Osaka Prefecture University Graduate School of Life and Environmental Sciences, Department of Veterinary Science, in Rinku Campus (2018-2019)





Veterinary Science

Graduate School of Life and Environmental Sciences Osaka Prefecture University

Welcome

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Osaka Prefecture University (OPU), one of the largest public universities in Japan, is a leading advanced research university. Located in southern Osaka, OPU consists of 4 colleges (comprising 13 undergraduate schools) and 7 graduate schools, distributed across three modern and convenientlylocated campuses: Nakamozu (the main campus), Habikino, and Rinku. OPU also has satellite campuses in the central region of Osaka. At each campus, you can find around 6,200 undergraduate and 1,900 graduate students pursing their academic interests with advanced, cutting-edge facilities under the supervision of 700 assigned faculty members.

OPU has been expanding its overseas network, especially in Southeast Asia. As of January 21, 2016, OPU has relationships with 154 partner institutions in 37 countries and regions. OPU conducts pioneering research in collaboration with these institutions and promotes student exchange. Please refer to the following OPU website for information about OPU's Worldwide Research and Education Network. http://www.osakafu-u.ac.jp/english/info/ overview/international_exchange.html

OPU actively accepts international students from around the world to promote the internationalization of its education and research. Currently, about 200 international students (including exchange students) from 18 countries and regions are studying at OPU. More than 50 international exchange students from our overseas partner institutions visit our campus every year.

Since April 2009, the OPU Division of Veterinary Science has relocated to our new Rinku Campus located on the shore across from the Kansai International Airport. On this new campus, the Veterinary Medical Center and Education and Research Center for Experimental Animal Science have been housed in an education/research building. With this relocation, undergraduate students in the first year of their veterinary science training who have completed their general subject courses and core courses for their major at the Nakamozu Campus will take their major courses from the second year onwards at the Rinku Campus.

Leading the world in conducting cuttingedge research at the Rinku Campus that is equipped with state-of-the-art facilities, our courses aim to cultivate the next generation of leaders in various areas such as an advanced medical treatment for animals, food safety, communicable diseases between humans and animals, and life science and animal biotechnology research. This is an opportunity to provide an overview of the scientific activities of our departments by this pamphlet.

As you will discover, our research activities span many different disciplines including clinical sciences veterinary medicine and basic sciences, resulting in an impressive number of original publications, which oftentimes stem form our students' doctoral theses (please refer to the list at end of the document).

We are looking forward to your continued support and cooperation.



Professor Kazumi Sasai: The head of the Department of Veterinary Science



Professor Toshiya Okada: The head of the Division of Veterinary Science

History

The Osaka Prefecture University Department of Veterinary Science has one of the richest traditions of any veterinary school in Japan, dating back to its inception as a training school for veterinary science (Jyuigaku-Kosyujo) in 1883 in Kita-ku, Osaka city.

In 1888, Osaka-Furitsu-Nogakko was founded and comprised of the Department of Veterinary Science and Department of Agriculture in Sakaiku, Sakai city. The campus outgrew its space due to facility improvements, and moved to Ikuno-ku, Osaka city in 1890. The new location of the school is commonly known as Katsuyama, which is a hill known to be one of the historical sites associated with the Osaka Campaign ("Osaka-nojin") in the 17th century. The school was named after the hill, as Kachiyama Nogakko.



Kachiyama Nogakko from 1890 to 1925

In 1926, the area around Osaka-Furitsu-Nogakko underwent urbanization and the campus of the school was relocated again to Daisen-cho in Sakai city. Taking advantage of the relocation to the Daisen school building, a campaign to upgrade the school to a higher education institution was initiated.



Daisen School from 1926 to 1968

In 1949, when universities were established under the new education system, Naniwa-Daigaku was established by the merger of seven technical schools in Osaka, each of which had a different campus. It placed a strong emphasis on "practical learning," thus offering courses in the areas of engineering, agriculture, economics, integrated arts and sciences and social welfare. In 1955, Naniwa Daigaku was renamed as Osaka Prefecture University. In the 1960s, departments which were dispersed on different campuses were unified to the Nakamozu Campus and thus, formed the basic system on which the current Nakamozu Campus developed.



Nakamozu Campus (the main campus) from 1969

In 2009, the Department and Division of Veterinary Science, and the Veterinary Medical Center relocated to our new Rinku Campus located on the shore across from the Kansai International Airport. The veterinary sciences department is carrying out improved faculty development programs at the new facilities, which are equipped with state-of-the-art educational and research equipment.



Rinku Campus from 2009

Organization

Veterinary science, a comprehensive science focused on animal treatment, tackles various issues deeply related to the health and safety of animals and humans and the welfare of the local society: (1) the enhancement of animal treatment, (2) the threat of amphixenosis due to the increase in the international movement of people and animals and also distribution of livestock products, (3) the improvement of livestock products, (3) the improvement of new medicine, and (5) the safety evaluation of foods and pharmaceuticals.

The Division of Veterinary Science aims to develop (1) specialists in veterinary learning, view, and technique who are capable of integrating specialized knowledge and technique in the domain of applied animal science, (2) specialists capable of contributing to the diagnosis and treatment of animals and public hygiene, and (3) international specialists capable of exhibiting innovative leadership in biomedical fields related to both animals and humans.

Since April 2009, the Division of Veterinary Science has transferred to our new Rinku Campus located on the shore across from Kansai International Airport. On this new campus, the Veterinary Medical Center and Education and Research Center for Experimental Animal Science have been housed in an education/research building under the department. The division is carrying out improved faculty development programs at the new facilities, which are equipped with the latest educational and research equipment.

Organization Chart of Division of Veterinary Science

Vet	erinary Science
	Structural and Functional Biosciences for animals
	Integrated Structural Biosciences
	Integrated Functional Biosciences
	Veterinary Environmental Sciences
	Bioenvironmental Sciences
	Infectious Diseases Control
	Veterinary Clinical Sciences
	Advanced Pathobiology
	Advanced Clinical Medicine

Integrated Structural Biosciences

Laboratory of Veterinary Anatomy

Professor Associate Professor Kazushige Ogawa Takayuki Nakajima

Research Interest (K. Ogawa):

The major research interest of **K. Ogawa** is whether Eph receptors and ephrin ligands regulate cytoarchitecture in various tissues once development is completed. The roles of Eph receptors and ephrins have been extensively characterized in developing tissues. Various biological functions have been attributed to these proteins, including tissue-border formation, cell adhesion, cell migration, axon guidance, vasculogenesis, and angiogenesis. However, little is known about expressions and functions of these proteins in normal adult tissues and organs.

M1 and M2 polarizations of monocyte-derived macrophages have been extensively characterized whereas those of tissue resident macrophages have not due to the difficulty of their propagation in vitro. Recently **K. Ogawa** has developed a primary culture method including cell purification, cryopreservation, and proliferation generally applied for tissue resident macrophages such as red pulp macrophages, Kupffer cells, brain macrophages, and lung interstitial macrophages. Moreover we have revealed that monocytes, peritoneal macrophages, and monocytes/macrophage line cells express several members of Eph receptors and ephrin ligands. Thus, we challenge to clear the M1 and M2 polarization nature of tissue resident macrophages along roles of the Eph receptors and ephrin ligands on their tissue-specific lodgment.

Key words:

Eph, ephrin, Integrin, Cell adhesion, Tissue organization, Tissue resident macrophages, Angiogenesis

Publications:

- M. Mukai, N. Suruga, N. Saeki, K. Ogawa EphA receptors and ephrin-A ligands are upregulated by monocytic differentiation/maturation and promote cell adhesion and protrusion formation in HL60 monocytes. BMC Cell Biol 18:28, 2017. doi: 10.1186/ s12860-017-0144-x.
- N. Konda, N. Saeki, S. Nishino, K. Ogawa Truncated EphA2 likely potentiates cell adhesion via integrins as well as infiltration and/or lodgment of a monocyte/ macrophage cell line in the red pulp and marginal zone of the mouse spleen, where ephrin-A1 is prominently expressed in the vasculature. *Histochem. Cell Biol.* 147:317–339, 2017. doi: 10.1007/s00418-016-1494-8 1.
- N. Saeki, S. Nishino, T. Shimizu, K. Ogawa EphA2 promotes cell adhesion and spreading of monocyte and monocyte/macrophage cell lines on integrin ligandcoated surfaces. Cell Adh. Migr., 9(6): 469-482, 2015; doi: 10.1080/19336918.2015.1107693.
- S. Uchiyama, N. Saeki, K. Ogawa Aberrant EphB/ ephrin-B expression in experimental gastric lesions and tumor cells. World J. Gastroenterol., 21(2): 453-464, 2015; doi: 10.3748/wjg.v21.i2.453.

Research Interest (T. Nakajima):

T. Nakajima studies the molecular and biochemical mechanisms in brain after cerebral ischemia using rat models of cerebral ischemia. Cardiopulmonary resuscitation is conducted to rescue the patients subjected to cardiac arrest. Even when the restoration of spontaneous circulation is achieved by an appropriate cardiopulmonary resuscitation, about 40% of those who arrive to the hospital never regain consciousness, and about 30% of those awakened suffer post-cardiac arrest brain injury, including cognitive and motor deficits. Post-cardiac arrest brain injury is caused by global cerebral ischemia following arrest. At present, there is no cardiac useful pharmacological therapy for post-cardiac arrest brain injury in clinical setting. The global cerebral ischemia induced by the occlusion of common carotid artery and vertebral artery is a good model of post-cardiac arrest brain injury. We study the pathophysiology of global cerebral ischemia using rat global cerebral ischemia model. Our research is a fundamental study for exploring a novel therapy for attenuating the post-cardiac arrest brain injury.

Key words:

Brain ischemia, Neuronal cell death

Publications:

- 1. **T. Nakajima**, R. Hata, Y. Kunieda, T. Kondo. Distribution of Smad mRNA and proteins in the rat brain. **J Chem Neuroanat**. 2017. 90:11-39.
- 2. T. Nakajima, R. Hata, T. Kondo, S. Takenaka. Proteomic analysis of the hippocampus in naïve and ischemic-preconditioned rat. J. Neurol. Sci., 358 : 158-171. 2015.
- 3. **T. Nakajima**, M. Yanagihara and H. Nishii. Temporal and regional patterns of Smad activation in the rat hippocampus following global ischemia. **J. Neurol. Sci.**, 337 : 25-37, 2014.
- T. Nakajima, S. Ochi, C. Oda, M. Ishii and K. Ogawa. Ischemic preconditioning attenuates of ischemia-induced degradation of spectrin and tau: implications for ischemic tolerance. Neurol. Sci., 32:229-239, 2011.

Laboratory of Veterinary Pathology

Research Interest

Common project: Diagnostic pathology for companion, zoo and laboratory animals.

Using chemically-induced hepatic and renal fibrosis, **J. Yamate** has investigated the complicated pathogenesis with regards to M1/M2 macrophage polarization an myofibroblasts. Additionally, transplantable rat models have been established in terms of stem cell differentiation and applications for biomedical sciences *in vivo* and *in vitro*.

M. Kuwamura studies rat and mouse mutants with neurological disorders pathologically. He is also interested in pathological aspects of diseases in companion and

Publications:

- Bondoc A, Golbar HM, Pervin M, Katou-Ichikawa C, Tanaka M, Izawa T, Kuwamura M, Yamate J. Participation of tumor-associated myeloid cells in progression of amelanotic melanoma (RMM Tumor Line) in F344 Rats, with particular reference to MHC Class IIand CD163-expressing cells. Cancer Microenviron 10: 9-24, 2017.
- Kuramochi M, Izawa T, Pervin M, Bondoc A, Kuwamura M, LaMarre J, Yamate J. Attenuation of thioacetamide-induced hepatocellular injury by short-term repeated injections associated with down-regulation of metabolic enzymes and relationship with MHC class IIpresenting cells. Exp Toxicol Pathol 69: 589-597, 2017.
- 3. Golbar HM, **Izawa T**, Bondoc A, Wijesundera KK, Tennakoon AH, **Kuwamura M**, **Yamate J**. Attenuation of alpha-naphthylisothiocyanate (ANIT)-induced biliary fibrosis by depletion of hepatic macrophages in rats. Exp Toxicol Pathol 69: 221-230, 2017.
- Tanaka M, Yamaguchi S, Akiyoshi H, Tsuboi M, Uchida K, Izawa T, Yamate J, Kuwamura M. Ultrastructural features of canine neuroaxonal dystrophy in a Papillon dog. J Vet Med Sci 79: 1927-1930, 2017.
- 5. Tanaka N, Izawa T, Takenaka S, Akiyoshi H, Yamate J,

Professor Associate Professor Associate Professor Jyoji Yamate Mitsuru Kuwamura Takeshi Izawa

domestic animals and comparison.

T. Izawa has studied on the key factors involved in the development of intractable diseases such as liver cirrhosis by molecular pathological approaches (i.e. DNA microarray, laser microdissection) using rodent models.

Key words:

Fibrosis, Macrophage function, Mesenchymal differentiation, Tumor models, Neurodegeneration, Animal models, Liver cirrhosis, Cytokines, Expression profile

Kuwamura M. Expression of Ccdc85C, a causative protein for murine hydrocephalus, in the mammary gland tumors of dogs. Histol Histopathol 32: 397-403, 2017.

- Shimotsuma Y, Tanaka M, Izawa T, Yamate J, Kuwamura M. Enhanced expression of Trib3 during the development of myelin breakdown in dmy myelin mutant rats. PLoS One 11: e0168250, 2016.
- 7. Atarashi M, Izawa T, Miyagi R, Ohji S, Hashimoto A, Kuwamura M, Yamate J. Dietary iron supplementation alters hepatic inflammation in a rat model of nonalcoholic steatohepatitis. Nutrients (in press).
- Nishina H, Izawa T, Ozaki M, Kuwamura M, Yamate J. Unilateral luteoma of the ovary in a pregnant Risso's dolphin (Grampus griseus). J Vet Med Sci 79: 1749-1752, 2017.
- Katou-Ichikawa C, Izawa T, Sasai H, Kuwamura M, Yamate J. Multiple histiocytic foam cell nodules in the tongue of miniature dachshund dogs. Vet Pathol 53: 625-8, 2016.
- 10. Izawa T, Horiuchi T, Atarashi M, Kuwamura M, Yamate J. Anti-fibrotic role of miR-214 in thioacetamide-induced liver cirrhosis in rats. Toxicol Pathol 43: 844-51, 2015.





