Biomimetics Biomaterials and Tissue Engineering

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Introduction

e technique of ultrasound-guided transvaginal follicular aspiration for ovum pick-up (OPU), is a non-invasive procedure for recovering oocytes from antral follicles in live animals. It was developed in the human [1,2] to assist human infertility. When people realized its application prospect, considerable researches have been aimed at applying this technology in the bovine. In 1987, an ultrasonic-guided aspiration of bovine follicular oocytes was rst proposed in Denmark [3] and in 1988; a real OPU was rst established in cattle by a Dutch team [4]. Together with fertilization of oocytes, OPU has been taken as a most exible and repeatable technique to produce embryos from any given live donor. Unlike MOET, OPU does not interfere with the normal reproduction and production cycles of the donor. Any female starting from 6 months of age to the third month of pregnancy and even soon a er calving (2-3 weeks) could be a suitable donor. It has been shown to be a feasible and practical alternative to the conventional multiple ovulation and embryo transfer (MOET) program [5,6], and it is being more and more used for commercial applications in the world [7,8].

e rst *I* Produced (IVP) calf was born in 1981 [9]. Both OPU and IVF could be seen as mature technologies in the current world. e total number of transferable IVP bovine embryos worldwide was 453,471 in 2011 [10], which included OPU embryos and abattoir embryos. Although there is a large variation between donors, it is capable of producing over 50 calves per donor cow per year if the two technologies-OPU and IVF are combined. In addition, with the complementing of bovine genome sequencing and key genes for traits of economic interest becoming available in the recent years, OPU/IVP has proven invaluable in rapidly multiplying rare genes and provides the basis for more advanced technologies such as cloning [11,12] and transgenic. Brazil dominated the IVP production by performing 53,019 OPU sessions averaging 15 oocytes and 6 embryos per session. ere are many embryo technology companies in Brazil, who are specializing in the production of embryos, embryo transfer or embryo-related technologies training to farmers or people related. is kind of companies or groups also exists in US, Canada, Italy, et al.

Di erent OPU Systems

e main process of OPU includes epidural anaesthesia, ovary positioning per rectum, follicle visualizing by the transvaginal transducer, oocyte aspiration by needle. ere are two major OPU systems including non stimulation and pre-stimulation procedure. As the name implies, the di erence is whether the donor will be stimulated with hormone prior to OPU.

e original OPU procedure includes no hormone stimulation. It routinely performs twice a week, which allows the maximum recovery of oocytes of suitable quality for embryo production in a given time interval compared to once-a-week OPU, because no dominant follicle develops when all visible follicles are aspirated ogy cos troductr,oo domina

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oocyte development, the total proportions of cleavage, development