School of
VETERINARY
MEDICINE
NATIONAL TAIWAN UNIVERSITY

http://www.vm.ntu.edu.tw/DVM_Eng/index.html
Goal
The School of Veterinary Medicine (SVM), restructured from the Department of Veterinary Medicine on Aug. 1, 2008, is not only a milestone of innovation to veterinary education in Taiwan but also a critical step to regain the school with International veterinary educational developments. This is an important step towards regulatory and preventive zoonotic diseases, protection of food safety of animal products, establishment of modern veterinary medical techniques, identification of animal welfare issues as well as enhancement of laboratory-animal knowledge. It is also essential to develop the veterinary specialties system and continuing education. Under SVM, there are three organizations including the Department and Institute of Veterinary Medicine (baccalaureate program since 1942, master’s program since 1968, and the PhD program since 1977), the Institute of Veterinary Clinical Sciences (master’s program since 2007) and the Institute of Molecular and Comparative Pathobiology (master’s program since 2011).

DVM (Baccalaureate) program
A 5-year program of Doctor of Veterinary Medicine (DVM) is provided. Students must complete and pass all required courses (167 credits) during the first four years before they are allowed to proceed to the final year as intern veterinarians. A minimum of 182 credits is required for the degree of DVM. The degree has also been accredited by the Hong-Kong and Macau governments since 1998, and also by the Veterinary Council Malaysian since 2011.

Master program at the Institute of Veterinary Medicine
This 2-4-year program consists of two divisions including Veterinary Public Health and Veterinary Basic Sciences. A minimum of 24 credits is required for the degree of Master of Veterinary Medicine.

Master program at the Institute of Veterinary Clinical Sciences
This 2-4 year program consists of two divisions including farm and wildlife animals and companion animals. A minimum of 24 credits is required for the degree of Master of Veterinary Medicine. Additionally, students who pass the required residency training will be awarded a Residency Certification.

Master program at the Institute of Molecular and Comparative Pathobiology
This 2-4 year program consists of two divisions including Veterinary Pathology and non-Veterinary Pathology. A minimum of 24 credits is required for the degree of Master of Veterinary Medicine. The required core courses of the program are general introduction of Molecular Pathobiology and Statistics (experimental design). Additionally, students who pass the required veterinary pathology residency training will be awarded a Residency Certification.

PhD program at the Institute of Veterinary Medicine
All PhD students must fulfill both course and research requirements for their PhD degree. A minimum of 18 credits is required for the degree. In addition, three dissertation research-related publications, including at least two published or accepted by SCI-listed journals, are required for the degree.
## Freshman year

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credits</th>
<th>Semesters</th>
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</thead>
<tbody>
<tr>
<td>CHINESE</td>
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<td>TWO</td>
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<tr>
<td>FRESHMAN ENGLISH / SECOND FOREIGN LANGUAGE</td>
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<td>TWO</td>
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<tr>
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<tr>
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<tr>
<td>GENERAL CHEMISTRY</td>
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<tr>
<td>GENERAL CHEMISTRY LAB.</td>
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<tr>
<td>ORGANIC CHEMISTRY</td>
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<tr>
<td>EMBRYOLOGY</td>
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<tr>
<td>VETERINARY ANATOMY AND LAB.</td>
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<tr>
<td>BIOSTATISTICS AND PRACTICE</td>
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## Sophomore year

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<tr>
<th>Course Title</th>
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<tbody>
<tr>
<td>ANIMAL HISTOLOGY AND LAB.</td>
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<tr>
<td>VETERINARY BACTERIOLOGY AND LAB.</td>
<td>3</td>
<td>ONE</td>
</tr>
<tr>
<td>VETERINARY PARASITOLOGY AND LAB.</td>
<td>3</td>
<td>ONE</td>
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<tr>
<td>INTRODUCTION OF LABORATORY ANIMAL SCIENCE</td>
<td>2</td>
<td>ONE</td>
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<tr>
<td>VETERINARY PHYSIOLOGY</td>
<td>6</td>
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<td>VETERINARY PHYSIOLOGY LAB.</td>
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<td>ONE</td>
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<tr>
<td>VETERINARY VIROLOGY AND LAB.</td>
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<tr>
<td>VETERINARY JURISPRUDENCE AND ETHICS</td>
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<tr>
<td>BIOCHEMISTRY</td>
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## BIOCHEMISTRY EXPERIMENTS

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<thead>
<tr>
<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>PHYSICAL EDUCATION (3, 4)</td>
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### Junior year

