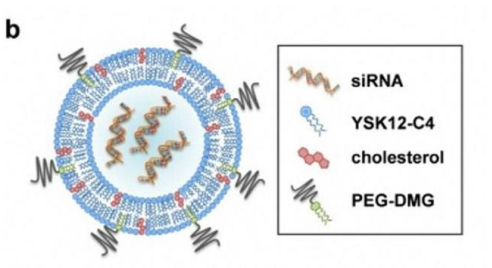
Pharmaceuticals／Drug discovery	Hokkaido University 1-1

The pH-responsive cationic lipids with efficient endosomal release －The ED50 values is 0.002mg/kg－

【Researcher】 Yusuke SATO , Ph.D., Assistant Professor
Hokkaido University Faculty of Pharmaceutical Sciences Biopharmaceutical Sciences and Pharmacy

【Overview】

Nanomedicines extend drug therapy from small molecular compounds to proteins/nucleicacids/genes. A lipid nanoparticle（LNP） is one of the promising nano-carrier for siRNA but a less efficiency or low endosomal release is a major problem. A pH-responsive cationic lipid is believed to be a solution.
A research group of Hokkaido University established a library of pH-responsive cationic lipids.
In this library, one showed high efficiency in endosomal release of the ED50 values 0.002mg/kg.
The group also has know-how and potential to develop best lipids for target cells and tissues.



【Potential Applications】

Drug delivery application for siRNA, oligonucleotides,etc.

【Future Development】

We are looking for a partner that will use our new technology under a license agreement. An Evaluation under MTA and a collaborative research with our lab are also available.

【Patent】

PCT/JP2018/022940

【Inquiry】 Hokkaido University
Institute for the Promotion of Business-Regional Collaboration Center for Innovation and Business Promotion
Kita 21-jo, Nishi 11-chome, Kita-ku, Sapporo, Hokkaido, Japan, 001-0021
TEL : 011-706-9561 E-mail : jigyo@mcip.hokudai.ac.jp

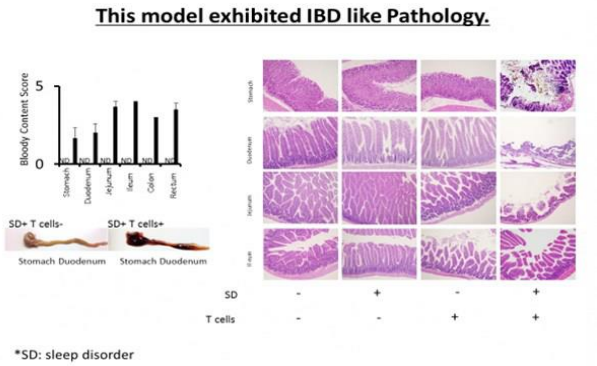
Pharmaceuticals／Drug discovery	Hokkaido University 1-2

Brain micro-inflammation at specific vessels under stress induce gastrointestinal failure

【Researcher】 Masaaki MURAKAMI, Ph.D., Professor
Hokkaido University Institute for Genomic Medicine and Graduate School of Medicine Division of Molecular Neuroimmunology

【Overview】

Impact of stress on diseases including gastrointestinal failure is well-known, but molecular mechanism is not understood. Our model demonstrates direct link between brain micro-inflammation and fatal gastrointestinal disease via establishment of a new neural pathway under stress. Under stress conditions, EAE caused severe gastrointestinal failure with high-mortality. Mechanistically, T cells accumulated at specific vessels of boundary area of a ventricle to establish brain micro-inflammation via stress-gateway reflex and leads fatal gastrointestinal disease via a new neural pathway. Importantly, induction of brain micro-inflammation at specific vessels by cytokine injection was sufficient to establish fatal gastrointestinal failure.



【Potential Applications】

・A Novel IBD like Model
・Screening Methods for new drug candidates using this model.
・New therapeutic candidates（e.g. anti-CCL5 antibody and other suppressors against brain inflammation under stress.）

【Future Development】

We are looking for a company that will be interested in using this model for drug screening and exploring clinical candidates for GI diseases.

【Patent】

PCT/JP2018/007901

【Inquiry】 Hokkaido University
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Hokkaido Research Seeds in Health and Medicine

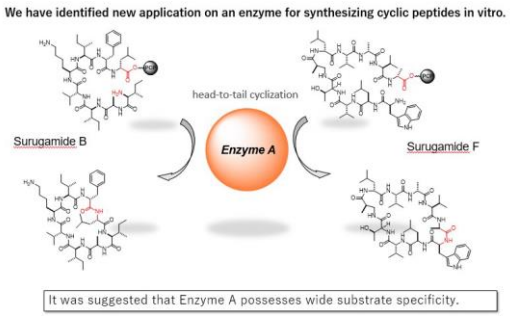
Pharmaceuticals／Drug discovery	Hokkaido University	1-3

