic Biology）

鈴木 誠（すずき まこと） 助教 ／ SUZUKI Makoto Assistant Professor

両生類を用いた**発生生物学**を基盤としつつ細胞生物学、先端ライブイメージング解析を取り入れることで、神経管をはじめとする**上皮性器官**の形成機構とその破綻により発症する**ヒト先天異常**に関する研究を進めています。

I am studying embryonic development at the cellular and molecular levels. Using amphibians, I analyze the mechanisms of formation of epithelial organs such as the neural tube and human congenital abnormalities caused by its disruption, utilizing cell biology and advanced live imaging techniques.

keywords:embryonic development, amphibian, Xenopus, epithelial morphogenesis, congenital disabilities, live imaging

研究者総覧

1.Distinct intracellular Ca^{2+} dynamics regulate apical constriction and differentially contribute to neural tube closure. Development 144:1307-1316.（2017）

2.Mechanical roles of apical constriction, cell elongation, and cell migration during neural tube formation in Xenopus. Biomech Model Mechanobiol 15:1733-1746.（2016）

3.MID1 and MID2 are required for Xenopus neural tube closure through the regulation of microtubule organization 137:2329-2339.（2010）

数理生命科学プログラム兼任（Concurrent post:Mathematical and Life Sciences）

細羽 康介（ほそば こうすけ） 助教 ／ HOSOBA Kosuke Assistant Professor

ゲノム編集技術を用いた**疾患のモデルマウス**の作製と表現型解析を行っています。将来的にはヒト疾患の病態解明や創薬研究に繋げたいと考えています。

Point mutations in human genome induce genetic disorders. To understand mechanism of human disorders, disease model animals are useful tools. My purpose is establishment of human disease model mice by CRISPR/Cas9 based genome editing technology and analysis of model mice to reveal pathology of human disorder.

keywords:Genome editing, Human mutation, Genetic disorder

研究者総覧

1.Insufficiency of ciliary cholesterol in hereditary Zellweger syndrome/EMBO J 39:e103499/2020

2.PLK1-mediated phosphorylation of WDR62/MCPH2 ensures proper mitotic spindle orientation/Hum Mol Genet 26:4429-4440/2017

3.Phosphorylation of myosin II regulatory light chain by ZIP kinase is responsible for cleavage furrow ingression during cell division in mammalian cultured cells/Biochem Biophys Res Commun 459:686-91/2015

生物工学プログラム兼任（Concurrent post:Biotechnology）

湯川 格史（ゆかわ まさし） 助教 ／ YUKAWA Masashi Assistant Professor

真核生物の**ゲノム安定性**維持に必要な**分裂期制御**、特に**紡錘体微小管**の形成機構に注目し、モデル生物である**酵母**を用いて研究を行っている。また、得られた知見を応用して、**ヒト疾患治療薬**の開発にも取り組んでいる。

Our main research interests are the molecular mechanisms of mitotic progression, particularly we focus on the spindle assembly which is required for proper chromosome segregation. For this purpose, we usually use yeast as a model organism. We also aim to apply our findings towards the development of novel anti-cancer drugs.

keywords:mitosis, chromosome segregation, spindle assembly, microtubule, actin, kinesin, myosin, yeast, anti-cancer drug

研究者総覧

1.Escape from mitotic catastrophe by actin-dependent nuclear displacement in fission yeast. iScience, 24:102031.（2021）

2.How Essential Kinesin-5 Becomes Non-Essential in Fission Yeast: Force Balance and Microtubule Dynamics Matter. Cells, 9:1154.（2020）

3.Kinesin-6 Klp9 plays motor-dependent and -independent roles in collaboration with Kinesin-5 Cut7 and the microtubule crosslinker Ase1 in fission yeast. Sci Rep, 9:7336.（2019）

数理生命科学プログラム兼任（Concurrent post:Mathematical and Life Sciences）

渡邉 朋信（わたなべ とものぶ） 客員教授 ／ WATANABE Tomonobu Visiting Professor

新規**先端光学計測技術**を開発し、それらを用いて**幹細胞**に対する**放射線被ばく影響**に関連する生物学研究に取り組む。研究成果の**実用化・産業化**にも積極的に取り組んでおり、幅広く**融合的/学際的研究**を実践している。

The activity is to conduct biological research related to the effect of radiation doses on stem cells using new state-of-the-art optical measurement techniques developed by ourselves. We are also actively involved in the practical application and industrialization of our own research results, and practices a wide range of interdisciplinary research.

keywords:radiation-dose effect, stem cell research, quantitative biology, optical microscopy, spectroscopy, machine learning.