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<tr>
<th>Course Title</th>
<th>Credits</th>
<th>Semesters</th>
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<tbody>
<tr>
<td>MOLECULAR BIOLOGY/CELL AND MOLECULAR BIOLOGY</td>
<td>2</td>
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<tr>
<td>VETERINARY PATHOLOGY AND LAB.</td>
<td>8</td>
<td>TWO</td>
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<tr>
<td>VETERINARY PHARMACOLOGY</td>
<td>6</td>
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<tr>
<td>VETERINARY PHARMACOLOGY LAB.</td>
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<td>ONE</td>
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<tr>
<td>VETERINARY GENETICS</td>
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<tr>
<td>VETERINARY ANESTHESIOLOGY AND LAB.</td>
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<tr>
<td>VETERINARY CLINICAL PATHOLOGY</td>
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<tr>
<td>VETERINARY CLINICAL PATHOLOGY LAB.</td>
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<td>ONE</td>
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<tr>
<td>VETERINARY IMMUNOLOGY</td>
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<tr>
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### Senior year

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<th>Course Title</th>
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<tr>
<td>SMALL ANIMAL SURGERY SKILLS AND LAB.</td>
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<tr>
<td>LARGE ANIMAL SURGERY &amp; LAB.</td>
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<td>ONE</td>
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<tr>
<td>AQUATIC ANIMAL DISEASES</td>
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<tr>
<td>VETERINARY THERIOGENOLOGY</td>
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<tr>
<td>POULTRY DISEASES</td>
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<tr>
<td>Course Title</td>
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<td>Semesters</td>
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<tr>
<td>SMALL ANIMAL MEDICINE</td>
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<td>ANIMAL HOSPITAL PRACTICES</td>
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<td>ONE</td>
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<tr>
<td>HORSE DISEASE</td>
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<tr>
<td>RUMINANT DISEASE</td>
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<tr>
<td>VETERINARY CLINICAL AND IMAGING DIAGNOSIS</td>
<td>2</td>
<td>ONE</td>
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<tr>
<td>EPIDEMIOLOGY OF DOMESTIC ANIMALS</td>
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### Fifth year

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<td>CLINICAL CONFERENCE</td>
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<td>NECROPSY</td>
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### Required Courses for Master degree program at the Graduate Institute of Veterinary Medicine

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<tr>
<th>Course Title</th>
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<tr>
<td>THESIS (M.V.M.)</td>
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<tr>
<td>INDEPENDENT STUDY (1~4)</td>
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<td>SEMINAR(1~4)</td>
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### Required Courses for Ph.D degree program

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<th>Course Title</th>
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<tr>
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<td>SEMINAR(1~4)</td>
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### Required Courses for Master degree program at the Graduate Institute of Veterinary Clinical Sciences

<table>
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<tr>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>THESIS (M.V.M.)</td>
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</tr>
<tr>
<td>INDEPENDENT STUDY (1~4)</td>
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<td>SEMINAR(1~4)</td>
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### Required Courses for Master degree program at the Graduate Institute of Molecular and Comparative Pathobiology

<table>
<thead>
<tr>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>THESIS (M.V.M.)</td>
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</tr>
<tr>
<td>INDEPENDENT STUDY (1~4)</td>
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<tr>
<td>SEMINAR(1~4)</td>
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</table>
SCHOOL OF VETERINARY MEDICINE
NATIONAL TAIWAN UNIVERSITY

— Institute of Veterinary Medicine
  Lab of Livestock Pollution Prevention and Control
  Lab of Food Hygiene and Safety
  Lab of Infection and Immunity
  Lab of Reproductive Biology and Cell Biology
  Lab of Neurophysiology
  Lab of Veterinary Parasitology
  Lab of Veterinary Immunology
  Lab of Molecular Bacteriology
  Lab of Veterinary Cancer Medicine
  Lab of Clinical Pathology and Cancer Research
  Lab of Immunopharmacology & Immunotoxicology
  Lab of Veterinary Pharmacology
  Lab of Regeneration Medicine and Stem Cell Research
  Lab of Poultry Diseases
  Lab of Monoclonal Antibody and Clinical Microbiology
  Lab of Molecular Cell Biology
  Lab of Aquatic Animal Diseases (1)

— Institute of Veterinary Clinical Sciences
  Lab of Large Animal and Wildlife Medicine
  Lab of Veterinary and Comparative Ophthalmology
  Lab of Small Animal Diseases
  Lab of Small Animal Surgery
  Lab of Small Animal Nephrology
  Lab of Small Animal Internal Medicine and Clinical Pathology
  Lab of Veterinary Neurology
  Lab of Veterinary Molecular Diagnosis
  Lab of Companion Animal Oncology

— Institute of Molecular and Comparative Pathobiology
  Lab of Electron Microscopy
  Lab of Veterinary Pathology
  Lab of Veterinary Neuropathology
  Lab of Laboratory Animal Medicine
  Lab of Aquatic Animal Diseases (2)
  Lab of Molecular Pathobiology
Lab of Livestock Pollution Prevention and Control

The mission is through investigation the livestock production environment to prevent pollutants and toxicants contamination to livestock products and also to decrease and eliminate disease-causation agents in animal production lines and in nature environment. This lab provides risk assessment for many exotic and emerging animal diseases according to available epidemiological data or self-laboratory research evidences and involves risk analysis of many veterinary public health issues.

