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Editorial

Recent Advances in Reproductive Technologies

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Never before have there been so many medical intervention options available to infertile couples seeking to become parents. These options are possible largely due to the research in animal reproduction which started several decades ago with the widespread use of artificial insemination in farm animals. This was followed by the advent of *in vitro* embryo production/manipulation and transfer, cryopreservation, and the development of reproductive cloning (that sparked an unprecedented interest in stem cell technology). In addition to advancing our ability to modify reproductive function and changing our perception of what is possible, such technologies have also greatly expanded our understanding of reproductive/gamete biology.

We have solicited research and review articles related to the recently developed technologies in animal reproduction for this special issue of the journal. The response was overwhelming and a number of exciting articles have been selected for publication. Most of the accepted papers in this issue are review papers (9 of 15) and the articles have been contributed by researchers from a dozen different countries, reflecting its international scope. We are extremely grateful to all the reviewers who took time to carefully read the submitted manuscripts and to provide critical comments which helped to ensure the high quality of this issue.

First few papers in this issue deal with sperm/semen. *Morrell & Rodriguez-Martinez* summarize the recent advances in sperm selection and its application in reproductive biotechnologies, including fractionated semen collection, cryopreservation, biomimetic sperm selection, sperm sex selection, and hyaluronic acid binding selection. *Bansal & Bilaspuri* review the impacts of oxidative stress and reactive oxygen species on sperm/semen function and highlight the emerging concept of utilizing oxidative stress as a tool for contraception. *Rodriguez-Martinez & Wallgren* review the new developments in cryopreservation of boar semen, a species from which the semen is known to be difficult to cryopreserve. Caballero et al. overview the importance of sperm interaction with the male reproductive fluids to acquire the fertilization ability and highlight the role of membranous vesicles (epididymosomes and prostasomes) present in these fluids. The research article by Mollineau et al. presents the results of comparing a number of semen extenders and storage options on sperm motility of agouti, a neotropical edible rodent.

Next few papers in this special issue address the transplantation of gonadal tissue and cells. *Honaramooz & Yang* provide a review of the salient recent research on germ cell transplantation in farm animals with emphasis on examination of ways to increase its efficiency through improved preparation of the recipient testes as well as isolation, purification, preservation, and transgenesis of the donor germ cells. The review paper by Mota et al. highlights those aspects of testis tissue xenografting that need further attention, namely, determinants of its outcome, preservation of the donor tissue, and subsequent ART techniques to produce offspring from the recovered material from grafts. The research paper by *Abbasi & Honaramooz* presents the results of a study aimed at improving the outcome of testis tissue xenografting by comparing the effects of using different numbers of donor tissue fragments to be grafted.

In the next few papers in this issue, oocytes/follicles have been discussed. *Prentice & Anzar* provide a review of the recent advances in cryopreservation of mammalian oocytes as a way to bank ova using slow freezing and vitrification. The research article by Presicce et al. presents the results of a study aimed at investigating the efficiency of *in vitro* embryo production based on the source of oocytes (recovered by ovum pick-up), hormonal stimulation, and utilizing sexed bovine sperm. Andrade et al. present their research results in which they tested the effects of culture media and supplements as well as fragments of cultured tissue on the ultrastructure of ovine primordial follicles.

The last few papers in this issue of the journal relate to a variety of subjects and techniques in reproduction. Monteiro et al. review the factors involved in nuclear reprogramming and discuss *in vitro* manipulations that potentially reduce epigenetic errors and better mimic *in vivo* conditions for preimplantation bovine embryos. The review article by de Sa Fihho et al. summarizes the current hormonal treatment protocols, as well as other approaches, used to optimize the reproductive performance of beef cattle reared under tropical environments. Buranaamnuay et al. provide their research findings on the comparison of two methods of artificial insemination (intrauterine versus deep intrauterine) in sows using frozen-thawed boar semen on fertilization rate and number of embryos. The last paper in this issue is a research article by *Booth & Webb* reporting on the effects of blockage of the vomeronasal organ ducts on serum concentrations of LH in South African does while exposed to bucks (Whitten effect).

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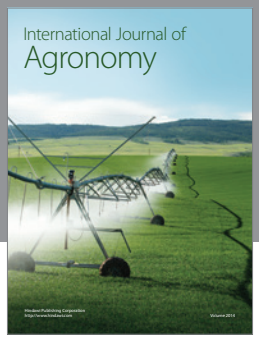

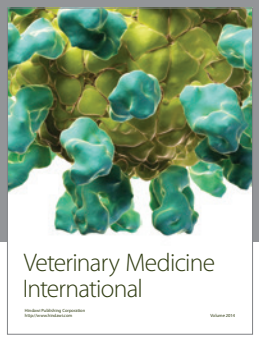

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