



XIII EDITION. Course 2016-17.
Master Course "Biology and Technology of Reproduction in Mammals".

OPENING DAYS

	MONDAY 19 SEPTEMBER 2016	TUESDAY 20 SEPTEMBER 2016
Morning	<p>10:00 Lecture room -1.2 Veterinary Faculty)</p> <p>Welcome & General Overview (Dr. R Romar)</p> <p>Introduction e Morphology & Function Package (Dr. O López)</p> <p>12:00 Visit to SACE (Dr. M T. Castells)</p>	<p>9:00 Visit to Veterinary Farm (Dr. S Ruiz)</p> <p>12:00 Theory Lecture room</p>
Break		
Afternoon	<p>15:00 Physiology lab Biosecurity information (Dr. A. Sánchez, Dr. S Cánovas)</p> <p>Scientific Bibliography Search (Dr. J Gadea)</p>	

SUBJECT: MORPHOLOGY AND FUNCTION OF THE MALE REPRODUCTIVE ORGANS (Compulsory subject)

Subject coordinated by: Dr. Octavio López Albors

Anatomy	Cellular biology	Physiology	Common tasks	Anat/Cell Biol/Physiol
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Begin: 19th – 30th September
1st WEEK

	MONDAY 19	TUESDAY 20	WEDNESDAY 21	THURSDAY 22	FRIDAY 23
Morning	<p>10:00 Lecture room -1.2 Veterinary Faculty)</p> <p>Welcome & General Overview (Dr. R Romar)</p> <p>Introduction e Morphology & Function Package (Dr. O López)</p> <p>12:00 Visit to SACE (Dr. M T. Castells)</p>	<p>9:00 Visit to Veterinary Farm (Dr. S Ruiz)</p> <p>12:00 Theory Lecture room Anatomy of the pelvis and general patterns of blood and nerve supply to the reproductive organs (Dr. M^a D. Ayala)</p>	<p>9:30-12:00 Practice. Dissection room Comparative anatomy of the pelvis and the male reproductive organs in domestic mammals (dog model). (Drs. M^a D Ayala & G. Ramírez)</p>	<p>10:00 Theory & Practice Cel Biol Med Practice Room Cell Biol Med (hall 2 floor) Comparative sperm morphology (Dr. M Avilés)</p>	<p>9:30 Theory. Lecture room Testicle physiology (Dr. S. Cánovas)</p> <p>12:00 Theory Cel Biol Med Spermiogenesis (Dr. M Avilés) Sperm morphology (Dr. M Avilés)</p>
Break					
Afternoon	<p>15:00 Physiology lab Biosecurity information</p> <p>Scientific Bibliography Search (Dr. J Gadea)</p>	<p>15:30 Theory Lecture room Comparative anatomy of the male reproductive organs in domestic mammals (Dr. M^a D. Ayala)</p>	<p>16:00 Practice Dissection room Dissection of fresh genital organs (ruminants and pig) Testicle and vas deferens vascular injection (Drs. R. Latorre & G. Ramírez)</p>	<p>16:00 Theory. Cel Biol Med Practice Room Testicle I: histology (Dr. JF Madrid)</p> <p>18:00 Theory. Cel Biol Med Practice Room Testicle II: spermatogenesis , sperm ducts and accessory reproductive glands (Dr. JF Madrid)</p>	

	MONDAY 26	TUESDAY 27	WEDNESDAY 28	THURSDAY 29	FRIDAY 30
Morning	8:00 Practice Veterinary farm Ejaculate obtaining in buck (Dr. J Gadea)	9:30 Theory Lecture Room Puberty and sexual behaviour (Dr. J. Gadea).	UNIVERSITY CLOSED FOR OFFICIAL ACADEMIC CEREMONY	9:30 Theory. Lecture room Anatomy of the male reproductive organs (human). Dr. K de Jong)	9:30 Practice Lab Physiol Epididymal fluid obtaining in pig and bull (Dr. S Cánovas)
	11:30 Practice Lab Physiol Analysis of ejaculated samples (Dr. J. Gadea)	11:30 Practice Cel Biol Med Practice Room Electron microscopy of testicle, spermatic ducts and accessory glands) (Dr. M. Jiménez)		11:30 Lecture room Seminars selection (Dr. O. López)	12:30 Info. session Lab physiol - Practicum - TFM (Dr. R. Romar)
Break					
Afternoon	15:30 Practice Cel Biol Med Practice Room Cel Biol Med Testicle and epididymis (light microscopy) (Dra. C.Ferrer y JF Madrid)	15:30 Theory Lecture Room Physiology of the epididymis and reproductive glands (Dra. J Gadea)		15:30 Practice Dissection room Anatomy of the male reproductive organs (human). (Dr. K de Jong)	

SEMINARS

1. Sperm maturation (Dr. M Avilés)
2. Testicle thermoregulation: anatomical and physiological aspects (Drs. O López, J. Gadea)
3. Seminal plasma composition (Dr. S. Cánovas)
4. Erection: anatomy and physiology (Drs. O. López, J Gadea)
5. Ejaculation: anatomy and physiology (Drs. O. López, J Gadea):
6. Regionalization of the sperm membrane (Dr. M Avilés):
7. Hypophysis: comparative anatomy and histology (Drs. O. López, Juan F° Madrid).

PAPER FOR ROUND TABLE DISCUSSION:

Harrison and Weiner, 1949. Vascular patterns of the mammalian testis and their functional significance

SUBJECT: MORPHOLOGY AND FUNCTION OF THE FEMALE REPRODUCTIVE ORGANS(Compulsory subject)

Subject coordinated by: Maria Jimenez Movilla

Anatomy	Cellularbiology	Physiology	Studentswork	Anat/CellBiol/Physiol
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Begin: 3rd October

