DADES GENERALS

Curs acadèmic	
Tipus de curs	Màster de Formació Permanent
Nombre de crèdits	60,00 Crèdits ECTS
Matrícula	6.700 euros (import preu públic)
Requisits d'accés	
Modalitat	On-line
Lloc d'impartició	UV Virtual Classroom
Horari	

Direcció

Organitzador	Facultat de Medicina i Odontologia
Direcció	José Bellver Pradas Profesor/a Titular de Universidad. Departament de Pediatria, Obstetrícia i Ginecologia. Universitat de València Nicolás Garrido Puchalt Director de Fundación Instituto Valenciano de Infertilidad - FIVI

Terminis

Preinscripció al curs	Fins a 27/10/2024
Data inici	Novembre 2024
Data fi	Abril 2026

Més informació

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PROGRAMA

1.1 Anatomy of the female reproductive organs.
1.2 Steroid and protein hormones of the reproductive axis
1.3 Ovarian rejuvenation
1.4 Uterine Factor and Implantation
1.5 Neuroendocrinology of the female reproductive system.
1.6 The menstrual cycle compared to other mammals
1.7 Endocrinology of the testicle and the effect of aging on the male reproductive system
1.8 Effect of age on the male reproductive system
1.9 Analysis of biochemical and ultrasound indicators for the control of the menstrual cycle. Hormonal action on the genital tract
1.10 Other endocrine axes and obesity (GH-IGF, thyroid, adrenal, etc.)
1.11 Effect of aging on the female reproductive system
1.12 The polycystic ovary

2.1 Gametogenesis: Biological relevance of meiosis.
2.2 Oogenesis; From oogonia to MII oocyte. Oogenesis stages
2.3 Oogenesis: Folliculogenesis
2.4 Ovulation induction
2.5 The testicle and the spermatogenesis
2.6 Markers of sperm quality
2.7 Factors affecting sperm quality
2.8 Markers of oocyte quality
2.9 Oocyte quality improvement
2.10 Oocyte in vitro maturation
2.11 In vitro gamete derivation from human embryonic stem cells
2.12 COVID-19 in Assisted Reproduction

3.1 Gamete transport
3.2 Gamete maturation
3.3 Fertilization in Humans
3.4 Gamete immunology
3.5 Fertilization: The role of the glycocalyx in fertilization
3.6 Fertilization: Oocyte molecular changes in response to the fertilizing sperm
3.7 Fertilization: Fertilization genomics
3.8 Uniparental Inheritance: Centrioles
3.9 Uniparental inheritance: Mitochondria
3.10 Fertilization abnormalities. Monopronuclear and Tripronuclear Zygotes
3.11 Fertilization correction mechanisms
3.12 Preimplantation embryo development
3.13 Blastomeric fate: polarization
3.14 Differentiations of cell linages I
3.15 Differentiations of cell linages II
3.16 Gastrulation
3.17 Transcriptomics of the preimplantation embryo development I
3.18 Transcriptomics of the preimplantation embryo development I
3.19 Morphological and functional embryology

4.1 Effect of aging on the female reproductive tract
4.2 Recurrent miscarriage
4.3 Sterility
4.4 Endometriosis
4.5 Uterine and tubal sterility
4.6 Artificial insemination
4.7 In vitro fertilization
4.8 Ovarian and endometrial manipulation
4.9 Fertility preservation for oncological and non-oncological reasons
4.10 Egg Donation
4.11 Ovarian Hyperstimulation Syndrome: Physiopathology, Prevention and Management
4.12 Critical analysis of egg donation
4.13 Medical treatment of endometriosis: New perspectives
4.14 Fundamentals of ultrasound imaging in patients with infertility problems
4.15 Health of children conceived by assisted reproduction techniques
4.16 ART biosurveillance system. SIRHA assisted human reproduction information system
4.17 The importance of the luteal phase in assisted reproduction

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5.1 Basic research in Human Reproduction
5.2 Isolation techniques and study of nucleic acids.
5.3 Isolation and protein study techniques. Protein Identification
5.4 Morphological location Immunohistochemistry Confocal and electronic microscopy. Applications in Reproductive Medicine
5.5 Cell culture. Human endometrial stromal and epithelial cell culture.
5.6 In vivo studies on animal models. Model for endometriosis studies
5.7 Omics as a non-invasive diagnostic tool
5.8 Massive sequencing applied to reproductive medicine
5.9 Mitochondrial DNA, the energy of the preimplantation embryo
5.10 Introduction to statistics I
5.11 Introduction to statistics II
5.12 Introduction to statistics III
5.13 Introduction to research and Good Clinical Practices
5.14 Developing a research project
5.15 Functions and responsibilities of the participants in a clinical trial
5.16 Drug development process
5.17 Classification of research projects
5.18 Use of research results: publication of results
5.19 How to write a manuscript
5.20 Ethics within publications

