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Research on the Mechanism of Oocyte Development

The mammalian ovary contains follicles in many development stages, which can be grown in vitro to provide an additional source of mature oocytes. These processes have long periods and the development and differentiation of female germ cells require a unique microenvironment created by surrounding somatic cells. Our research theme is focused on the mechanism of oogenesis/folliculogenesis by somatic cells in human and animal ovaries. Furthermore, we are developing in vitro culture systems compatible with all stages of oocytes present in ovarian tissue. These systems contributed to assisted reproductive medicine, animal reproduction, and the conservation of endangered species.

Cryopreservation System of Reproductive Tissue and Germ Cell

Embryo cryopreservation has become routine procedures in assisted reproductive medicine worldwide. Recently, there has been a growing interest in cryopreservation of ovaries or oocytes for women's career development and to protect germ cells from cancer treatment. A few reports successful in births by obtaining mature oocytes from the frozen ovarian tissue or immature oocytes. However, the success rates are limited, the optimization of these freezing methods is urgently needed. To solve this problem, we investigated the effects of cryopreservation on ovarian tissue and oocytes. We focused on cryoprotective substances, osmotic stress, and antioxidants during the freeze-thaw process. Our research goal is to establish safe cryopreservation methods, which technology will also preserve livestock and wildlife in the event of unprecedented epidemiological problems.