Faculty

Dr. Chin-Cheng Chou (chouchin@ntu.edu.tw | T. +886 2 33661292)

Research interests
- Acrylamide-induce toxicities and apoptosis of the cells
- Environmental toxicants and occupational health investigation
- Modelling development for risk assessment of exotic and emerging animal diseases
- Characterization, origination and evolution of livestock-associated methicillin-resistant Staphylococcus aureus

Lab of Food Hygiene and Safety

The veterinary branch of food safety usually concerns eliminating or controlling food hazards at source, extending its reach from farms to slaughterhouses or even markets. It includes various fields of studies such as public health, veterinary epidemiology, veterinary clinical microbiology and food safety, etc. The focus of our research involves of food hygiene, bacterial food-borne diseases and their pathogenesis. We are also a TAF accredited laboratory for isolation of Salmonella spp. and for procedures of specific Salmonella serotypes typing from animals and related samples. We maintain a cooperative relationship with the National Taiwan University Zoonoses Research Center. Advance techniques for epidemiological studies such as pulse-field gel electrophoresis (PFGE) and Multi-locus sequence typing (MLST) are well established in our lab. Students are also trained with asepsis operating techniques and offered opportunities to participate in field investigations. Our lab provides an appropriate environment for training and development of skills and concepts to carry out epidemiological studies.

Faculty

Dr. Chung-Hsi Chou, (cchou@ntu.edu.tw | T. +886 2 33669735)

Research interests
- Bacterial food-borne diseases and pathogenesis
- Epidemiological studies of current zoonotic food-borne pathogens
Lab of Infection and Immunity

My lab investigates viral pathogenesis and immunity, which encompass all aspects of infection of animal hosts, including the sequence of events from entry to shedding, the clearance or persistence of the virus, the immune response of the host and the subsequent occurrence of disease. In recent years, emerging viral diseases pose serious threats to humans and animals, and they have incurred tremendous financial and societal costs for decades. We currently focus on the study of avian influenza virus and coronavirus, and use chickens and mice as our research models.

Faculty
Dr. Hui-Wen Chen  (winnichen@ntu.edu.tw | T. +886 2 33669450)

Research interests
- Viral immunology
- Vaccine/Antivirals discovery
- Microbiology diagnostics
- Infectious diseases epidemiology

Lab of Reproductive Biology and Cell Biology

Cell membrane is one of the most active compartments of a cell. A constant reorganization of cell membrane surface components (e.g. proteins, lipids) is required to maintain vital biological phenomena, such as wound repair, cell growth, cell differentiation, cell mobility as well as cell-cell interactions. Our main interests are to understand how membrane surface dynamics affect (1) fertilization processes in mammals and (2) disease progression in kidney, and more importantly, how these processes are being regulated in vivo.

Faculty
Dr. Pei-Shiue Jason Tsai  (p.s.tsai@ntu.edu.tw | T. +886 2 33661806)

Research interests
- Sperm Membrane Dynamics and Modifications upon Fertilization Processes
- Functions of Calcium and Proton Channels on Gametes (Ca2+-ATPase, V-ATPase)
- Cytoskeleton Regulation of Membrane Surface Protein Reorganization
- Cytoskeleton Regulation of Protein and Intracellular Vesicle Trafficking

Lab Website: http://jasonpstsai.wix.com/jt-lab-ntuvm
Lab of Neurophysiology

My research focuses on the underlying mechanisms in sleep disruptions induced by stress, neurological diseases (e.g., epilepsy and Parkinson’s disease) and psychiatric disorders, such as depression and anxiety. We are also interested in the effects of acupuncture and herbal medicines on the treatment of insomnia. Sleep-wake activities are recorded and analyzed by the electroencephalography, electromyography, gross movements and cortical temperature. Pharmacological methods, optogenetics technique, confocal microscope and behavioral tests are employed to elucidate the neural mechanisms. Our goal is to elucidate the underlying mechanisms of sleep disturbances by different animal models and to provide the solutions for insomnia and sleep disturbances.

Faculty
Dr. Fang-Chia Chang  （fchang@ntu.edu.tw ︱ T. +886 2 33663883 ）

Research interests
- Effects of neurological diseases (e.g., epilepsy, Parkinson’s disease, anxiety) on sleep
- Effects of stress on sleep
- Effects of acupuncture on sleep and its related mechanisms
- Neuroimmunomodulation on sleep
- Effects of herbal medicines on sleep and its related mechanisms

Lab of Veterinary Parasitology

Veterinary Parasitology studies the life history and pathological etiology of each parasite. Always the disease is associated with the life style of the animal and the life history of the parasite. In spite of the life history, low immunological physiology caused by low animal welfare is also another important etiology of parasitic diseases. The status of animal welfare is relevant to the assessment for five freedoms of animal to be treated.