New Enzyme for Biosynthesis of Cyclic Peptides

【Researcher】 Toshiyuki WAKIMOTO , Ph.D., Professor,
Hokkaido University Faculty of Pharmaceutical Sciences Molecular Phamaceutical Siences

【Overview】

Cyclic peptides are polypeptide chains taking cyclic ring structure. Several cyclic peptides found in nature are used in clinic (e.g. cyclosporin A, rapamycin,tacrolimus, polymyxin B, avermectin B). Cyclic peptides generally show biological activity compared to their linear counterparts due to the conformational rigidity. However, the low productivity for synthesise cyclic peptides prevent us from efficient clinical development with the peptides. Now we identified an enzyme which overcomes the abstacles. We have successfully synthesized cyclic peptides which were difficult to obtain by in vitro enzymatic synthesise.



【Potential Applications】

Peptide biosynthesis

【Future Development】

We are looking for a partner that will use our new technology under a license agreement. An Evaluation under MTA and a collaborative research with our lab are also available.

【Patent】

PCT/JP2019/017707

【Inquiry】 Hokkaido University
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Pharmaceuticals／Drug discovery	Sapporo Medical University	2-1

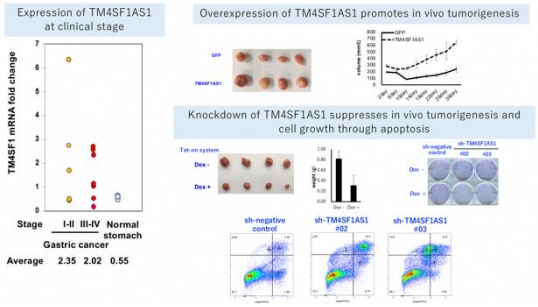
Identification of a long non-coding RNA as a therapeutic target in gastric cancer

【Researcher】 Hiroshi Kitajima, M.S., Assistant Professor
Department of Molecular Biology, Sapporo Medical University

【Overview】

Gastric cancers (GCs) arise from Helicobacter pylori-related gastritis. In recent years, long non-coding RNA (lncRNAs) have emerged as key components in multiple cellular processes including tumorigenesis.

In this study, we identified TM4SF1AS1 as a novel gastritis and GC-related lncRNA. Knockdown of TM4SF1AS1 suppressed proliferation, migration, invasion and in vivo tumorigenesis by GC cells. TM4SF1AS1 affects expression of interferon- and immune-related genes in GC cells, suggesting that TM4SF1AS1 may be involved in immune response. Expression of TM4SF1AS1 is elevated in other malignancies including breast and liver cancer, and its knockdown suppressed cancer cell proliferation.



【Potential Applications】

・Applicable for TM4SF1AS1 producing carcinomas (Gcs, breast cancer and liver cancer).
・A prognostic biomarker of Gcs.

【Future Development】

Looking for a partner for collaborative research and development.
Looking for a partner that will use our new technology under a license agreement.

【Patent】

PCT/JP2019/14028

【Inquiry】 Shiro Itagaki, Ph. D., Intellectual Property Management Office, Sapporo Medical University
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Hokkaido Research Seeds in Health and Medicine

Pharmaceuticals／Drug discovery	Sapporo Medical University	2-2

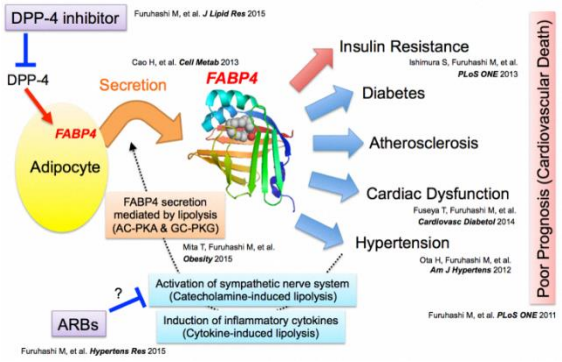
Development of novel therapy and diagnosis by common factors in cardiovascular, renal and metabolic diseases

【Researcher】 Masato Furuhash, M.D., Ph.D., Professor
Department of Cardiovascular, Renal and Metabolic Medicine, Sapporo Medical University

【Overview】

Fatty acid-binding protein 4 (FABP4) is mainly expressed in adipocytes and macrophages and plays important roles in the development of insulin resistance and atherosclerosis (Furuhashi M, et al. Nat Rev Drug Discov 2008).

We previously demonstrated that a small molecule FABP4 inhibitor would be a novel drug for diabetes and atherosclerosis (Nature 2007). FABP4 is secreted from adipocytes in association with lipolysis via a non-classical pathway and acts as an adipokine for the development of insulin resistance and atherosclerosis (Cell Metab 2013). FABP4 is ectopically induced in vascular endothelial cells by ageing and vascular injury, promoting endothelial dysfunction and neointima formation (Arterioscler Thromb Vasc Biol 2016).