End: 14th October

First week

	MONDAY 3	TUESDAY 4	WEDNESDAY 5	THURSDAY 6
Morning	<p>09:30 Lecture room</p> <p>General overview of the subject (Dr. M. Jiménez)</p> <p>10:00 Theory. Lecture room</p> <p>Anatomy of the female reproductive system (human). (Dr. K de Jong)</p> <p>12:00 Theor. Lecture room</p> <p>Comparative anatomy of reproductive organs in domestic mammals (Dr R. Latorre.)</p>	<p>10:00 Theory. Lecture room</p> <p>Comparative anatomy of reproductive organs in domestic mammals (Dr. R. Latorre)</p> <p>Comparative anatomy of the mammary glands (Dr. M.D. Ayala)</p>	<p>9:30 Practice. Dissection room</p> <p>Comparative anatomy of reproductive organs in domestic mammals. (Drs. R. Latorre & G.Ramirez)</p>	
	Break			
Afternoon	<p>15:30 Practice. Dissection room</p> <p>Anatomy of the female reproductive system (human). (Dr. De Jong)</p>	<p>16:00 Practice. Dissection room</p> <p>Female reproductive organs in canine (Drs. M^aD Ayala & G. Ramirez)</p>	<p>15:30 Theory. Medicine faculty</p> <p>The ovary histological organization Dr. Manuel Aviles</p> <p>17:00 Theory. Medicine faculty</p> <p>Folliculogenesis, oogenesis and female gamete. Dr. Manuel Aviles</p>	

Second week

	MONDAY 10	TUESDAY 11	WEDNESDAY 12	THURSDAY 13	FRIDAY 14
Morning	<p>9:30 Practice. Faculty of Medicine Microscopic observation of ovary (newborn, Young, menopausal primate, mare) Dra. Concepción Ferrer</p> <p>13:00 Theory. Faculty of Medicine Origin and composition of the zona pellucida Dr. Maria José Izquierdo</p>	<p>9:30 Practice. Faculty of Medicine. Microscopy observation of uterus, oviduct, etc Dr. Juan Francisco Madrid</p> <p>13:00 Theory. Faculty of Medicine Development of the zona pellucida Dr. Maria Jimenez</p>	UNIVERSITY CLOSED	<p>9:30 Theory. Lecture room Physiology of female reproductive system. Dr. P Coy</p> <p>11:30 Estrous cycle in domestic females Dr. R Romar</p>	<p>10.00 Theory Lecture room Menstrual cycle in women. Control of menstrual cycle in women Dra. MT Prieto</p> <p>12:00. Theory Control of estral cycle in domestical animals with special focus in cow. Dr. Dimitrios Rizos</p>
Break					
Afternoon	<p>15:30 Theory. Faculty of Medicine Histological organization of the reproductive tract Dra. Concepción Ferrer</p>	<p>15:30 Practice. Faculty of Medicine. Electron microscopy of the female reproductive organs. Dra. Maria Jimenez SEMINAR SELECTION</p>		<p>15:30 Practice Lab Physiology Oestrus cycle in the bitch. Dr. Sebastian Cánovas</p>	<p>15.30 Practice Lab Physiology Identification of the different phases of the estrous cycle by observing the ovary Dr. R Romar and S. Canovas</p>

SEMINARS

1. Composition of the uterine fluid. P Coy.
2. Functional relationship between the ovarian artery and vein: Anatomy
3. Comparative anatomy of the female tract related to the artificial insemination: Anatomy
4. Gene expression in the vagina: M. Avilés
5. Follicular atresia: M. Jimenez-Movilla
6. The polycystic ovarian syndrome in women: MJ Izquierdo,

7. Clinical cases related with the control of estrous cycle in pets. S. Cánovas
8. Hormonal regulation of the menstrual cycle and its relationship with contraceptives: R.Romar
9. Seasonal reproductive changes in mare and small ruminants. R Romar
10. Differential gene expression in the oocyte and cumulus cells depending of the hormone treatment in human:
M Avilés

PAPER FOR ROUND TABLE DISCUSSION:

Shuai Chen, Ralf Einspanier and Jennifer Schoen. In vitro mimicking of estrous cycle stages in porcine oviduct epithelial cells: Estradiol and progesterone regulate differentiation, gene expression, and cellular function. *Biology of Reproduction* 2013, 89:54, 1-12 (R. Romar)



**MASTER “BIOLOGY AND TECHNOLOGY OF REPRODUCTION IN MAMMALS”.
CLOSING-OPENING CEREMONY FOR 2015/16 – 2016/17.**

Date: 20th October 2016

Place: Graduation Hall, Faculty of Veterinary, University Campus of Espinardo, Murcia, Spain.

Program

9.30h	Welcome. Mrs. Pilar Garrido. <i>General Coordinator of Campus Mare Nostrum.</i> Mr Octavio López. <i>Vicedean fo Academic Organization, Internacionalization and Veterinary Degree students.</i> Mrs Raquel Romar. <i>Master’s program coordinator.</i>
10.00- 11.00h	Farewell to the XII promotion of students (course 2015-16) and awarding diplomas. Mrs. Marina Fernández Rufete Lozoya. <i>MSc. student representative. Course 2015-16.</i> Welcome to the students of the course 2016-17. Mrs. Iris Martínez Rodero. <i>MSc. student representative. Course 2016-17.</i>
11.00h	Coffee
11.30h- 12.30h	Inaugural conference “ <i>Temperature gradients in female reproductive tissues</i> ” by Professor Ronald H. F. Hunter. University of Cambridge, United Kingdom.
12.30h- 13.30h	Conference “ <i>Time lapse systems for human embryo selection</i> ” by Dr. Marta Mollá. IVI clinic. Murcia, Spain.
13.30h	Lunch
15:30h	Conference “ <i>Undertake a business: a career after studying a master</i> ” by Miriam Lencina Guardiola and Maria José Jiménez Ruiz. MSc. Biol Reprod. Murcia. Bioidentity Análisis Genéticos. Elche, Spain.

Supported by:



GAMETES-OVIDUCT INTERACTIONS BEFORE FERTILIZATION (1 week/3 ECTS) (24- 28th October 2016)

Coordinator: Pilar Coy Fuster

Theoretical Sessions: Room -1.3. Library (Veterinary Faculty). Practical Sessions: Department of Veterinary Physiology (1st floor, Faculty of Veterinary).

