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Nota di contenuto	PART I Introduction -- Cryopreservation in global perspectives: Editors' thoughts -- Historical Background on Gamete and Embryo Cryopreservation -- PART II Principles and Models -- Principles of Cryopreservation -- Animal Models for Human Oocyte, Embryo, and Tissue Cryopreservation -- Considerations in Immature Oocyte Cryopreservation -- Antioxidants and Antifreeze Proteins in Cryopreservation/Vitrification -- Devitrification Thresholds and Warming Rates of Reproductive Cells -- PART III Methodology and Management -- Human Sperm Slow-freezing -- Human Sperm Vitrification -- Human Epididymal and Testicular Sperm Cryopreservation -- Human Oocyte Slow-freezing -- Human Embryo (Zygote, Cleaved, Blastocysts) Slow-freezing -- Human Oocyte Vitrification -- Human Embryo Vitrification (zygote/cleavage/blastocyst) -- Human Ovarian Tissue Slow-freezing -- Human Ovarian Tissue Vitrification.-Vitrification: implementation and training -- Establishing a Donor Oocyte Cryo Bank Network: USA Experience -- Establishing a Donor Oocyte Cryo Bank Network: European Experience -- Managing a Sperm Bank: European Experience -- Managing a Sperm Bank: USA Experience -- Managing a central cryo depository -- PART IV Advances in Cryotechnology, Research, and Animal Models -- Artificial Intelligence (AI) and oocyte/embryo

assessment in cryopreservation cycles -- Vitrification: A Reliable Method for Cryopreservation of Animal Embryos -- Cryopreservation Effect on Genetic/Epigenetic Function: Neonatal Outcomes -- Fertility Preservation and Genome Resource Banking for Rare and Endangered Animal Species -- End of Ice Age and the beginning of Space Age: The Freeze drying of human gametes -- PART V Expected outcomes and Quality Control -- Quality control and KPIs in cryopreservation: Aspiring for the best results -- Handling and assessing of human oocytes and blastocysts after vitrification and warming -- Health of offspring following cryopreservation of oocytes and embryos -- Elective and Onco-fertility preservation outcomes after oocyte vitrification -- PART VI Multiple vitrification-warming and biopsy procedures on human Embryos -- Fertility preservation in pre-pubertal girls -- Fertility Preservation in Transgender Patients -- Fertility Preservation in pre-adolescent and adolescent males: Recent Developments and New Insights -- PART VII Guidelines, Regulations and Best Practices -- Setting up a cryopreservation lab and selecting media, disposables and systems for vitrification -- Cryopreservation and storage of reproductive tissues: Good practice guidelines -- Transportation of Frozen Gametes and Embryos- Good Practice Guidelines -- Good practice guideline of ovarian tissue transportation for optimizing fertility outcomes -- Disposition of cryopreserved specimen -- European regulations for Reproductive Tissue banks -- Ethical issues related to cryopreserved reproductive specimen -- Legal liability landscape and the person/property divide -- Challenges on safe keeping cryo stored specimen in time of armed conflict: Live observations from the war zone -- PART VIII Industrial breakthroughs in cryopreservation and cryo-storage -- At home sperm banking kits -- Single sperm cryopreservation for azoospermia management -- Keeping cryopreserved specimen safe: Thermographic Imaging -- Robotic cryostorage solution -- Maximizing Donor Egg Efficiency - Artificial Intelligence & Genetically Certified Oocytes -- Automating Vitrification -- EmbryoOptions -- LN2 Sterilization to avoid cross contamination -- Lab on a chip – Cryopreservation -- PART IX Appendices – Protocols -- Oocyte slow freezing protocol -- Embryo slow freezing protocol (zygote/cleavage/blastocyst) -- Human ovarian tissue slow freezing protocol -- Proper maintenance of dewars/cryo-storage tanks.0 Human Sperm Vitrification -- SOP on maintaining and managing cryopreserved samples and cryo-tanks in an IVF lab.

Sommario/riassunto

Cryopreservation of oocytes, sperm, and ovarian and testicular tissues, as well as embryos, is one of the most critical procedures to preserve the reproductive capacity of individuals. It is an indispensable part of assisted reproductive technologies, as nearly all IVF clinics around the world have embraced the freeze-all embryo strategy with no fresh embryo transfers. Advanced platforms, such as automation and artificial intelligence, are making their way into all aspects of assisted reproductive technologies, including reproductive tissue banking process and storage. At the same time, lax regulations and lack of training combined with rapid demands of IVF services have resulted in a climate of frequent disaster and catastrophic incidents from the cryo labs that store thousands of patients' embryos for years. With the onset of malpractice lawsuits against the clinics and awards of large compensation to the patients, regulations are getting stricter in this arena to safeguard the integrity of storage systems, and industry leaders are developing advanced devices and alarm systems to remotely monitor storage systems exploring the power of internet, AI and automation. Therefore, there is an urgent need for a comprehensive text in this field based on the introduction of such a

wide array of advanced devices, newer technologies, regulatory frameworks, risks and disaster management options. With contributions from top internationally recognized scientists and clinicians with expertise in cryopreservation and reproductive technology, this book provides a comprehensive overview of the basics of cryobiological processes and a technically detailed presentation on all aspects of cryopreservation of reproductive cells and tissues. It presents the current, well-established procedures, as well as novel techniques with the latest innovations described in detail. Bringing together the latest information with key thought leaders in the field, Cryopreservation in Assisted Reproduction is intended to be the go-to resource for all reproductive medicine clinicians, embryologists, lab technologists, IVF lab directors/managers, and researchers. .