Moreover, ectopic FABP4 is also induced in glomerular endothelial cells, and urinary FABP4 level is associated with renal prognosis (Tanaka M, et al. Nephron Clin Pract 2014).

【Potential Applications】

・Development of novel therapy on metabolic diseases and atherosclerosis.
・Development of novel biomarkers for the early diagnosis of cardiovascular event and renal dysfunction.

【Future Development】

Looking for a partner for collaborative research and development.
Looking for a partner that will use our new technology under a license agreement.

【Patent】

JP(Patent No. 6558729)

【Inquiry】 Shiro Itagaki, Ph. D., Intellectual Property Management Office, Sapporo Medical University
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Pharmaceuticals／Drug discovery	Sapporo Medical University	2-3

Liver organoid model for pharmacokinetic assay

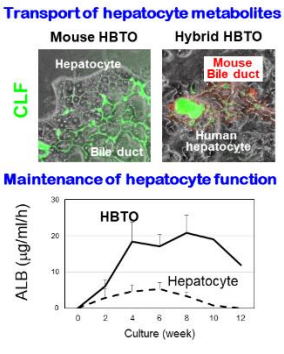
【Researcher】 Naoki Tanimizu, Ph.D., Associate Professor
Department of Tissue Development and Regeneration, Research Institute for Frontier Medicine,Sapporo Medical University (Current affiliation: Division of Regenerative Medicine, Center of Stem Cell Biology and Regenerative Medicine, The Institute of Medical Science, The University of Tokyo)

【Overview】

Hepatocyte culture is an important tool for toxicological and pharmacological assays. However, primary hepatocytes quickly reduce their function in culture, since the accumulation of bile within hepatocyte clusters causes hepatocyte death.

Inventors have connected, for the first time, hepatocytes with bile ducts ex vivo by generating a hepatobiliary tubular organoid (HBTO) from mouse hepatocyte progenitors and biliary epithelial cell (BEC). Cholyl Lysine Fluorescein (CLF), a bile acid analog, and bilirubin were taken in hepatocyte and transported into the bile duct in HBTO, indicating that HBTO recapitulates the in vivo flux of hepatocytes' metabolites within the liver tissue. Moreover, hepatocytes in HBTOs maintain their metabolic functions more than one month.

The inventors also established a hybrid HBTO consisting of human hepatocytes to recapitulate human metabolism within the organoid. They are currently working on the establishment of hepatic disease models using HBTOs.



【Potential Applications】

・Scalable in vitro model for drug development
・Induction and long-term maintenance of CYP activities and Albumin secretion
・Monitoring available for metabolism or hepatotoxicity of potential drugs in vitro

【Future Development】

Looking for a partner for collaborative research and development.
Looking for a partner that will use our new technology under a license agreement.

【Patent】

PCT/JP2020/14421

【Inquiry】 Shiro Itagaki, Ph. D., Intellectual Property Management Office, Sapporo Medical University
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Hokkaido Research Seeds in Health and Medicine

Pharmaceuticals／Drug discovery	Sapporo Medical University	2-4

Development of CAR-T cells targeting cancer stem cell antigen for refractory osteosarcoma

【Researcher】 Toshihiko Torigoe, M.D., Ph.D., Professor, Tomohide Tsukahara, M. D., Ph. D, Associate Professor
Department of Pathology, Sapporo Medical University

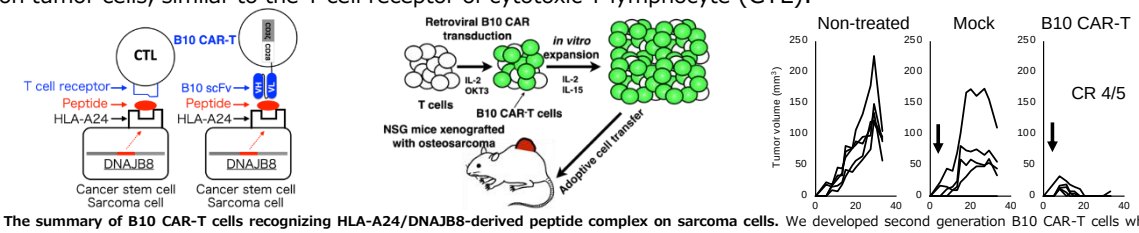
【Overview】

Osteosarcoma is a highly malignant sarcoma and new treatment modalities were urgently required.

1. A rare neoplasm, mainly occurred in young decades.
2. The prognosis is still poor in non-responder to chemotherapy and patients with lung metastasis (5-year OS:20%)
3. No new therapeutic drugs appeared in last 30 years.

The target cancer stem cell antigen DNAJB8 and antibody clone B10.