Faculty
Dr. Chang-Young Fei  （fei@ntu.edu.tw ︱ T. +886 910161024 ）

Research interests
- Parasitic diseases of wildlife
- Parasitic diseases of pets
Lab of Veterinary Immunology

The studies of the Lab currently have shown that various aspects of immunomodulation occur by the administration of *Toxoplasma gondii* antigens or nutrients. No research project will be conducted after July 2015 due to Dr. Lin’s retirement.

Faculty
Dr. Dah-Sheng Lin  (dsl@ntu.edu.tw | T. +886 2 33661290)

Research interests
- Immunity to infection
- Immunonutrition

Lab of Molecular Bacteriology

*Salmonella* is a pathogenic agent of public health concern. Fimbriae are hair-like appendages present on the outer membrane of many *Enterobacteriaceae* including *Salmonella*. This structure is implicated in the adherent event which is a prerequisite for bacterial colonization and may eventually results in infection. *Salmonella* possesses a variety of fimbrial gene cluster while the *fim* gene cluster is responsible for the production of type 1 fimbriae. One of the long term research goals of my lab is to understand the detail regulatory mechanism of type 1 fimbriae, the most commonly found fimbrial type of *Salmonella*, and to elucidate how type 1 fimbriae may involve in the infectious cycle of *Salmonella*. Production of extended-spectrum beta-lactamases (ESBL) confers resistance to the commonly used beta-lactam drugs. The ESBLs reported thus far have been primarily documented in human clinical cases; nevertheless, attention has been drawn to non-human sources, such as animals, as possible origins of the infections. Another research interest in my lab is to characterize the ESBL-producing bacteria isolated from animals.

Faculty
Dr. Kuang-Sheng Yeh  (ksyeh@ntu.edu.tw | T. +886 2 33661289)

Research interests
- Regulation of type 1 fimbriae in *Salmonella enterica* species
- Characterization of ESBL-producing microorganisms isolated from animals
Lab of Veterinary Cancer Medicine

The Laboratory for Veterinary Cancer Medicine aims to study the molecular mechanism caused animal tumors and look for new therapeutic and diagnostic targets for animal cancers. We have specific interests in canine melanoma, lymphoma, mammary tumor and mast cell tumor.

Faculty

Dr. Taiching Liao  (atlliao@ntu.edu.tw | T. +886 2 33669877)

Research interests
- Molecular carcinogenesis of animal cancer
- Novel therapeutic and diagnostic methods of animal cancer

Lab of Clinical Pathology and Cancer Research (CPCR Lab)

The interest area of CPCR lab focus on: (1) exploring cancer biomarkers for cancer diagnosis or therapy development; (2) investigating cell metabolism relevant to cancer malignancy; (3) dissecting the interaction between host immunity and cancer progression. Canine lymphoma phenotyping and prognosis predicting developed by our lab now have become routine cancer diagnostic programs in NTU veterinary hospital. By finding the roles of novel cancer biomarkers and studying the interplay between host immune system and tumor cells, we hope to disclose potential candidates/strategy for therapeutic applications.

Faculty

Dr. Chen-Si Lin, (cslin100@ntu.edu.tw | T. +886 2 33661286)

Research interests
- cancer biomarkers
- the role of mitochondria in cancer metabolism
- cancer immunotherapy
Lab of Immunopharmacology & Immunotoxicology

The research of this laboratory is directed toward elucidating the immunological impacts and their underlying mechanisms for the effects of nanomaterials and immunoactive herbal constituents, including cannabidiol, areca nut-derived procyanidins, and the major yam-derived sapogenin diosgenin.

Faculty

Dr. Tong-Rong Jan  (tonyjan@ntu.edu.tw | T. +886 2 33661287)

Research interests
- Immunopharmacology: Elucidating underlying mechanisms for the anti-allergic and prebiotic effects of diosgenin and other bioactive natural products.
- Immunotoxicology: Investigating underlying mechanisms for cannabidiol-mediated pro-apoptotic effects on immune cells.
- Nanotoxicology: Studying effects of nanomaterials on antigen-specific immunity and the functionality of microglia and T cells.

Lab of Veterinary Pharmacology

Veterinary pharmacology studies mechanism of drug actions and drug therapeutic usages in various domestic and wild species. Courses cover the fundamental pharmacodynamics and pharmacokinetics principles of drug actions, systemic pharmacology, common medications used in common veterinary disease processes and basic pharmacy techniques in veterinary practice. Chang’s research interests are bacterial resistance, drug combinations, and drug residues.