	MONDAY 24th Oct	TUESDAY 25th Oct	WEDNESDAY 26th Oct	THURSDAY 27th Oct	FRIDAY 28th Oct
Morning	<p>9:00: Theoretical session</p> <p>Presentation. Introduction to the Subject P Coy and R Romar</p> <p>9:30 Theoretical session Generalities of the oviduct. Oviductal fluid composition. R Romar</p> <p>11:30 Oocyte maturation during oviductal transport P Coy</p>	<p>9:00 Practice II. Obtaining and storing oviductal fluid C. Soriano and R Romar</p> <p>12:00 Theoretical session Gene expression of the oviduct and protein composition M. Avilés</p>	<p>9:30 Practice IV. Preparation of oviductal fluid samples for enzymatic assays. R Romar</p> <p>12:00 Theoretical session Interaction spermatozoa- oviduct. Sperm reservoir and capacitation in the oviduct R López-Úbeda.</p>	<p>9:00 Practice III Sperm binding to oviductal epithelial cells. P Coy and S. Cánovas</p>	<p>9:00. Practice VI Assessment of the results of the enzymatic analysis in oviductal fluid R. Romar</p> <p>Discussion of scientific papers S Cánovas R. Romar</p>
Break					
Afternoon	<p>15:30 Practice I. Culture of oviductal epithelial cells. S. Cánovas and R. Romar</p>		<p>16:00 Practice V Changes in zona pellucida digestion mediated by the oviduct P Coy and S. Cánovas</p>	<p>15:30 Room Francisco Moreno (1.1)</p> <p>Quality System in the MSc studies of Veterinary Faculty in Murcia</p>	

- Scientific papers proposed:
- CARRASCO LC, COY P, AVILÉS M, GADEA J, ROMAR R. Glycosidase determination in bovine oviduct fluid at follicular and luteal phases of the estrous cycle. **Reproduction, Fertility and Development** 20 1-10. 2008
- CARRASCO LC, ROMAR R, AVILÉS M, GADEA J, COY P. Determination of glycosidase activity in porcine oviduct fluid at the different phases of the estrous cycle. **Reproduction** 136: 833–842. 2008.

SUBJECT: FERTILIZATION, EMBRYO DEVELOPMENT AND PREGNANCY(Compulsory subject)

From 31 octoberth to 11th November 2016

Subject coordinated by P Coy

Lecture room (theoretical sessions): room number-1.3 (located at ground floor of the library of the Veterinary Faculty).
Lab Veterinary Physiology: Department of Physiology, 1st floor Veterinary Faculty. Dissection room (Veterinary Anatomy).

1st week

	MONDAY31	TUESDAY1	WEDNESDAY2	THURSDAY3	FRIDAY4
Morning			9:00 h. Introduction to the subject P Coy 9:15 Theoretical session <i>Fertilization. Gamete recognition</i> María Jiménez 10:15 h Selection of seminars	9:00 Practice <i>Obtaining of tubal oocytes</i> Lab Histology Department Medical School 2nd floor. M. Avilés	9:00 Practice <i>Obtaining of 2-cell embryos</i> Lab Histology Department Medical School. 2nd floor. M. Avilés
			13:00 h. Theoretical session <i>Fertilization. Acrosomal reaction and sperm penetration</i> MJ Izquierdo	12:00 h Theoretical session <i>Roles of oviductal proteins in mammalian fertilization and embryo development</i> P Coy	12:00 h <i>Implantation and placentation</i> F. Gil
Break					
Afternoon			16:00 h Theoretical session <i>Fertilization. Fusion of gametes and the polyspermy block</i> M.Avilés	16:00 h Theoretical session <i>Early stages of embryonic development (from zygote to blastocyst)</i> F. Gil	

2nd WEEK

	MONDAY 7 Nov	TUESDAY 8 Nov	WEDNESDAY 9	THURSDAY 10	FRIDAY 11
Morning	9:30 h Theoretical session <i>Physiology of pregnancy in domestic animals</i> P Coy Allocation of seminars	9:00 h Practice: Dissection room <i>Comparative anatomy of placentation (I)</i> F. Gil O. López	9:30 h Theoretical session <i>Physiology of lactation in domestic animals</i> S. Cánovas		9:30 Theoretical session <i>Human lactation</i> Veronica Muñoz
	11:00 h Theoretical session <i>Fetus development in humans.</i> MT Prieto				
Break					
Afternoon	16:00 h Theoretical session <i>Physiology of parturition</i> S Cánovas	16:00 h Practice: Dissection room <i>Comparative anatomy of placentation (II)</i> F. Gil G Ramirez R Latorre	16:30 h Theoretical session <i>Lactation in the cow</i> Pablo Larrosa	16:00 h. Theoretical session <i>Embryology of reproductive organs and mammary gland</i> F Gil	

SEMINARIES

1. Sperm competition M Avilés.
2. Species-specific gamete recognition. M. Avilés
3. Teratogens in women. MJ Izquierdo
4. Common malformations in the male reproductive organs. F Gil
5. Common malformations in the female reproductive organs. F Gil
6. Ectopic pregnancy in primates. P Coy
7. Parturition in the mare. R Romar
8. Practical information on lactation in human. R Romar
9. Comparative chronology of fetal development in human and domestic species. P Coy

PAPERS IN DISCUSSION

ZP2 peptide beads select human sperm in vitro, decoy mouse sperm in vivo, and provide reversible contraception. Avella MA, Baibakov BA, Jimenez-Movilla M, Sadusky AB, Dean J. *SciTransl Med.* 2016 Apr 27;8(336):336ra60. doi: 10.1126/scitranslmed.aad9946.

Time table: SPERM FUNCTIONAL ANALYSIS (2016-17)
(november 14-21)

MONDAY 14	TUESDAY 15	WEDNESDAY 16	THURSDAY 17	FRIDAY 18	MONDAY 21
Presentation (Dr. C. Matás) T. Seminal analysis (Dr. V. Luño/C. Matas) P. Routine semen evaluation (Dr. Luño/Matas)	T. Sperm capacitation (Dr. R. López). T. Techniques to evaluate sperm capacitation (Dr. R. López). P. Protein phosphorylation analyzed by IFI and Acrosome reaction (I) (Dr. Lopez/Matas)	T. Introduction to fluorescence techniques (microscopy and flow cytometry) (Dr. Gadea). T. Spermatic tropism (quimiotaxis, termotaxis and rheotaxis) (Dr. Perez-Cerezales). T. Assessment of DNA damage in spermatozoa (Dr. Perez-Cerezales).	T. Prediction of fertility (Dr. Gadea). T. Sperm motility (Dr. C. Soler)	T. Sperm assessment by in vitro techniques (Dr. Gadea) P. Flow Cytometry/ Group A	P. Cytometry/ 9:30 Group B 12:00 Group C CASA 9:00 Group C 10:30 Group D 12.00 Group B
lunch					
15.30 T. Seminal analysis in human (Dr. E. Sellés)	15.30 P. Protein phosphorylation analyzed by IFI and Acrosome reaction (II) (Dr. Lopez/Matas)	15.30 T. Sperm DNA fragmentation. (Florentin Staicu) P. Determination of DNA fragmentation (Staicu/Matas)	15.30 T. Computer assisted sperm analysis (CASA) (Dr. C. Soler)	15.30 P. CASA Group A	15.30 P. Cytometry/Group D

Lessons start at 9.30. The place for theoretical session (T) will be -1.2 room. The place for practice session (P) will be in SACE and physiology lab.