Laboratory of Laboratory Animal Science

Professor Toshiya Okada Tomohiro Kondo Assistant Professor

Research Interest:

development, improvement and biological differences of laboratory animals. The present major studies are:

- (1) Developmental studies of laboratory animals during perinatal period.
- (2) Effects of environmental factors on the development of 5. Nakajima T, Hata R, Kondo T, Takenaka S. Proteomic laboratory animals.
- (3) Development and improvement of animal models for human diseases.
- (4) Studies on the species and strain differences in laboratory animals.
- (5) Genetic analysis in laboratory animals.

Key words:

Behavioral Analysis, Cataract, Cerebral Ischemia, Environmental Enrichment, Fetal Growth Restriction, Genetic Analysis, Intrauterine Growth Retardation, Renal Development

Publications:

- 1. Nakamura J, Shimomoto T, Collins LB, Holley DW, Zhang Z, Barbee JM, Sharma V, Tian X, Kondo T, Uchida K, Yi X, Perkins DO, Willis MS, Gold A, Bultman SJ. Evidence that endogenous formaldehyde produces immunogenic and atherogenic adduct epitopes. Sci. Rep., 7(1):10787, 2017.
- 2. Kondo T, Nakamori T, Nagai H, Takeshita A, Kusakabe KT, and Okada, T. A novel spontaneous mutation of BCAR3 results in extrusion cataracts in CF#1 mous strain. Mamm. Genome, 27(9-10): 457-459 2016.
- 3. Yuasa K, Kondo T, Nagai H, Mino M, Takeshita A, Okada, T. Maternal protein restriction that does not have an influence on the birth weight of the offspring induces morphological changes in kidneys reminiscent of phenotypes exhibited by intrauterine growth retardation rats. Congenit. Anom., 56(2): 79-85, 2016.

- T. Okada and T. Kondo research work focuses on the 4. Kondo T, Kitano-Amahori Y, Nagai H, Mino M, Takeshita A, Kusakabe KT, Okada T. Effects of maternal subtotal nephrectomy on the development of the fetal kidney: A morphometric study. Congenit. Anom., 55(4): 178-182, 2015.
 - analysis of the hippocampus in naïve and ischemicpreconditioned rat. J Neurol Sci., 358(1-2):158-171, 2015.
 - 6 Kondo T, Nagai N, Kawashima T, Taniguchi Y, Koyabu N, Takeshita A, Kusakabe KT, Okada T. Hereditary and histological characteristics of a new cataract mouse model originating from CF#1 strain (CF#1/b cac). Comp. Med., 64(5): 360-368, 2014.
 - 7. Takeshita A, Kusakabe KT, Hiyama M, Kuniyoshi N, Kondo T, Kano K, Kiso Y, Okada T. Dynamics and reproductive effects of complement factors in the spontaneous abortion model of CBA/J x DBA/2 mice. Immunobiology, 219 (5): 385-391, 2014.
 - 8. Kondo T, Ishiga-Hashimoto N, Nagai H, Takeshita A, Mino M, Morioka H, Kusakabe KT, Okada T. Expression of transforming growth factor β (TGF β) and fibroblast growth factor 2 (FGF2) in the lens epithelium of Morioka cataract (MCT) mice. Congenit, Anom., 54 (2): 104-109, 2014.
 - 9. Srimontri, P, Hirota, H, Kanno, H, Okada, T, Hirabayashi, Y. Kato, K. Infusion of growth hormone into the hippocampus induces molecular and behavioral responses in mice. Exp. Brain Res., 232(9): 2957-2966, 2014.
 - 10. Okada T, Kataoka Y, Takeshita A, Mino M, Morioka H, Kusakabe KT, Kondo T. Effects of transient forebrain ischemia on the hippocampus of the Mongolian Gerbil (Meriones unguiculatus): An immunohistochemical study. Zool. Sci., 30(6): 484-489, 2013.

Morioka cataract (MCT) mouse



a new cataract mouse model originated in the ddY strain

Enrichment material



left: plastic igloo and plastic crawl ball, right: paper house

Page 6

Integrated Functional Biosciences

Laboratory of Integrative Physiology

Professor Associate Professor Associate Professor Yoichi Nakamura Mitsuaki Moriyama Katsura Takano

Research Interest:

In the central nervous system, there are three kinds of glial cells other than neurons: astrocytes, oligodendrocytes, and microglia. They play various important roles in both pathological and physiological conditions. Goal of our research is to elucidate the glial regulation mechanism of inter- and intra-cellular signaling using cultured cells as basic experimental systems, with biochemical, immunological, morphological techniques, and so on.

Various glial functions; eg. the productions of NO, cytokines and neurotrophic factors and phagocytosing activity, are closely related on the pathomechanisms of neurodegeneration; such as, Alzheimer disease, Parkinson disease, prion disease, traumatic brain injury, and brain ischemia. We have examined the effects of many substances on the glial function and found various interesting results; recent outcomes are; the effects of zinc, insulin, amphotericin B, amyloid β , acetate, and so on (see publication list).

We have also focused on the glial enzymatic activities such as type 2 transglutaminase and superoxide dismutase of extracellular type.

We believe that the elucidation of the mechanism of glial regulation shall lead a basic construction of therapeutics of various neurodegenerative diseases above mentioned.

Key words:

Astrocytes, Microglia, Neurodegenerative diseases, Prion diseases, Traumatic brain injury, Transglutaminase, Extracellular superoxide dismutase, Phagocytosis

Publications:

- **1. M. Moriyama**, A. Hashimoto, H. Satoh, K. Kawabe, M. Ogawa, **K. Takano**, **Y. Nakamura**: *S*-Equol, a major isoflavone from soybean, inhibits nitric oxide production in lipopolysaccharide-stimulated rat astrocytes partially via the GPR30-mediated pathway. *Int. J. Inflam.* In press
- M. Moriyama, S. Fujitsuka, K. Kawabe, K. Takano, Y. Nakamura: Zinc potentiates lipopolysaccharide-induced nitric oxide production in cultured primary rat astrocytes. *Neurochem. Res.* 43: 363-374 (2018).
- 3. K. Takano, K. Koarashi, K. Kawabe, M. Itakura, H. Nakajima, M. Moriyama, Y. Nakamura: Insulin expression in cultured astrocytes and the decrease by amyloid β. *Neurochem. Int.* 11/2017;, DOI:10.1016/j.neuint.2017.10.01

- **4. K. Takano**, M. Ogawa, K. Kawabe, **M. Moriyama**, Y. Nakamura: Inhibition of gap junction elevates glutamate uptake in cultured astrocytes. *Neurochem. Res.* 43: 50-56 (2018).
- 5. K. Kawabe, K. Takano, M. Moriyama, Y. Nakamura: Microglia Endocytose Amyloid β Through the Binding of Transglutaminase 2 and Milk Fat Globule EGF Factor 8 Protein. *Neurochem. Res.* 43: 32-40 (2018).
- biochemical, 6. K. Kawabe, K. Takano, M. Moriyama, Y. Nakamura: so on. Transglutaminases derived from astrocytes accelerate amyloid β aggregation. *Neurochem. Res.* 42: 2384-2391 (2017).
 - K. Takano, N. Ishida, K. Kawabe, M. Moriyama, S. Hibino, T. Choshi, O.Hori, Y. Nakamura: A dibenzoylmethane derivative inhibits lipopolysaccharide-induced NO production in mouse microglial cell line BV-2. *Neurochem. Int.* 04/2017;, DOI: 10.1016/j.neuint.2017.04.002
 - K. Kawabe, K. Takano, M. Moriyama, Y. Nakamura: Amphotericin B increases transglutaminase 2 expression associated with upregulation of endocytotic activity in mouse microglial cell line BV-2. *Neurochem. Res.* 42: 1488-1495 (2017).
 - **9. M. Moriyama**, R. Kurebayashi, K. Kawabe, **K. Takano**, Y. Nakamura: Acetate attenuates lipopolysaccharide-induced nitric oxide production through an anti-oxidative mechanism in cultured primary rat astrocytes. *Neurochem. Res.* 41: 3138-3146 (2016).

Our cultured astrocytes: GFAP immunostaining with DAPI



Laboratory of Veterinary Pharmacology

T. Takeuchi's research interest:

Transit of foods and contents from the mouth to the anus has received an exact control. The peristaltic movement in the gastrointestinal tract is regulated by the close interaction of cells such as the mucous, the enteric neurons, the smooth muscles, and the interstitial cells of Cajal that compose the intestines organization. **T. Takeuchi** has elucidated the interactive mechanisms between them and their changes at the pathological condition and at the same time clarified their individual functions.

Y.T. Azuma:

My group studies the immunological function of interleukin-19. Research interests are inflammatory bowel disease, mucosal immunology, inflammation (skin, lung, liver, pancreas, colon, kidney), fibrosis, transgenic mice, and knockout mice.

Selected Publications:

Fujimoto Y, Fujita T, Kuramoto N, Kuwamura M, Izawa T, Nishiyama K, Yoshida N, Nakajima H, Takeuchi T, <u>Azuma YT.</u> (2018) The Role of Interleukin-19 in contact hypersensitivity. **Biol. Pharma. Bull.** 41(2), 182-189.

Fujimoto Y, Tsuneyama K, Kuramoto N, Hayashi S, Yoshida N, Morioka A, Teramoto M, Nakajima H, Takeuchi T, <u>Azuma YT</u>. (2017) Exacerbated experimental pancreatitis in interleukin-19 knockout mice. **Glob. Drugs Therap.** 2(5), 1-5.

Fujimoto Y, <u>Azuma YT</u>, et al. (2017) Interleukin-19 contributes as a protective factor in experimental Th2mediated colitis. **Naunyn Schmiedebergs Arch. Pharmacol.** 390(3), 261-268.

Matsuo Y, <u>Azuma YT</u>, et al. (2015) Interleukin 19 reduces inflammation in chemically induced experimental colitis. **Int. Immunopharmacol.** 29(2), 468-475.

<u>Azuma YT</u>, et al. (2011) IL-19 as a potential therapeutic in autoimmune and inflammatory diseases. **Curr. Pharm. Des.** 17(34), 3776-3780.

<u>Azuma YT</u>, et al. (2011) Interleukin-19 is a negative regulator of innate immunity and critical for colonic protection. **J. Pharmacol. Sci.** 115(2), 105-111.

<u>Azuma YT</u>, et al. (2010) Interleukin-19 protects mice from innate-mediated colonic inflammation. **Inflamm. Bowel Dis.** 16(6), 1017-1028.

Professor Associate Professor Associate Professor Tadayoshi Takeuchi Yasu-Taka Azuma Hidemitsu Nakajima

H. Nakajima:

Major goal is to elucidate molecular mechanisms underlying neuronal dysfunction elicited by a multifunctional protein GAPDH, which has been first identified in neurodegenerative/neuropsychiatric disorders. **H. Nakajima** has discovered a novel inhibitor of GAPDH aggregation with some PCTpatents. These projects are going up with techniques of molecular biology, cell biology and GAPDH-mutantgenetically-modified animals established by our labs using cutting-edge genome edition procedures.

Selected Publications:

<u>Nakajima H</u>, Takeuchi T. et al. (2017) GAPDH aggregation causes mitochondrial dysfunction during oxidative stress-induced cell death. J. Biol. Chem. 292(11), 4727-4742

<u>Nakajima H</u>, Takeuchi T. et al. (2017) Extracellular poly(ADP-ribose) is a neurotrophic signal that upregulates glial cell line-derived neurotrophic factor (GDNF) levels in vitro and in vivo. **Biochem. Biophys. Res. Commun.** 484(2), 385-389.

Kubo T, <u>Nakajima H</u>, Nakatsuji M, Itakura M, Kaneshige A, Azuma YT, Inui T, Takeuchi T. (2016) Active site cysteine-null GAPDH rescues nitric oxide-induced cell death. **Nitric Oxide**. 53, 13-21.

Itakura M, <u>Nakajima H</u>, Takeuchi T. et al. (2015) GAPDH aggregates accelerate amyloid- β amyloidogenesis in Alzheimer disease. **J. Biol. Chem**. 290(43), 26072-26087.

Itakura M, <u>Nakajima H</u>, Takeuchi T. et al. (2015) Glyceraldehyde-3-phosphate dehydrogenase aggregation inhibitor peptide: a potential therapeutic strategy against oxidative stress-induced cell death. **Biochem. Biophys. Res. Commun.** 467(2), 373-376.

<u>Nakajima H</u>, Takeuchi T. et al. (2015) Nucleartranslocated glyceraldehyde-3-phosphate dehydrogenase promotes poly(ADP-ribose) polymerase-1 activation during oxidative/nitrosative stress in stroke. **J. Biol. Chem.** 290(23), 14493-14503.

Tristan CA, <u>Nakajima H</u>, Takeuchi T, et al. (2015) Role of apoptosis signal-regulating kinase 1 (ASK1) as an activator of the GAPDH-Siah1 stress-signaling cascade. **J. Biol. Chem**. 290(1), 56-64.

Laboratory of Cellular and Molecular Biology

Research Interest:

Komori: Peroxisomes are subcellular organelles found in virtually all eukaryotic cells and function in a wide variety of metabolic pathways including biosynthesis of cholesterol, bile acids, dolichol, and ether phospholipids. Peroxisomal dysfunctions in human lead to severe abnormalities that are often lethal such as Zellweger syndrome. My research interests are 1) molecular mechanism of peroxisome biogenesis and degradation (pexophagy), 2) biological significance of ether lipids (plasmalogens) in mammals, 3) heterologous expression of useful proteins in methylotrophic yeast, and 4) contribution of human CYP enzymes in the metabolism of flavonoid derivatives.

proteins, between the nucleus and the cytoplasm is fundamental for eukaryotic gene expression. Different classes of the "cargo" molecules are transported by dedicated "transport receptors" through the nuclear pore complexes. I am currently interested in elucidating the molecular mechanism of mRNA nuclear export in mammals, with special emphasis on 1) the link between nuclear export 5. Tanaka, K, Soeda, M, Hashimoto, Y, Takenaka, S, and and transcription/processing of mRNA, 2) the functions of tissue specific mRNA transport receptors. To achieve these goals, various modern molecular biological technologies, including next-generation sequencing and CRISPR/Cas9mediated genome editing etc., are employed.