6.1 Structure of an assisted reproduction unit
6.2 History of assisted reproduction techniques

6.3 Low complexity procedures: artificial insemination and sperm freezing
6.4 Gamete donation
6.5 Diagnostic procedures in the clinical analysis laboratory
6.6 High complexity procedures
6.7 Applied molecular biology techniques
6.8 Research in Assisted Reproduction
6.9 Risk management
6.10 Treatment of sanitary waste
6.11 ISO Management System and Quality Management
6.12 Artificial intelligence in Assisted Reproduction

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7. 1 The testicle and spermatogenesis
7.2 Basic semen analysis. Spermiogram Special situations and additional tests
7.3 Sperm preparation techniques for homologous artificial insemination, indications and outcomes
7.4 Oxidative Stress and its effect on gametes and embryos
7.5 Sperm freezing techniques
7.6 Selection, control and use of sperm donors
7.7 Management and control of the Sperm Bank
7.8 Sperm washing in seropositive males for HIV, hepatitis B and hepatitis C
7.9 Flow cytometry: cell sorting, applications on sperm and sperm separation
7.10 Sperm DNA fragmentation and male fertility
7.11 Methods for an objective selection of competent sperm
7.12 Microarrays technology in sperm diagnosis
7.13 Other molecular markers of sperm quality
7.14 Automated Semen Analysis I
7.15 Automated Semen Analysis II; ISAS

8.1 The clinical embryology laboratory: a cleanroom
8.2 Getting to know laboratory environment
8.3 Environmental contamination and the In Vitro Fertilization laboratory
8.4 The in vitro fertilization (IVF) laboratory: Structure, equipment and maintenance
8.5 Oocyte retrieval, capacitation and sperm retrieval protocols. Conventional insemination
8.6 Sperm selection for ICSI
8.7 Use of testicular sperm in In Vitro Fertilization
8.8 Micromanipulation techniques, assisted fertilization: SUZI, PZD, ICSI and associated techniques
8.9 Evaluation of fertilization. Pronuclear Score and Reproductive Outcomes
8.10 Oocyte dysmorphisms and clinical repercussion
8.11 Standard Embryo Culture: Selection Criteria for Embryos for Transfer and Freezing
8.12 Embryo transfer
8.13 Cryopreservation of oocytes and embryos
8.14 The role of the IVF laboratory in preserving fertility
8.15 Rescue of immature oocytes in In Vitro Fertilization
8.16 Quality management of a clinical embryology laboratory
8.17 Key performance indicators in IVF
8.18 Traceability in the IVF laboratory

9.1 Importance of preconception and preimplantation sexing in animals
9.2 Analysis of the sperm DNA content: bases of the X/Y separation
9.3 Legislation on sex determination
9.4 Molecular and Cellular Bases of sex
9.5 Sexual differentiation in mammals
9.6 Sex determination and differentiation in humans and associated alterations
9.7 Advantages of sexual reproduction
9.8 Clinical relevance of preconception and preimplantation sex selection in humans
9.9 Alternative sexing methods
9.10 Variations in the sex ratio. Effect of external factors
9.11 Sex Reassignment and Assisted Reproduction
9.12 Assisted Reproduction in patients with sexual disorders

10.1 Cell culture
10.2 Culture media
10.3 Types of prolonged culture
10.4 How to obtain blastocyst stage embryos
10.5 Application of coculture to research. History
10.6 Application of coculture to research. New technologies
10. 7 Embryo development: From fertilization to blastocyst

10.8 Correlation between morphology and aneuploidies: from gamete to blastocyst
10.9 The blastocyst: types and morphology

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11. 1 Biophysical Principles of Cell Cryopreservation
11.2 Cryoprotectants: Permeable Agents; Non-Permeable Agents
11.3 Cryopreservation Methods: Slow Freezing
11.4 Cryopreservation Methods: Vitrification
11.5 Oocyte Cryopreservation. History. Main Factors Affecting the Cryopreservation of the Female Gamete
11.6 Vitrification of Oocytes and Embryos in Assisted Reproduction
11.7 Cryo-room: Equipment and Requirements
11.8 Crypreservation Laboratory: Equipment and transfer of samples
11.9 Maintenance of Storage Tanks and Transport Containers
11.10 Cryo-management
11.11 Factors Affecting the Oocyte Vitrification Program
11.12 Subcellular Effects of Vitrification I: Oxidative Stress
11.13 Subcellular Effects of Vitrification II: Epigenetics
11.14 Ovarian Tissue Cryopreservation

