2.4.7 Laboratory : Laboratory of Reproductive Biology

Member :	Professor	Imai, Hiroshi
	Associate Professor	Yamada, Masayasu
	Associate Professor	Minami, Nojiro
	Doctor's program	3
	Master's Program	6
	Undergraduate	4

A. Research Activities (2009.4-2010.3)

A-1. Main Subjects

a) Development and Differentiation in Mammalian Embryos

The regulatory factors required for in vitro maturation, fertilization and development of eggs are studied. We found that IVM/IVF embryos require some unknown factors from follicle cells during maturation for their further development, so now we are focusing on elucidation of the molecular mechanisms of this intracellular communication between oocytes and follicle cells. In addition, genes and proteins that are involved in the preimplantation development and differentiation are also studied using mouse embryo culture system.

b) Analisis of nuclear reprogramming of mammalian somatic cells

It has become possible to produce clone animals derived from differentiated somatic cells using nuclear transfer technique, however, it is still unknown how can differentiated cells acquire totipotency during development. In addition, the great majority of reconstituted embryos die after nuclear transfer without involvement of ontogenesis. In our laboratory, reprogramming mechanisms of differentiated cells and embryonic anomaly during embryogenesis are examined using cell and molecular biological techniques.

c) Establishment and application of stem cell lines from of germ cells and artificially reprogrammed cells

Development of techniques to establish embryonic, spermatic and artificially reprogrammed stem cells having pluripotency is undertaken. Reconstitution of embryos and production of transgenic animals using the stem cells are studied. We are intending to utilize stem cell lines to apply transgenic technique for improvement of livestock animals.

A-2.Publications and presentations

a) Publications

Original Papers

- Miyamoto K, Tsukiyama T, Yang Y, Li N, Minami N, Yamada M and Imai H.: Reprogramming of somatic cells in cell-free extracts from mammalian oocytes. Biol. Reprod., 80: 935-943 (2009)
- Goel, S, Fujihara M, Tsuchiya K, Takagi Y, Minami N, Yamada M and Imai H.: Multipotential ability of primitive germ cells from neonatal pig testis cultured in vitro. Reprod. Fertil. Dev., 21: 696-708 (2009)

b) Conference and seminar papers presented

- The 102th Annual Meeting of Japanese Society of Animal Reproduction, 1 presentation
- The 134th Annual Meeting of Japanese Society of Fertility and Sterility (Western Branch), 1 presentation
- The 59th Annual Meeting of Japanese Society of Animal Science (Western Branch), 1 presentation
- The 9th Annual Meeting of the Japanese Society for Regerative Medicine, 1 presentation
- The 32nd Annual Meeting of the Molecular Biology Society of Japan, 2 presentations
- The 112th Annual Meeting of Japanese Society of Animal Science, 1 Presentation

A-3.Off-campus activities

Membership in academic societies

- Imai, Hiroshi, D.Agric.Sci : Japan Embryo Transfer Society (Vice President, Director), Japan Society for Reproductive Medicin (Director), Japanese Society of Animal Reproduction (Director), Japan Society of Fertilization and Implantation (Director), Japanese Society of Zootechnical Science (Councilor), Kansai Society of Zootechnical Science (Councilor)
- Yamada, Masayasu, D. Med. Sci : Japan Society for Reproductive Medicin (Councilor, Executive Editor), The Japanese Society of Animal Reproduction (Councilor), Japan Embryo Transfer Society (Officer and Editorial Board)
- Minami, Naojiro, D. Agri. Sci : The Japanese Society of Animal Reproduction (Managing Editor, Councilor), Japan Embryo Transfer Society (Officer), Japan Society for Reproductive Medicin (Deputy・Officer)

Research grants

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

- Challenging Exploratory Research : Imai, Hiroshi : Induction of nuclear reprogramming of somatic cells by oocyte extracts.
- Scientific Research (B)(2) : Minami, Naojiro : Functional analysis of a Oog1 and molecular basis of zygotic gene activation in the mouse
- Challenging Exploratory Research : Minami, Naojiro : Creation of mono-sexual animal using haploid-specific gene expression during spermatogenesis

2.Other Research Grants

- Grant from Ministry of Agriculture, Forestry and Fisheries ：Imai, Hiroshi (Co-investigator: Minami, Naojiro)：Research project for the construction of management system for distribution of semen in Japanese Black cattele
- JST Adaptable and seamless technology transfer program：Yamada, Masayasu：Development of novel synthetic medium for effective production of blastocysts with high developmental competence from mouse IVF embryos

A-4.International cooperation and overseas activities

Membership in academic societies

- Imai, Hiroshi: International Congress of Animal Reproduction (Executive Committee Member), International Symposium on Spermatology (Executive Committee Member)

International meetings(country,roles)

- Imai, Hiroshi：7th Annual Meeting of International Society for Stem Cell Research (Barcelona, Presentation), 42nd Society for the Study of Reproduction (Pittsburgh, Presentation)
- Yamada, Masayasu：7th Annual Meeting of International Society for Stem Cell Research (Barcelona, Presentation)
- Minami, Naojiro：7th Annual Meeting of International Society for Stem Cell Research (Barcelona, Presentation), 42nd Society for the Study of Reproduction (Pittsburgh, Presentation)

International joint research, overseas research surveys

- Preservation of endangered species and genetic resources by animal biotechnology. (Imai, Hiroshi, India)

Visiting Research Scholars

- Guest Research Associate　1（India）

B.Educational Activities(2009.4-2010.3)

B-1.On-campus teaching

a) Courses given

- Undergraduate level: Outline of Bioresource Science III (Imai), Developmental and Reproductive Technology (Yamada), Introduction to Animal Science Literature I (Yamada), Methods and Techniques in Animal Reproduction Experimentation (Imai, Yamada, Minami), Biotechnology (Yamada), Reproductive Physiology (Minami)
- Graduate level: Advanced Course of Reproductive Physiology (Imai), Reproductive Physiology-Seminar (Imai, Yamada, Minami), Laboratory Course in Reproductive Physiology (Imai, Yamada, Minami), Genetic Engineering in Developmental Biology (Yamada)

B-2.Off-campus teaching etc.

Part-time lecturer

- Imai, Hiroshi: National Livestock Breeding Center (Lecturer, Animal Reproduction Training Course), Fukui Prefectural University, Faculty of Biotechnology, Animal Genetic and Biotechnology, Monbusho Super Science High school Program, Ube High school, Yamaguchi Pref. Lecture
- Yamada, Masayasu: Osaka City University, Medical School, Reproductive Medicine
- Minami, Naojiro: Tokyo University of Agriculture, Graduate School of Agriculture

Open lectures, etc.

- Imai, Hiroshi: Special Lecture on the Japanese Society of Mammalian Ova Research
- Minami, Naojiro: Special Lecture on Japan Society of Fertilization and Implangation

B-3.Overseas teaching

International students

- International students : Master 1 (China) Doctral 1 (Korea)

Lectures and seminars

- Imai, Hiroshi

CCMB Seminar(Invited Speaker) : Center For Cellular Molecular Biology(India)

C.Other Remarks

- Imai, Hiroshi：Committee of Research Investigation of Agriculture, Forestry and Fisheries Technical Information Society, Committee of Research Project of Ministry of Agriculture, Forestry and Fisheries, Assessment Committee of Research Grant of Ministry of Agriculture, Forestry and Fisheries, Assessment Committee of Research Grant of Ministry of Agriculture, Forestry and Fisheries, Assessment Committee of Bio-oriented Technology Research Advancement Institution