Key words:

peroxisome, protein import, pexophagy, plasmalogen, cytochrome P450, nucleo-cytoplasmic transport, Tap/NXF family proteins, TRanscription-EXport (TREX) complex

Professor Associate Professor

Masayuki Komori Jun Katahira

Publications:

- 1. Shimada, T, Takenaka, S, Kakimoto, K, Murayama, N, Lim, YR, Kim, D, Foroozesh, MK, Yamazaki, H, Guengerich, FP, and Komori, M. Structure-function studies of naphthalene, phenanthrene, biphenyl, and their derivatives in interaction with and oxidation by cytochromes P450 2A13 and 2A6. Chem. Res. Toxicol., 29: 1029-1040, 2016.
- 2. Shimada, T. Kakimoto, K. Takenaka, S. Koga, N. Uehara, S, Murayama, N, Yamazaki, H, Kim, D, Guengerich, FP, and Komori, M. Roles of human CYP2A6 and monkey CYP2A24 and 2A26 cytochrome P450 enzymes in the oxidation of 2,5,2',5'-tetrachlorobiphenyl. Drug Metab. Dispos., 44: 1899-1909, 2016.
- Katahira: Transport of macromolecules, such as RNAs and 3. Katahira, J. Nuclear export of messenger RNA. Genes (Basel), 6: 163-184, 2015.
 - 4. Katahira, J, Okuzaki, D, Inoue, H, Yoneda, Y, Maehara, K, and Ohkawa, Y. Human TREX component Thoc5 affects alternative polyadenylation site choice by recruiting mammalian cleavage factor I. Nucleic Acids Res., 41: 7060-7072, 2013.
 - Komori, M. Identification of phosphorylation sites in Hansenula polymorpha Pex14p by mass spectrometry, FEBS Open Bio., 3: 6-10, 2012.

Bioenvironmental Sciences

Laboratory of Toxicology

Research Interest:

K. Nishimura: Erythropoiesis is indispensable to recovery of the anemia. However, the mechanism of erythropoiesis has many questions. I study the mechanism of erythropoietin production and the search of the substance which promotes erythropoietin production.

It is reported that the erythropoietin participates in mechanism of cell protection. I study the interaction of erythropoietin production and autophagy induction as the cell protective function.

H. Nakagawa: Newly synthesized proteins are transported from ER to Golgi apparatus through the COPII transport vesicles. The failure of COPII vesicle formation causes the ER stress and then leads to ER stress-induced apoptosis. I study the mechanism of the COPII vesicle transport.

Keweord:

Autophagy, Endoplasmic reticulum stress, Vesicular transport, Programmed cell death, G protein, Apoptosis, Microflora, Anemia and Erythropoiesis



Autophagy: MDC stain

Publications:

- 1. K. Nishimura, K. Goto, H. Nakagawa. Effect of erythropoietin production induced by hypoxia on autophagy in HepG2 cells. Biochem Biophys Res Commun. 495(1), 1317-1321, 2018
- K. Nishimura, R. Matsumoto, Y. Yonezawa, H. Nakagawa. Effect of quercetin on cell protection via erythropoietin and cell injury of HepG2 cells. Arch Biochem Biophys. 636,11-16, 2017
- H. Nakagawa, K. Hazama, K. Ishida, M. Komori, K. Nishimura, S. Matsuo. Inhibition of PLD1 activity causes ER stress via regulation of COPII vesicle formation. Biochem Biophys Res Commun. 490(3), 895-900, 2017
- T. Bessho, T. Okada, C. Kimura, T. Shinohara, A. Tomiyama, A. Imamura, M. Kuwamura, K. Nishimura, K. Fujimori, S. Shuto, O. Ishibashi, BK.

Associate Professor Assistant Professor Kazuhiko Nishimura Hiroshi Nakagawa

Kubata, T. Inui. Novel Characteristics of Trypanosoma brucei Guanosine 5'-monophosphate Reductase Distinct from Host Animals. **PLoS Negl. Trop. Dis.**, 10, e0004339. doi: 10.1371/journal.pntd.0004339, 2016

- K. Murakami, H. Nakagawa, K. Nishimura, Matsuo S. Changes in peptidergic fiber density in the synovium of mice with collagenase-induced acute arthritis. Can J Physiol Pharmacol. 93(6), 435-441, 2015
- N. Iwasaki, Y. Sugiyama, S. Miyazaki, H. Nakagawa, K. Nishimura, S. Matsuo. An ATF4-Signal-Modulating Machine Other Than GADD34 Acts in ATF4-to-CHOP Signaling to Block CHOP Expression in ER-Stress-Related Autophagy. J Cell Biochem. 116(7), 1300-1309, 2015
- A. Hinenoya, K. Shima, M. Asakura, K. Nishimura, T. Tsukamoto, T. Ooka, T. Hayashi, T. Ramamurthy, SM Faruque, S. Yamasaki. Molecular characterization of cytolethal distending toxin gene-positive *Escherichia coli* from healthy cattle and swine in Nara, Japan. BMC Microbiol., 14:97 doi: 10.1186/1471-2180-14-97, 2014
- K. Nishimura, K. Tokida, H. Katsuyama H. Nakagawa, S. Matsuo. The effect of hemin-induced oxidative stress on erythropoietin production in HepG2 cells. Cell Biol. Int., 38, 1321-1329, 2014
- K. Nishimura, H. Katsuyama, H. Nakagawa, S. Matsuo. Stimulating Effect of Ethanol on Erythropoietin Production in the Liver Cells. J. Metab. Synd., 3, 164 doi: 10.4172/2167-0943.1000164, 2014
- H. Matsumoto, S. Miyazaki, S. Matsuyama, M. Takeda, M. Kawano, H. Nakagawa, K. Nishimura, S. Matsuo. Selection of autophagy or apoptosis in cells exposed to ER-stress dependents on ATF4 expression pattern with or without CHOP expression. Biology Open, 2(10), 1084-1090, 2013
- 11. H. Nakagawa, M. Ishizaki, S. Miyazaki, T. Abe, K. Nishimura, M. Komori, S. Matsuo. Sar1 translocation onto the ER-membrane for vesicle budding has different pathways for promotion and suppression of ER-to-Golgi transport mediated through H89-sensitive kinase and ER-resident G protein. Mol. Cell Biochem., 366(1-2), 175-182, 2012

Laboratory of Veterinary Public Health

Research Interest:

The research projects in the laboratory deal with the pathogenic bacteria, such as diarrhogenic Escherichia coli, Clostridium perfringens, Salmonella, and Listeria, that cause food-borne diseases and zoonoses. The projects are directed toward understanding the molecular mechanism of 1) how these bacterial pathogens respond to the surroundings to response, inflammation, autophagy, zenophagy, sporulation, exert their virulence, 2) how they induce pathological alterations in host cells, and 3) how the host cells respond at screen, antimicrobial resistance molecular and cellular levels defending themselves against the pathogens' attack. Microbiological, biochemical,

Publications:

- Sakanoue H, Nakano T, Sano K, Yasugi M, Monma C, Miyake M. Adherence of Clostridium perfringens spores to human intestinal epithelial Caco-2 cells. FEMS Microbiol. Lett., in press, 2018.
- 2. Yasugi M, Otsuka K, Miyake M. Nitrate salts suppress sporulation and production of enterotoxin in Clostridium perfringens strain NCTC8239. Microbiol Immunol. 60: 657-668, 2016.
- Yasugi M, Okuzaki D, Kuwana R, Takamatsu H, Fujita 3. M, Sarker MR, Miyake M. The transcriptional profile deoxycholate-induced during sporulation in а Clostridium perfringens isolate from foodborne illness. Appl. Environ. Microbiol., 82: 2929-42, 2016.
- Yasugi M, Sugahara Y, Hoshi H, Kondo K, Talukdar 4. PK, Sarker MR, Yamamoto S, Kamata Y, Miyake M. In vitro cytotoxicity induced by Clostridium perfringens isolate carrying a chromosomal cpe gene is exclusively dependent on sporulation and enterotoxin production. Microb. Pathog., 85: 1-10, 2015.
- 5. Matsuzawa T, Fujiwara E, Washi Y. Autophagy activation by interferon- γ via the p38 mitogen-activated protein kinase signalling pathway is involved in macrophage bactericidal activity. Immunology, 141: 61-9, 2014.

Professor Associate Professor Associate Professor

Masami Miyake Takeshi Matsuzawa Mayo Yasugi

immunological, and genetic procedures, as well as cell biology techniques, are employed to visualize the molecular events during the course of host-parasite interactions.

Key words:

Escherichia coli, Clostridia, Salmonella, Listeria, stress germination, virulence factors, toxins, high through-put



Immunohistochemistry of Zonula occludens-1 (ZO-1) recruitment at the sites of infection by enteropathogenic E. coli (EPEC) in HeLa cells. Green, ZO-1; blue, bacterial DNA; red, Factin. For detail, refer to Infect. Immun. 75: 565-573, 2007.



Phase contrast (Upper) and fluorescence (lower) micrographs of Clostridium perfringens cells in the process of sporulation. Bacterial cells at different sporulation stages can be observed. Blue, DNA; red, membrane structure.

Professor Assistant Professor Shinobu Watarai Tadashi Iwasaki

Research Interest:

S. Watarai: The potential usefulness of liposomes as carriers and adjuvants for developing topical and mucosal vaccines has attracted considerable interests. pH-sensitive liposomes, which generate fusion ability under weakly acidic conditions, were developed to establish effective vaccine. The usefulness of pH-sensitive fusogenic polymer-modified liposomes as a vaccine carrier is studied and the applied research of the pH-sensitive fusogenic liposomes for the disease prevention and treatment is also done. The development of liposome vaccine for cancer therapy and the8development of liposomal mucosal vaccine are advanced now.

T. Iwasaki: My major research interest is pathological mechanisms of allergic diseases and the application of its knowledge to the establishment of treatment of the disease.

Key words:

Allergy, Diagnosis, Cancer, Immunization, Infectious 9. Kodama H, Nakamura H, Kashima M, **Iwasaki T**, Togase Disease, Liposome, Vaccine H. Protection against atypical *Aeromonas salmonicida*

Publications:

- 1. Okazaki, S., **Iwasaki, T.**, Yuba, E., and **Watarai, S.** Evaluation of pH-sensitive fusogenic polymer-modified liposomes co-loaded with antigen and α galactosylceramide as an anti-tumor vaccine. **J. Vet. Med. Sci.**, in press.
- 2. Shimizu, Y., **Iwasaki, T.**, Tajima, T., Yuba, E., Kono, K., and **Watarai, S.** Induction of antibody response in the oral cavity of dogs following intraocular (eye drop) immunization with *Porphyromonas gingivalis* cell lysate incorporated in pH-sensitive fusogenic polymer-modified liposomes. **J. Vet. Med. Sci.**, 79 (2), 290-298, 2017.
- Watarai, S., and Sasaki, Y. Evaluation of stearylaminemodified liposomes for the oral vaccine adjuvant. J. Infect. Dis. Ther., 2:141, 2014.
- Watarai, S., Iwase, T., Tajima, T., Yuba, E., Kono, K., and Sekiya, Y. Application of pH-sensitive fusogenic polymer-modified liposomes for development of mucosal vaccines. Vet. Immunol. Immunopathol., 158(1-2): 62-72, 2014.
- 5. Watarai, S., Iwase, T., Tajima, T., Yuba, E., and Kono, K. Efficiency of pH-sensitive fusogenic polymer-modified liposomes as a vaccine carrier. Scientific World J., 2013:903234, 2013.

- Yuba, E., Harada, A., Sakanishi, Y., Watarai, S., and Kono, K. A liposome-based antigen delivery system using pH-sensitive fusogenic polymers for cancer immunotherapy. Biomaterials, 34(12): 3042-3052, 2013.
- 7. Kamimiya, H., Suzuki, Y., Kasama, T, Kajiwara, H., Yamamoto, T., Mine, T., **Watarai, S.**, Ogura, K., Nakamura, K., Tsuge, J., and Kushi, T. Unique gangliosides synthesized *in vitro* by sialyltransferases from marine bacteria and their characterization: gangliosides synthesis by bacterial sialyltransferases. J. Lipid Res., 54(3): 571-580, 2012.
- Sakata J, Kawatsu K, Iwasaki T, Tanaka K, Takenaka S, Kumeda Y, Kodama H. Production and characterization of a novel monoclonal antibody against *Vibrio parahaemolyticus* F0F1 ATP synthase's delta subunit and its application for rapid identification of the pathogen. J. Microbiol. Methods., 88(1): 77-82, 2012.
- 9. Kodama H, Nakamura H, Kashima M, **Iwasaki T**, Togase H. Protection against atypical *Aeromonas salmonicida* infection in common carp, *Cyprinus carpio* L., by administration of a mixed microbial culture of *Lactobacillus paracasei*, *Pichia membranifaciens* and *Saccharomyces cereviciae*. J. Vet. Med. Sci., 73(10): 1319-1325, 2011.

Laboratory of Veterinary Epidemiology

Research Interest:

M. Mukamoto's research work focuses on clarification of molecular mechanisms on the infection of pathogenic microorganisms to elicit infectious diseases in domestic animals.
M. Mukamoto attempts to analyze functional mechanisms of pathogenic factors and host factors for 7. pathogens by use of various molecular biological, biochemical and immunological techniques. The present main research is analysis of molecular structures and biological activities in toxins from *Clostridium perfringens*, *C. septicum* and *C. chauvoei*.

T. Kohda focuses on the areas of research closely related to current knowledge on the structure and function of botulinum neurotoxins. The main task of the present research is the mechanism of receptor recognition and the different affections of host animals.

Key words:

Pathogenic microorganisms, Diagnosis, Infectious diseases control, Pathogenic factor, Clostridia, toxin

Publications:

- T. Kohda, K. Nakamura, K. Hosomi, S. Kozaki and M. Mukamoto. Characterization of the functional activity of botulinum neurotoxin subtype B6. Microbiol. Immunol., 61: 482-489, 2017.
- M. Nishiike, M. Haoka, T. Doi, T. Kohda and M. Mukamoto. Development of a preliminary diagnostic measure for bovine leukosis in dairy cows using peripheral white blood cell and lymphocyte counts. J. Vet. Med. Sci., 78: 1145-1151, 2016.
- H.Teramoto, Y. Kumeda, K. Yokoigawa, K. Hosomi, S. Kozaki, M. Mukamoto, and T. Kohda. Genotyping and characterization of the secretory lipolytic enzymes of *Malassezia pachydermatis* isolates collected from dogs. Vet. Rec. Open, 2: e000124, 2015.
- K. Hosomi, R. Kuwana, H. Takamatsu, T. Kohda, S. Kozaki, and M. Mukamoto. Morphological and genetic characterization of group *I Clostridium botulinum* type B strain 111 and the transcriptional regulator spoIIID gene knockout mutant in sporulation. Anaerobe, 33: 55-63, 2015.
- K. Hosomi, Y. Sakaguchi, T. Kohda, K. Gotoh, D. Motooka, S. Nakamura, K. Umeda, T. Iida, S. Kozaki, and M. Mukamoto. Complet nucleotide sequence of a plasmid containing the botulinum neurotoxin gene in *Clostridium botulinum* type B strain 111 isolated from an infant patient in Japan. Mol. Genet. Genomics, 289: 1267-1274, 2014.
- 6. Y. Sakaguchi, K. Hosomi, J. Uchiyama, Y. Ogura, K. Umeda, M. Sakaguchi, **T. Kohda**, **M. Mukamoto**, N.