1. DNAJB8 is expressed in cancer stem cells with the characteristics of high tumorigenesis and resistance to chemotherapy
2. The mRNA expression of DNAJB8 is restricted only in testis lacking HLA molecules among normal organs. It is an ideal expression status as cancer-testis antigen.
3. Clone B10 scFv (single chain variable fragment) specifically recognized HLA-A24/DNAJB8-derived peptide complex expressed on tumor cells, similar to the T cell receptor of cytotoxic T lymphocyte (CTL).



(Left panel) The summary of B10 CAR-T cells recognizing HLA-A24/DNAJB8-derived peptide complex on sarcoma cells. We developed second generation B10 CAR-T cells which showed specificity similar to TCR of CTLs. **(Middle and right panels)** The anti-tumor effects of B10 CAR-T cells in vivo adoptive cell transfer model. B10 CAR-T cells (1x10e7) were infused into immunodeficient NSG mice xenografted with osteosarcoma cell line KIKU on Day 5. B10 CAR-T cells showed strong anti-tumor effects.

【Potential Applications】

・CAR-T cell therapy targeting cancer stem cell antigen.

・A candidate new treatment modality for refractory osteosarcoma.

【Future Development】

GMP grade CAR virus construction.
Looking for a partner for collaborative research and development.
Looking for a partner that will use our new technology under a license agreement.

【Patent】 PCT/JP2019/039400

【Inquiry】 Shiro Itagaki, Ph. D., Intellectual Property Management Office, Sapporo Medical University
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Pharmaceuticals／Drug discovery	Sapporo Medical University	2-5

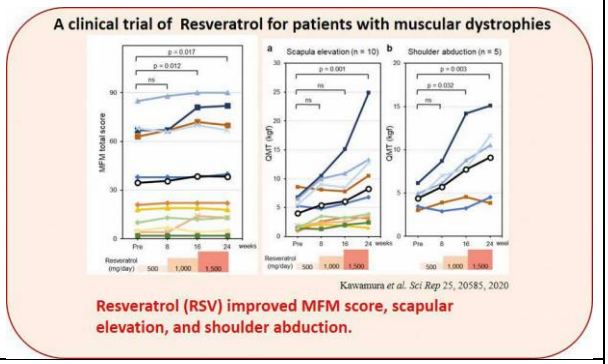
Development of the innovative remedy and clinical application for Muscular Dystrophy

【Researcher】 Shinobu Fukumura, M.D., Ph.D., Assistant Professor
Department of Pediatrics, Sapporo Medical University

【Overview】

SIRT1, a product of the longevity gene, induces anti-oxidative enzymes and promotes cell survival. Resveratrol, a polyphenol, is an activator of SIRT1. We found that resveratrol ameliorates muscular weakness, muscle degeneration and progressive heart failure in Duchenne muscular dystrophy (MD) model animals. Recently, we found that resveratrol is effective on MD patients （Fig）.

We concern with the application of SIRT1 activators such as resveratrol for several type of muscular diseases.



【Potential Applications】

Development of therapies of muscle destruction in several types of muscular diseases in muscular dystrophy and myopathies, and muscular inflammatory diseases.

【Future Development】

Looking for a partner that will develop our new technology under a license agreement.

【Patent】

JP (Patent No. 5850503)

【Inquiry】 Shiro Itagaki, Ph. D., Intellectual Property Management Office, Sapporo Medical University
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Hokkaido Research Seeds in Health and Medicine

Pharmaceuticals／Drug discovery | **Sapporo Medical University** | **2-6**

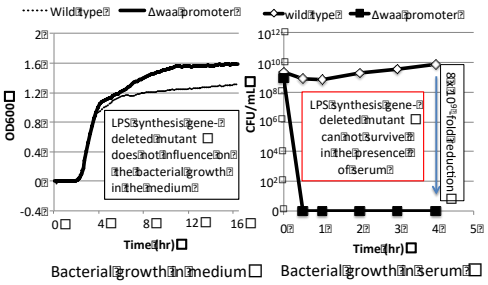
Screening of vivoEF inhibitors for site-specific therapy against bacterial infections

【Researcher】 Toyotaka Sato, D.V.M., Ph.D., Assistant Professor
Department of Microbiology, Sapporo Medical University (Current affiliation: Department of microbiology, faculty of veterinary medicine, Hokkaido university)

【Overview】

Antimicrobial resistance is plobrematic worldwide. However, the development of new antimicrobial agents continues to decrease. Particularly, compounds targeting new bacterial factors and effective against multidrug resistant bacteria or antimicrobial agents that inhibits the side-effective selection pressure have not been developed. To overcome above issues, we have been researching on the establishment of site-specific therapy against bacterial infections. We have focused on a bacterial factor that no effect for the bacterial growth in vitro, but essential for the growth in a specific site in vivo (infection sites such as some tissues and blood), termed as "in vivo bacterial Essential Factor (vivoEF)".