SUBJECT "IN VITRO MATURATION, IN VITRO FERTILIZATION AND EMBRYO CULTURE". 28th November-2ndDecember and 12th-16th December. 2016

Master Course "Biology and Technology of Reproduction in Mammals". 2016-17.

Theoretical Sessions: Room -1.2. Library (Veterinary Faculty). **Practical Sessions:** Department of Veterinary Physiology (1st floor, Faculty of Veterinary).

MONDAY 28 Nov	TUESDAY 29 Nov	WEDNESDAY 30 Nov	THURSDAY 1 Dec	FRIDAY 2 Dec
<p>9.00-9.30h. Subject Presentation. Groups arrangement. <i>R. Romar</i> Five A-groups: 4 students/group Seven B-groups: 3 students/group Three C-groups: 7 students/group</p> <p>9.30-11.00h Lesson 1. Composition and preparation of culture media. <i>S. Cánovas</i></p> <p>11.30h. Practice 1. Groups A1 (11.30h), A2 (12.15h) and A3 (13.00h) Preparation of culture media for manipulation of oocytes. <i>JA. Carvajal and S. Cánovas</i></p>	<p>9.00-10.15h. Lesson 2. In vitro maturation I (IVM): generalities. <i>R. Romar</i></p> <p>10.30-11.45h. Lesson 3. In vitro maturation II (IVM): current status and results in different mammalian species. <i>R. Romar</i></p> <p>12.00-14.30h. Practice 2. (All groups). Obtaining, manipulation and in vitro maturation of pig oocytes. <i>S. Cánovas and C. Soriano</i></p>	<p>9.30-10.45h. Lesson 4. In vitro maturation in humans. <i>G. Arroyo. Dexeus Institute, (Barcelona).</i></p> <p>11.00-12.15h. Lesson 5. IVM results evaluation. <i>R. Romar</i></p> <p>13.00-14.15h. Practice 4. Groups B7 and B6. Microscopic evaluation of immature and mature oocytes. <i>C. Soriano and S. Garcia</i></p>	<p>9.00-10.15h. Lesson 6. In vitro fertilization I (IVF): generalities and current status. <i>C. Matas</i></p> <p>10.30-12.00h. Lesson 7. In vitro fertilization II (IVF): evaluation of results after IVF. <i>C. Matas</i></p> <p>13.00-14.15h. Practice 4 (cont.). Groups B3 and B2. Microscopic evaluation of oocytes (immature and mature) <i>S. García and C. Soriano</i></p>	<p>9.30-10.45h. Practice 5. Group C1. Porcine IVF. <i>C. Matas</i></p> <p>11.00-12.15h. Practice 5 (cont.). Group C2. Porcine IVF. <i>C. Matas</i></p> <p>12.30-13.45h. Practice 5 (cont.). Group C3. Porcine IVF. <i>C. Matas</i></p>
<p>15.00h. Practice 1 (cont.). Groups A4 (15.00h) and A5 (15.45h). Preparation of culture media for manipulation of oocytes. <i>JA. Carvajal and S. Canovas</i></p>	<p>15.30-18.00h. Practice 3. (All groups). Staining and fixing of oocytes. <i>R. Romar and E. Paris</i></p>	<p>15.00-16.15h. Practice 4 (cont.). Groups B5 and B4. Microscopic evaluation of oocytes (immature and mature) <i>C. Soriano and P. Coy</i></p>	<p>15.00-16.15h. Practice 4 (cont.). Group B1. Microscopic evaluation of immature and mature oocytes. <i>R. Romar</i></p>	

SUBJECT "IN VITRO MATURATION, IN VITRO FERTILIZATION AND EMBRYO CULTURE". 28th November-2ndDecember and 12th-16th December. 2016

Master Course "Biology and Technology of Reproduction in Mammals". 2016-17.

Theoretical Sessions: Room -1.2. Library (Veterinary Faculty). **Practical Sessions:** Department of Veterinary Physiology (1st floor, Faculty of Veterinary).

MONDAY 12 Dec	TUESDAY 13 Dec	WEDNESDAY 14 Dec	THURSDAY 15 Dec	FRIDAY 16 Dec
<p>9.30-10.45h. Practice 6. Groups B1 and B2. Microscopic evaluation of zygotes. <i>R. Romar and S. García</i></p> <p>11.00-12.15h. Practice 6 (cont.). Groups B3 and B4. Microscopic evaluation of zygotes. <i>C. Matas and C. Soriano</i></p> <p>12.30-13.45h. Practice 6 (cont.). Groups B5 and B6. Microscopic evaluation of zygotes. <i>P. Coy and E. Paris</i></p>	<p>9.00-10.15h. Lesson 8. Embryo culture (EC I): generalities. <i>V. Maillo (INIA, Madrid)</i></p> <p>10.30-11.45h. Lesson 9. Embryo culture (EC II): problems derived from in vitro culture. <i>V. Maillo (INIA, Madrid)</i></p> <p>12.00-13.15. Lesson 10. Embryo culture and development in humans. <i>V. Hurtado de Mendoza (Caremujer-Quirón, Unidad Reproducción Asistida, Hospital Quirón Sagrado Corazón, Sevilla)</i></p> <p>13.30-14.30h. Lesson 11. Embryo classification in humans. <i>V. Hurtado de Mendoza</i></p>	<p>9.30-10.45h. Lesson 12. Intracytoplasmic sperm injection (ICSI). <i>E. García-Roselló (UCH-CEU Valencia)</i></p> <p>Mock exam. <i>R. Romar</i></p> <p>11.00-12.15h. Practice 8. Group B1. ICSI of pig oocytes. <i>S. Cánovas and E. García-Roselló</i></p> <p>12.30-13.45h. Practice 8 (cont.). Group B2. ICSI of pig oocytes. <i>S. Cánovas and E. García-Roselló</i></p>	<p>9.30-10.45h. Practice 8 (cont.). Group B4. ICSI of pig oocytes. <i>S. Cánovas and E. García-Roselló</i></p> <p>11.00-12.15h. Practice 8 (cont.). Group B5. ICSI of pig oocytes. <i>S. Cánovas and E. García-Roselló</i></p> <p>12.30-13.15h. Practice 8 (cont.). Group B6. ICSI of pig oocytes. <i>S. Cánovas and E. García-Roselló</i></p>	
<p>15.30-16.45h. Practice 6 (cont.). Groups B7. Microscopic evaluation of zygotes. <i>C. Matas</i></p>	<p>16.00-18.00h. Practice 7. All groups. <i>Evaluation of embryo development in pig and cow.</i> <i>V. Maillo, S. García, C. Soriano and R. Romar</i></p>	<p>15.30-16.45h. Practice 8 (cont.). Group B3. ICSI of pig oocytes. <i>S. Cánovas and E. García-Roselló</i></p>	<p>15.30-16.45h. Practice 8 (cont.). Group B7. ICSI of pig oocytes. <i>S. Cánovas-E. García-Roselló</i></p>	

