Tokyo Metropolitan University,

Graduate School of Human Health Sciences

Department of Frontier Health Sciences

Cognitive Neuroscience
Science of Organ Motility
Science of Functional Morphology
Evaluation of Public Health Activity

We tackle various issues concerning human health sciences and medicine at the molecular, cellular, organ, individual, and social levels through strategies of interdisciplinary, leading-edge basic science research.

The Department of Frontier Health Sciences consists of three fields and one endowed program: Science of Organ Motility, Science of Functional Morphology, Evaluation of Public Health Activity and Project Division for Healthcare Innovation. In this department, we build flexible and organic collaborations with other departments to further promote education and research. We also make use of the most advanced and comprehensive research bases of our partner graduate schools in Tokyo medical partner organizations and so on to develop sophisticated researchers and educators in interdisciplinary and basic science research or academic fields, as well as training practicing expert professionals with broad-based knowledge and high-level research abilities.

Science of Organ Motility "Let's measure the macro movement of organs at the nano level!"

In the Science of Organ Motility field, we aim to unravel the mechanisms of muscle contraction and relaxation, which are the source of the movement of organs, and the motility of cells that constitute organs. We conduct studies using the latest physiological techniques, such as X-ray diffraction, trying to capture the living movements of various organs and tissues at the molecular (nano) level. In addition, we hope to shed light on the true nature of the functions and movements of molecules related to contraction and relaxation in intact organs and tissues, and clarify the mechanisms of the physiology and pathophysiology of organ movement.

Science of Functional Morphology "Analysis of autonomic innervation concerning with cancer, and obesity!"

In the Science of Functional Morphology field, we are contributing to research areas relating to the patterns of perineural infiltration of cancer and the development of new operative procedures for the preservation of organ functions, while elucidating the basic principles of autonomic innervation of internal organs with our original whole-mount immunohistochemical method. In addition, we are carrying out studies on research to analyze the mechanism of visceral fat accumulation, particularly mesenteric fat, and to analyze the relationship of obesity-resistant and gut flora in an experimental animal, *Suncus murinus*.

Evaluation of Public Health Activity "Improve the sense of understanding groups quantitatively!"

In the Evaluation of Public Health Activity field, we conduct studies to effectively carry out evaluations of health activities, using scientific techniques based on health statistics, quantitative study methods, and epidemiology at the sites of health activities, such as health centers, municipalities, schools, businesses, and so on, while giving consideration to ethics. Public health activities also include activities involved in clinical care that are significantly health oriented, as well as public health nursing activities.

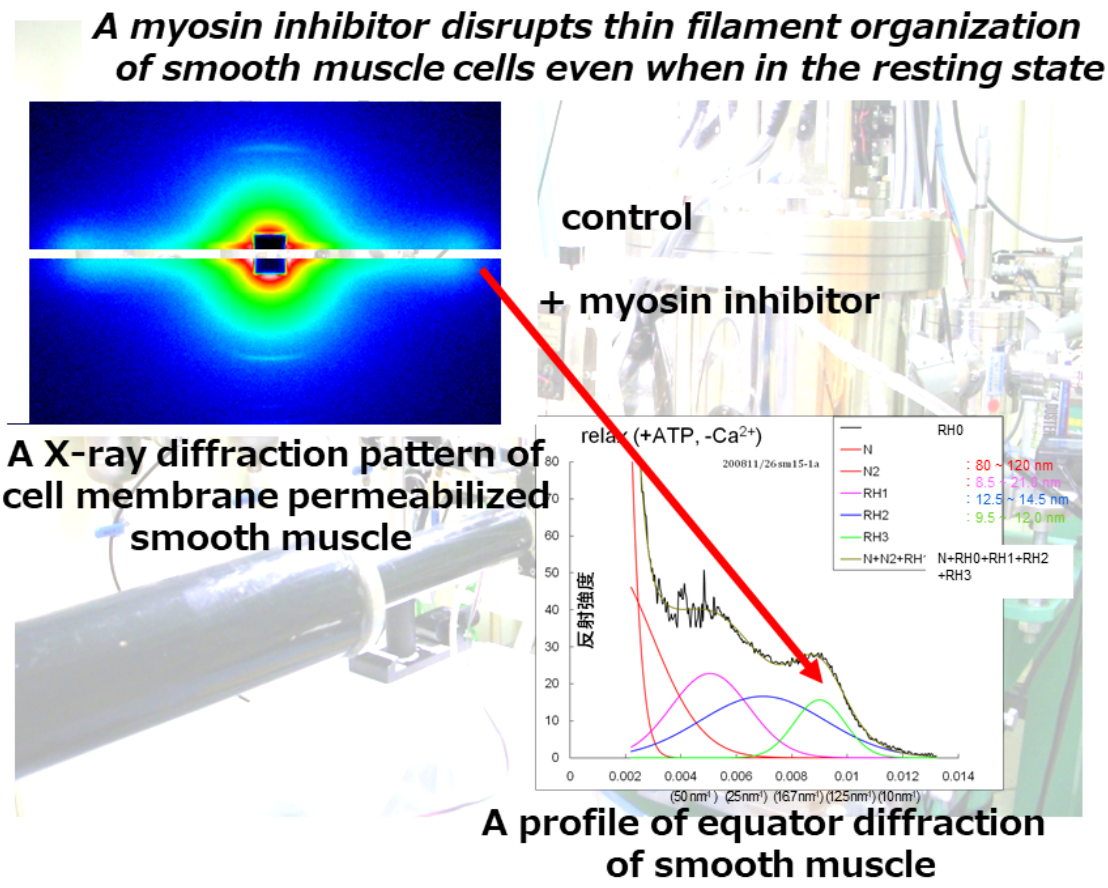
Project Division for Healthcare Innovation