We screened compounds that target vivoEF, and identified several vivoEF inhibitors having specific antibacterial activity only in the presence of human serum.



【Potential Applications】

・Antimicrobials for sepsis
・infection-site specific therapy using “pinpointed” antimicrobials (vivoEF inhibitor)
・Antimicrobials against multidrug bacteria especially for extensively drug-resistant bacteria.

【Future Development】

Looking for a partner for collaborative research and development.
Looking for a partner that will use our new technology under a license agreement.

【Patent】

JP (Publication No. 2019-71853)

【Inquiry】 Shiro Itagaki, Ph. D., Intellectual Property Management Office, Sapporo Medical University
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Pharmaceuticals／Drug discovery | **Asahikawa Medical University** | **3-1**

Therapeutic Agent for IBD "Long-Polyphosphate"

【Researcher】 Mikihiro Fujiya, Professor of Gastroenterology and Endoscopy, Division of Metabolism and Biosystemic Science, Gastroenterology and Hematology/Oncology

【Overview】

Administration of “Long Polyphosphate” strongly improved intestinal barrier function with new mode of action. Our clinical research suggested that oral administration of long polyphosphate led to mucosal healing in considerable IBD patients. Long-Polyphosphate is a promising therapeutic agent for IBD.

MOA

Long-Polyphosphate develops a robust intestinal barrier function through interaction with epithelial integrin β1, followed by the p38 pathway activation and HSP27 expression. (HSP27 regulates tight junction proteins)

PLoS ONE Aug2011 | Volume 6 | Issue 8 | e23278

【Potential Applications】

・Medical agent

【Future Development】

・Development partnership

【Patent】

JP Patent No.5660508, EP Patent No. 2559437
US Patent Application 13/639206

【Inquiry】 IP Center, Asahikawa Medical University
2-1-1-1, Midorigaoka-Higashi, Asahikawa, Hokkaido, Japan, 078-8510
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Hokkaido Research Seeds in Health and Medicine

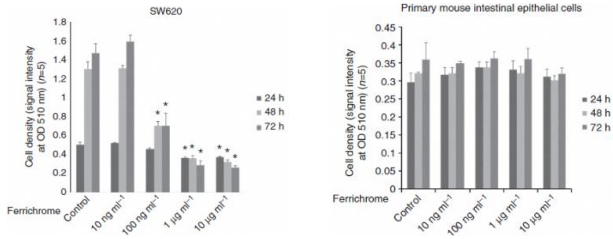
Pharmaceuticals／Drug discovery	Asahikawa Medical University 3-2

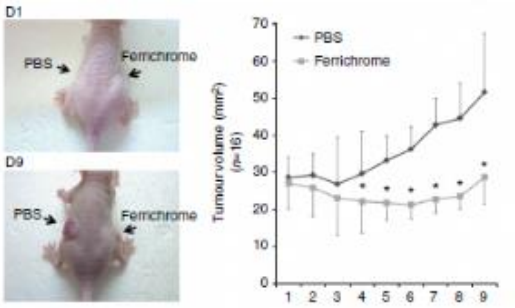
Anti-Cancer Agent "Ferrichrome"

【Researcher】 Mikihiro Fujiya, Professor of Gastroenterology and Endoscopy, Division of Metabolism and Biosystemic Science, Gastroenterology and Hematology/Oncology

【Overview】

We identified “ferrichrome” as a tumor-suppressive molecule produced by Lactobacillus casei. The tumor-suppressive effect of ferrichrome is greater than that of cisplatin and 5-fluorouracil, and ferrichrome has less effect on non-cancerous intestinal cells , serum AST, ALT and Fe. Ferrichrome induces apoptosis through a process that is mediated by the JNK-associated induction of DNA damage-inducible transcript 3（DDIT3）. Nature COMMUNICATIONS 2016 Aug 10;7:12365.





【Potential Applications】

・Medical agent

【Future Development】

・Development partnership

【Patent】

PCT/JP2017/001803

【Inquiry】 IP Center, Asahikawa Medical University
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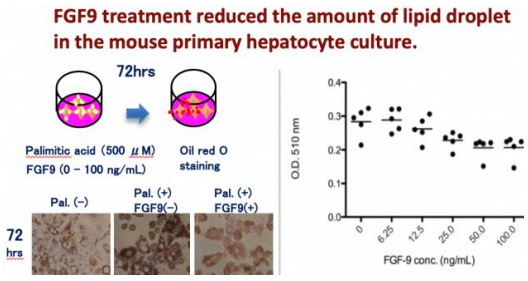
Pharmaceuticals／Drug discovery	Asahikawa Medical University 3-3

