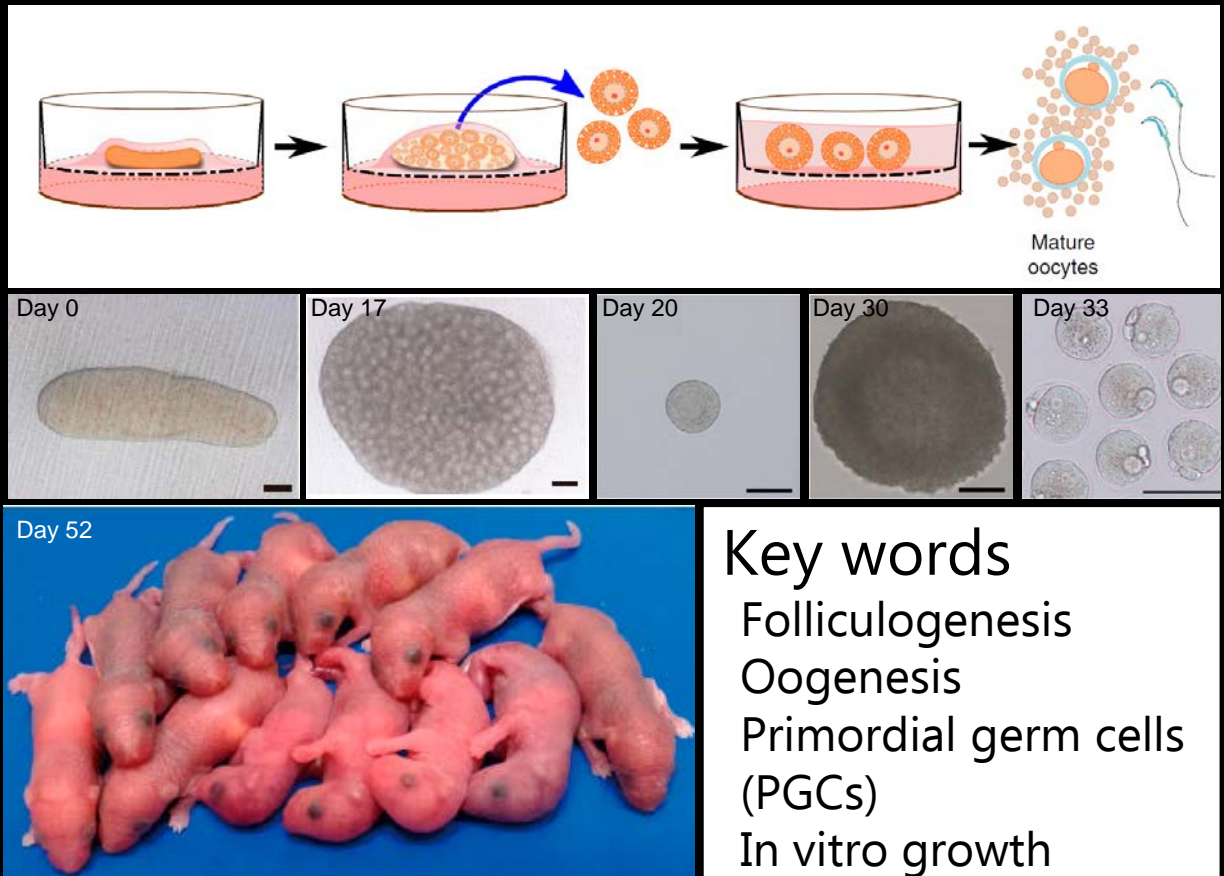


The 21st leading seminar

In vitro growth of primordial germ cells derived from mouse fetal ovaries (マウス胎子卵巢由来始原生殖細胞の体外発育)



Dr. Kanako MOROHAKU

Assistant professor, Division of Animal Science,
Faculty of Agriculture, Shinshu University
Cazzarelli Prize 2016 (The best paper award of PNAS)



Date: October 18th (Wed), 2017
Time: 16:00- 17:00
Venue: Lecture Hall

Organizer: Kenichiro SAKAGUCHI (D2)
Lab. Theriogenology
(ksaka@vetmed.hokudai.ac.jp)

Biography

Kanako Morohaku, Ph.D.

Assistant professor
Division of Animal Science
Faculty of Agriculture
Shinshu University

Education

Doctorate: Tohoku University, 2010
Master of Science: Tohoku University, 2007
Bachelor's Degree: Tohoku University, 2005

Professional Career

2017 (Oct) – Present: Assistant professor at Shinshu University
2013- 2017 (Sep): Postdoctoral Associate at Tokyo University of Agriculture
2011- 2013: Postdoctoral Associate at Cornell University
2010- 2011: JSPS Research Fellow (PD-fellowship)
(Postdoctoral Fellow at Kitasato University)
2009- 2010: JSPS Research Fellow (DC-fellowship)

Research interests

1. Mammalian oogenesis and folliculogenesis
2. Germ cell preservation

Representative publication

1. Morohaku, K. et al., **Nature Protocols** 12(9):1817-1829. 2017
2. Morohaku, K. et al., **Proc Natl Acad Sci U S A** 113(32): 9021-9026. 2016
3. Tu, L. N., Morohaku, K. et al., **J Biol Chem** 289(40): 27444-27454. 2014
4. Morohaku, K. et al., **Endocrinology** 155(1): 89-97. 2014
5. Morohaku, K. et al., **PLoS One** 8(11): e77533. 2013
6. Morohaku, K., et al., **PLoS One** 8(9): e74509. 2013

Awards

2017: Cozzarelli Prize 2016 (The best paper award of PNAS)
2014: Endocrine Society The Best of Basic Research 2014

Abstract

***In vitro* growth of primordial germ cells derived from mouse fetal ovaries**

In female mammals, only 1% or less of mature oocytes in ovaries that stock several or more thousands of oocytes can be ovulated during the reproductive period. This process is called folliculogenesis, in which each oocyte is stored in single follicle, grown from primordial to tertiary follicle stage, matured, and finally ovulated. Prior to folliculogenesis, oocytes are differentiated from primordial germ cells (PGCs) via oogonia at the fetus stage. To utilize and supply oocytes for reproduction of livestock and endanger animals, a protocol that can produce many matured oocytes *in vitro* is required and expected to be developed to grow PGCs and/or immature oocytes. For this achievement the following process need to be developed: 1) meiotic entry and formation of primordial follicles, 2) establishment of oocyte-specific genomic imprinting, and 3) growth and maturation of the cytoplasm and karyoplasts of oocytes. Recently, we succeeded in *in vitro* production of matured oocytes that can develop to fetuses and finally live offspring. In this reports, we showed that the estrogen-signaling pathway is activated excessively in ovaries during organ culture, and also found that an estrogen receptor antagonist improves the follicle assembly *in vitro* during the period corresponding to that of oocyte cyst breakdown.

In this seminar, I will introduce the brief history of the *in vitro* culture system for follicles and ovaries, and our developed culture systems for PGCs in embryonic ovaries.