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Mini-Symposium:
Challenges to functional oocyte production in vitro

Preface

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The goal of this mini-symposium is to provide a contemporary overview of the current status of our challenges in producing functional oocytes in vitro. The development of functional oocytes requires multiple processes, including the differentiation of primordial germ cells (PGCs), the epigenetic reprograming of an oocyte genome, and the construction of the tissue structures required for the development of both somatic and germ cell compartments of ovarian follicles. Although many challenges have been overcome, the complex processes of oocyte development have never been recapitulated in vitro in successive studies. However, rapid advances in the techniques and general understanding of oocyte development have led to the hope that such successes are imminent.

This mini-symposium, titled “Challenges to functional oocyte production in vitro,” will introduce recent advances in the techniques and knowledge of functional oocyte production in culture. First, Dr. Obata will describe the DNA methylation required for development of functional oocytes and the differences in DNA methylation status between in vivo- and in vitro-grown oocytes. Then, Drs. Hayashi and Saitou will describe their recent success in producing functional PGC-like cells from embryonic stem cells and induced pluripotent stem cells. Lastly, Drs. Hirao and Miyano will review the recent status of in vitro-growth culture of oocytes in large animals.

I hope this mini-symposium will help bring into sharper focus both the current status of oocyte development and the techniques of functional oocyte production in vitro, and will inspire the interest of many young scientists in this exciting research field.