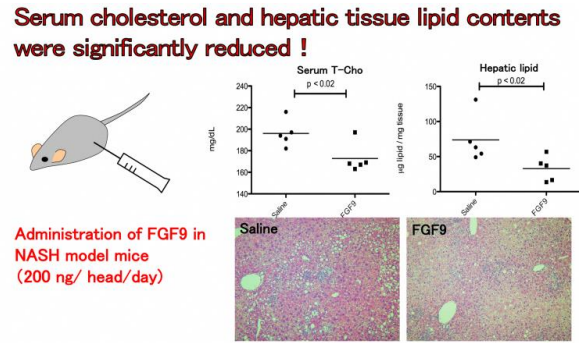
Novel Agent for NASH "FGF9"

【Researcher】 Hiroki Tanaka, Assistant professor of Tumor Pathology, Division of Pathology

【Overview】

Recent studies have shown that sarcopenia has been associated with exacerbation of Non-alcoholic steato-hepatitis (NASH). Using mouse NASH／sarcopenia model, we identified a therapeutic function of Fibroblast Growth Factor 9（FGF9）in NASH.





【Potential Applications】

・Medical agent

【Future Development】

・Development partnership

【Patent】

JP Patent Application 2016-212412

【Inquiry】 IP Center, Asahikawa Medical University
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Hokkaido Research Seeds in Health and Medicine

Pharmaceuticals／Drug discovery	Asahikawa Medical University	3-4

New Capillary Stem Cells "CapSCs"

【Researcher】 Junichi Kawabe, Professor of Biochemistry

【Overview】

CapSCs are new stem cells, isolated and identified from capillary. CapSCs has multipotency, and differentiate to vessel, nerve, skeletal muscle, etc. CapSCs can be isolated and purified by specific cell surface marker antibodies. CapSCs is promising cell source for lower limb ischemia, ischemic heart disease, sarcopenia, neurological disorders, etc.

Control　　CapSC+

Ischemic hind limbs model

【Potential Applications】

・Regenerative therapy

【Future Development】

・Development Partnership

【Patent】

PCT/JP2016/072259

【Inquiry】 IP Center, Asahikawa Medical University
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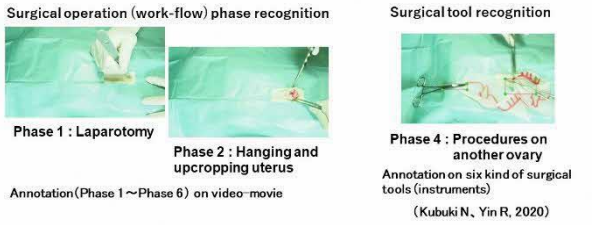
Medical care/Diagnostic/Medical equipment	Kitami Institute of Technology	4-1

Dataset for development of surgical operation supporting robot for small animals －A canine spay surgery as an example－

【Researcher】 Yoshihiko Hayakawa, MSc, Ph.D., Associate Professor
Dept. of Engineering on Intelligent Machines & Biomechanics, School of Regional Innovation & Social Design Engineering, Faculty of Engineering, Kitami Institute of Technology

【Overview】

Development of autonomous surgical robotic machines for standard surgical procedures is under requisition. Ovariohysterectomy is the common surgical sterilization procedure for small animals, cats and dogs, etc. The simulation of the canine spay surgery, ovario-hysterectomy, was carried out and the data set of the surgery were made. As shown in a figure, the automatic image recognition of surgical operation (work-flow) phases (left) and tools (surgical instruments, right) were carried out.



【Potential Applications】

Development of autonomous surgical robotic machines for standard surgical procedures
・Automatic image recognition technology for object detection and tracking
・Application of motion capture

【Future Development】

Offering for R&D partners (Manufacturers in Veterinary Medicine, Medical Equipment, and Robotics. Information Technology)

【Patent】

Nothing to specify

【Inquiry】 National university corporation Hokkaido Higher Education and Research System, Kitami Institute of Technology
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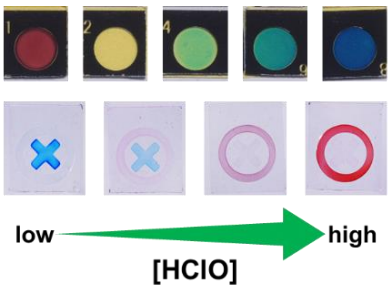
Hokkaido Research Seeds in Health and Medicine

Medical care/Diagnostic/Medical equipment	Kitami Institute of Technology 4-2

Hypochlorous Acid-Responsive Thin Films that Exhibit Remarkable Color Changes

【Researcher】 Yasumasa Kanekiyo, PhD
School of Regional Innovation and Social Design Engineering, Kitami Institute of Technology

【Overview】



Due to the spread of covid-19 around the world, the demand of hypochlorous acid (HClO) as a disinfectant has been dramatically increasing worldwide. HClO is a powerful disinfectant for various viruses and bacteria, however, it is susceptible to be decomposed during storage. To ensure effectiveness of the disinfectants, it is important to supply conveniently measurable HClO sensors to ordinary people for checking HClO concentration in their disinfectant.