Professor Assistant Professor Masafumi Mukamoto Tomoko Kohda

Misawa, S. Matsuzaki, T. Hayashi, and S. Kozaki. Draft Genome Sequence of *Clostridium botulinum* Type B Strain Osaka05, Isolated from an Infant Patient with Botulism in Japan. **Genome Announc.**, 2: e01010, 2014.

- M. Mukamoto, R. Kimura, M.B. Hang'ombe, T. Kohda, S. Kozaki. Analysis of tryptophan-rich region in *Clostridium septicum* alpha-toxin involved in binding to GPI-anchored proteins. Microbiol. Immunol., 57: 163-169, 2013.
- K. Nakamura, T. Kohda, Y. Seto, M. Mukamoto, and S. Kozaki. Improved detection methods by genetic and immunological techniques for botulinum C/D and D/C mosaic neurotoxins. Vet. Microbiol., 162: 881-890, 2013.
- M. Mukamoto, H. Maeda, T. Kohda, C. Nozaki, M. Takahashi, and S. Kozaki. Production of a neutralizing mouse-human chimeric antibody against botulinum neurotoxin serotype E. Jpn. J. Infect. Dis., 66: 46-50, 2013.
- M. Mukamoto, H. Maeda, T. Kohda, C. Nozaki, M. Takahashi, S. Kozaki. Characterization of neutralizing mouse-human chimeric and shuffling antibodies against botulinum neurotoxin A. Microbiol. Immunol., 56: 748-755, 2012.
- K. Nakamura, T. Kohda, Y. Shibata, K. Tsukamoto, H. Arimitsu, M. Hayashi, M. Mukamoto, N. Sasakawa, S. Kozaki. Unique biological activity of botulinum d/c mosaic neurotoxin in murine species. Infect. Immun., 80: 2886-2893, 2012.



Colonies of *C. perfringens* isolated from a necrotic enteritis chicken on CW agar plate with egg yolk.



Rounding cell death of rat cardiac cells by alpha-toxin from *C. septicum*.

Laboratory of International Prevention of Epidemics

Research Interest: S. Yamasaki, A. Hinenova, SP Awasthi and N. Hatanaka have focused on enteric bacteria such as enterohemorrhagic Escherichia coli, other diarrheagenic E. coli, in particular, CDT-producing E. coli, Campylobacter spp. Vibrio spp. and Shigella spp. in terms of molecular epidemiology, development of diagnostic measures, virulence mechanisms and antimicrobial resistances. Our goal of the study is to develop rapid and simple diagnostic, therapeutic and preventive methods against these bacterial infections.

Matsubayashi's research work focuses on understanding the distribution of intestinal protozoa (Cryptosporidium, Giardia, Eimeria, and Entamoeba etc.) in human, livestock, and wild and companion animals by genetical survey, and on controlling their infections. From the viewpoints, my interests include development of molecular tools to assess host specificity or their pathogenicity using mouse or chick models, and clarification of host-parasite adaptation by chemical biology, or genome or transcriptome analyses.

Key words:

Food microbiology, Antimicrobial resistance. Rapid diagnosis, Zoonosis, Molecular Epidemiology, Pathogenic coli. Cytolethal Distending Toxin. Eimeria. ECryptosporidium, Parasitic adaptations

Publications:

- 1. R.A. Ombarak, A. Hinenoya, A.-R. M. Elbagory and S. Yamasaki*. Prevalence and molecular characterization of antimicrobial resistance in Escherichia coli isolated from raw milk and raw milk cheese in Egypt. J. Food Prot., 81: 226-232, 2018.
- 2. T. Koreeda, T. Kawakami, A. Okada, Y. Hirashima, N. 9. A. Hinenoya, K. Shima, M. Asakura, K. Nishimura, T. Imai, K. Sasai, S. Tanaka, M. Matsubayashi*, T. Shibahara. Pathogenic characteristics of a novel intranuclear coccidia in Japanese black calves and its genetic identification as Eimeria subspherica. Parasitol Res., 116: 3243-3247, 2017.
- 3. A. Hinenoya, N. Yasuda, N. Mukaizawa, S. Sheikh, Y. Niwa, S. P. Awasthi, M. Asakura, T. Tsukamoto, A.

Professor Associate Professor Associate Professor Specially Appointed Assistant Professor

Shinji Yamasaki Makoto Matsubayashi Atsushi Hinenoya Sharda Prasad Awasthi Noritoshi Hatanaka

Nagita, M. J. Albert, and S. Yamasaki*. Association of cytolethal distending toxin-II gene-positive Escherichia *Escherichia albertii.* an emerging coli with entropathogen. Int. J. Med. Microbiol., 307: 564-571, 2017.

- 4. M. Matsubayashi*, F. Kawahara, T. Hatta, J. Yamagishi, T. Miyoshi, Anisuzzaman, K. Sasai, T. Isobe, K. Kita and N. Tsuji. Transcriptional profiles of virulent and precocious strains of Eimeria tenella at sporozoite stage; novel biological insight into attenuated asexual development. Infect. Genet. Evol., 40:54-62, 2016.
- 5. R. A. Ombarak, A. Hinenoya, S. P. Awasthi, A. Shima, A.-R. M. Elbagory and S. Yamasaki*. Prevalence and pathogenic potential of Escherichia coli isolates from raw milk and raw milk cheese in Egypt. Int. J. Food Microbiol., 221: 69-76, 2016.
- 6. K. Kamei, N. Hatanaka, M. Asakura, S. Somroop, W. Samosornsuk, A. Hinenoya, N. Misawa, S. Nakagawa and S. Yamasaki*. *Campylobacter hyointestinalis* isolated from pigs produce multiple variants of biologically active cytolethal distending toxin. Infect. Immun., 83(11): 4304-4313, 2015.
- 7. M. S. H. Zahid, S. P. Awasthi, M. Asakura, S. Chatterjee, A. Hinenoya, S. M. Faruque and S. Yamasaki*. Suppression of virulence of toxigenic Vibrio cholerae by anethole through the cyclic AMP (cAMP)-cAMP receptor protein signaling system. PLoS ONE, 10(9): e0137529, 2015.
- 8. M. Matsubayashi, K. Kanamori, M. Sadahiro, M. Tokoro, N. Abe, M. Haritani and T. Shibahara*. First molecular identification of *Entamoeba polecki* in a piglet in Japan and implications for aggravation of ileitis by coinfection with Lawsonia intracellularis. Parasitol. Res., 114: 3069-73, 2015.
- Tsukamoto, T. Ooka, T. Hayashi, T. Ramamurthy, S. M. Faruque and S. Yamasaki*. Molecular characterization of cytolethal distending toxin gene-positive Escherichia coli from healthy cattle and swine in Nara, Japan. BMC Microbiol., 14(4):97, 2014.



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Laboratory of Veterinary Microbiology

Associate Professor Associate Professor Yoshiyuki Seto Tomoko Tajima

Research Interest:

Y. Seto is interested in the infectious diseases, and 2. N. Iritani, A. Kaida, H. Kubo, N. Abe, K. Goto, H. Ogura, developing the laboratory diagnostic methods using the and Y. Seto. Molecular epidemiology of Noroviruses various molecular approaches to control the infectious diseases.

T. Tajima is interested in the immunological responses of 3. K. Nakamura, T. Kohda, Y. Seto, M. Mukamoto, and S. host against infectious diseases caused by intracellular pathogens such as viruses and Rickettsia.

Key words:

Infectious Diseases, Molecular Epidemiology, Caliciviruses, Anaplasma, Rickettsia, Ehrlichia, Feline infectious peritonitis virus

Publications:

1. N. Iritani, A. Kaida, N. Abe, J. Sekiguchi, H. Kubo, K. Takakura, K. Goto, H. Ogura, and Y. Seto. Increase of GII.2 Norovirus infection during the 2009-2010 season in Osaka

city, Japan. J. Med. Virol., 84, 517-525, 2012.

detected in seasonal outbreaks of acute nonbacterial gastroenteritis in Osaka city, Japan. J. Med. Virol., 82, 2097-2105, 2010.

Kozaki. Improved detetion methods by genetic and immunological techniques for botulinum C/D and D/C mosaic neurotoxins. Vet. Microbiol., 162, 881-890, 2013.

4. T. Tajima, and M. Wada. Inhibitory effect of interferon gamma on frequency of Ehrlichia canis-infected cells in vitro. Vet. Immunol. Immunopathol., 156, 200-204, 2013.

5. T. Soma, M. Wada, S. Taharaguchi, and T. Tajima. Detection of ascitic feline coronavirus RNA from cats with clinically suspected feline infectious peritonitis. J. Vet. Med. Sci., 75, 1389-1392, 2013.

Transmission electron microscopy images. (A) Norovirus detected in fecal specimen, (B) Noroviru-like particle expressed by Baculovirus expressing system.



(A)



(B)

Ehrlichia canis -infected dog macrophage line cell



Feline infectious peritonitis virus-infected cat line cell

Advanced Pathobiology

Laboratory of Cell Pathobiology

Research Interest:

Our research work focuses on the cellular mechanisms of blood, incretion and metabolism taking place in the control of homeostasis in animals, the pathophysiology of disorders caused by the structural or functional abnormalities in the cells, and diagnosis and therapy in those disorders. Projects under investigation include; 1) dendritic cell based tumor immunotherapy, 2) establishment of canine and feline embryonic stem cells (ES cells) from blastocyst, 3) generation of canine and feline induced pluripotent stem cells (iPS cells) from adult cells for regenerative veterinary medicine, and 4) development of canine and feline in vitro fertilization techniques.

Key words:

Cancer, Cat, Dendritic cell, Dog, Embryonic stem cell, Induced pluripotent stem cell, *in vitro* fertilization, Regenerative veterinary medicine, Tumor immunotherapy

Publications

- N.H. De Silva, T. Akazawa, V. Wijewardana, N. Inoue, M. Oyamada, A. Ohta, Y. Tachibana, D.P.H. Wijesekera, M. Kuwamura, Y. Nishizawa, K. Itoh, T. Izawa, S. Hatoya, T. Hasegawa, J. Yamate, T. Inaba, K. Sugiura. Development of effective tumor immunotherapy using a novel dendritic cell-targeting Toll-like receptor ligand. PLOS One 12(11): e0188738, 2017.
- T. Nishimura, N. Unezaki, R. Kanegi, D.P.H. Wijesekera, S. Hatoya, K. Sugiura, N. Kawate, H. Tamada, H. Imai, T. Inaba. Generation of canineiInduced extraembryonic endoderm-like cell line That forms both extraembryonic and embryonic endoderm derivatives. Stem Cells Dev. 26(15): 1111-1120, 2017.
- T. Nishimura, S. Hatoya, R. Kanegi, D.P.H. Wijesekera, K. Sanno, E. Tanaka, K. Sugiura, H. Tamada, H. Imai, T. Inaba. Feeder-independent canine induced pluripotent stem cells maintained under serum-free *conditions*. Mol. Reprod. Dev. 84(4) :329-339, 2017.

ProfessorKikuya SugiuraAssociate ProfessorShingo HatoyaVisiting ProfessorToshio InabaVisiting ProfessorNorimitsu Inoue

- Kanegi, S. Hatoya, Y. Tsujimoto, S. Takenaka, T. Nishimura, V. Wijewardana, K. Sugiura, M. Takahashi, N. Kawate, H. Tamada, T. Inaba. Production of feline leukemia inhibitory factor (LIF) with biological activity in Escherichia coli. Theriogenology, 86(2): 604-611, 2016.
- Y. Koyama, T. Ito, A. Hasegawa, M. Eriguchi, T. Inaba, T. Ushigusa, K. Sugiura. Exosomes derived from tumor cells genetically modified to express Mycobacterium tuberculosis antigen: a novel vaccine for cancer therapy. Biotechnol. Lett. 38(11):1857-1866, 2016.
- 6. Y. Koyama, **K. Sugiura**, C. Yoshihara, **T. Inaba**, T. Ito. Highly effective non-viral antitumor gene therapy system comprised of biocompatible small plasmid complex particles consisting of pDNA/ polyethylenimine "max"/anionic polysaccharide ternary complexes. **Pharmaceutics**, 7: 152-164, 2015.
- V. Wijewardana, K. Sugiura, D.P.H. Wijesekera, S. Hatoya, T. Nishimura, R. Kanegi, T. Ushigusa, A. Fujii, T. Inaba. Development of a dendritic cell-targeting lipopeptide as an immunoadjuvant that inhibits tumor growth without inducing local inflammation. J. Vet. Med. Sci., 77(7): 771-775, 2015.
- D.P.H Wijesekera, K. Sugiura, E. Yuba, K. Ueda, Wijewardana V, Kanegi R, Nishimura T, Ushigusa T, S. Hatoya, K. Kono, T. Inaba. Enhancement of anti-tumor immune responses by transfection of IFNγ gene into tumor using a novel type synthetic vector. Vet. Immunol. Immunopathol. 162 (1-2): 59-64, 2014.
- H. Nishida, M. Nakayama, H. Tanaka, H. Kamishina, T. Izawa, S. Hatoya, K. Sugiura, Y. Suzuki, C. Ide, T. Inaba. Evaluation of serum phosphorylated neurofilament subunit NF-H as a prognostic biomarker in dogs with thoracolumbar intervertebral disc herniation. Vet. Surg. 43(3): 289-293, 2014



Canine Dendritic cells expressing MHC Class II, generated from monocytes (Vet Immunol Immunopathol 2006)



Canine ES cells isolated in our labs (Mol Reprod Dev 2006)



Canine iPS cells isolated in our labs (Stem Cells Dev 2013)



Feline iPS cells isolated in our labs (ISSCR 11th Annual Meeting 2013)

Laboratory of Veterinary Radiology

Research Interest of Prof. Matsuyama:

DNA damages by environmental and intracellular agents, if left unrepaired, lead to carcinogenesis, aging and other adverse health effects. The major focus of our research is to understand molecular mechanisms of cellular DNA base excision repair that remove DNA lesions and restore genetic information. Another major focus is identification of tumorrelated gene expression in various companion animal tumors.

