

## Chair                      Chair of Animal Anatomy, Nutrition and Resources

### 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 (2010.4-2011.3)**

##### **A-1. Main Subjects**

a) The utilization of functional ingredients for improvement of physiological, immune and reproductive functions

Animals occasionally suffer physiological, immunological and reproductive disorders by environmental changes. We assess the effects of functional ingredients in diets on mammalian physiological functions by biochemical, histopathological and molecular-biological techniques.

- Improvement of intestinal immunity of neonates by beta-carotene
- The effect of phytoestrogens on the calcium metabolism in pregnant and lactating mice
- Amelioration of heat stresses on bovine preimplantation embryos by astaxanthin

b) Development of the ecological management system for dairy and beef cattle

Cattle yield nutritious milk and meat from grasses inedible for humans; on the other hand, excrete the methane gas and nitrogen and phosphorus, which are causes of the global warming and water pollution. To develop ecological livestock management system, we clarify the effect of heat stress and other factors on their metabolism using biochemical and nutrition physiological techniques.

- Development of environment-conserving cattle breeding system utilizing domestic roughage
- Improvement of the productivity and water utilization of livestock cattle in hot environment

c) Factors regulating mammalian reproductive functions

Domestic animals with high performance often have low reproductive ability, which results in the lowered productivity. We are analyzing the factors involved in the mammalian reproductive processes and are developing techniques to improve reproductive efficacies and to avoid disorders.

- Factors involved in the development and function of ovaries and utilization of oocytes
- Effects of environmental factors on the development of mammalian preimplantation embryos

## **A-2.Publications and presentations**

### **a) Publications**

#### Original Papers(including book-reviews)

- Yasumatsuya K., K. Kasai, T. Hamano, O. Nishino, M Akaike, M. Hayashi, S. Kume, T. Nagase: Effect of changing amount of milk replacer for Japanese Black calves on their growth and starter intake. Kansai Journal of Animal Science 168; 17-23, 2011 (in Japanese)
- Nishiyama Y., M. Sugimoto, S. Ikeda, S. Kume: Supplemental  $\beta$ -carotene increases IgA secreting cells in mammary gland and IgA transfer from milk to neonatal mice. Br J Nutr 105; 24-30, 2011
- Sugimoto M., N. Kagawa, M. Morita, S. Kume, K. Wongpanit, H. Jin, N. Manabe: Changes in the expression of decoy receptor 3 in granulosa cells during follicular atresia in porcine ovaries. J Reprod Dev 56; 467-474, 2010
- Namekawa T., S. Ikeda, M. Sugimoto, S. Kume: Effects of astaxanthin-containing oil on development and stress-related gene expression of bovine embryos exposed to heat stress. Reprod Domest Anim 45; e387-e391, 2010
- Ikeda S., M. Sugimoto, S. Kume: Dynamic expression of vimentin in bovine blastocysts in extended in vitro culture. Reprod Domest Anim 45; 295-301, 2010

#### Reports,others

- Kume,S, T.Shukuin: Feeding management for high producing cows fed forages. Chikusan no kenkyu 64; 1063-1073, 2010
- Kume,S.: Potassium metabolism in dairy cows and effects of low potassium feeding for dairy cows. Kachikusinryo 58; 67-72, 2011

### **b) Conference and seminar papers presented**

- 14th Animal Science Congress of the Asian -Australasian Association of Animal Production Societies: 2 presentations
- The 103th Annual Meeting of Japanese Society of Animal Reproduction: 1 presentation
- The 60th Meeting of Kansai Society of Animal Science: 3 presentations
- The Society for Risk Analysis Japan The 23rd Annual Meeting: 1 presentation

## **A-3.Off-campus activities 1**

### 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)

### **A-3.Off-campus activities 2**

#### Research grants

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

- Grant-in-Aid for Scientific Research from the Japanese Society for Promotion of Science (C) : Kume, Shin-ichi, Dr. Agric. Sci. : Mechanism of plant estrogen via placenta of mammals

- Grant-in-Aid for Young Scientists from Monbu Kagakusho (B) : Ikeda, Shuntaro, Dr. Agric. Sci. : Roles of methylation pathway in epigenetics of bovine early embryos

### **A-4.International cooperation and overseas activities 2**

#### Visiting Research Scholars

- Visiting Scholar 1 (China)

### **B.Educational Activities(2010.4-2011.3)**

#### **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 I (Kume 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 Environmental Physiology (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

- Kume, S.: Kyoto University of Education, Faculty of Education, Practice of cultivation

#### **B-3.Overseas teaching 1**

#### 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).