Faculty

Dr. Shao-Kuang Chang, (skchang@ntu.edu.tw | T. +886 2 33663863)

Research interests
- Bacterial resistance of fluoroquinolones
- Drug combinations and clinical applications
- Drug residues in food producing animals.
Lab of Regeneration Medicine and Stem Cell Research

Recent development in the field of regenerative medicine highlighted the emerging need for cellular therapies. The use of biotechnology methods tailored for development of human cells or organs for the treatment of diseases using the novel approaches at the doorstep to its clinical application and prevention. Dr. Kuo’s current research has a focus on bone marrow stem cells and platelet-rich fibrin (PRF) releasates in regenerative medicine: bio-tooth/ articular cartilage/ diabetes mellitus/ renal failure/ injured sciatic nerves / osteoporosis, etc.

Faculty
Dr. Tzong-Fu Kuo (tzongfu@ntu.edu.tw | T. +886 2 33661295 )

Research interests
- Integrative & complementary medicine
- Stem cell applications
- Regenerative medicine

Lab of Poultry Diseases

The mission of the Lab of Poultry Diseases is to supply assistance and support the poultry industry in Taiwan and some countries in the world. This lab provides accurate, timely, and cost-effective diagnostic services, consultation, disease surveillance and management for poultry industry. Another mission of this lab is to educate and train veterinarians major in poultry diseases.

Faculty
Dr. Ching-Ho Wang, (chingho@ntu.edu.tw | T. +886 2 33663859)

Research interests
- Development of infectious bronchitis vaccines from Taiwanese strains
- Epidemiology analysis for avian influenza in Taiwan
- Control of avian leucosis and avian reticuloendotheliosis
- Serological surveillance for chicken industry
- Development of antibody and antigen detection methods for chicken viral diseases
Lab of Monoclonal Antibody and Clinical Microbiology

Monoclonal antibody (MAb) mainly studies the diagnosis and pathogenesis of animal viral diseases. Especially focus on the MAbs against viral structural and non-structural proteins, to correlate with immune response of vaccinated and natural infected animals respectively.

Faculty
Dr. Ivan Chen Cheng  (ivancheng@ntu.edu.tw | T. +886 2 33669912)

Research interests
- Swine viral diseases, such as Foot-and-mouth disease and the DIVA strategy and tools for disease surveillance
- Non-structural protein of avian influenza virus and its function on host immune response
- MAb-based diagnostic tool for animal viral disease

Lab of Molecular Cell Biology

Mechanisms of oxidative toxicities in various animal cell culture systems are our primary research interests. DNA damages or apoptosis induced by hydrogen peroxide or aflatoxin in rat hepatocytes and macrophages have been studied. More chemicals and cell type from other animals or human will be included in the future.

Faculty
Dr. Jiann-Gwu Lee, (dvmjgl@ntu.edu.tw | T. +886 2 33663873)

Research interests
- Oxidants induced geno-toxicities
- Signal transduction pathways
- Apoptosis
Lab of Aquatic Animal Diseases (1)

Group of fish diseases
This group consists of the Lab of Fish Disease and Lab of Aquatic Pathobiology, and has an active program that focuses on aquatic animal health. The Northern Center for Aquatic Animal Health, supported by Bureau of Animal and Plant Health Inspection and Quarantine provides research and service functions with an emphasis on important issues in fish health. Present areas of interest in research include the pathogenesis of fish diseases, development of fish vaccines and fish health management in aquaculture systems.

Faculty
Dr. Meei-Mei Chen (cmm@ntu.edu.tw | T. +886 2 33661288 )

Research interests
- Diagnosis and treatment of aquatic animal diseases
  Studies including:
  1) Koi herpesvirus: pathogenesis and Immunology and development of inactivated vaccine.
  2) Streptococcus: the relationship between biofilm formation and immune response of the host. The relationship between capsule formation and immune response of the host.
Lab of Large Animal and Wildlife Medicine

We have our own outpatient department for exotic pets, wild animals and large animals in our hospital. In addition, the clinic provides home-visit veterinary services. We are devoted to enhance medical quality of those fields and plug into advanced clinical research.

Research includes the physiology of wildlife, investigate the prevalence, diagnosis and treatment of wildlife diseases. By cooperating with several rehabilitation centers and research institutions, we rescue injured wild animals such as wild birds, sea turtles, small rodents, non-human primates and join in wildlife conservation research in Taiwan.

Furthermore, there is a 3-years resident training program in our lab. Residents are trained to perform general health examination, internal medicine, surgical medicine, endoscopic surgery, laboratory examination, and imaging examination in exotic pets, wild animals and large animals.