Asignatura: Reproducción Asistida en la Especie Humana.

Coordinadora: Marta Mollá (Marta.Molla@ivi.es)

Curso 2016-2017

Del 30 de enero al 10 de febrero 2017

Las clases tendrán lugar en la Clínica IVI-Murcia (biblioteca)

C/ Navegante Macías del Poyo, 5,
Edificio Delfín, 30007 Murcia

Lunes 30 de enero

13.50 Apertura del curso: Marta Mollá

14.00-16.00 Estudio de la pareja estéril.

Dra. María Nicolás. Ginecóloga. Unidad de Medicina Reproductiva IVI Murcia

16.00-17.00 Factores endocrinos de la infertilidad.

Dra. Marta Arráez Monllor. Médico endocrina. Servicio de Endocrinología y nutrición
H.U. Virgen de La Arrixaca.

Martes 31 de enero

11.00-12.30 Protocolos de estimulación ovárica controlada.

Dra. Martina Trabalón. Ginecóloga. Unidad de Medicina Reproductiva IVI Murcia

12.30-14.00 Programa de donación de ovocitos.

Dra. Laura Fernández Olmedilla. Ginecóloga. Unidad de Medicina Reproductiva IVI
Murcia.

Miércoles 1 de febrero

17.00-18.30 Gonadotoxicidad de los tratamientos oncológicos.

Dr. Jose Luis Alonso. Jefe de servicio de Oncología del Hospital Virgen de la Arrixaca

**18.30-20.00 Preservación de la fertilidad: Estimulación Ovárica en pacientes con
Cáncer hormono dependiente.**

Dr. Jose L. Landeras Gutiérrez. Director Médico IVI Murcia

Jueves 2 Febrero

15.00-16.00 Factor masculino.

Dr. Juan Carlos Martínez Soto. Director Lab de Andrología IVI Murcia.

16.00-17.00 Inseminación artificial.

Dra. Elena Sellés Soriano. Lab de Andrología IVI Alicante.

17.00-18.00 Técnicas de selección espermática.

Dr. Juan Carlos Martínez Soto. Director Lab de Andrología IVI Murcia.

Viernes 3 Febrero

16.00-17.00 Test SCD.

Dra. Lourdes Muriel Ríos. Directora Laboratorio de Fecundación in vitro KINGS COLLEGE Hospital (Londres, U.K.)

17.00 18.00 Salidas profesionales en la U.E.

Dra. Lourdes Muriel Ríos. Directora Laboratorio de Fecundación in vitro KINGS COLLEGE Hospital (Londres, U.K.)

Lunes 6 Febrero

10.00-12.00 Laboratorio de Fecundación in Vitro.

Dra. Beatriz Amorocho Llanos. Supervisora Laboratorio FIV, IVI Murcia.

12.00-13.00 Casos clínicos de los tratamientos de Reproducción Asistida. Inmaculada Campos Ramírez. Directora laboratorio FIV, IVI Almería.

Martes 7 Febrero

15.00-16.00 Criterios morfológicos y no morfológicos de selección de embriones.

Dr. David Gumbao Baño. Embriólogo Clínico, Laboratorio FIV, IVI Murcia

16.00-17.00 Nuevos Sistemas de selección embrionaria.

Julián Marcos. Embriólogo Clínico, Laboratorio FIV, IVI Murcia.

17.00-18.00 Diagnóstico Genético Preimplantacional.

Inmaculada Pérez Cano. Directora Laboratorio FIV, IVI Alicante.

Miércoles 8 Febrero

16.00-17.00 Aspectos Psicológicos de la reproducción asistida.

Marisol Rodenas. Psicóloga, IVI Murcia

17.00-18.00 Nuevas aplicaciones de las técnicas de Fecundación in Vitro Activación ovocitaria mediante ionóforo de calcio, Cultivo embrionario in vivo. Biopsia del corpúsculo Polar.

Marta Mollá Silva. Directora Laboratorio FIV, IVI Murcia

18.00-19.00 Control de calidad en laboratorio de reproducción.

Dra. Beatriz Amorocho Llanos. Supervisora Laboratorio FIV, IVI Murcia.

Viernes 10 Febrero

10.00-11.00 ISO 9001/UNE179007.

Jordán García Ortega. Embriólogo Clínico. Consultor Dirección General Médica.

11.00-12.30 Test de compatibilidad genética.

Dr. Julio Martín Rodríguez. Head of PGD Genomics. IGENOMIX

12.30-14.00 Test Endometriun Receptivity Assay (ERA).

María Ruíz Alonso. Lab Manager. IGENOMIX

15.00-16.00 Disruptores endocrinos.

Dra. Inmaculada Campos Galindo. Biologist. PGD Molecular Cytogenetics. IGENOMIX

16.00-17.30 Asesoramiento genético/reproductivo, aplicaciones en la práctica clínica diaria. Indicaciones para el diagnóstico genético prenatal. Nuevos métodos de análisis genético.