In my laboratory, a novel HClO-responsive thin film that exhibits distinct color changes was recently developed. It was also succeeded in developing a sensor that displays different signs in response to change in HClO concentration. These technologies will make the measurement of HClO much easier than existing methods, and will contribute to make the infection prevention more effective.

【Potential Applications】

- Prevention of infectious diseases
- Continuous monitoring of effectiveness of disinfectants
- Checking hypochlorite content in factory products

【Future Development】
Looking for research and development partners. Also seeking for licensing partners.

【Patent】
Japanese patent application No. 2021-215106

【Inquiry】 National university corporation Hokkaido Higher Education and Research System, Kitami Institute of Technology
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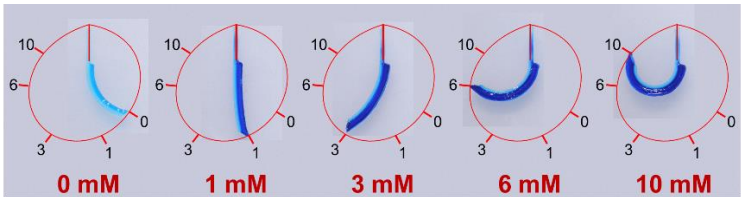
Medical care/Diagnostic/Medical equipment	Kitami Institute of Technology 4-3

Hypochlorous Acid-Responsive Bilayer Hydrogels that Show Distinct Deformation

【Researcher】 Yasumasa Kanekiyo, PhD
School of Regional Innovation and Social Design Engineering, Kitami Institute of Technology

【【Abstract】



Due to the spread of novel corona virus, the demand of hypochlorous acid (HClO) as a disinfectant has been dramatically increasing worldwide. HClO is a powerful disinfectant for various viruses and bacteria, however, it is susceptible to be decomposed during storage. To ensure effectiveness of the disinfectants, it is important to supply conveniently measurable HClO sensors to ordinary people for checking HClO concentration in their disinfectant.

In my laboratory, new type of bilayer hydrogels that bend according to HClO concentration have recently been developed. As the concentration of HClO increases, the hydrogel shows remarkable deformation as if the hands of an analog watch are rotating (see the above figure). By developing a HClO sensor utilizing this bilayer hydrogel, quantification of HClO can be conducted just by looking at the position of the edge of the gel. We believe that this technology will contribute to make the infection prevention more effective.

【Potential Applications】

- Prevention of infectious diseases
- Continuous monitoring of effectiveness of disinfectants
- Checking hypochlorite content in factory products

【Future Development】
Looking for research and development partners. Also seeking for licensing partners.

【Patent】

【Inquiry】 National university corporation Hokkaido Higher Education and Research System, Kitami Institute of Technology
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Hokkaido Research Seeds in Health and Medicine

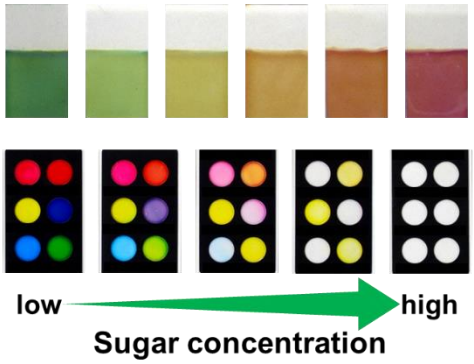
Medical care/Diagnostic/Medical equipment | **Kitami Institute of Technology 4-4**

Bio- and Environment-Responsive Molecular Recognition Materials that Exhibit Remarkable Color Changes

【Researcher】 Yasumasa Kanekiyo, PhD
School of Regional Innovation and Social Design Engineering, Kitami Institute of Technology

【Overview】

In my laboratory, novel sugar-sensing chips that show distinct color changes were developed utilizing boronic acid-containing polymers. The measurement can be conducted simply by immersing the sensing chip in an aqueous sugar solution. As the sugar concentration increased, the thin films showed a multi-patterned color change that enabled the quantification of the sugars using pattern-based sensing. In addition, colorimetric sensing chips responding to formaldehyde, hypochlorite, hydrogen peroxide, lactic acid, etc. have been developing in my laboratory.



【Potential Applications】

- Prevention and treatment of diabetes
- Continuous monitoring of glucose level in urine
- Formaldehyde monitoring in house
- Checking chlorine content in drinking water
- Application for industrial production processes

【Future Development】

Looking for research and development partners.
Also seeking for licensing partners.

【Patent】

Japanese patent application No. 4845024.

