List of Research projects Conducted by Academic Advisors (Applied Natural Medicine)

Educational area Responsible teacher Contact address	Research contents
Clinical Pharmaceutics Professor KATO Atsushi (Sugitani Campus) kato@med	・Drug design and validation of chaperone compounds for rare lysosomal diseases utilising Protein-Ligand Docking ・Research on the development of functional cosmetics based on scientific evidence ・Research on the isolation and purification of the iminosugars from plants and their application as pharmaceuticals. ・Reverse translational research on Japanese and Chinese medicines, taking into account clinical experience.
Medicinal Resource Science Professor SHOJI Tsubasa (Sugitani Campus) tsubasa@inm	1. Molecular regulation of alkaloid and terpenoid pathways in medicinal plants of the Solanaceae family. 2. Novel regulatory mechanisms of alkaloid pathways in tobacco plants. 3. Biosynthesis and accumulation of natural sweeteners. 4. Collaborate with industry partners to apply our research to the stable supply and production of herbal medicines.
Natural Products & Drug Discovery Professor MORITA Hiroyuki (Sugitani Campus) hmorita@inm	・Studies on biosynthesis of naturally occurring bioactive compounds ・Structural basis for secondary metabolite enzymes ・Enzyme engineering for novel drug development ・Isolation of bioactive compounds from plants, microorganisms, and marine organisms ・Investigation of Asia's natural resources not fully utilized ・Discovery of natural anticancer agents from medicinal plant resources by employing a novel antiausterity screening strategy ・Chemical investigation of medicinal plants and search for novel bioactive secondary metabolites ・Investigation of the structure-activity relationship of the active natural compounds and their mechanism of action against cancer cell survival pathways ・Discovery of metabolomic biomarkers associated with cancer cells by utilizing FT-NMR and MS strategy
Neuromedical Science Professor TOHDA Chihiro (Sugitani Campus) chihiro@inm	・Elucidation of the molecular mechanism of restoring the neuronal network for activation of neural function. ・Traditional medicine research for developing fundamental therapeutic drugs for Alzheimer's disease, spinal cord injury, degenerative cervical myelopathy, glaucoma, and disuse syndrome. ・Molecular basis of crosstalk between the central nervous system and peripheral organs, which controls neural function. ・Clinical study aiming to develop new botanical drugs and new usage of Kampo formulas. ・Clinical study to analyze factors affecting physical and mental health and to identify biomarkers of well-being.
Host Defences Professor HAYAKAWA Yoshihiro (Sugitani Campus) haya@inm	・Study of NK cell biology and its roles in immunity ・Role of innate immune responses in cancer progression ・Immunological study of inflammatory & allergic diseases ・Modulation of immune responses and immunological diseases by Kampo medicines ・Study to regulate cancer progression & metastasis