Faculty

Dr. Chau-Hwa Chi  (chie@ntu.edu.tw | T. +886 2 27396828 ext1161)

Research interests
- Conservation medicine
- Wildlife and exotic animal Medicine
- Large animal medicine
- Chinese herb medicine application in animals

Lab of Veterinary and Comparative Ophthalmology

The laboratory works on clinical veterinary ophthalmology and comparative ophthalmology. The lab studies mechanisms, diagnosis, and management of ophthalmic diseases with importance in veterinary or human medicine, especially glaucoma, retinal degeneration, retinal ischemia, corneal diseases, keratoconjunctivitis sicca, cataracts. The lab staff is also involved in clinical duty of veterinary ophthalmology service.

The service provides management of ophthalmic diseases in companion animals, exotic pets, and zoo animals.

Faculty

Dr. Chung-Tien Lin  (ctlin@ntu.edu.tw | T. +886 2 27359931)

Research interests
- Laser surgery of glaucoma in dogs and cats
- Retinal diseases of small animals and humans
- Antioxidant nutrients for retinal protection and eye health in animals and humans
- Complications of hypermature cataracts in dogs and cats
Lab of Small Animal Diseases
The topics investigated in this lab are mainly categorized into four systems: skin diseases, endocrine disorders, acquired cardiopulmonary disorders, and infectious diseases. All studies and investigations are based on the client-owned clinical cases, no experimental animals are ever involved in investigation in this lab. Atopic dermatitis and ectoparasitic diseases are the major streams in the dermatological investigation. Disorders of adrenal and thyroid glands, as well as endocrine pancreatic diseases are the major streams in the studies of endocrinopathies. Blood pressure associated cardiac disorders and application of 2D speckle-tracking echocardiography are the key studies in the cardiopulmonary disorders. Epidemiology of helicobacter and babesiosis are the major topics in infectious diseases.

Faculty
Dr. Hui-Pi Huang (hphuang@ntu.edu.tw | T. +886 2 27396828 ext 3050)

Research interests
- Complications associated with hyperadrenocorticism: hypertension, microalbuminuria, hypertropic cardiomyopathy, diabetes mellitus and myotonia.
- Chronic degenerative valvular diseases: 2D speckle-tracking echocardiography
- Pulmonary hypertension and associated with respiratory disorders.
- Application of therapeutic exercise programs and physiotherapies in management of myotonia, chronic degenerative valvular diseases and chronic enteropathies.
- Fitness programs for geriatric animals.
Lab of Small Animal Surgery

The Small Animal Surgery laboratory at Veterinary Medicine Teaching Hospital of National Taiwan University aims to provide the students with opportunities to have clinical training and experience in the assessment, diagnosis, management and surgical treatments, and to offer the surgical services on companion animals from the general cases or referred from local animal clinics over Taiwan area. The surgical services available in our section include the orthopedic surgeries and soft tissue surgeries. The laboratory research specializes in clinical medicine, orthopedic biomechanics, biomedical imaging, regeneration medicine, and development of experimental animal model and materials for artificial bone.

Faculty
Dr. Ching-Ho Wu (chinghowu@ntu.edu.tw | T. +886 2 27396828 ext. 5 230)
Dr. I-Li Liu (liuili@ntu.edu.tw | T. +886 2 27396828 ext. 2030)

Research interests
Dr. Ching-Ho Wu
- Small Animal Clinical Medicine
- Orthopedic Biomechanics
- Biomedical Imaging Analysis
- Regeneration Medicine

Dr. I-Li Liu
- Small animal orthopaedics
- Bone regeneration medicine,
- Experimental animal model,
- Bone biomechanics and artificial materials

Lab of Small Animal Nephrology

The goals of Small animal nephrology are to improve understanding of kidney diseases, discover the renal biomarker and test novel treatments for dogs and cats with renal dysfunction. We aim to provide integrated clinical, academic and research training for students and veterinarians. In animal hospital, we also offer clinical services for advanced treatments such as intermittent hemodialysis (HD), continuous renal replacement therapy (CRRT), sustained low efficiency daily diafiltration(SLEDD-f) for clinical cases requiring renal replacement therapy.

Faculty
Dr. Ya-Jane Lee (yajanelee@ntu.edu.tw | T. +886 2 27396828 ext. 5140)

Research interests
- Urinary biomarkers of kidney disease progression
- Molecular pathogenesis of polycystic kidney disease
- Uremic toxins
- The application of advance renal replacement therapy in small animals
Lab of Small Animal Internal Medicine and Clinical Pathology

Our Lab is devoted to investigate and treat small animal internal diseases, and provide medical managements for shelter animals. We have established and published a clinical useful and non-expensive therapeutic strategy (combinations of clindamycin, diminazene and imidocarb; CDI) in treatment of canine *Babesia gibsoni* infection; an algorithm for disease stage in cats with feline infectious peritonitis; an algorithm for disease severity scoring system in feline pancreatitis. We also provide students with clinical experiences in examinations, diagnoses, and treatments in various small animal internal diseases, especially intensive and critical cares, at NTU Veterinary Hospital. In addition, the students in the lab would attend shelter animals or sick dogs and cats by the roadside. Our Lab specializes in critical services in the fields of hematology, immune-mediated diseases, infectious diseases and endocrinology for companion animals.