Key words:

DNA repair, oxydative damages, tumorigenesis, adaptive response.

Research Interest of Prof. Noguchi:

MicroRNAs (miRNAs) have been known to contribute to tumor development and progression. Therefore, the tumorspecific miRNAs are considered to be therapeutic targets and biomarkers. The aims of our research are to understand the molecular mechanisms involved in development or progression of canine cancers by elucidating the functions of tumor-specific miRNAs and to develop the novel therapeutic modalities based on the molecular mechanisms.

Also, we participate in cancer therapy in veterinary medical center and we attempt to apply the achievements of our study to cancer therapy.

Key words:

Canine cancer, miRNA, biomarker, cancer therapy

Publications:

- C. C. Hwang, M. Igase, M. Sakurai, T. Haraguchi, K. Tani, K. Itamoto, T. Shimokawa, M. Nakaichi, Y. Nemoto, S. Noguchi, M. Coffey, M. Okuda, and T. Mizuno. Oncolytic reovirus therapy: Pilot study in dogs with spontaneously occurring tumours. Vet. Comp. Oncol., in press, 2017.
- T. Usui, M. Sakurai, S. Nishikawa, K. Umata, Y. Nemoto, T. Haraguchi, K. Itamoto, T. Mizuno, S. Noguchi, T. Mori, S. Iwai, T. Nakagawa, H. Yamawaki, T. Ohama, and K. Sato. Establishment of a dog primary prostate cancer organoid using the urine cancer stem cells. Cancer Sci., 108(12):2383-2392, 2017
- 3. **S. Noguchi**, S. Shibutani, K. Fukushima, T. Mori, M. Igase, and T. Mizuno. Bosutinib, an SRC inhibitor, induces caspase-independent cell death associated with

Associate Professor	Satoshi Matsuyama
Associate Professor	Shunsuke Noguchi

permeabilization of lysosomal membranes in melanoma cells. **Vet. Comp. Oncol.**, in press, 2017

- 4. H. Tamada, K. Takemoto, M. Tominaga, N. Kawate, M. Takahashi, S. Hatoya, **S. Matsuyama**, T. Inaba, and T. Sawada. Expression and localization of epidermal growth factor, transforming growth factor- α and epidermal growth factor receptor in the canine testis. **J. Reprod. Dev.**, 62(1): 59-64, 2016.
- K. Shosu, M. Sakurai, K. Inoue, T. Nakagawa, H. Sakai, M. Morimoto, M. Okuda, S. Noguchi, and T. Mizuno. Programmed cell death ligand 1 expression in canine cancer. In Vivo., 30(3):195-204, 2016.
- 6. M. Igase, C. C. Hwang, S. Kambayashi, M. Kubo, M. Coffey, T. S. Miyama, K. Baba, M. Okuda, S. Noguchi, and T. Mizuno. Oncolytic reovirus synergizes with chemotherapeutic agents to promote cell death in canine mammary tumor. Can. J. Vet. Res., 80(1):21-31, 2016.
- 7. M. Yamamoto, R. Yamamoto, S. Takenaka, S. Matsuyama, and K. Kubo. Abundance of BER-related proteins depends on cell proliferation status and the presence of DNA polymerase β . J. Radiat. Res., 56(4): 607-14, 2015.
- 8. R. Yamamoto, M. Umetsu, M. Yamamoto, S. Matsuyama, S. Takenaka, H. Ide, and K. Kubo. AP endonuclease knockdown enhances methyl methanesulfonate hypersensitivity of DNA polymerase β knockout mouse embryonic fibroblasts. J. Radiat. Res., 56(3):462-466, 2015.
- S. Matsuyama, Y. Nakano, M. Nakamura, R. Yamamoto, T. Shimada, F. Ohashi, and K. Kubo. Cloning and expression analysis of prohibitin mRNA in canine mammary tumors. J. Vet. Med. Sci., 77(1):101-104, 2015.
- 10. S. Noguchi, T. Mori, M. Igase, and T. Mizuno. A novel apoptosis-inducing mechanism of 5-aza-2'-deoxycitidine in melanoma cells: Demethylation of TNF- α and activation of FOXO1. Cancer Lett., 369:344-353, 2015.
- S. Noguchi, T. Mori, T. Nakagawa, K. Itamoto, T. Haraguchi, and T. Mizuno. DNA methylation contributes to toward silencing of anti-oncogenic microRNA-203 in human and canine melanoma cells. Melanoma Res., 25:390-398, 2015.

Laboratory of Theriogenology

Professor Professor Hiromichi Tamada Noritoshi Kawate

Research Interest:

We are studying on reproductive phenomena and their artificial controls in domestic animals, and clarifying causes and developing methods of diagnosis, treatment and prevention of reproductive diseases.

The purposes of our research are clarifying the roles of hormones and factors in animal reproduction, controlling reproductive phenomena and contributing to prevention and 7. treatment for reproductive diseases.

Research themes for each professor:

Dr. Hiromichi Tamada:

The current research includes the followings.

- (1) Effects of Lepidium meyenii (maca) on reproduction
- (2) Placental changes by estrogen deficeincy
- (3) Improvement of embryo culture system

Dr. Noritoshi Kawate:

(1) Application of insulin-like peptide 3 (INSL3) assay for evaluations of reproductive functions in domestic animals

(2) Study on associations of semen characteristics in Japanese Black beef bulls with testicular and metabolic hormones

(3) Effects of GnRH antagonist and vaccines to suppress testicular functions in domestic animals

Publications:

- 1. Shinohara T, Ohta Y, Kawate N, Takahashi M, Sakagami N, Inaba T, Tamada H*. Treatment with the MAPK kinase inhibitor U0126 during the first two hours of in vitro maturation improves bovine oocyte developmental competence. Reprod Domest Anim. 53: 270–273, 2018.
- Yoshida K, Ohta Y, Kawate N, Takahashi M, Inaba T, Hatoya S, Morii H, Takahashi K, Ito M, Tamada H*. Long-term feeding of hydroalcoholic extract powder of Lepidium meyenii (maca) enhances the steroidogenic ability of Leydig cells to alleviate its decline with ageing in male rats. Andrologia. 50: doi: 10.1111/and.12803. 2018.
- Ohta Y, Kawate N, Inaba T, Morii H, Takahashi K, Tamada H*. Feeding hydroalcoholic extract powder of Lepidium meyenii (maca) enhances testicular gene expression of 3β-hydroxysteroid dehydrogenase in rats. Andrologia. 49: doi: 10.1111/and.12792. 2017.
- Hannan MA, Kawate N*, Fukami Y, Weerakoon WWPN, Büllesbach EE, Inaba T, Tamada H. Changes of plasma concentrations of insulin-like peptide 3 and testosterone, and their association with scrotal circumference during pubertal development in 14. male goats. Theriogenology. 92: 51–56. 2017.
- Ogawa E, Kawate N, Inaba T, Tamada H*. Testicular gene expression of steroidogenesis-related factors in prepubertal, postpubertal, and aging dogs. Theriogenology. 90: 42–48. 2017.

- Hannan MA, Kawate N*, Fukami Y, Weerakoon WW, Büllesbach EE, Inaba T, Tamada H. Effects of long-acting GnRH antagonist, degarelix acetate, on plasma insulin-like peptide 3, testosterone and luteinizing hormone concentrations, and scrotal circumference in male goats. Theriogenology. 88: 228–235. 2017.
 - Kunishige K, Kawate N, Inaba T, Tamada H*. Exposure to zearalenone during early pregnancy causes estrogenic multitoxic effects in mice. **Reprod** Sci. 24: 421–427. 2017.
- Kibushi M, Kawate N*, Kaminogo Y, Hannan MA, Weerakoon WW, Sakase M, Fukushima M, Seyama T, Inaba T, Tamada H. Fetal gender prediction based on maternal plasma testosterone and insulin-like peptide 3 concentrations at midgestation and late gestation in cattle. Theriogenology. 86: 1764–1773. 2016.
- Ichikawa A, Tamada H*. Ketoconazole-induced estrogen deficiency causes transient decrease in placental blood flow associated with hypoxia and later placental weight gain in rats. Reprod Toxicol. 63: 62–9. 2016.
- Hannan MA, Kawate N*, Fukami Y, Pathirana IN, Büllesbach EE, Inaba T, Tamada H. Acute regulation of plasma insulin-like peptide 3 concentrations by luteinizing hormone in male goats. Theriogenology.; 86: 749-56. 2016.
- 11. Tamada H*, Adachi N, Kawate N, Inaba T, Hatoya S, Sawada T. Positive correlation between patency and mRNA levels for cyclooxygenase-2 and prostaglandin E synthase in the uterine cervix of bitches with pyometra. J. Vet. Med. Sci. 78. 525-528. 2016.
- Tamada H*, Takemoto K, Tominaga M, Kawate N, Takahashi M, Hatoya S, Matsuyama S, Inaba T, Sawada T. Expression and localization of epidermal growth factor, transforming growth factor-α and epidermal growth factor receptor in the canine testis.
 J. Reprod Dev., 62:59-64, 2016.

Ohta Y, Yoshida K, Kamiya S, Kawate N, Takahashi M, Inaba T, Hatoya S, Morii H, Takahashi K, Ito M, Ogawa H, Tamada H*. Feeding hydroalcoholic extract powder of Lepidium meyenii (maca) increases serum testosterone concentration and enhances steroidogenic ability of Leydig cells in male rats. Andrologia. 48. 347-354. 2016.

 Hannan MA, Fukami Y, Kawate N*, Sakase M, Fukushima M, Pathirana IN, Büllesbach EE, Inaba T, Tamada H. Plasma insulin-like peptide 3 concentrations are acutely regulated by luteinizing hormone in pubertal Japanese Black beef bulls. Theriogenology, 84:1530-5, 2015.

Advanced Clinical Medicine

Laboratory of Veterinary Internal Medicine

Research Interest:

Our common research theme include 1) development of novel detection and prevention tools for infectious disease, especially zoonosis in companion and industrial animals, 2) epidemiological studies of zoonosis in companion, industrial and wild animals, 3) development of diagnostic and therapeutic tools for neoplastic diseases in companion animals using immunological methods, and 4) establishment of novel diagnostic and therapeutic procedures for dermatological and autoimmune diseases in companion animals.

Prof. Sasai's interests involve the study of mechanism of dermatological disorder in small animals using immunological technique. He is also interested in establishment of new diagnosis technique for zoonosis, especially Cryptosporidium and epidemiological studies of zoonosis in wild animals. Moreover, he is involved in the study of host defense mechanism against chicken coccidiosis 8. using monoclonal antibodies. Associate Professor H. Tani has focused on the development of detection tools and oral mucosal vaccine for microbial infections due to Staphylococcus and Salmonella spp.. Associate Professor M. Furuya has focused on the identification of specific tumor antigen leads to the development of new diagnosis method and cancer immunotherapy in veterinary clinical practice. Our research would provide the versatile information and tools for small animal medicine, livestock industry, and wildlife management.

Key words:

Dermatology, Zoonosis, Cryptosporidium, Monoclonal antibody, Salmonella

Publications:

- 1 gingivostomatitis. Nakanishi H, Furuya M, Soma T, Hayashiuchi Y, Yoshiuchi R, Matsubayashi M, Tani H, Sasai K. J. Feline. Med. Surg. 2018. doi: 10.1177/1098612X18761274.
- 2. Outcome of limb fracture repair in rabbits: 139 cases (2007-2015). Sasai H, Fujita D, Seto E, Denda Y, Imai Y, Okamoto K, Okamura K, Furuya M, Tani H, Sasai K. J. Am. Vet. Med. Assoc. 252 :457-463. 2018.
- Characterization of Ornithobacterium rhinotracheale 3 from commercial layer chickens in eastern Japan. Umali DV, Shirota K, Sasai K, Katoh H. Poult. Sci. 97:24-29. 2018.
- 4. Feline coronavirus antibody titer in cerebrospinal fluid from cats with neurological signs. Soma T, Saito N, Kawaguchi M, Sasai K. J. Vet. Med. Sci. 80:59-62. 2018.
- 5. First detection and molecular identification of

Professor Associate Professor Associate Professor Kazumi Sasai Hiroyuki Tani Masaru Furuya

Entamoeba bovis from Japanese cattle. Matsubayashi M, Matsuura Y, Nukata S, Daizi Y, Shibahara T, Teramoto I. Tomohide Matsuo. Uni S. Hatta T. Kaneko A, Tsuji N, Sasai K. Parasitol. Res. 117:339-342. 2018.

- 6. Pathogenic characteristics of a novel intranuclear coccidia in Japanese black calves and its genetic identification as Eimeria subspherica. Koreeda T, Kawakami T, Okada A, Hirashima Y, Imai N, Sasai K, Tanaka S, Matsubayashi M, Shibahara T. Parasitol. Res. 116:3243-3247. 2017.
- Development of molecular diagnostic protocols for 7. detecting three types of Entamoeba from diarrheal and asymptomatic pigs and environmental moist soils. Hirashima Y, Manchanayake T, Yano T, Kitahara S, Koreeda T, Kamimura S, Sasai K, Matsubayashi M, Shibahara T. Parasitol. Res. 116:2001-2007. 2017.
- Serological surveillance for antibodies against six canine viruses in wild raccoons in Japan. Aoki E, Soma T, Yokoyama M, Matsubayashi M, Sasai. J. Wildlife Dis. 53:761-768. 2017.
- 9. Report of fatal mixed infection with Cryptosporidium parvum and Giardia intestinalis in neonatal calves. Matsuura Y, Matsubavashi M, Nukata S, Shibahara T, Ayukawa O, Kondo Y, Matsuo T, Uni S, Furuya M, Tani H, Tsuji N, Sasai K. Acta parasitologica 62:214-220. 2017.
- 10. Detection of kobuvirus RNA in Japanese domestic dogs. Soma T, Matsubayashi M, Sasai K. J Vet Med Sci. 78:1731-1735. 2016.
- Coccidia, 11. Identification of Eimeria acervulina conoid antigen using chicken monoclonal antibody. Matsubayashi M, Minoura C, Kimura S, Tani H, Furuya M, Lillehoj HS, Matsuda H, Takenaka S, Hatta T, Tsuji N, Sasai K. Parasitol Res. 115:4123-4128. 2016.
- Prevalence of microorganisms associated with feline 12. First report of molecular identification of Cystoisospora suis in piglets with lethal diarrhea in Japan. Matsubayashi M, Takayama H, Kusumoto M, Murata M, Uchiyama Y, Kaji M, Sasai K, Yamaguchi R, Shibahara T. Acta Parasitol. 61:406-411. 2016.
 - 13. Transcriptional profiles of virulent and precocious strains of Eimeria tenella at sporozoite stage; novel biological insight into attenuated asexual development. Matsubayashi M, Kawahara F, Hatta T, Yamagishi J, Miyoshi T, Anisuzzaman, Sasai K, Isobe T, Kita K, Tsuji N. Infect. Genet. Evol. 40:54-62. 2016.
 - 14. Characteristics of bone fractures and usefulness of micro-computed tomography for fracture detection in rabbits: 210 cases (2007-2013). Sasai H, Fujita D, Tagami Y, Seto E, Denda Y, Hamakita H, Ichihashi T, Okamura K, Furuya M, Tani H, Sasai K, Yamate J. J Am. Vet. Med. Assoc. 246:1339-1344. 2015.

