Advancements in assisted reproductive technologies: Enhancing ivf success with genetic screening and cryopreservation.

Enrica Rienzi*

Department of Preventive Medicine and Public Health, University of Granada, Spain

Introduction

Advancements in assisted reproductive technologies (ART) have significantly improved success rates and outcomes for individuals seeking solutions for infertility [1]. Among these, in vitro fertilization (IVF) has benefited greatly from innovations such as genetic screening and cryopreservation, offering enhanced precision and flexibility in treatment [2].

Genetic screening techniques, particularly preimplantation genetic testing (PGT), have revolutionized embryo selection in IVF. PGT allows clinicians to identify embryos with chromosomal abnormalities, reducing the likelihood of implantation failure, miscarriage, and genetic disorders [3]. By selecting genetically normal embryos, PGT increases the chances of successful pregnancy and improves neonatal outcomes [4]. This is particularly beneficial for older patients or those with a history of recurrent pregnancy loss, where chromosomal abnormalities are more common. Advanced technologies like next-generation sequencing (NGS) have further enhanced the accuracy and reliability of genetic screening [5].

Cryopreservation has also transformed IVF practices, providing flexibility in embryo transfer timing and preserving fertility for future use [6]. The development of vitrification, a rapid freezing technique, has significantly improved the survival rates of frozen embryos, oocytes, and sperm. This advancement minimizes cellular damage during freezing and thawing, ensuring high-quality embryos for transfer [7]. Frozen-thawed embryo transfer (FET) cycles have been associated with comparable or even superior pregnancy outcomes compared to fresh transfers, partly due to improved synchronization of the uterine environment [8].

Together, genetic screening and cryopreservation have made IVF more efficient and patient-friendly. They allow for individualized treatment approaches, optimizing success rates while minimizing risks [9]. However, challenges remain, including the cost and accessibility of these technologies, which can limit their availability to certain populations. Future research aims to refine these methods further, making them more affordable and widely applicable [10].

Conclusion

Genetic screening and cryopreservation represent significant advancements in ART, enhancing IVF success and offering hope to individuals struggling with infertility. These technologies continue to shape the future of reproductive medicine.

References

1. Alon I, Guimón J, Urbanos-Garrido R. What to expect from assisted reproductive technologies? Experts' forecasts for the next two decades. Technol. Forecast. Soc. Change. 2019;148:119722.
2. Nawroth F, Rahimi G, Isachenko E, et al. Cryopreservation in assisted reproductive technology: new trends. Semin Reprod Med. 2005;23(04):325-335.
3. Bagchi A, Woods EJ, Critser JK. Cryopreservation and vitrification: recent advances in fertility preservation technologies. Expert Rev Med Devices. 2008;5(3):359-70.
4. Fesahat F, Montazeri F, Hoseini SM. Preimplantation genetic testing in assisted reproduction technology. J Gynecol Obstet Hum Reprod. 2020;49(5):101723.
5. Kumar D, Punetha M, Dua S, et al. Advancement in Reproductive Biotechnologies in Livestock. InGenom. Proteomics Biotechnol. 2022:215-230.
6. Sciorio R, Campos G, Tramontano L, et al. Exploring the effect of cryopreservation in assisted reproductive technology and potential epigenetic risk. Zygote. 2023:1-3.
7. Casciani V, Galliano D, Franasiak JM, et al. Are we approaching automated assisted reproductive technology? Embryo culture, metabolomics, and cryopreservation. F&S Reviews. 2021;2(4):251-64.
8. Pulla BS, Pote V, Dhulkhedkar S. Novel Advancements in Genome Editing Technology to Be Used in In vitro fertilization (IVF). InGreen AI-Powered Intell. Syst. Dis. Progn. 2024:321-344.
9. De Geyter C. Assisted reproductive technology: impact on society and need for surveillance. Best Pract Res Clin Endocrinol Metab. 2019;33(1):3-8.
10. Tesarik J. Assisted reproduction: new challenges and future prospects. Tesarik J, editor. 2019;40:269-86.

***Correspondence to:** Enrica Rienzi, Department of Preventive Medicine and Public Health, University of Granada, Spain. E-mail: enricar@gu.sp.co

Received*:** 25-Oct-2024, Manuscript No. AAGGS-24-155115; ***Editor assigned: 26-Oct-2024, Pre QC No. AAGGS-24-155115(PQ); ***Reviewed*:** 09-Nov-2024, QC No. AAGGS-24-155115; ***Revised:*** 14-Nov-2024, Manuscript No. AAGGS-24-155115(R); ***Published:*** 21-Nov-2024, DOI: 10.35841/aajnnr-8.6.238

Citation: *Rienzi E. Advancements in assisted reproductive technologies: Enhancing ivf success with genetic screening and cryopreservation. Gynecol Reprod Endocrinol.2024;8(6):238*