

Reproductive Tissue Biobank – A Minireview

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Abstract

Biobanks of reproductive tissues are essential for drug discovery and disease modeling of reproductive diseases. They represent biobanks that collect, store, and manage biological samples, such as sperm, oocytes, embryos, and reproductive tissues, as well as associated clinical and genetic data. The RTB aims to promote infertility research by providing high-quality biological samples for academic and clinical studies related to genetic disorders and other reproductive health issues. The RTB will: a) Create generation and dissemination of tissue samples and samples from reproductive tissues. b) Comply with ethical and regulatory frameworks for using reproductive tissues in research and treatment. c) Enable the identification of new biomarkers, therapeutic targets, and personalized therapies for reproductive diseases. In this article, we will discuss how and why reproductive tissue biobanks are formed, their relevance, and their increasing importance for advancing reproductive medicine.

Keywords: Biobank, Reproductive Diseases, Reproductive Tissue, Infertility, Personalized Medicine

Introduction

Biobanks are vital collections of biological material (eg. tissues, cells, and fluids) collected for storage and used for research and clinical purposes for an extended period (1).

Reproductive tissue biobanks are designed to collect and preserve reproductive cells (sperm and oocytes) and reproductive tissues (including embryos) along with clinical and genetic information (2). These biobanks are crucial for advancing research into reproductive diseases such as infertility, genetic syndromes, and hormonal diseases (3).

Biobanks of reproductive tissues facilitate research by offering researchers and clinicians access to high-quality biological specimens and data (4). Because of their unique biological similarities, they are handy for studying genetic, hormonal, and environmental factors affecting reproductive health. Biobanks, for instance, can help identify new biomarkers for infertility, facilitate the treatment of reproductive abnormalities in a personalized way, and preserve fertility in patients treated for cancer (3).

However, the establishment of the Reproductive Tissue Biobank (RTB) is a substantial step towards addressing the increasing burden of reproductive diseases. The RTB seeks to establish itself as a regional center of excellence for reproductive research and treatment, utilizing cutting-edge biotechnological methodologies that conform to international standards.

This article discusses the formation, relevance, and utilization of reproductive tissue biobanks, emphasizing their impact on reproductive medicine advancement.

1. Applications of Reproductive Tissue Biobanks

Reproductive tissue biobanks have a wide range of applications in research and clinical practice. Some of the

key applications include:

1.1. Research on Infertility

Infertility affects millions of couples worldwide, and reproductive tissue biobanks provide valuable resources for studying its causes and developing effective treatments (5). By analyzing sperm, oocytes, and embryos, researchers can identify genetic and molecular factors that contribute to infertility (6).

1.2. Fertility Preservation

Reproductive tissue biobanks play a crucial role in fertility preservation for patients undergoing cancer therapy or other treatments that may compromise their reproductive health (7). Cryopreservation of sperm, oocytes, and embryos allows patients to preserve their fertility for future use (8).

1.3. Genetic Disorders

Reproductive tissue biobanks enable the study of genetic disorders that affect reproductive health, such as polycystic ovary syndrome (PCOS), endometriosis, and male factor infertility (9). By analyzing genetic data from reproductive tissues, researchers can identify potential therapeutic targets and develop personalized treatments (10).

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1.4. Development of Novel Therapies

Reproductive tissue biobanks provide a platform for discovering novel biomarkers and therapeutic targets for reproductive diseases (11). For example, researchers can use biobank samples to study the molecular mechanisms underlying reproductive disorders and test new drugs or therapies (4).

2. Reproductive Tissue Biobank (RTB)

2.1. Importance of Establishing the RTB

The establishment of the Reproductive Tissue Biobank (RTB) is a critical step toward addressing the growing burden of reproductive diseases in the country. The RTB will serve as a centralized repository for reproductive tissues and samples, providing researchers and clinicians with access to high-quality biological resources.

2.2. Mission of the RTB

The RTB aims to (a) collect, store, and distribute reproductive tissues and samples for research and clinical use; (b) develop standardized protocols for sample collection, storage, and data management; and (c) promote collaboration between researchers, clinicians, and industry stakeholders to advance reproductive medicine.

2.3. Key Components of the RTB

The RTB will include the following components:

- **Sperm Bank:** For the collection and cryopreservation of sperm samples.
- **Oocyte Bank:** For storing oocytes for fertility preservation and research.
- **Embryo Bank:** For the cryopreservation of embryos for assisted reproductive technologies (ART).
- **Tissue Bank:** For the collection and storage of reproductive tissues, such as ovarian and testicular tissues.

Challenges and Future Directions

Although there are many potential benefits to reproductive tissue biobanks in the context of reproductive medicine, a number of challenges related to ethics, regulation, and advanced biotechnological integration need to be addressed. Resolving these challenges will require partnerships among researchers, clinicians, policymakers, and industry stakeholders. Moving forward, the RTB hopes to enhance its repository of reproductive tissues and samples, create cutting-edge research partnerships, and establish collaborations with biobanks and research institutes worldwide. The RTB is here to help make life better for people worldwide by joining the fight to help with reproductive health and reproductive disease.

Conclusion

The establishment of the Reproductive Tissue Biobank of Iran (RTB) represents a significant advancement in reproductive medicine. By providing researchers and clinicians with access to high-quality

biological resources, the RTB will facilitate the discovery of novel biomarkers, therapeutic targets, and personalized treatments for reproductive diseases. As the RTB continues to grow and evolve, it will play a critical role in improving reproductive health and addressing the growing burden of reproductive diseases in Iran and beyond.

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