**Faculty**

Dr. Bi-Ling Su  (bilingsu@ntu.edu.tw | T. +886 2 27396828 ext. 4010 )

**Research interests**
- Small animal infectious diseases
- Tick-borne diseases
- Immune-mediated diseases
- Endocrinology

Lab of Veterinary Neurology

We provide both undergraduate and postgraduate students as well as residents with clinical training in neurological examination, investigation procedures, imaging interpretation, diagnosis, and medical and surgical management in the field of clinical neurology in small animals. We also offer clinical service on medical neurology and neurosurgery at National Taiwan University Veterinary Teaching Hospital. Investigation procedures we conduct include clinical pathology, imaging (radiography, myelography, CT and MRI), cerebrospinal fluid analysis, electrodiagnostic testing and nerve/muscle biopsy. The research interests of the lab of veterinary neurology include imaging diagnosis of neurological disease, hypothermia treatment for brain injury, and stem cell therapy for CNS diseases.

**Faculty**

Dr. Ya-Pei Chang  (yapeichang@ntu.edu.tw | T. +886 2 27396828 ext. 2170 )

**Research interests**
- Radiographic findings of atlantoaxial instability
- Hypothermia treatment for brain injury
- Feline thiamine deficiency
- Preparation and application of mesenchymal stem cells therapy, including harvesting, isolation, pathogen screening protocols, clinical application in CNS diseases, and the potential mechanisms of therapeutic
**Institute of Veterinary Clinical Sciences**

**Lab of Veterinary Molecular Diagnosis**

The Laboratory of Veterinary Molecular Diagnosis aims to (1) virus infection and mutation mechanism study, (2) advance techniques in veterinary pathogen diagnosis, including viruses, bacteria and parasites, and (3) clinical application of molecular biology techniques to the diagnosis and treatment of animal diseases.

**Faculty**

**Dr. Lih-Chiann Wang**  ( lcwang@ntu.edu.tw | T. +886 2 27396828 ext. 4270 )

**Research interests**
- Influenza A virus investigation
- Canine respiratory pathogen diagnosis
- Molecular diagnosis using oligonucleotide microarray and loop-mediated isothermal amplification (LAMP) techniques

**Lab of Companion Animal Oncology**

Cancer has become one of the leading cause that affects companion animal health in recent years. Clinical oncology laboratory focuses in providing clinical service, training, as well as research in fine tuning treatment protocol and explore possible novel modalities. This laboratory is located on 6th floor of teaching hospital and provide first opinion and referral out patient service. The clinical training involve students and residents in practicing modern cancer diagnosis, planning, treatments, and long term care for cancer patients. Recent clinical trials include photodynamic therapy, immune modulation and target therapy, novel neoadjuvant procedure to further enhance of traditional treatment modalities.

**Faculty**

**Dr. Jihjong Lee**  ( jacklee@ntu.edu.tw | T. +886 2 33663880 )

**Research interests**
- Drug resistance in canine lymphoma
- Molecular targeting in treating canine malignant tumors
- Apoptotic mechanism in cancer pathogenesis and treatment developments
Institute of Molecular and Comparative Pathobiology

Lab of Electron Microscopy

Using electron microscopy as research tools, our lab focuses on the ultrastructures of domestic and laboratory animal tissues. Through the comparisons between physiological and pathological states, we study the mechanisms of pathogenesis, search for solutions and provide solid evidence for diagnosis. We offer courses in animal histology, histological physiology, basic and advanced training in biological EM for the undergraduate or graduated students to further their studies/research. In recent years, we have rendered the services to the campus by means of consulting, sample preparation, ultra-thin sectioning, positive/negative staining, EM observations, elemental analysis with energy dispersive spectrometry (EDS), and micro-computed tomography (micro-CT). As a branch of the Joint Center for Instruments and Researches under the College of Bioresources and Agriculture, we are devoted to solving the technical problems for the users of biological EM here in NTU.

Faculty
Dr. Chiung-Hsiang Cheng (emcheng@ntu.edu.tw | T. +886 2 33663872)

Research interests
- Veterinary diagnostics using pathology and other techniques.

Lab of Veterinary Pathology

For the past 20 years my laboratory has been devoted to the diagnostic pathology services mostly on tumors and tumor-like lesions of small animals. Interesting cases will be investigated further. Granted projects are mostly focused on exploring the pathogenesis of viral infectious diseases of farm animals mainly porcine and sheep. Recently our interests extended to the development of diagnostics and vaccines.