M^a Carmen Martínez Romero. Genetista. Unidad de Biología Molecular HUVA.

SUBJECT "REPRODUCTIVE BIOTECHNOLOGIES AND RECOVERY OF ENDANGERED SPECIES". February 20-24th.

Master Course "Biology and Technology of Reproduction in Mammals". 2016-17.

	Monday 20 Feb	Tuesday 21 Feb	Wednesday 22 Feb	Thursday 23 Feb	Friday 24Feb
10.00-13.30h	<p>Presentation</p> <p>Lesson 1. <i>Current state of the reproductive technologies</i> Dr. Joaquín Gadea Dpto. Fisiología, UMU</p> <p>Lesson 2. <i>Superovulation in equids and applications</i> Dr. Ignacio Giménez Nebot, Rara Avis Biotecnología</p>	<p>Lesson 4. <i>Reproductive biotechnologies in porcine: sex sorted semen and embryo transfer</i> Dr. Francisco García-Vázquez Dpto. Fisiología, UMU</p> <p>Lesson 5. <i>Oestrus synchronization, artificial insemination and embryo transfer in bovine</i> Dra. Susana Astiz, INIA</p>	<p>Lesson 6. <i>Porcine Artificial Insemination centers</i> D. Pedro José Llamas Import –Vet</p> <p>Lesson 7. <i>Artificial insemination in porcine</i> D. Pedro José Llamas Import –Vet</p>	<p>Lesson 8. (8.30h) <i>Artificial ovary and the application in endangered recovery species</i> Dr. Luis Vieira Dpto. Fisiología, UMU</p> <p>Practice 3. (10.00h) <i>Terra natura visit. Handling of wild animals. Reproductive methodologies used in zoos</i></p> <p>Lesson 9. (13.00h) <i>Physiology of reproduction in dolphins and applied biotechnology</i> Dra. María Jesús Sánchez Calabuig, INIA</p>	OPOSICIÓN Prof. CARMEN MATÁS PARRA
14.00-16.00h					
16.00-19.00h	<p>Lesson 3. <i>Artificial insemination and embryo transfer in equids</i> D. Josep Giner Torres</p>	<p>Practice 1. <i>Artificial insemination in bovine</i> Dra. Susana Astiz, INIA Dr. Salvador Ruiz, Dpto. Fisiología, UMU UMU farm (Boots and boilersuit)</p>	<p>Practice 2. <i>Artificial insemination in porcine</i> Dr. Francisco García-Vázquez, Dpto. Fisiología, UMU <i>Granja x confirmar</i> (Boots and boilersuit)</p>	<p>Lesson 10. <i>Interspecies Nuclear Transfer: uses and limitations for recovering endangered species</i> Dr. Sebastián Cánovas, UMU</p> <p>Lesson 11. <i>African Elephant Immuno-contraception</i> Dra. Pilar Coy Dpto. Fisiología, UMU</p>	

CRYOPRESERVATION of GAMETES and EMBRYOS (February 27 - March 3, 2017)

MONDAY February 27	TUESDAY February 28	WEDNESDAY March 1	THURSDAY March 2	FRIDAY March 3
<p><u>Theory (I) (9.30-14.30 h)</u> Introduction. Practice Groups Distribution</p> <p>Basics of Cryobiology Sperm Cryopreservation <i>Salvador Ruiz (UMU)</i></p> <p>Oxidative Stress and Cryopreservation Frozen Semen and Fertility <i>Joaquín Gadea (UMU)</i></p> <p>Master Classroom Veterinary Faculty</p>	<p><u>Practice I (9-11.30 h)</u> <u>G. A:</u> Freezing Boar Semen <u>G. B:</u> Freezing Bovine Semen <u>G. C:</u> Frozen/Thawed Semen Evaluation <i>S. Ruiz, L. Vieira, J. Gadea</i></p> <p><u>Practice II (12-14.30 h)</u> <u>G. B:</u> Boar Semen <u>G. C:</u> Bovine Semen <u>G. A:</u> Semen Evaluation <i>S. Ruiz, L. Vieira, J. Gadea</i></p> <p>Physiology Lab</p>	<p><u>Practice IV (9-11.30 h)</u> <i>(voluntary)</i> Horse semen collection <i>Rodrigo Diego (UMU)</i> <i>Angel Cascales</i> <i>(Mare Farm "La Luna")</i></p> <p>Mare Farm "La Luna" Archena (Murcia)</p> <p><u>Theory III (12-14.30 h)</u> Freezing Horse Semen <i>Jordi Miró</i> <i>(Univ. Autònoma Barcelona)</i></p> <p>Master Classroom Veterinary Faculty</p>	<p><u>Practice VI (9.30-11.30 h)</u> Obtaining Oocytes for Vitrification (Complete Group) <i>Cristina Soriano</i> <i>L. Vieira (UMU)</i></p> <p>Physiology Lab</p> <p><u>Theory IV (12-14 h)</u> Cryopreservation of Gametes and Embryos in Lab Animals. Basics and Applications <i>Gonzalo Moreno Del Val</i> <i>(Instituto Neurociencias Alicante)</i></p> <p>Master Classroom Veterinary Faculty</p>	<p><u>Theory & Practice (II) (9.15-11.30 h)</u> Freezing Human Semen (Complete Group) <i>Juan Carlos Martínez</i> <i>(IVI-Murcia)</i></p> <p>Physiology Lab</p> <p><u>Theory V (12-14 h)</u> Cryopreservation of Pluripotent and Induced Embryonic Stem Cells <i>Sebastián Cánovas</i> <i>(UMU)</i></p> <p>Master Classroom Veterinary Faculty</p>
<p><u>Theory II (16-18 h)</u> Factors affecting Freezing Semen Freezing Protocols <i>Luis Vieira (UMU)</i></p> <p>Master Classroom Veterinary Faculty</p>	<p><u>Practice III (16-18.30 h)</u> <u>G. C:</u> Boar Semen <u>G. A:</u> Bovine Semen <u>G. B:</u> Semen Evaluation <i>S. Ruiz, L. Vieira, J. Gadea</i></p> <p>Physiology Lab</p>	<p><u>Practice V (16.30-19 h)</u> Freezing Horse Semen (Complete Group) <i>J. Miró</i> <i>R. Diego (UMU)</i></p> <p>Physiology Lab</p>	<p><u>Theory & Practice (I) (16-20 h)</u> Vitrification of Oocytes and Embryos (Complete Group) <i>Beatriz Amorocho</i> <i>David Gumbao</i> <i>(IVI-Murcia)</i></p> <p>Physiology Lab</p>	

