Chair Animal Genetics and Reproduction

2.4.6 Laboratory : Animal Breeding and Genetics

Member:	Professor	Iwaisaki, Hiroaki, Ph.D.
	Assistant Professor	Taniguchi, Yukio
	Assistant Professor	Matsuda, Hirokazu
	Master's Program	2
	Undergraduate	4
	Other	2
	Post-Doctoral fellow	1

A. Research Activities (2010.4-2011.3)

A-1. Main Subjects

a) Studies on the Procedures for Genomic Evaluation and Genome-Wide Association Studies

For analyses of genomic evaluation of animals and genome-wide association studies using an immense amount of SNP information simultaneously, we have developed several computing procedures, and their Fortran programs, employing best linear unbiased prediction, Bayesian, and kernel multivariate analyses methods. In addition, applying these procedures to simulated data and actual data of hetero stock mice and Japanese Black cattle, we have investigated properties of the procedures in details, and confirmed that the Bayesian methods using the Metropolis-Hastings algorithm and some methods belonging to kernel multivariate analyses methods are a promising approach.

b) Study on the Molecular Mechanism Underlying Marbling in Beef

In the muscle tissue of the bADAM12 transgenic mice, which is a mouse model showing intramuscular fat deposition, the expressions of adipocyte-differentiation related genes (transcription factors, matrix proteins and matrix metalloproteinases) were immunohistochemically analyzed, suggesting that the intramuscular adipocyte differentiation proceeded in connective tissues between muscle fibers.

In addition to expression level, the activities of membrane-type matrix metalloprotease, MT1-MMP and ADAM12 were regulated by the localization to cell surface. To examine the process of MT1-MMP or ADAM12 intracellular transport, the bovine MT1-MMP or ADAM12 -GFPfusion protein was expressed in Cos1 cells or preadipocyte cell line 3T3-L1 and the intracellular distributions on the GFP signal were analyzed.

c) Acquirement of Marker Information Useful for Analysis of Genetic Diversity in Japanese Crested Ibis Population

It is desirable to perform molecular genetic studies with marker information, in order to analyze the genetic diversity in Japanese crested ibis population in Sado Island. We thus tried to acquire marker information in captive Japanese crested ibis population in Sado Island. Microsatellite markers informative for Japanese crested ibis population in Sado Island. Microsatellite markers informative for Japanese crested ibis and species related to the crested ibis, and then the genotyping of these markers was performed. The genomic region of the major histocompatibility complex (MHC) contains multi-gene family members involved in the immune response. To determine the genomic organization of the MHC region in Japanese crested ibis, genomic fragments containing the MHC class I and II genes were isolated and analyzed by restriction enzyme mapping and PCR. These results indecated that Japanese crested ibis has at least two and four copies of MHC class I and II genes, respectively.

A-2.Publications and presentations

a) Publications

Books

- Iwaisaki, H.: Biometrics. Kagakudohjin, 2010

Original Papers(including book-reviews)

- Kanao, T., Y. Taniguchi, T. Yamada, and H. Iwaisaki: Identification of the Matrix Metalloproteinase Genes Expressed in the bovine longissimus muscle. Kansai J Anim Sci 168;25-32, 2011

- Urano, K., T. Yamada, Y. Taniguchi, H. Iwaisaki, T. Sugiyama, K. Homma, Y. Kaneko, S. Yamagishi: Non-invasive sampling technique for DNA extraction from captive Japanese Crested Ibis on Sado Island. Anim Sci J 81;1-4, 2010

- Iwaisaki, H.: The Wagyu cattle breeding in Japan: progress and future prospects. Utilization of native animals for building rural enterprises in warm climate zone; 107-119, FFTC/ASPAC, 2010

- Iwaisaki, H., A. Arakawa, H. Matsuda: Breed Res 18;17-49, 2010 Genomic selection. Jpn J Anim

b) Conference and seminar papers presented

- The 113 th Annual Meeting of Japanese Society of Animal Science : 5 presentations

- The 60th Annual Meeting of Kansai Animal Science Society : 2 presentations

- The 11th Japanese Society of Animal Breeding and Genetics : 3 presentations

- The 59th Annual Meeting of Hokusinetsu Animal Science Society : 2 presentations

- The 32nd Conference for the International Society for Animal Genetics : 2 presentations

- The 14th Asian-Australisian Association of Animal Production Societies : 1 presentations

A-3.Off-campus activities 1

Membership in academic societies

- Iwaisaki, Hiroaki, Ph.D. : Japanese Society of Animal Science (Associate editor)

A-3.Off-campus activities 2

Research grants

Categories

- Iwaisaki, Hiroaki, Ph.D. : Developing a genetic evaluation system using the chromosome segment model : Grant-in-Aid for Scientific Research (C)

- Nomura, Tetsuro, Ph.D. (Agric.) (Part: Iwaisaki, H.) : Influence of global warming on age-change in geographical cline of elytras spots pattern genes in the multicolored Asian lady beetle Harmonia axyridis :

A-4.International cooperations and overseas activities 1

Membership in academic societies

- Iwaisaki, Hiroaki, Ph.D. : Asian-Australasian Association of Animal Production Societies (Associate editor)

A-4.International cooperations and overseas activities 2

Visiting Research Scholars

- Senior research associate 1(U.S.A.)

B.Educational Activities(2010.4-2011.3)

B-1.On-campus teaching

a) Courses given

- Undergraduate level:
Outline of Agrigultural Science II (Iwaisaki et al.), Outline of Bioresource Science II (Iwaisaki et al.), Applied Animal Genetics (Iwaisaki), Animal Breeding and Genetics (Iwaisaki), Introduction to Foreign Literature in Bioresource Science I (Taniguchi, et al.), Basic Laboratory Course in Bioresource Science I, II (Taniguchi, et al.), Technology theory of Animal Husbandry and Practice II (Iwaisaki, Taniguchi, et al.), Laboratory Course in Bioresource Science I, II (Taniguchi, Matsuda, et al.), Cell Biology II (Taniguchi, et al.), Seminar in Applied Animal Science I, II (Taniguchi, Matsuda, et al.), Domestic Animal Genome Science Biotechnology (Iwaisaki, et al.)

- Graduate level:

Advanced Animal Breeding and Genetics (Iwaisaki), Seminar in Animal Breeding and Genetics (Iwaisaki, Taniguchi, Matsuda), Laboratory Course in Animal Breeding and Genetics (Iwaisaki, Taniguchi, Matsuda)

B-2.Off-campus teaching etc.

Part-time lecturer

- Iwaisaki, Hiroaki, Ph.D.: Ishikawa Prefectural University (Animal Breeding and Genetics)