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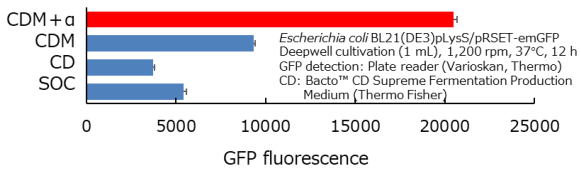
Pharmaceuticals／Drug discovery | **Kitami Institute of Technology 4-5**

Chemical defined medium for protein and nucleic acid production by Escherichia coli –Design CDM to express larger amount of recombinant protein than natural media–

【Researcher】 Masaaki Konishi, Ph. D.
Faculty of Engineering, Bioprocess Engineering Lab, Kitami Institute of Technology

【Overview】

By AI assisted design for microbial media and composition profiling using several appratus, GC-MS, LC-MS, ion chromatograpy, amino acid composition analysis, ICP-MS, chemical defined media were desined. The CDM accomplished to large amout of recombinant protein by E. coli. The expression level was approximately 4-folds larger than that using SOC broth. The CDM should contribute to improve the quality control of protein expression and nucleic acid production in phermaseutical applications.



【Potential Applications】

Production of protein and nucleic acid in pharmaceutical applications

Providing CDM as research reagent.

【Future Development】

Joint research and commercialization with pharmaceutical and chemical manufacturers.
Patent licensing to pharmaceutical and chemical manufacturers.

【Patent】

JP patent application No. 2023-016849

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Hokkaido Research Seeds in Health and Medicine

Medical care/Diagnostic/Medical equipment | **Muroran Institute of Technology** | **5-1**

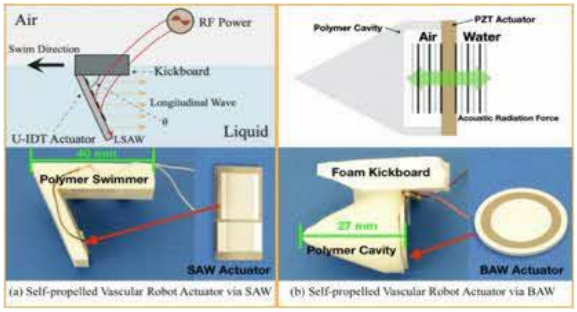
Underwater Autonomous Ultrasonic Propulsion System for Medical Implant Robot –Ultrasonic Propulsion System for Autonomous Intravascular Robot–

【Researcher】 Deqing Kong, Ph.D., Assistant Professor
Muroran Institute of Technology, College of Design and Manufacturing Technology

【Overview】

Underwater acoustic radiation propulsion with ultrasonics, the reaction of acoustic radiation force, is proposed and investigated with surface acoustic wave transducer and thickness-vibration-mode ultrasonic transducer. The high-power microscale underwater robot can be achieved with higher frequencies.

In the field of intravascular robotics, one possibility is proposed to keep the position and go upstream in the influence of blood flow. Our ultrasonic propulsion system deserves to be expected in minimally invasive treatment, targeted therapy and telemedicine, based on the advantages of high-power density, self-propelled, simple structure and low cost.



(a) Self-propelled Vascular Robot Actuator via SAW (b) Self-propelled Vascular Robot Actuator via BAW

【Potential Application】

・Intravascular Robot
・Minimally invasive treatment
・Drug Delivery
・5G telemedicine

【Future Development】

・Collaboration with medical device and hospital
・Business partner for industrialization

【Patent】

Patent is pending.

【Inquiry】 Deqing Kong, Ph.D., Assistant Professor
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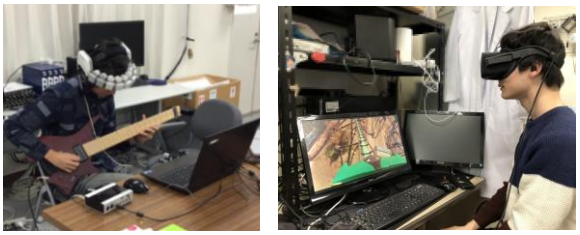
Medical care/Diagnostic/Medical equipment | **National Institute of Technology, Hakodate College** | **6-1**

Measurement of Bio-signals and its analysis

【Researcher】 Kenji MORIYA, Professor, Ph.D.(Eng) Bio-signals Measurement Lab.,
Dept of Production Systems Engineering, National Institute of Technology (KOSEN), Hakodate College

【Overview】

When you need customer's evaluation, especially emotional estimation (*e.g.*, excitement, comfortable, anxiety, etc.) for your developed product and when you need to investigate subject's mental state under your own specific environment or conditions, measurement of various bio-signals is one of effective methods.


Measurement of brain activities in music composition and analysis of autonomic nervous system function during 3D-VR experience

【Potential Application】

We provide
・Optical Topography device
・Holter ECG measurement device
・Eye movements and blink measurement device

【Future Development】

Please contact us if you are interested in estimation of your developed products/ environment using bio-signals measurements.

【Patent】

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