

Cryopreservation and egg freezing: shaping the future of fertility preservation in assisted reproductive technologies.

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Introduction

Cryopreservation and egg freezing have revolutionized fertility preservation in assisted reproductive technologies (ART), offering women the ability to delay childbearing while maintaining the potential for future pregnancies [1]. This technology allows eggs to be harvested, frozen, and stored for later use, significantly increasing reproductive autonomy and providing options for women who may not be ready for motherhood at a younger age [2].

One of the primary reasons for egg freezing is to preserve fertility in women facing age-related declines in egg quality and quantity [3]. As women age, the quality of their eggs deteriorates, which can reduce their chances of successful conception. Freezing eggs at a younger age, when egg quality is higher, can offer a solution for women who wish to postpone childbearing due to career goals, personal circumstances, or medical conditions such as cancer that may affect fertility [4]. A study published in *Fertility and Sterility* (2014) highlighted those eggs frozen in the younger years yield higher success rates when thawed and used in ART compared to those frozen at older ages [5].

Recent advances in cryopreservation techniques, including vitrification, have dramatically improved the success rates of egg freezing. Vitrification is a rapid freezing process that prevents the formation of ice crystals within the eggs, which can damage cellular structures [6]. This has led to higher survival rates of eggs after thawing and improved outcomes in subsequent fertilization and embryo development [7]. According to a 2018 review in *Human Reproduction Update*, the success rates of pregnancies from frozen eggs are comparable to those from fresh eggs when used in conjunction with ART, although variables such as age at freezing and the number of eggs frozen remain critical factors in determining success [8].

The costs associated with egg freezing can be prohibitive, and there are ethical considerations regarding the long-term storage and potential use of frozen eggs [9]. Moreover, the process does not guarantee success, and the eventual thawing and fertilization of the eggs may not always result in a viable pregnancy [10].

Conclusion

Cryopreservation and egg freezing have opened new avenues

for fertility preservation, providing women with greater reproductive options. As the techniques continue to evolve, they are likely to become even more effective, offering hope for women looking to balance career, health, and family planning.

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