Faculty
Dr. Fun-In WANG (fiwangvm@ntu.edu.tw | T. +886 2 33661285)

Research interests
- Diagnostic veterinary pathology.
- Pathogenesis of viral diseases, in particular porcine.
- Expression of porcine teschovirus proteins and its applications.
- Development of viral vector vaccine.
Lab of Veterinary Neuropathology

Laboratory of veterinary neuropathology was founded in 1999 and it is an important part of veterinary pathology. Several techniques such as HE, histochemistry, immunohistochemistry, PCR, western blot and electron microscopy are employed to study infectious diseases, zoonosis, and tumor diagnosis as well in miscellaneous animal species. At present, the lab also extends its research capacity into veterinary forensics for the purpose of animal welfare and right.

Faculty
Dr. Chen-Hsuan Liu  (chhsuliu@ntu.edu.tw | T. +886 2 33663760 )

Research interests
- Veterinary forensics
- Diagnostic pathology (surgical and anatomic)
- Comparative pathology

Lab of Laboratory Animal Medicine

Area of Laboratory Animal Medicine/Comparative Medicine covers multiple subjects in lab animal field, including laboratory animal science, experimental application, animal models, lab animal management, lab animal disease, lab animal diagnostics, lab animal regulations, and lab animal welfare. My research has focused on investigating the pathogenesis of novel rodent infectious diseases and developing the diagnostic assays for infectious agents.

Faculty
Dr. Cho-Hua Wan  (chwan@ntu.edu.tw | T. +886 2 33663885 )

Research interests
- Rodent parvoviruses
- Rodent infectious diseases
- Diagnostics improvement/development
- Pathogenesis of infectious diseases
Lab of Aquatic Animal Diseases (2)

Group of fish diseases
This group consists of the Lab of Fish Disease and Lab of Aquatic Pathobiology, and has an active program that focuses on aquatic animal health. The Northern Center for Aquatic Animal Health, supported by Bureau of Animal and Plant Health Inspection and Quarantine provides research and service functions with an emphasis on important issues in fish health. Present areas of interest in research include the pathogenesis of fish diseases, development of fish vaccines and fish health management in aquaculture systems.

Faculty
Dr. Pen-Heng Chang  (penheng@ntu.edu.tw | T. +886 2 33661296 )

Research interests
- Pathogenesis and pathology of piscine microorganism.
- Epidemiologic studies of abalone herpesvirus.
The overall mission of our lab is to explore the pathogenesis and interactions of viral pathogens from various animal species, such as classical swine fever virus (CSFV), porcine reproductive respiratory syndrome virus (PRRSV), porcine circovirus type 2 (PCV2), torque teno sus virus (TTSuV), porcine endemic diarrhea virus (PEDV), and feline infectious peritonitis virus (FIPV). Extending the aforementioned studies to vaccine developments such as PRRSV and PEDV, either by using traditional or plant-based delivery systems, is our principal task. Our lab is also involved in the anatomic pathology residency training program and the routine pathological diagnostic service; therefore, diagnosis and disease surveillance of important zoonotic and non-zoonotic pathogens, such as mycobacteria, hepatitis E virus, Nipah virus, rabies virus, chytrid fungus, Coxiella burnetii, or even toxicosis in wildlife and domestic animals are our research interests as well.

**Faculty**

Dr. Victor Fei Pang  (pang@ntu.edu.tw | T. +886 2 33663867)
Dr. Chian-Ren Jeng (crjeng@ntu.edu.tw | T. +886 2 33663869)
Dr. Hui-Wen Chang (huiwenchang@ntu.edu.tw | T. +886 2 33669899)

**Research interests**

Dr. Victor Fei Pang
- Immunopathogenesis and interactions of porcine viral pathogens (such as PRRSV, PCV2, and TTSuV) and/or mycotoxins (such as aflatoxin, fumonisin)
- Development of plant-based PRRSV oral vaccine
- Diagnosis and disease surveillance of zoonotic and non-zoonotic diseases and toxicosis of wildlife and domestic animals

Dr. Chian-Ren Jeng
- Pathogenesis and interactions of porcine viral pathogens, including CSFV, PRRSV and PCV2
- Development of plat-based PRRSV oral vaccine,
- Diagnosis and disease surveillance of important zoonotic diseases, including tuberculosis, hepatitis E virus and Nipath virus

Dr. Hui-Wen Chang
- Molecular pathogenesis of viral diseases
- Subunit vaccine, inactive vaccine, or live attenuate vaccine development.
- Molecular virology: viral virulent gene determination, cellular receptor identification, viral-host interactions, and the epidemiology of viral diseases.