More than three decades have passed from the application of assisted reproductive techniques in the treatment of infertility and birth of the first in vitro fertilized baby. Nevertheless, we have witnessed a revolution in infertility research and provision of its treatment services in the past thirty-three years (1).
One of these developments was made possible by the introduction of intracytoplasmic sperm injection (ICSI) in 1993. This method offered treatment of a wide spectrum of infertile men with a very limited number of spermatozoa in the semen or testicular tissue that would not have had other treatment options earlier (2).
Recognition of adult and embryonic stem cells and their applications in biology and medicine, especially in regenerative medicine, is another key area of interest (3).
One of the recent remarkable revolutions is the use of vitrification (ultra-rapid freezing) of gametes and reproductive tissues such as the ovaries for fertility preservation (4). Formerly, slow freezing was performed by means of programmable equipment with survival rates less than 50% for embryos and less than 10% for oocytes as most of the tissues and gametes lost their viability due to the damages during the freeze-thawing process, which in turn limited the success rate of treatment cycles using frozen embryos and gametes.
Vitrification has revolutionized gametes and human fertility preservation, as it offers a post-thawed embryo viability rate of about 100% without fears of reduced quality or cell damage (5).
The first article of the current issue comprehensively addresses the importance of cryopreservation for fertility preservation and explores the drastic changes it has brought about in infertility research and treatment via comparison of slow and ultra rapid methods.
Reproduction, infertility research and treatment procedures face numerous known and unknown challenges with resultant limitations in research and treatment success rates. However, regarding the importance of fertility in human life and the vast ongoing research in this field, we would undoubtedly witness important discoveries in future, such as the possibility to select embryos with a maximum potential for implantation and an increased ART success rate, reduced number of transferred embryos and avoidance of multiple pregnancies (6).
The possibility to select the kind of spermatozoa and ova with high potentials for producing good quality embryos could be another upcoming issue. Regeneration of gametes or reproductive tissues from stem cells or some other resources in sterile patients would be another challenging area in this field (7). Nevertheless, solid research would undoubtedly result in noticeable breakthroughs in the near future.

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