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Complex Biosystem Research Professor NAKAGAWA Yoshimi (Sugitani Campus) ynaka@inm	・Functional analysis of transcription factors that regulate glucose and lipid metabolism ・Study for nutrient metabolism regulation by cell-cell and tissue-tissue interaction ・Study for the molecular mechanism of improvement of lifestyle-related diseases by Wakan-yaku
Presymptomatic Disease Professor KOIZUMI Keiichi (Sugitani Campus) kkoizumi@inm	・Understanding of the fluctuation of biometric information and its medical applications. ・Elucidation of the function of immunostimulatory nanoparticles and nucleotide degradant discovered by traditional Japanese medicine (Kampo formula) and their medical applications.
Computational Drug Design and Mathematical Medicine Professor TAKAOKA Yutaka (Sugitani Campus) ytakaoka@med	Our aims to construct theoretical medicine, which has an analogous concept of theoretical physics in contrast with experimental physics. It is not easy to describe the human body, that is, a complex system, with a hard science which uses mathematical models in such field as physics or chemistry. Therefore, we utilize molecular simulation analyses to describe human body partially, and use this approach to predict the future disease treatments. It is a challenge to evolve the medical system as a science with accumulated logic for prediction from the one which emphasizes experiences and results. Our final goal is to enable a paradigm shift from "validation" to "prediction" in the system of medical science. It is important to note that we pay attention whether the mathematical model is applicable to the real world and do not aim for mathematical sophistication. In addition, we also study the themes for Kampo and Acupuncture, machine learning and natural language processing, and social medicine such as community medical policies, improvement of hospital function, and medical management as follows: ・Prediction of adverse drug reactions base on molecular simulation and mathematical models ・Prediction of drug efficacy of molecularly target drugs for cancer based on molecular simulation and mathematical models ・Design of nucleic acid drugs and evaluation of drug efficacy ・Application of drug repurposing to computational drug design ・Molecular simulation analysis of pathological conditions caused by genetic mutations resulting in amino acid substitutions ・Molecular mechanisms of therapeutic effects of acupuncture and moxibustion ・Application of AI technologies such as machine learning and natural language processing to improvement of hospital functions ・Population dynamics and the future prediction of community medicine
Biofunctional Chemistry Professor IKAWA Yoshiya (Gofuku Campus) yikawa@sci	Research interest in our group is to elucidate the molecular basis of naturally occurring RNAs with catalytic and receptor functions. Another research interest of our group lies in the artificial generation of novel RNAs and RNA-based molecular systems with through rational and evolutional approaches.
Cell Biology Professor KARAHARA Ichirou (Gofuku Campus) karahara@sci	Research and education to understand the environmental responses of plant organs and tissues, analyzing from macroscopic to ultrastructural structures, including 3D levels

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Bioorganic Medicinal Chemistry Associate Professor OKADA Takuya (Gofuku Campus) tokada@eng	Based on synthetic organic chemistry, we conduct research and education on the synthesis of natural organic compounds having unique structures, and on the design, synthesis, and structural optimization of small molecules with the aim of developing novel pharmaceuticals.
Engineering based on Genetic Information Professor KUROSAWA Nobuyuki (Gofuku Campus) kurosawa@eng	The research focused on the development of monoclonal antibodies for diagnosis, therapy and to analyze the functionality of biomolecules. The research focused on the production of substances through biological reaction engineering using microorganisms and the elucidation of microbial cellular mechanisms. The research focused on the production of substances by biological reaction engineering using microorganisms and the elucidation of microbial cellular mechanisms. The research is focused on the techniques of synthetic biology for the artificial reconstruction of the molecules and systems that make up life.
Engineering based on Genetic Information Associate Professor OZAWA Tatsuhiko (Gofuku Campus) toza@eng	・We conduct education and research on basic research and translational research using monoclonal antibodies involved in diseases. ・We conduct education and research on developing new antibody platforms that use antibody engineering technology.
Synthetic and Medicinal Chemistry Professor ABE Hitoshi (Gofuku Campus) abeh@eng	In this field, education and research is conducted on the development of efficient synthetic methods for biologically active compounds such as pharmaceuticals and various functional organic molecules.
Pharmacology Associate Professor TAKASAKI Ichiro (Gofuku Campus) takasaki@eng	Education and research will be conducted on intractable chronic pain diseases such as postherpetic neuralgia, migraine, and cancer pain, and intractable chronic pruritic diseases such as atopic dermatitis, in order to elucidate their pathological mechanisms and to discover novel therapeutic agents.
Behavioral Neurochemistry Professor SHIMIZU Kimiko (Gofuku Campus) kshimizu@ctg	Many physiological functions are rhythmically regulated by the circadian clock and change in a circadian manner. Our laboratory aims to elucidate the “mechanism” of circadian regulation of higher brain functions such as memory formation and emotional regulation. We conduct research at the multiple levels, from the molecular to the behavioral. Examples are shown below. ・Behavioral analysis of circadian rhythms of memory and emotion ・Molecular mechanisms of circadian changes in memory and emotion ・Visualization of synaptic changes associated with brain function ・Mechanisms of action of novel neurosteroids

・The (Gofuku Campus), (Sugitani Campus) and (Takaoka Campus) in the contact information indicate the campus where the teacher's laboratory is located.

・A portion of email address is listed in the contact address. Please use it for preliminary consultations with the relevant academic advisor in the field of your choice. Please add ".u-toyama.ac.jp" after the address.
Example) abc@def → abc@def.u-toyama.ac.jp