Details of Technology

Name of Technology	Primordial germ cell (PGC)	Life Science
Name/Post/Faculty	Kazuei Matsubara / Associate Professor / Animal Science, Faculty of Agriculture	
Key words	chicken, experimental animals, germ cell, preservation of genetic resources	

What kind of technology is this?

Outline

These include the technology of preserving primordial germ cells with chromosome number of 2n, the precursors of sperms and eggs, the technology of restoring PGC preserved in a different strain by implanting to the original strain and the technology of producing germ cells *in vitro*.

The present research has been performed to preserve Iwate Chicken. Our future research is performed to utilize chicken eggs as industrial materials by introducing useful genes into PGCs. The goal of the research on mouse PGC is to produce sperms and eggs from PGCs *in vitro*. PGCs are germ cells with chromosome number of 2N, the precursors of sperms and eggs. PGCs in chickens move in yolk sac marginal arteriovenous blood and start meiosis in the primodium of the testis and ovary called genital ridge at 2 or 3 days after the commencement of the incubation. Therefore, a germline Chimera can be produced by introducing donor PGCs at this time into a different strain of chicken and donor chicken can be restored by mating chickens with germline chimera. It is also possible to develop transgenic chickens with useful gene DNA in the nucleus of donor PGC. Mouse PGCs are fixed at the genital ridge after moving among cells on day 11 to 13 of fetal age. We succeeded in the isolation of PGCs at this time with a purify of 90% or more and prepared polyclonal antibodies against PGC. We established the PGC cultivation method and succeeded in the growth of PGCs isolated from female fetuses to the secondary oocytes by implanting the PGCs under the renal capsule of nude mice. In the mammalian embryological research, it is important to handle a large number of mouse eggs. We aim to provide the raw materials in the medical field by inducing PGC to sperms and eggs in the *in vitro* incubation system.

What are its applications?

The implantation of chicken PGC to a different strain chicken can be easily performed. The technology can be commercialized into the business of strain maintenance and chicken raising. Mouse PGCs can be induced into sperms and eggs *in vitro*.

The technology can be commercialized into the experimental animal business and as the germ cells for research in the medical field.

Related patents	
Related materials	Kikuchi, A., Matsubara (Ito), K., Takahashi, J., Kawahata, R. and Goto, T., (2000) Identification and observation of chicken primordial germ cell. *Journal of Tohoku Animal Science and Technology Society. 50*: 24-30, Iwamoto, W., Yoshida, K., Matsubara, K., Takahashi, J., Goryo, M., Saito, Y. Yoshida, N., Komatsu, S., Kawahata, R. and Kayano, H. (2003) Trial of genital chimera production using primordial germ cell (PGC) of Iwate chicken, *Journal of Tohoku Animal Science and Technology Society. 52*: 46 and others.

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