12.1 Embryo health: morphological indicators of embryo quality
12.2 Embryo health: introduction to non-morphological indicators of embryo quality
12.3 Embryo health: introduction to non-morphological indicators of embryo quality. Respirometry
12.4 Factors affecting embryo quality. Intrinsic factors: infertility causes
12.5 Factors affecting embryo quality. Intrinsic factors: effect of the spermatozoon
12.6 Factors affecting embryo quality. Intrinsic factors: effect of the oocyte
12.7 Factors affecting embryo quality. Intrinsic factors: effect of progesterone on oocyte quality
12.8 Factors affecting embryo quality. Extrinsic factors: response to ovarian stimulation
12.9 Factors affecting embryo quality. Extrinsic factors: types of ex vivo culture
12.10 Factors affecting embryo quality. Extrinsic factors: effect of humidity during culture on embryo quality
12. 11 Factors affecting embryo quality. Extrinsic factors: effect of oxygen tension on embryo quality and livebirth rate
12.12 Factors affecting the outcomes of vitrified blastocysts. How to improve survival rate and clinical outcome
12.13 Strategies to improve embryo quality: Cytoplasm transfer
12.14 Strategies to improve embryo quality: Nuclear transfer
12. 15 Mitochondrial content during the preimplantation development and its relationship with embryo quality.
12. 16 Strategies to improve embryo quality: Assisted hatching and fragment removal

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Pluripotency and totipotency basic concepts
Telomeric protection and pluripotentiality
Embryonic stem cell
Collection of embryonic stem cells in the blastocyst
13.1 Functional genomics and transcriptional signature of blastomeres, Inner Cell Mass (ICM) and Trophectoderm (TE). In vivo and in vitro transcriptomic pluripotency profiling (stem cells)
13.2 Establishment and Culture of embryonic and trophoblastic stem cells
13.3 Technical aspects of the nuclear transplant
13.4 Dynamics of nuclear reprogramming
13.4 Use of polar bodies in nuclear transplantation
13.5 Technical aspects of transplantation for meiotic use
13.6 Blastomeric splitting as a cloning method without reprogramming
13.7 Primordial germ cells in the adult ovary
13.8 Obtaining oocytes in vitro
13.9 Testicular stem cells
13.10 Obtaining spermatozoa in vitro
13.11 Model embryos: present and future

14.1 Introduction to genetics and medical genomics
14.2 Meiosis, oogenesis and spermatogenesis
14.3 Post-fertilization mitotic divisions, and embryonic mosaicism
14.4 Embryo biopsy: update
14.5 PGT for monogenic disorders and carrier screening
14.6 PGT for chromosome abnormalities and chromosome rearrangements
14.7 The PGT-A controversy
14.8 Future directions for the molecular assessment and diagnosis of embryos
14.9 Genetic counseling in the infertile / sterile couple
14.10 Reproductive Genomics: basics, consortia, databases and genomic datasets
14.11 Techniques for genomic analysis: preliminary, exploratory and functional
14.12 Techniques for systems genomic analysis: network modelling

14.13 Genomic tools of computational prediction and clinical application
14.14 Genetic diagnosis of endometrial factor: controversies
14.15 Analysis of genome variants: prioritization of clinical biomarkers and gene panels in diagnosis
14.16 Systems Reproduction Medicine: the big data era

15.1 Stem cells. Therapeutic possibilities. Regenerative Medicine
15.2 Pluripotent Stem Cells: types and general aspects
15.3 New Technologies in Reproductive Medicine: Organoids and Microfluidics
15.4 Multipotent Cells: Umbilical Cord
15.5 Perinatal stem cells: umbilical cord tissue
15.6 Gamete generation from stem cells: reprogramming and transdifferentiation
15.7 Adult Stem Cells in Human Testicles
15.8 Adult stem cells in Myometrium and Fibroids
15.9 Adult Stem Cells in the Human Endometrium
15.10 Fertility Preservation
15.11 Ovarian Rejuvenation and Stem Cells: Applications and Future Perspectives
15.12 Uterus Transplantation

16. 1Initial Concepts
16.2 Law 14/2006 on Assisted Reproduction Techniques
16.3 Europe
16. 4 Wider Worlds

Elaboration of the Master¿s Degree Final Project.

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