Laboratory of Veterinary Surgery

Research Interest:

This laboratory aims to clarify the pathophysiological mechanisms of intractable diseases in companion animals and to develop the novel surgical therapies for these diseases. The laboratory has studied on: (1) the development of surgical treatment in soft tissue surgery for companion animals, (2) the pathophysiology, diagnosis and therapies in disorders of urinary and cardiovascular 9. system, (3) the relationship between tumor and inflammatory response, (3) the pathophysiology, diagnosis and therapies in systemic inflammatory response syndrome, especially sepsis, (4) the development of new biomarkers in tumor-bearing animals, and (5) 10. interventional radiology for tumor-bearing animals.

Key words:

Soft tissue surgery, Urology, Cardiology, Oncology, Inflammatory response, Sepsis, Biomarker, Interventional radiology

Publications

- Tanaka T, Akiyoshi H, Shimazaki H, Kawakami R, Mie K, Yamada Y, Ohashi F. Apparent diffusion coefficient value for a B-cell central nervous system lymphoma in a cat. JFMS Open Rep. 4(1): 2055116917750762, 2018
- Tanaka M, Yamaguchi S, Akiyoshi H, Tsuboi M, Uchida K, Izawa T, Yamate J, Kuwamura M. Ultrastructural features of canine neuroaxonal dystrophy in a Papillon dog. J. Vet. Med. Sci. 79(12): 1927–1930, 2017
- Tanaka T, Akiyoshi H, Mie K, Shimazaki H, Ohashi F. Drip infusion cholangiography with CT in cats. J. Feline Med. Surg. 1098612X17738615, 2017
- Katayama N, Sugimoto K, Okada T, Ueha T, Sakai Y, Akiyoshi H, Mie K, Ueshima E, Sofue K, Koide Y, Tani R, Gentsu T, Yamaguchi M. Intra-arterially infused carbon dioxide-saturated solution for sensitizing the anticancer effect of cisplatin in a rabbit VX2 liver tumor model. Int. J. Oncol. 51(2): 695-701, 2017
- Tanaka N, Izawa T, Takenaka S, Akiyoshi H, Yamate J, Kuwamura M. Expression of Ccdc85C, a causative protein for murine hydrocephalus, in the mammary gland tumors of dogs. Histol. Histopathol. 32(4): 397-403, 2017
- 6. Mie K, Shimada T, Akiyoshi H, Hayashi A, Ohashi F. Change in peripheral blood lymphocyte count in dogs following adoptive immunotherapy using lymphokineactivated T killer cells combined with palliative tumor resection. Vet. Immunol. Immunopathol. 177: 58-63, 2016
- 7. Mie K, Tomihari M, Hoshi K, Nakamura T, Yamaguchi T, Miyahara K, Shimada T. Influence of

ProfessorHideo AAssociate ProfessorHidetakAssistant ProfessorKeiichir

Hideo Akiyoshi Hidetaka Nishida Keiichiro Mie

transfusion of lymphokine-activated T killer cells on inflammatory response in dogs after laparotomy. J. Vet. Med. Sci. 78(4):579-585. 2016

- Sone K, Akiyoshi H, Hayashi A, Ohashi F. Elevation of serum surfactant protein-A with exacerbation in canine eosinophilic pneumonia. J. Vet. Med. Sci. 78(1): 143–146, 2016
- Kuromachi M, Izawa T, Hori M, Kusuda K, Shimizu J, Iseri T, Akiyoshi H, Ohashi F, Kuwamura M, Yamate J. Chordoma of the thoracic vertebrae in a Bengal tiger (Panthera tigris tigris). J. Vet. Med. Sci. 77(7): 893-895, 2015
- Iseri T, Shimizu J, Akiyoshi H, Kusuda K, Hayashi A, Mie K, Izawa T, Kuwamura M, Yamate J, Fujimoto Y, Ohashi F. Computed tomography and magnetic resonance imaging of thoracic chordoma in a Bengal tiger (Panthera tigris tigris). J. Vet. Med. Sci. 77(7): 857-860, 2015
- Ishibashi M, Hayashi A, Akiyoshi H, Ohashi F. The influences of hyperbaric oxygen therapy with a lower pressure and oxygen concentration than previous methods on physiological mechanisms in dogs. J. Vet. Med. Sci. 77(3): 297-304, 2015
- Nojiri A, Akiyoshi H, Ohashi F, Ijiri A, Sawase O, Sumida T, Matsushita T, Takemoto M, Fujibayashi S, Yamaguchi T. Treatment of a unicameral bone cyst in a dog using a customized titanium device. J. Vet. Med. Sci. 77(1): 127-131, 2015
- Tamai R, Furuya M, Hatoya S, Akiyoshi H, Yamamoto R, Komori Y, Yokoi S, Tani K, Hirano Y, Komori M, Takenaka S. Profiling of serum metabolites in canine lymphoma using gas chromatography. J. Vet. Med. Sci. 76(11): 1513-1518, 2014
- Ijiri A, Yoshiki K, Tsuboi S, Shimazaki H, Akiyoshi H, Nakade T. Surgical resection of twenty-three cases of brain meningioma in dogs and cat. J. Vet. Med. Sci. 76(3): 331-338, 2014
- Chung JS, Tamura K, Akiyoshi H, Cruz Jr PD, Ariizumi K. The DC-HIL/Syndecan-4 Pathway Regulates Autoimmune Responses Through Myeloidderived Suppressor Cells. J. Immunol. 192(6): 2576-2584, 2014
- 16. Tanaka T, Shimada T, Akiyoshi H, Shimizu J, Zheng C, Yijyun L, Mie K, Hayashi A, Kuwamura M, Hoshi F and Ohashi F. Relationship between major histocompatibility complex class I expression and prognosis in canine mammary gland tumors. J. Vet. Med. Sci. 75(10): 1393–1398, 2013
- Ishibashi M, Akiyoshi H, Iseri T, Ohashi F. Skin conductance reflects drug-induced changes in blood levels of cortisol, adrenaline and noradrenaline in dogs. J. Vet. Med. Sci. 75(6):809-813, 2013

Laboratory of Veterinary Advanced Diagnosis and Treatment

Professor Associate Professor Takashi Hasegawa Yuka Fujimoto

Research Interest:

T. Hasegawa's research is the analysis of pathophysiology, and advanced diagnostic and/or therapeutic procedures on intractable disorders in the areas of veterinary ophthalmology, orthopedics, and neurology. In addition, my current major interests are the development of novel diagnostic and therapeutic procedures including regeneration therapy to some diseases including keratoconjuctivitis sicca, corneal disorders, glaucoma, and delayed- and/or non-union bone fractures. My research groups are now investigating the analysis of pathophysiology via ultrasound biomicroscopye on canine glaucoma and developing novel artificial tears containing sodium hyaluronate/dodecahydrosqualene for treatment of keratoconjuctivitis sicca.

Publications;

- 1. **Hasegawa, T**., Tanaka, S., and Sawa, S. A preliminary clinical trial for evaluation of the therapeutic effects of a tear substitute containing 0.1% polyvinyl alcohol, 0.3% sodium hyaluronate, and 5% dodecahydrosqualene in dogs with corneal ulcers. **Vet. Ophthalmol.**, E13-E14, 2017.
- 2. Hasegawa, T., Tanaka, S., and Sawa, S. Clinical trial of a tear substitute containing 0.1% polyvinyl alcohol, 0.3% sodium hyaluronate, and 5% dodeca- hydrosqualene in 14 dogs with keratoconjunctivitis sicca: A pilot study. Vet. Ophthalmol.,19:E26, 2016.
- 3. Hasegawa, T., Amako, H., Sakamoto, Y., and Sawa, S. Corneal-protective effects of tear substitutes containing sodium hyaluronate (SH)/dodecahydrosqualene (DHS) with polyvinyl alcohol (PVA) on porcine dry eye model and assessment of adverse effects of the substitute in live rabbit eyes. Vet. Ophthalmol.,18:E18, 2015.
- 4. Wada, Y., Yamamoto, R., Kitamura, N., Akiyoshi, H., Hasegawa, T., Shimada, T., Ohashi, F., and Kubo, K. The effectiveness of megavoltage radiation therapy against nasal tumors in 24 dogs. J. Jpn. Vet. Med. Assoc., 68: 441-446, 2015. (in Japanese with English abstract).
- Hasegawa, T., Kawata, M., and Ota, M. Ultrasound biomicroscopic findings of the iridocorneal angle in live healthy and glaucomatous dogs. J. Vet. Med. Sci., 77: 1625-1631, 2015.
- Bondoc, A, Izawa, T., Hirata, S., Hasegawa, T., Kuwamura, M., Golbar, H. M., and Yamate, J. Myoepithelioma of the gland of the third eyelid in a dog. J. Comp. Pathol., 151:186-189, 2014.
- Hasegawa, T., Amako, H., Yamamoto, T., Tazawa, M., and Sakamoto, Y. Corneal- protective effects of an artificial tear containing sodium hyalulonate and castor oil on a porcine short-term dry eye model. J. Vet. Med. Sci., 76:1219-1224, 2014.

Research Interest:

Y. Fujimoto is interested to study innate immunity in veterinary medicine and has focuses on gastrointestinal immunity and oral immunity in dogs and cats. And, study of anesthesia and pain control for dogs and cats is one of research themes, too.

Key words:

chronic inflammation, inflammatory bowel disease, chronic enteritis, gingivostomatitis, innate immunity, veterinary science, regulatory T cell, anesthesia, pain control

Publications:

1. Y. Fujimoto, N. Nakatani, T. Kubo, Y. Semi, N. Yoshida, H. Nakajima, T. Iseri, Y.T. Azuma, T. Adenosine and ATP affect LPS-induced cytokine production in canine macrophage cell line DH82 cells. J. Vet. Med. Sci., 74(1): 27-34, 2012.

Veterinary Medical Center

Laboratory of Veterinary clinical pathology

Research Interest:

This laboratory aims to elucidate pathologic condition of the 5. disease in companion animals and provide novel method for the diagnosis for the disease.

T. Shimada has focused on the relationship between an immune response and an intractable disease such as cancer, 6. IBD and so on. We have analyzed immune cells and immunological products such as cytokines in clinical samples of the disease with doctor course students and exclusive staffs. Our goal of the study is to develop immunological methods of diagnosis and therapy against the intractable disease.

S. Shimamura has focused on the identification of novel 8. biomarkers for cardiorenal syndrome and their utility in prognosis, diagnosis and targeted treatment of heart failureinduced renal disease in companion animals.

Key words:

immune response, intractable disease, cancer

Publications:

- 1. Shimamura S, Shiota Y, Takagi N, Habara T, Hirata S, Komai H, Nishimura S, Tani H, Shimada T. EBSTEIN ANOMALY IN THE TSUSHIMA LEOPARD CAT (PRIONAILURUS BENGALENSIS EUPTILURUS). J Zoo Wildl Med. 48(2):586-589, 2017
- 2. Kuramochi M, Izawa T, Nishimura S, Shimada T, Kuwamura M, Yamate J. Pleomorphic adenoma of the labial gland, characterized by reticular pattern of myoepithelial cells in a dog. J. Vet. Med. Sci. 79(7): 1163-1166, 2017
- 3. S, Yamasaki M. The modulating effects of propofol and its lipid carrier on canine neutrophil functions. J Vet Med Sci. 78(12):1825-1829, 2017
- 4. Mie K, Shimada T, Akiyoshi H, Hayashi A, Ohashi F. Change in peripheral blood lymphocyte count in dogs following adoptive immunotherapy using lymphokineactivated T killer cells combined with palliative tumor resection. Veterinary Immunology and Immunopathology. 177:58-63, 2016

Professor Associate Professor Terumasa Shimada Shunsuke Shimamura

- Mie, M. Tomihari, K. Hoshi, T. Nakamura, T. Yamaguchi, K. Miyahara, T. Shimada. Influence of transfusion of lymphokine- activated T killer cells on inflammatory responses in dogs after laparotomy. J Vet Med Sci., 78(4):579-585, 2016.
- Katayama M, Ogaya H, Shimamura S, Uzuka Y. Kite Shield-Shaped Wedge Recession for Treatment of Medial Patellar Luxation in Seven Small-Breed Dogs. Vet Surg. 45(1):66-70, 2016
- Matsuyama S, Nakano Y, Nakamura M, Yamamoto R, 7. Shimada T, Ohashi F, Kubo K. Cloning and expression analysis of prohibitin mRNA in canine mammary tumors. J. Vet. Med. Sci. 77(1): 101-104, 2015.
- Y. Sasaki, R. Iwama, S. Shimamura, M. Katayama, Y. Uzuka, K. Yabe, K. Takasuna, H. Satoh, K. Furuhama. Estimation of glomerular filtration rate in dogs by a single-blood sample method involving iodixanol. Am J Vet Res., 76(9): 828-835, 2015.
- 9. M. Tomihari, A. Nishihara, T. Shimada, M. Yanagawa, M. Miyoshi, K. Miyahara, A. Oishi. A comparison of the immunological effects of propofol and isoflurane for maintenance of anesthesia in healthy dogs. J. Vet. Med. Sci., 77(10): 1227-1233, 2015.
- Mashita T, Kamishina H, Nakamoto Y, Akagi Y, 10 Nakanishi A, Harasaki Y, Ozawa T, Uemura T, Kobatake Y, Shimamura S, Kitamura N, Maeda S, Uzuka Y, Shaw G, Yasuda J. Combination of serum phosphorylated neurofilament heavy subunit and hyperintensity of intramedullary T2W on magnetic resonance imaging provides better prognostic value of canine thoracolumbar intervertebral disc herniation. J Vet Med Sci. 77(4):433-8, 2015
- Sato R, Aoki T, Kobayashi S, Uchida N, Shimamura 11. Iwama R, Sato T, Katayama M, Shimamura S, Satoh H, Ichijo T, Furuhama K. Relationship of glomerular filtration rate based on serum iodixanol clearance to IRIS staging in cats with chronic kidney disease. J Vet Med Sci. 77(8):1033-5, 2015

Veterinary Medical Center

Veterinary Medical Center

One of the Nation's Leading Center of Veterinary Clinical Care

The Department of Veterinary Science originated as a veterinary clinic back in 1883. Transferred to the Rinku Campus in April 2009, it has added advanced medical facilities to its educational setting. The buildings on the campus are soundproof, odor-controlled, and fully prepared against biohazard and virus attacks. The Veterinary Medical Center, one of the cuttingedge facilities on the new campus, provides secondary care for animals utilizing high-tech medical devices such as linac radiation therapy machines and MRI. It also responds to specialized care and emergency operations, many of which treat age-related diseases that are increasing in animals similarly to humans.