18 Students (6 Students/Practice Group): **Group A** (6). **Group B** (6). **Group C** (6).

Técnicas en biología celular y molecular aplicadas a la reproducción

HORARIO	Lunes 6 de marzo	Martes 7 de marzo	Miércoles 8 de marzo	Jueves 9 de marzo	Viernes 10 de marzo
9H	8h30 PCR Dr. Juan Carlos Corrales Dr. Christian de la Fe Enfermedades Infecciosas. 2ª planta de la Facultad de Veterinaria.	Técnicas de tratamiento digital de imagen Dra. María Teresa Castells Edificio SACE, aula de investigación (Planta baja tras conserjería)	Microarray, RNAseq y Bioinformática Leopoldo Gonzalez Brusi Departamento Facultad de Medicina Utilización de herramientas informáticas para alineamiento, glicosilación, peso molecular, etc Dra. Maria José Izquierdo Rico Departamento Facultad Medicina,	9h30 Enrica Bianchi 10:15 Teoría Microscopía Confocal Dra. Blanca Algarra Oñate (Karolinska institutet, Estocolmo, Suecia) LAIB 10h30 PRÁCTICAS Inmunocitoquímica a nivel de microscopía confocal Dra. Blanca Algarra Oñate, LAIB	9h30 Enrica Bianchi 10:15 PRÁCTICAS Electroforesis y Western blot Dra. Carla Moros Nicolás, INRA, Tours, Francia LAIB
11 h	DESCANSO	DESCANSO	DESCANSO	DESCANSO	DESCANSO
11h30	PCR Dr. Juan Carlos Corrales Dr. Christian de la Fe	PRÁCTICAS DE ANÁLISIS DE IMAGEN Dra. María Teresa Castells	Inmunocitoquímica a nivel de microscopía electrónica Dr. Manuel Avilés LAIB	PRÁCTICAS Microscopía confocal Dra. Blanca Algarra Oñate, LAIB	11h30-14h00 PRÁCTICAS Electroforesis y Western blot Dra. Carla Moros Nicolás LAIB

13h-14h		13h PROTEÓMICA Dr. Alejandro Torrecillas CAID, UMU, Espinardo			
	COMIDA	COMIDA	COMIDA	COMIDA	COMIDA
16-18 h	TEORÍA MICROSCOPIA ELECTRÓNICA DE TRANSMISIÓN Y DE BARRIDO Dra Concepción Ferrer TÉCNICAS HISTOQUÍMICAS E INMUNOCITOQUÍMICAS Dr. Juan Fco Madrid Facultad de Medicina, Espinardo	LABORATORIO INTEGRADO DE BIOLOGÍA MOLECULAR DEL SACE Dr. César Flores Dra. MJ López.	PRODUCCIÓN DE PROTEÍNAS RECOMBINANTES EN CÉLULAS DE MAMÍFERO Dra. María Jiménez Movilla	Prácticas Cultivos celulares Dra. Blanca Algarra Oñate LAIB	15:30-16:00 Teoría sobre citometría de flujo Dra. Carla Moros Nicolás, LAIB 16:00-19:00 PRÁCTICAS Citometría de flujo Dra. Carla Moros Nicolás (INRA, Tours, Francia) LAIB
18h-20h	PRÁCTICAS Procesamiento muestras de parafina y microscopía electrónica Dr. Manuel Avilés		Contrastar rejillas Ir al Microscopio electrónico para ver rejillas		

.- El alumno debería realizar un portafolios que recoja los diferentes conceptos teóricos y prácticos y aparatos vistos y utilizados.

ASIGNATURA "Transgénesis, terapia génica, clonación y células madre".
Del 13 al 17 de Marzo de 2017.
Master "Biología y tecnología de la reproducción en mamíferos". Curso 2016-17.

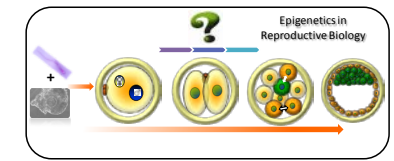
Sesiones teóricas: Clase -1.2, Biblioteca. Facultad Veterinaria.

	LUNES 13 marzo	MARTES 14 marzo	MIÉRCOLES 15 marzo	JUEVES 16 marzo	VIERNES 17 marzo
	<p>9:30 Presentación del curso y guía docente</p> <p>Interés de los animales transgénicos en la agricultura y la medicina.</p> <p>Aspectos éticos y morales de la transgénesis animal</p> <p>Dr. Joaquín Gadea. UM</p>	<p>9:00. Utilización de los espermatozoides como vectores de la transgénesis: SMTG.</p> <p>Dr. Francisco García-Vázquez. UM</p> <p>10:30 Producción de biomateriales. Transgénesis en el gusano de seda</p> <p>Dr. Salvador Aznar. IMIDA</p> <p>12:15. La transgénesis y clonación en animales de laboratorio.</p> <p>Metodología de la transgénesis.</p> <p>Dr. Raúl Fernández González. INIA. Madrid</p>	<p>9:00 Células madre: ¿qué son?, tipos, ¿Cómo se obtienen y cómo se cultivan? Aplicaciones.</p> <p>Dr. Sebastián Cánovas. UM.</p> <p>Uso de células madres mesenquimales.</p> <p>Dr. Juan Antonio Marchal. UGR</p>	<p>9:00. Bases moleculares de la transgénesis. Diseño de transgenes.</p> <p>Uso de endonucleasas de restricción para generar animales transgénicos</p> <p>CRISPR-Cas y su aplicación en animales de granja</p> <p>Dr. Pablo Bermejo-Álvarez INIA Madrid.</p>	<p>Clonación: transferencia nuclear en bovino.</p> <p>Reprogramación celular y transdiferenciación.</p> <p>Dr. Sebastián Cánovas. UM.</p> <p>Preparación del trabajo de revisión</p> <p>Dr. Joaquín Gadea. UM</p>
	<p>15:30. Producción de cerdos transgénicos. Metodología y aplicaciones</p> <p>Dr. Joaquín Gadea. UM</p>	<p>16:00 Técnicas de transgénesis y el bienestar animal</p> <p>Observación microscópica de muestras.</p> <p>Dr. Raúl Fernández González. INIA. Madrid</p>	<p>Células madres tumorales.</p> <p>Dr. Juan Antonio Marchal. UGR</p> <p>Cerdos transgénicos para xenotrasplantes</p> <p>Dr. Guillermo Ramis. UM</p>	<p>Trabajo personal</p>	<p>Trabajo personal</p>

Evaluación: Examen preguntas cortas sobre los conceptos básicos de la asignatura.