In the Project Division for Healthcare Innovation, our studies involve researching and developing enzyme immunoassays to sensitively and specifically detect biomarkers such as hormones and proteins to allow prompt and accurate diagnosis of conditions such as lifestyle-related diseases and cancer that require costly care.

Science of Organ Motility

Let's measure the macro movements of organs and tissues at the nano metre level!

In the Science of Organ Motility field, we aim to unravel the mechanisms of muscle contraction and relaxation, which are the source of the movement of organs, and the motility of cells that constitute organs. We conduct physiological studies making use of techniques such as X-ray diffraction, trying to capture the living movements of various organs and tissues at the molecular (nano metre) level. In particular, in our X-ray diffraction research on smooth muscles distributed in internal organs, we demonstrated the disruption of the myosin filament structure in smooth muscles by a myosin blocker for the first time in the world, and next we will conduct quantitative analysis of equatorial reflection profiles. We want to shed light on the true nature of the functions and movements of molecules related to contraction and relaxation in intact organs and tissues, clarify the mechanisms of the physiology and pathophysiology of organ movements, and contribute to the advancement of health sciences. Youthful, flexible thinking is needed to promote research. We sincerely hope that you will join us.



If you are interested, please contact us at the following e-mail address:masaru [at] tmu.ac.jp

Faculty in charge (person to contact): Masaru Watanabe (M.D, Ph.D.)
The researcher's website: http://www.tmu.ac.jp/stafflist/data/wa/908.html

We are actively recruiting students of the master's and doctor's courses!!