The contemporary operating room (left) and CT scanner (right)



The high-energy radiation therapy facility (left and middle)

Veterinary Medical Center

Veterinary Medical Center

Director Terumasa Shimada

Exclusive staffs Professor Associate Professor Assistant Professor Assistant Professor Assistant Professor Assistant Professor

Terumasa Shimada Shunsuke Shimamura Shougo Hirata Tomoyo Nabetani Yusuke Wada Hiroki Yamazaki Marina Funayama

The Veterinary Medical Center is a referral and teaching hospital. The aims of the center are to provide a comprehensive and demonstrably excellent clinical service across a range of species and disciplines to clients, to continue to make advances in veterinary knowledge, diagnosis, treatment and patient welfare through clinical research and to provide a wide range of clinical cases and species for teaching students and training postgraduate clinical professionals. The center has clinical services as below.

Internal Medicine:

Our staff provides diagnosis and treatment of general internal diseases. Specialized clinical departments of internal medicine also provide advanced clinical diagnosis and treatment of specified diseases, such as cardiac diseases, skin diseases, and immunological diseases.

Professor Professor Associate Professor Associate Professor Associate Professor Assistant Professor Kazumi Sasai Kikuya Sugiura Hiroyuki Tani Shingo Hatoya Masaru Furuya Tomoyo Nabetani

Surgery

Our staff provides diagnosis and surgical treatment of chest (heart and lung), abdomen (liver, gastro-intestinal tract, kidney, and urinary bladder), skin, and other soft-tissue diseases; bone and joint diseases; disc, spinal cord, and brain diseases; and all types of cancer.

Professor
Professor
Associate Professor
Associate Professor
Assistant Professor
Assistant Professor
Assistant Professor
Assistant Professor

Takashi Hasegawa Hideo Akiyoshi Yuka Fujimoto Shunsuke Shimamura Keiichiro Mie Shougo Hirata Hiroki Yamazaki Marina Funayama

Theriogenology

Our staff covers all aspects of reproductive health, including obstetrics, breeding soundness examination, infertility, artificial insemination, and reproductive surgery.

Professor Professor Hiromichi Tamada Noritoshi Kawate

Radiology

Our staff provides radiation treatment using a state-of-the-art linear accelerator for patients with cancer (including mast cell tumors, soft tissue sarcomas, nasal tumors, brain tumors, spinal tumors, and melanomas).

Professor Associate Professor Associate Professor Assistant Professor Terumasa Shimada Satoshi Matsuyama Shunsuke Noguchi Yusuke Wada



X-RAY FLUOROSCOPY SYSTEM



MRI

Education and Research Center for Experimental Animal Science

Learning practical skills in conducting laboratory animal experiments

The Education and Research Center for various kinds of animals, including domestic Experimental Animal Science is newly animals, companion animals, animals for established on the Rinku Campus as an interfaculty core facility for conducting issues surrounding the relationship between experimental animal research in the humans and animals and promote animal university.

The main feature of the center is an animal farm for breeding small laboratory animals such as specific pathogen-free rodents and genetically modified mice as well as mediumsized animals such as dogs and goats under proper breeding conditions as directed by a central control system. The center is also equipped with laboratory equipment supporting various investigations into the development of novel medical treatments, the clarification of mechanisms of disease onset, of infectious diseases, the prevention particularly zoonotic diseases, and so on. The scientists should consider the welfare of

animals, companion animals, animals for exhibition and laboratory animals, ethical issues surrounding the relationship between humans and animals and promote animal welfare and protection from a practical point of view. The center will also effectively and efficiently provide not only equipment and rooms for animal experiments but also information covering all aspects of experimental animal research including genetic features of animals, proper handling, and appropriate experimental protocols. The center will also promote animal welfare and protection from a practical point of view. Through these activities, the center will practically support education and research in animal biology as the core element of its veterinary science program.



A researcher working at procedure room



Industry-Academia-Government Collaboration Institution • Joint Use Institution

The various results of research in animal life science are accumulated in the "Rinku campus" which is a creation base of "intelligence" of Kansai as intellectual property through scientific research activities and practical veterinarian clinical activity. The "intellectual property" must be returned to society as property common to human beings. From this point, the social role of the "Rinku campus" which serves as a central base of "intelligence" of a south Osaka area is important. Of course we contribute to society through education and research from a long-term viewpoint. Furthermore we directly return the accumulating "intellectual property" to society by practicing densely the constant cooperation with private enterprises,

the government and a self-governing body. We think that it is our important mission who is working at the creation base of "intelligence".

The "intellectual creation cycle" which we aim at is standing on a global view, performing the advanced and innovative research activities, and using all the created results for society from a public situation.

An industry-academia-government collaboration institution and a joint use institution are the bases of an "intellectual creation cycle". Therefore, our institution comprises the latest facilities and devices.



LCMS-IT-TOF

LCMS-IT-TOF is the liquid chromatograph mass spectrometer which combined the high-speed liquid chromatograph, the ion trap type mass spectrometer, and the flight time type mass spectrometer



TEM

Transmission electron microscope (TEM) is used to investigate the fine structure of biological samples including microorganisms and cellular organelle.



Live Cell Imaging System

We can analyze a living cell including the time lapse observation using luminescence or fluorescence.

Undergraduate Veterinary Course: School of Veterinary Science

The School of Veterinary Science OPU (SVSOPU), originally known as Jyuigaku-Kosyujo, was established in 1883 as a public training and medicare center for animals in Osaka. Since then, over the past 100 years the school has been cultivating many specialists who have become leaders in veterinary medical practice, higher education, public health, research, disease control, food safety, and environmental protection and biotechnology. The mission of this school is

The SVSOPU, as one of the 16 schools offering undergraduate veterinary education Japan, provides a six-year courses in educational program to foster students specializing in veterinary science. The curriculum of the undergraduate veterinary course consists of 13 liberal arts (26 credits) and 104 specialized subjects relating to veterinary science. Students must earn at least 220 credits in total, including 180 credits for specialized subjects, for their graduation. Graduation requirements include finishing 2.5 years of research work and a graduation thesis. Through the program, the graduates will be qualified as an applicant for the Japanese "National License for Veterinarian". Successful applicants who pass the national

to foster veterinarians, technical experts, and researchers to contribute to social and industrial development and scientific progress. Students gain specialized knowledge on advanced veterinary medical care, problem-solving skills, and creativity together with a deep understanding of bioethics and the coexistence of human beings and animals.

exams can hold a Japanese veterinary license and are eligible for veterinary clinic practice, food inspection, and related occupations specified for veterinarians. Among the 40-50 annual graduates, approximately half of them are employed as veterinary clinicians. A quarter of the graduates work as public employees, as experts for infection control in animal diseases and for food safety control. The rest of the graduate enter pharmaceutical companies, where they work in basic and applied research, or attend graduate school to continue his/her research experiences.



In the "Large Animal Practice A" program, undergraduate students learn basic knowledge on handlings and diagnostic procedures for Large animal practice. There are five laboratories for undergraduate practice classes in the SVSOPU, which have been equipped with specific purposes (small large animal clinics. animal clinics. histochemistry, pharmacology, microbiology, etc.).

Graduate School: Division of Veterinary Science

Veterinary science, a comprehensive science focused on animal treatment, tackles various issues deeply related to the health and safety of animals and humans and the welfare of the local society: (1) the enhancement of animal treatment, (2) the threat of amphixenosis due to the increase in the international movement of people and animals and also distribution of livestock products, (3) the improvement of livestock products, (3) the improvement of livestock product of new medicine, and (5) the safety evaluation of foods and pharmaceuticals.

The Division of Veterinary Science aims to develop (1) specialists in veterinary learning, view, and technique who are capable of integrating specialized knowledge and technique in the domain of applied animal science, (2) specialists capable of contributing to the diagnosis and treatment of animals and public hygiene, and (3) international specialists capable of exhibiting innovative leadership in biomedical fields related to both animals and humans.

Since April 2009, the Division of Veterinary Science has transferred to our new Rinku Campus located on the shore across from Kansai International Airport. On this new campus, the Veterinary Medical Center and Education and Research Center for Experimental Animal Science have been housed in an education/research building under the department. The division is carrying out improved faculty development programs at the new facilities, which are equipped with the latest educational and research equipment.

Subdivision: Structural and Functional Bioscience for Animal

Our major objective is to disseminate the latest animal biological information. To achieve this goal, we conduct research; from both morphological and functional view points, into complicated and varied life processes regarding gene, protein, cell organelle, cell, tissue, and organism functions in animals while keeping in mind the differences in biomechanisms among species. We try to provide superior educational opportunities based on

research and integrate this into a comprehensive body of knowledge.

Course: Integrated Structural Biosciences Course: Integrated Functional Biosciences

Subdivision: Veterinary Environmental Sciences We aim to maintain and improve quality of the life environment and the health of livestock, pets, and human beings from the veterinary science point of view. To achieve this goal, we educate and conduct research into harmful factors in terms of (1) their action mechanisms, influences and controls on the molecular, cellular, organismal, and group levels, (2) their relation to food safety, and (3) their analysis and evaluation using advanced techniques. Course: Bioenvironmental Sciences

Course: Infectious Diseases Control

Subdivision: Veterinary Clinical Sciences

We aim to maintain the highest educational and research standards on the organismal, cellular, and molecular levels regarding (1) the latest diagnosis, treatment and prevention methods for animal diseases and (2) the etiopathogenesis and pathema of animal diseases or production difficulties caused by environmental changes.

Course: Advances Pathobiology Course: Advanced Clinical Medicine

See our webpage for detail <http:// www.bioenv.osakafu-u.ac.jp/eng/grad/vet/ grad vet e.html>



Summary of employment

CLASS OF 2015

Number of Respondents39Male 19Female 20

Type of Employment Accepted

Employment	Number of graduates
Small animal practice	18
Large animal practice	5
Local government	4
Federal government	0
Private company	6
National research center	0
Not decided	1
Total	34

Type of Advanced Education Positions Accepted

Position	Number of graduates
Ph.D. in Osaka Pref. Univ.	2
Ph.D. in other vet. School	1
Ph.D. in medical School	2
Total	5

CLASS OF 2016

Number of Respondents 46 Male 32 Female 14

Type of Employment Accepted

Employment	Number of graduates
Small animal practice	23
Large animal practice	3
Local government	2
Federal government	2
Private company	7
National research center	0
Not decided	6
Total	43

Type of Advanced Education Positions Accepted

Position	Number of graduates
Ph.D. in Osaka Pref.	2
Univ.	
Ph.D. in other vet.	1
School	
Ph.D. in medical	0
School	
Total	3

Doctoral Theses from 2014 to 2018

Author	Author Title of the thesis		
2018			
Hiroyuki Iwai	Toxicity comparison of surfactants and surface treatment agents APFO and its alternative substance APFHx	K. Sasai	
Hitoshi Nakanishi	The study of clinical condition analysis and treatment for feline gingivostomatitis		
Seiji Okazaki	Development of a novel tumor vaccine using pH-sensitive liposome	S. Watarai	
Pervin Munmun	Pathological studies on liver homeostasis and hepatotoxicity based on macrophage function and authophagy in rats	J. Yamate	
Wataru Amano	A study of mechanism of action of the JAK inhibitor JTE-052 on atopic dermatitis	T. Takeuchi	
Azimun Nahar	Prevalence and characterization of extended-spectrum beta-lactamase- producing <i>Escherichia coli</i> and <i>mcr-I</i> gene-positive <i>E. coli</i> in domestic and imported chickens in Japan	S. Yamasaki	
Noritomo Yasuda	Development and application of a detection method for <i>Escherichia albertii</i> by re-identification of cytlethal destending toxin-II producing <i>E. coli</i> as <i>E. albertii</i>	S. Yamasaki	
Takahiro Ushigusa	Studies in tumor immunotherapy by expression of a tumor-associated neoantigen using a gene of <i>Micobauterium tuberclosis</i>	K. Sugiura	
Aoi Ichikawa	Studies on the effects of an antifungal drug ketoconazole on rat placentas	H. Tamada	
	2017		
Phuong Hoai Phong	Prevalence of extended-spectrum β -lactamase (ESBL)-producing <i>Escherichia coli</i> in healthy adults in Vietnam and analysis of how cephem antibiotic affect intestinal colonization and emergence of multi-drug resistant ESBL-producing <i>E. coli</i> in a mouse model	S. Yamasaki	
Noritoshi Hatanaka	Characterization of the third cytolethal distending toxin produced by <i>Campylobacter hyointestinalis</i>	S. Yamasaki	
Srinuan Somroop	Comparative analysis of cytolethal distending toxin (<i>cdt</i>) genes, and biological activities of CDTs in <i>Campylobacter helveticus</i> and <i>Campylobacter upsaliensis</i> in Japan	S. Yamasaki	
Hiroyuki Kubota	Analysis of <i>Clostridium difficile</i> in human feces by a quantitative polymerase chain reaction	S. Yamasaki	
Hiroyuki Iwai	Toxicity comparison of surfactants and surface treatment agents APFO and its alternative substance APFHx	K. Sasai	
Bondoc Alexandra Ioana	Characterization of rat amelanotic melanoma-derived homotransplantable tumor line and cultured cell lines, with particular reference to tumor Microenvironments	J. Yamate	
Chisa Katou	Studies on the epitope of rat somatic stem cell-recognizing antibody (A3), and the participation of labeled cells in hair follicle formation and Cutaneous wound healing	J. Yamate	
Hannan M.A.	Secretory pattern of insulin-like peptide 3 and its regulation in male ruminants	H. Tamada	
Yoshihiro Ohta	Studies on the effects of <i>Lepidium meyenii</i> (maca) on androgen production by rat testes	H. Tamada	
Toshiya Nishimura	Establishment and differentiation of canine iPS cell lines and induced extraembryonic endoderm cell lines	T. Inaba	
Ryoji Kanegi	Generation of induced pluripotent stem cells and production of associated protein, leukemia inhibitory factor in the cat	T. Inaba	
Wijesekera Daluthgamage Patsy Himali	Manipulation of tumor microenvironment by cytokine gene transfection enhances dendritic cell-based immunotherapy	T. Inaba	

