## 2.4.9 Laboratory : Laboratory of Animal Physiology and Functional Anatomy

| | | |
|---|---|---|
| Member: | Professor | Kume, Shin-ichi, Dr. Agric. Sci. |
| | Assistant Professor | Sugimoto, Miki, Dr. Agric. Sci. |
| | Assistant Professor | Ikeda, Shuntaro, Dr. Agric. Sci. |
| | Doctor's program | 1 |
| | Master's Program | 6 |
| | Undergraduate | 3 |
| | Researcher | 1 |

**A. Research Activities (2009.4-2010.3)**

**A-1. Main Subjects**

a) The effect of functional food ingredients and endocrine disruptors on physiology, immune and reproductive functions.

Human foods and livestock feeds contains a variety of ingredients that improves reproduction and immune functions. On the other hand, endocrine disruptors can bind to nuclear receptors including estrogen receptors and interfere with the reproductive functions in animals. We have been evaluating the effects of these substances on the biological functions in mammals and developing a method for effective utilization of functional ingredients.

b) The effect of global warming and environmental loading substances on physiology and productivity of mammals

Animals convert ingested feed into heat energy and maintain their body temperature by homeostasis, while they yield livestock products for human food. Global warming, however, impairs the physiology and productivity of mammals. Effects of heat stresses on metabolism at the organ- to whole-body levels are being examined using biochemical and pathological techniques. In addition, methods for effective utilization of energy and materials upon environmental changes are being developed.

c) Functional morphology of mammalian reproduction and its regulation mechanism

Domestic animals with high productivity often have low reproductive ability. We are analyzing the factors involved in different processes in mammalian reproduction and are developing techniques for efficient utilization of germ cells and for avoidance of reproductive disorders.

**A-2.Publications and presentations**

a) Publications

Books

- Kume,S: Mineral and vitamin. Dairy cattle nutrition. Dairy Japan. Tokyo. 81-106. 2010..(in Japanese)

- Kume,S: Metabolism and nutritional control during heat stress. Nutritional management of dairy cattle. Dairyman. Tokyo. 176-182. 2009..(in Japanese)

Original Papers

- Takagi, N., S. Hasegawa, M. Sugimoto, S. Ikeda and S. Kume: Effect of feeding whey protein or skim milk protein on nitrogen utilization and fecal IgA in mice after weaning. Kansai Journal of Animal Science166; 1-9, 2010. (in Japanese)
- Kasai, K., K. Yasmatsuya, T. Seyama, H. Hirayasu, Y. Fujitani, K. Mamdokoro, M. Akaike, O. Nishino and S. Kume: Colostral Immunoglobulin G level and antibody titers in dairy cows treated with a maternal vaccine. Kansai Journal of Animal Science 166; 27-32, 2010. (in Japanese)
- Ikeda, S., T. Namekawa, M. Sugimoto and S. Kume: Expression of methylation pathway enzymes in bovine oocytes and preimplantation embryos. J Exp Zool A Ecol Genet Physiol 313; 129-136, 2010
- Kume, S., K. Nonaka, T. Oshita and T. Kozakai: Evaluation of drinking water intake, feed water intake and total water intake in dry and lactating cows fed silages. Livestock Science 128; 46-51, 2010.
- Murai, I., M. Sugimoto, S. Ikeda and S. Kume: Effects of high potassium chloride supplementation on water intake, urine volume and nitrogen balance in mice. Animal Science Journal 81; 80-84. 2010
- Tabata, Y., D. Togo, M. Kitagawa, K. Oishi, H. Kumagai, S. Kume and H. Hirooka: Nitrogen, phosphorus, and potassium utilization and their cycling in a beefforage production system. Animal Science Journal 80; 475-485, 2009.
- Ikeda, S., A. Tatemizo, D. Iwamoto, S. Taniguchi, Y. Hoshino, T. Amano, K. Matsumoto, Y. Hosoi, A. Iritani and K. Saeki: Enhancement of histone acetylation by trichostatin A during in vitro fertilization of bovine oocytes affects cell number of inner cell mass of the resulting blastocysts. Zygote 17; 209-215, 2009.
- Asakura, M., S. Ninomiya, M. Sugimoto, M. Oku, SI. Yamashita, T. Okuno, Y. Sakai and Y. Takano: Atg26-mediated pexophagy is required for host invasion by the plant pathogenic fungus Colletotrichum orbiculare. Plant Cell 21; 1291-304, 2009.

b) Conference and seminar papers presented

- The 59th Meeting of Kansai Society of Animal Science: 6 presentation
- The 22th Meeting of Japanese Society of Equine Science: 1 presentation
- The 112th Meeting of Japanese Society of Animal Science: 2 presentation

**A-3.Off-campus activities**

Membership in academic societies

- Kume, Shin-ichi, Dr. Agric. Sci. : Japanese Society of Animal Science (Director), Kansai Society of Animal Science (President), Japanese Society of Equine Science (Editor), Japanese Society of Animal Nutrition and Metabolism (Councilor)
- Sugimoto, Miki, Dr. Agric. Sci. : The Society for Reproduction and Development (Committee for Encouragement of young members)

Research grants

1. Grants-in-aid for Scientific Research(KAKENHI)

- Scientific Research (C) : Kume, Shin-ichi, Dr. Agric. Sci. : Mechanism of plant estrogen via placenta of mammals
- Young Scientists (B) : Ikeda, Shuntaro, Dr. Agric. Sci. : Roles of methylation pathway in epigenetics of bovine early embryos

2.Other Research Grants

- Research project for utilizing advanced technologies in agriculture, forestry and fisheries : Kume, Shin-ichi, Dr. Agric. Sci. : Development of high qualitied whey milk replacer

**A-4.International cooperation and overseas activities**

Visiting Research Scholars

- Visiting Scholar 1 （China）

**B.Educational Activities(2009.4-2010.3)**

**B-1.On-campus teaching**

a) Courses given

- Undergraduate level : Outline of Bioresource Science II (Kume et al.), Animal Physiology (Kume et al.), Animal Physiology and Anatomy

(Kume), Introduction to Foreign Literature in Bioresource Science II (Ikeda et al.), Fundamentals for the Experiments for Bioresource Science (Sugimoto, Ikeda et al.), Laboratory Course in Bioresource Science I and II (Sugimoto, Ikeda et al.), Animal Environmental Physiology (Kume), Livestock Production Techniques and Practice II (Kume et al.), Seminar for Applied Animal Science Ⅰ and Ⅱ (Sugimoto et al.)

- Graduate level : Animal Physiology and Anatomy (Kume), Seminar in Animal Physiology and Anatomy (Kume, Sugimoto, Ikeda), Laboratory Course in Animal Physiology and Anatomy (Kume, Sugimoto, Ikeda)

**B-2.Off-campus teaching etc.**

Part-time lecturer

- Shinichi Kume: Miyazaki University, Faculty of Agriculture (Animal Environmental Physiology)

**B-3.Overseas teaching**

International students

- International students : Master 1 (China)

**C.Other Remarks**

- Kume, Shin-ichi, Dr. Agric. Sci. : Agricultural Establishment Research Committee of Kinki, Chugoku, Shikoku Region in National Agriculture and Bio-oriented Research organization (member).