Los alumnos en parejas (2 personas) elaborarán un documento de revisión sobre un tema relacionado con la transgénesis animal, clonación, terapia génica o células madre. Este documento tendrá un formato de revista científica que si tiene la calidad suficiente y así se desea podrá ser enviada para su evaluación.
Fecha de entrega documento: lunes 11 de mayo. Presentación: 10 min día del examen
Exámenes..

EPIGENETICS IN REPRODUCTIVE BIOLOGY 27-31th MARCH 2017



	MONDAY 27March	TUESDAY 28March	WEDNESDAY 29March	THURSDAY 30March	FRIDAY 31March
9.30-10.30	Welcome and introduction to the course. “Los nuevos secretos de nuestra herencia” https://www.youtube.com/watch?v=dLKL6qJhPM8	Epigenetic re-programming through the germ cell development and gametogenesis Dr. Sebastian Cánovas	Bisulfite sequencing and SeqMonk tools for BS methylation analysis Dr. Pilar Coy Practical session (ALA Verderón)	DNA methylation profiling in single cells: Challenges and opportunities Dr. Gavin Kelsey (Babraham Institute) Sala de Grados	Discussion of papers Dra. María Jiménez-Movilla Dr. Sebastian Cánovas
11.00-12.30	What is epigenetics? And How can epigenetics be studied? Dr. Ann Van Soon (Univ. Gent)	Impact of Assisted Reproductive Technologies on DNA methylation during preimplantation development Dra. Pilar Coy			11.30: Deciphering the role of maternal methylation in placental development using CRISPR-Cas9 genome editing system Dr. Vicente Perez-García (Babraham Institute) Sala de Grados
12.30-14:00	Selection of paper and seminar works (3). Dra. María Jiménez-Movilla Dr. Sebastian Cánovas	Impact of DNA methylation in human testicular tumors of germinal cells Dr. Sebastian Cánovas	Regulación epigenética de la respuesta inmunitaria durante el desarrollo del pez cebra. Dr. Victor Mulero	Impact of epigenetics in embryonic development Dr. Alfonso Gutierrez Adan (INIA, Madrid) Sala de Grados	
14-15:30	Lunch	Lunch	Lunch	Lunch	
15:30-17:30	Epigenetic mechanisms in early embryo development Dr. Sebastian Cánovas	Analysis of DNA methylation profile in gene promoters Dr. Sebastián Cánovas Practical session (ALA Verderón)		Seminar work. Dra. Jiménez-Movilla	

Evaluación:

1. Examen preguntas tipo test y cortas sobre los conceptos básicos de la asignatura (40%).
2. Presentación y discusión de trabajos (40%). Los alumnos en parejas (2 personas) elaborarán un documento (trabajo dirigido) sobre un tema relacionado con el contenido de la asignatura, entre los propuestos por el profesorado. Además participarán en la discusión de un artículo científico propuesto por el profesorado.
3. Trabajo del estudiante (20%): asistencia, implicación con el grupo y participación

Applications of Ultrasonography in Reproductive Biology (March 20 - 24, 2017)

MONDAY March 20	TUESDAY March 21	WEDNESDAY March 22	THURSDAY March 23	FRIDAY March 24
<p><u>Theory (I) (10 - 13.30 h)</u></p> <p>Introduction</p> <p><i>Dr. Salvador Ruiz (UMU)</i></p> <p>Basics of ultrasounds. Ultrasound reproductive in pigs</p> <p><i>Dr. Juan Carlos Gardón (Univ. Católica Valencia)</i></p> <p>Master Classroom Veterinary Faculty</p>	<p><u>Theory (II) (10 - 13.30 h)</u></p> <p>Ultrasound reproductive in cows.</p> <p>Ultrasound reproductive in small ruminants</p> <p><i>JC Gardón</i></p> <p>Master Classroom Veterinary Faculty</p>	<p><u>Theory (III) (11.30 - 14 h)</u></p> <p>Ultrasound reproductive in mares</p> <p><i>Dr. Jordi Miró (UAB)</i></p> <p>Master Classroom Veterinary Faculty</p>	<p><u>Theory (IV) (10 - 13.30h)</u></p> <p>Revision ecographic images</p> <p><i>S Ruiz</i></p> <p>OPU in cows</p> <p><i>S Ruiz</i></p> <p>Master Classroom Veterinary Faculty</p>	<p><u>Practice (V) (10 - 13.30 h)</u></p> <p>OPU in cows</p> <p><i>S Ruiz</i></p> <p>Veterinary Farm Murcia University</p>
<i>Pause: Lunch</i>				
<p><u>Practice (I) (16 - 18.30 h)</u></p> <p>Equipment. Probes. Female reproductive tracts and testicles by ultrasonography in vitro (samples from slaughterhouse)</p> <p><i>JC Gardón, S Ruiz Rodrigo Diego (UMU)</i></p> <p>Physiology Lab Veterinary Faculty</p>	<p><u>Practice (II) (16 - 18.30 h)</u></p> <p>Ultrasound in cows and goats</p> <p><i>JC Gardón, S Ruiz</i></p> <p>Veterinary Farm Murcia University</p>	<p><u>Practice (III) (15.30-18.30 h)</u></p> <p>Ultrasound in mares</p> <p><i>J. Miró, R. Diego, S Ruiz, Angel Cascales (Mare Farm "La Luna")</i></p> <p>Mare Farm "La Luna" Archena (Murcia)</p>	<p><u>Practice (IV) (16 - 18.30 h)</u></p> <p>Ultrasound in pigs</p> <p><i>Dr. Iván Hernández (Boehringer-Ingelheim)</i></p> <p>Veterinary Farm Murcia University</p>	

Nº students: 5

Scanners: Falco-Vet Esaote. Imago ECM. Practices in farm required that students are equipped with overall and boots.