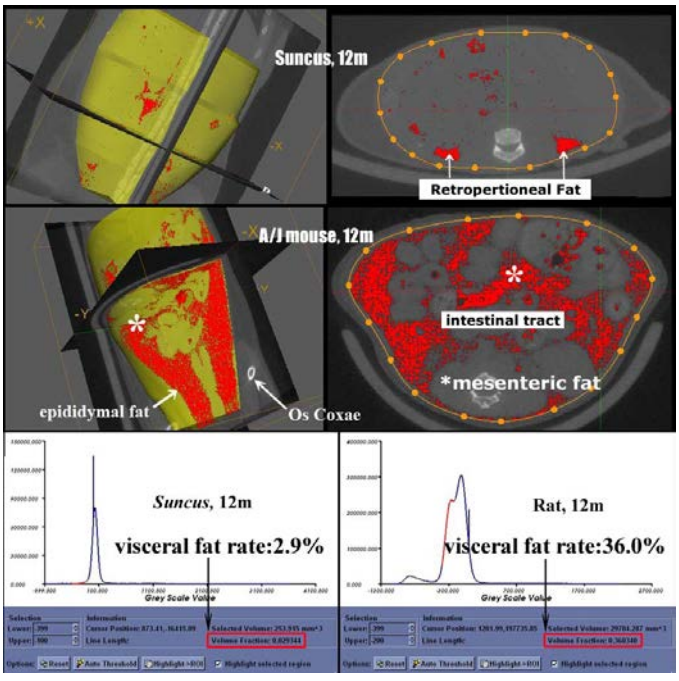
Science of Functional Morphology

We are conducting **analysis on the autonomic innervation with clinical applications in mind**. We aim to illuminate various clinical issues, such as the pattern of perineural infiltration of cancer, through three-dimensional visualization of the visceral autonomic nervous system using whole-mount immunohistochemistry with the house musk shew (*Suncus murinus*), basic research using neuroscience techniques by utilizing antibodies specific to sympathetic, parasympathetic, and sensory nerves, and gross anatomical analyses.

Furthermore, we conduct research on the receptor and transmission mechanisms of visceral pain. Specifically, we are carrying out studies to clarify the underlying **mechanisms** for visceral pain associated with chronic pancreatitis and fibrosis of the pancreas.

house musk shew (*Suncus murinus*)

Innervation of the stomach in *Suncus murinus*



We are also carrying out a study on the mechanisms of obesity-resistant. The *Suncus murinus* does not accumulate visceral fat all its life. This research will lead to the prevention and treatment of metabolic syndrome in humans by elucidating the distribution of feeding factors in the *Suncus murinus* digestive tract, analyzing the distribution and differentiation potential of adipose stem cells, and understanding **the mechanisms of anti-obesity and anti-accumulation of visceral fat** and analyzing the relationship of obesity-resistant and gut flora in *Suncus murinus*.

We are also studying on **Clinical Anatomy** of the musculoskeletal system.

If you are interested, please feel free to contact us.

Faculty in charge (person to contact): Shuang-Qin Yi, M.D., PhD.

E-mail: yittmniu [at] tmu.ac.jp

Phone: 03-3819-1211 (Ext.: 445)

Evaluation of Public Health Activity

When we perform health preservation activities in various disciplines as specialists, and have questions about the current status and position of these activities, whether or not they are effective, and so on, we begin to evaluate them. In essence, it can be said that evaluations are involved in all aspects of public health activities.

This field is referred to as the Evaluation of Public Health Activity. We consider that this field includes aspects involving evaluations of public health activities and health (nursing) activities for individuals and families related to communities (affected by social background).

Our research topics cover not only public health (public health nursing) activities performed in various occupational categories, including public health nurses, but also care-related events such as nursing that have a strong social aspect. Evaluations can be broadly divided into quantitative evaluations and qualitative evaluations, and we focus on quantitative evaluation in this field. As a platform for evaluation, it will be important to understand quantitative study design, epidemiological study methods and health statistics, learn how to operate statistical software, and so on. We hope to guide graduate students focusing on these essential matters in line with each student's research topic, while respecting the student's pace.

Some previous research topics worked on by graduate students

Patients' awareness of privacy concerning initial information and nurses' perceptions
Analysis of the structure of public health nurses' assessments regarding whether or not continuous support is required for medical check-ups for infants
Examinations of subjective well-being of the home-bound elderly and associated factors on remote islands and in urban areas
Analysis of the influence of the use of long-term care insurance services on the prevention of worsening degree of care in people requiring support at home and those certified as being in need of Grade 1 long-term care
Analysis of risk assessment sheets for community DOTS according to the characteristics of patients with tuberculosis in the community
Development and evaluation of an educational program to prevent violence between partners
Examinations of criteria-setting to predict the risk of people in need of support progressing to a condition requiring long-term care, using a checklist issued by Kita Ward, Tokyo
Relationships between emotional labor and work engagement in nursing staff
Study comparing the health literacy self-awareness of schizophrenics in a mental hospital with nurses' perceptions about the same ability

Faculty in charge: Yasutoshi Nekoda

The researcher's website:
http://weber.hs.tmu.ac.jp/cat/

Address: 7-2-10 Higashiogu,
Arakawa-ku, Tokyo, JAPAN