Doctoral Theses from 2014 to 2018

Author	Title of the thesis	Supervisor
2017		
Kazuhiro Nishiyama	Studies on Regulating Mechanisms of Gastrointestinal Motility through Ca ²⁺ Mobilization-Relating Molecules and Organic Interaction	T. Takeuchi
Masanori Itakura	ri Itakura Studies on Pathophysiological Significance of Glyceraldehyde-3-Phosphate Dehydrogenase (GAPDH) Aggregates in Neurological Disorders and Efficacy of GAPDH Aggregation Inhibitor	
Kenji Kawabe	Study of transglutaminase in glial cellular functions	Y. Nakamura
Yosuke Shimizu	Development of mucosal vaccine for periodontitis of small animals by application of pH-sensitive fusogenic polymer-modified liposomes	S. Watarai
	2016	
Keiko Ogata	Studies on histopathological characteristics and alterations of miRNA expression in chemically induced rat neurotoxicity models	J. Yamate
Yoko Kokoshima	ko Kokoshima Pathological studies on dwarf rats derived from Wistar Hannover GALAS rats, with particular reference to thyroid, pituitary and bone	
Hisashi Anayama Studies on Distribution and Differentiation of Adipose Progenitor Cells in Rat Adipose Tissue		J. Yamate
Pathological Studies on Histogenesis of Stem Cell-Derived Rat Tumors, with Particular References to Cellular Properties of Malignant Fibrous Histiocytoma and Malignant Teratoma		J. Yamate
Eizi Teramoto The development of an isolation method of <i>Malassezia pachydermatis</i> in the external ear canal of dogs and comparison of genotyping and biological activities among the isolates		M. Mukamoto
Kimio Nishiike	Study on the monitoring of bovine leukosis	M. Mukamoto
Noritaka Saeki	EphA2 and ephrin-A1 being expressed in monocytes/macrophages and vascular endothelial cells are implicated in transendothelial migration	K. Ogawa
Jun Saeki	Epidemiological survey of bacterial zoonosis from the animals to be close	K. Sasai
Takashi Kurakawa	Analysis of human microbiota by quantitative reverse transcription polymerase chain reaction	S. Yamasaki
Abundance of BER-related proteins and effects of methylated bases on the interaction between N-methylpurine DNA glycosylase and nuclear proteins in mouse cells		K. Kubo
Natsuki Tanaka	Functional analyses of Ccdc85c, a causative gene for genetic hydrocephalus	M. Kuwamura
Maki Ishibashi	The influences of lower-hyperbaric oxygen therapy to glutathione peroxydase in blood of dogs	F. Ohashi
Keiichiro Mie	Effects of adoptive immunotherapy using lymphokine-activated T killer cells on peripheral blood lymphocytes of tumor-bearing dogs	F. Ohashi

Doctoral Theses from 2014 to 2018

Author	Title of the thesis	Supervisor		
2015				
Reo Tamai	Reo Tamai Blood metabolites profiles of dogs with lymphoma and antitumor effect of fatty acid synthase inhibitor			
Yui Suzuki	Pathological Study on the 5/6 Nephrectomy Renal Failure Model Using Common Marmoset Monkey (Callithrix jacchus)	J. Yamate		
Youko Nishimura	Studies on Establishment of Cardiotoxicity Biomarkers in Rats Based on Toxicogenomic Technologies	J. Yamate		
Hiroshi Sasai	Retrospective study on incidence form of the fracture of the rabbit, examination about utility of the imaging using Micro Computed Tomography and fracture treatment in the small animal practice	K. Sasai		
Md. Shamin Hasan Zahid	Effects of anethole on the growth and virulemce expression of toxigenic <i>Vibrio cholerae</i> and its therapeutic effects in animal models	S. Yamasaki		
Kohji Hosomi	Studies on molecular mechanisms of sporulation by <i>Clostridium botulinum</i> type B	M. Mukamoto		
Mifumi Kawabe	Canine oral malignant melanoma: evaluation of radiotherapy and profiling of plasma metabolites using gas chromatography mass spectrometry	S. Takenaka		
Tennakoon Mudiyanselage Anusha Hemamali Tennakoon Pathological Studies on Myofibroblast Properties in Thioacetamide-Induced Rat Liver Fibrosis and Cirrhosis with Special Emphasis on Glial Fibrillary Acidic Protein Expression.		J. Yamate		
Miyuu Tanaka	Pathological and genetical studies on the novel myelin mutant VF rat	M. Kuwamura		
Rajapaksa Rathnayaka Mudiyanselage Kavindra Kumara Wijesundera		J. Yamate		
Rina Sakai	Studies on identification of novel genomic biomarkers for classifying DNA damage-induced clastogenicity and application of a discrimination tool for clastogenicity screening based on toxicogenomics technologies	K. Kubo		
Minoru Ohta	Studies on anesthetic management of thoroughbred racehorses anesthetized with sevoflurane	F. Ohashi		
2014				
Toshiyuki Tanaka	Relationship between MHC class I expression and epigenetics in canine mammary gland tumor	F. Ohashi		
Tetsuya Hasegawa	A retrospective study of canine epilepsy and gas chromatography mass spectrometry-based metabolic profiling of cerebrospinal fluid from epileptic dogs	M. Komori		
Ai Takeshita	Involvement of adipsin in mouse pregnancy loss and fetomaternal immunotolerance	T. Okada		
Emi Kashiwagi	Pathological studies on regenerating renal tubules in cisplatin-induced rat renal failure, with particular references to prostaglandin E_2 , neutrophil gelatinase-associated lipocalin and osteopontin	J. Yamate		
Takahiro Yuasa	Pathological studies on Thy-1-expressing cells in rat renal interstitial fibrosis, with particular relation to myofibroblast development	J. Yamate		

Directory

[l		-
Name	E-mail	Tel	Fax
Shingo Hatoya, DVM, PhD	hatoya@vet.osakafu-u.ac.jp	+81-72-463-5379	+81-72-463-5379
Kikuya Sugiura, DVM, PhD	sugiura@vet.osakafu-u.ac.jp	+81-72-463-5374	+81-72-463-5374
Facto DAiCVO, Charter DJCVS	hsst56@vet.osakafu-u.ac.jp	+81-72-463-5414	+81-72-463-5414
Yuka Fujimoto, DVM, PhD	fujimoto@vet.osakafu-u.ac.jp	+81-72-463-5457	+81-72-463-5457
Hiromichi Tamada, DVM, PhD	tamada@vet.osakafu-u.ac.jp	+81-72-463-5347	+81-72-463-5347
Noritoshi Kawate, DVM, PhD	nkawate@vet.osakafu-u.ac.jp	+81-72-463-5354	+81-72-463-5354
Kazumi Sasai, DVM, PhD	ksasai@vet.osakafu-u.ac.jp	+81 72-463-5082	+81-72-463-5387
Hiroyuki Tani, DVM, PhD	tanisi@vet.osakafu-u.ac.jp	+81-72-463-5082	+81-72-463-5387
Masaru Furuya, DVM, PhD	furuya@vet.osakafu-u.ac.jp	+81-72-463-5082	+81-72-463-5387
Satoshi Matsuyama, DVM, PhD	matuyama@vet.osakafu-u.ac.jp	+81-72-463-5480	+81-72-463-5484
Sunsuke Noguchi, DVM, PhD	snoguchi@vet.osakafu-u.ac.jp	+81-72-463-5480	+81-72-463-5484
Keiichiro Mie, DVM, PhD	mie@vet.osakafu-u.ac.jp	+81-72-463-5463	+81-72-463-5463
Hideo Akiyoshi, DVM, PhD	akiyoshi@vet.osakafu-u.ac.jp	+81-72-463-5476	+81-72-463-5476
Terumasa Shimada, DVM, PhD	terumasa@vet.osakafu-u.ac.jp	+81-72-463-5783	+81-72-463-5783
Shunsuke Shimamura, DVM, PhD	shimamura@vet.osakafu-u.ac.jp	+81-72-463-5832	+81-72-463-5183
Yoshiyuki Seto, DVM, PhD	set@vet.osakafu-u.ac.jp	+81-72-463-5695	+81-72-463-5695
Tomoko Tajima, DVM, PhD	tajima@vet.osakafu-u.ac.jp	+81-72-463-5698	+81-72-463-5695
Shinji Yamasaki, PhD	shinji@vet.osakafu-u.ac.jp	+81-72-463-5653	+81-72-463-5653
Makoto Matsubayashi, DVM, PhD	matsubayashi@vet.osakafu-u.ac.jp	+81-72-463-5513	+81-72-463-5676
Atsushi Hinenoya, DVM, PhD	hinenoya@vet.osakafu-u.ac.jp	+81-72-463-5676	+81-72-463-5676
Sharda Prasad Awasthi, PhD	getsharda@gmail.com	+81-72-463-5513	+81-72-463-5676
Noritoshi Hatanaka, DVM, PhD	dx203011@edu.osakafu-u.ac.jp	+81-72-463-5676	+81-72-463-5676
Masafumi Mukamoto, DVM, PhD	mukamoto@vet.osakafu-u.ac.jp	+81-72-463-5683	+81-72-463-5691
Tomoko Kohda, DVM, PhD	kohda@vet.osakafu-u.ac.jp	+81-72-463-5690	+81-72-463-5691
Kazuhiko Nishimura, DVM, PhD	nisimura@vet.osakafu-u.ac.jp	+81-72-463-5556	+81-72-463-5556
Hiroshi Nakagawa, DVM, PhD	nakagawa@vet.osakafu-u.ac.jp	+81-72-463-5556	+81-72-463-5556
Masami Miyake, DVM, PhD	mami@vet.osakafu-u.ac.jp	+81-72-463-5706	+81-72-463-5711
Takeshi Matsuzawa, DVM, PhD	tm@vet.osakafu-u.ac.jp	+81-72-463-5709	+81-72-463-5711
Mayo Yasugi, DVM, PhD	shishimaru@vet.osakafu-u.ac.jp	+81-72-463-5709	+81-72-463-5711
Shinobu Watarai, DVM, PhD	swatarai@vet.osakafu-u.ac.jp	+81-72-463-5720	+81-72-463-5738
Tadashi Iwasaki DVM, PhD	chuu@vet.osakafu-u.ac.jp	+81-72-463-5720	+81-72-463-5738
Tadayoshi Takeuchi, DVM, PhD	takeuchi@vet.osakafu-u.ac.jp	+81-72-463-5251	+81-72-463-5251
Yasu-Taka Azuma, PhC, PhD	azuma@vet.osakafu-u.ac.jp	+81-72-463-5264	+81-72-463-5264
Hidemitsu Nakajima, DVM, PhD	hnakajima@vet.osakafu-u.ac.jp	+81-72-463-5274	+81-72-463-5264
Yoichi Nakamura, PhD	yoichi@vet.osakafu-u.ac.jp	+81-72-463-5235	+81-72-463-5235
Mitsuaki Moriyama, DVM, PhD	moriyama@vet.osakafu-u.ac.jp	+81-72-463-5250	+81-72-463-5250
Katsura Takano, PhD	takano@vet.osakafu-u.ac.jp	+81-72-463-5243	+81-72-463-5250
Masayuki Komori, PhD	komori@vet.osakafu-u.ac.jp	+81-72-463-5293	+81-72-463-5326
Kazushige Ogawa, DVM, PhD	kogawa@vet.osakafu-u.ac.jp	+81-72-463-5584	+81-72-463-5584
Takayuki Nakajima, DVM, PhD	t-nakaji@vet.osakafu-u.ac.jp	+81-72-463-5594	+81-72-463-5584
Jyoji Yamate, DVM, PhD	yamate@vet.osakafu-u.ac.jp	+81-72-463-5334	+81-72-463-5346
Mitsuru Kuwamura, DVM, PhD	kuwamura@vet.osakafu-u.ac.jp	+81-72-463-5342	+81-72-463-5346
Takeshi Izawa, DVM, PhD	izawa@vet.osakafu-u.ac.jp	+81-72-463-5346	+81-72-463-5346
Toshiya Okada, DVM, PhD	okada@vet.osakafu-u.ac.jp	+81-72-463-5607	+81-72-463-5629
Tomohiro Kondo, DVM, PhD	kondo@vet.osakafu-u.ac.jp	+81-72-463-5609	+81-72-463-5629

Directory

Name	E-mail	Tel	Fax
Shougo Hirata, DVM	hirata@vet.osakafu-u.ac.jp	+81-72-463-5082	+81-72-463-5183
Tomoyo Nabetani, DVM	t-nabetani@vet.osakafu- u.ac.jp	+81-72-463-5082	+81-72-463-5183
Yusuke Wada, DVM	y-wada@vet.osakafu-u.ac.jp	+81-72-463-5082	+81-72-463-5183
Hiroki Yamazaki, DVM, PhD	hyamazaki@vet.osakafu-u.ac.jp	+81-72-463-5082	+81-72-463-5183
Marina Funayama, DVM, PhD	funayama@vet.osakafu-u.ac.jp	+81-72-463-5082	+81-72-463-5183





JR Airport Line or Nankai Airport Line: a 6-minute walk from Rinku-Town Station (Exit 3)