研究者総覧

1.Following embryonic stem cells, their differentiated progeny, and cell-state changes during iPS reprogramming by Raman spectroscopy. Anal Chem 92, 14915–14923（2020）

2.Linking substrate and nucleus via actin cytoskeleton in pluripotency maintenance of mouse embryonic stem cells. Stem Cell Res. 41, 101614（2019）

3.Second harmonic generation polarization microscopy as a tool for protein structure analysis. Biophys Physicobiol. 16, 147-157（2019）

所 属

国立研究開発法人
理化学研究所

Institute of
Physical and
Chemical Research

HON Chung Chau（ホン チュン チョウ） 客員教授 ／ Visiting Professor

Why are some people more likely to develop certain diseases (e.g. heart disease) than the others? The answer lies in their genomes. We study the effects of genetic variations between individuals on gene expression in different cell-types, aiming to understand missing links between our genomes and diseases.

keywords: single-cell genomics, genetics, transcriptomics, bioinformatics

1.An atlas of human long non-coding RNAs with accurate 5' ends. Nature 543 (7644), 199-204 (2017)
2.Recombination of repeat elements generates somatic complexity in human genome. Cell S0092-8674(22)00784-X (2022)
3.C1 CAGE detects transcription start sites and enhancer activity at single-cell resolution. Nat Comm 10, 360 (2019)

教員一覧（List of Faculty Members）

あ

か

さ

た

な

は

ま

や

わ

英字

東広島キャンパス地図 Higashi-Hiroshima Campus Map

- 生物工学プログラム Program of Biotechnology
- 生命医科学プログラム Program of Biomedical Science
- 基礎生物学プログラム Program of Basic Biology
- 数理生命科学プログラム Program of Mathematical and Life Sciences
- 生命医科学プログラム Program of Biomedical Science
- 生命環境総合科学プログラム Program of Life and Environmental Sciences
- 生命医科学プログラム Program of Biomedical Science
- 研究科長室 Dean's office
- 食品生命科学プログラム Program of Food and AgriLife Science
- 生物資源科学プログラム Program of Bioresource Science
- 生命医科学プログラム Program of Biomedical Science

Web

研究科ホームページ
https://www.hiroshima-u.ac.jp/ilife

教員インタビュー 研究を語る
https://gsbstop.hiroshima-u.ac.jp/kataru/

お問い合わせ先 Contact

大学院統合生命科学研究科 Graduate School of Integrated Sciences for Life

代表窓口 〒739-8528 東広島市鏡山1-4-4 TEL：082-424-7904/FAX：082-424-2459（生物学系総括支援室／Support Office for the fields of Biosphere Science）
https://www.hiroshima-u.ac.jp/ilife E-mail：sei-bucho-sien@office.hiroshima-u.ac.jp

プログラム別連絡先

●生物工学プログラム
〒739-8530 東広島市鏡山1-3-1 TEL：082-424-7004/FAX：082-424-7000
（理学系支援室（先端））

●食品生命科学プログラム／生物資源科学プログラム
〒739-8528 東広島市鏡山1-4-4 TEL：082-424-7904/FAX：082-424-2459
（生物学系総括支援室）

●生命環境総合科学プログラム
〒739-8521 東広島市鏡山1-7-1 TEL：082-424-6306/FAX：082-424-0751
（総合科学系支援室）

●基礎生物学プログラム／数理生命科学プログラム／生命医科学プログラム
〒739-8526 東広島市鏡山1-3-1 TEL：082-424-7305/FAX：082-424-0709
（理学系支援室（理））

2022年6月発行 編集・発行／広島大学 大学院 統合生命科学研究科 広報委員会