

SUBJECT: MORPHOLOGY AND FUNCTION OF THE MALE REPRODUCTIVE ORGANS (Compulsory subject, 6 ECTS)

Subject coordinated by: Dr. Octavio López Albors

Anatomy	Cellular biology	Physiology	Common tasks
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Begin: 17th – 28th September
1st WEEK

	MONDAY 17	TUESDAY 18	WEDNESDAY 19	THURSDAY 20	FRIDAY 21
Morning	<p>10:00 Lecture room -1.3 Veterinary Faculty)</p> <p>Welcome & General Overview (Dr. M. Jiménez Dr. R. Romar Dr. O. López)</p> <p>Introduction e Morphology & Function Package (Dr. O López)</p>	<p>9:30-12:00 Practice. Dissection room</p> <p>Comparative anatomy of the pelvis and the male reproductive organs in domestic mammals (dog model). (Drs. M^a D Ayala & G. Ramírez)</p>		<p>11:00 Theory Cel Biol Med</p> <p>Histology & cell biology - Comparative sperm morphology (Dr. M Aviles Dr. Maria José Izquierdo Rico)</p>	<p>9:30 Theory. Lecture room</p> <p>Testicle physiology (Dr. S. Cánovas)</p> <p>12:00 Theory Lecture Room</p> <p>Physiology of the epididymis and reproductive glands (Dra. J Gadea)</p>
Lunch Break					
Afternoon	<p>11:30 Theory Lecture room</p> <p>Anatomy of the pelvis and general patterns of blood and nerve supply to the reproductive organs (Dr. M^a D. Ayala)</p>	<p>12:15 Theory Cel Biol Med Practice Room Cell Biol Med (hall 2 floor)</p> <p>Histology & cell biology: - Spermiogenesis (Dr.M. Aviles) Sperm morphology (Dr.M. Aviles)</p>	<p>16:00 Theory. Cel Biol Med Practice Room</p> <p>Histology & cell biology: - Testicle (Dr JF Madrid)</p>	<p>16::00 Theory. Cel Biol Med Practice Room</p> <p>Histology & cell biology: - Sperm ducts - Accessory Reproductive Glands. (Dr.JF Madrid)</p>	

	MONDAY 24	TUESDAY 25	WEDNESDAY 26	THURSDAY 28	FRIDAY 29
Morning	(off) Opening Day Academic Year	10:00 Practice Veterinary farm Semen recovery in buck (Dr. J Gadea, Dr. LA. Vieira) Practice Lab Physiol Analysis of ejaculated samples (Dr. J. Gadea, Dr. LA. Vieira)	9:30 Theory Lecture Room Puberty and sexual behaviour (Dr. J. Gadea). 12:00 Practice Cel Biol Med Practice Room Electron microscopy of testicle, spermatic ducts and accessory glands (Dr. M. Jiménez)	9:30 Practice Lab Physiol Epididymal fluid obtaining in pig and bull (Dr. S Cánovas) 12:30 Info. session Lab physiol - Practicum - TFM (Dr. R. Romar)	9:30 Theory. Lecture room Anatomy of the male reproductive organs (human). Dr. K de Jong) 11:30 Lecture room Seminars assignement (Dr. O. López)
Break					
Afternoon		15:30 Practice Cel Biol Med Practice Room Cel Biol Med Testicle and epididymis (light microscopy) (Dra. C.Ferrer y JF Madrid)			

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. Hypophysis: comparative anatomy and histology (Drs. O. López, Juan Fº Madrid)
7. Main causes of infertility in males (Dr. P. Ross)
8. Effect of esteroid and other esteroid disruptors in testicle function (Dr. S. Cánovas, P. Ross)

PAPER FOR ROUND TABLE DISCUSSION:

Not available yet

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: 1st October

End: 11th October

First week

	MONDAY 1	TUESDAY 2	WEDNESDAY 3	THURSDAY 4
Morning	<p>09:30 Lecture room. Introduction to the subject. Dr. Maria Jimenez</p> <p>10:00 Theory. Lecture room Anatomy of the male and female reproductive system (human). Dr. K de Jong</p> <p>12:00 Theor. Lecture room Comparative anatomy of reproductive organs in domestic mammals. Dr R. Latorre.</p>	<p>10:00 Theory. Lecture room 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 Comparative anatomy of reproductive organs in domestic mammals. Drs. R. Latorre & G. Ramírez</p> <p>12:00 Theory. Medicine faculty The ovary histological Organization. Dr. Manuel Avilés</p>	<p>9:30 Theory. Medicine faculty Folliculogenesis, oogenesis and female gamete. Dr. Manuel Aviles</p> <p>12:00 Theory. Lecture room Origin and composition of the zona pellucida Dr. Maria José Izquierdo-Rico</p>
Break				
Afternoon	<p>15:30 Practice. Dissection room Anatomy of the female reproductive system (human). Dr. De Jong</p>	<p>16:00 Practice. Dissection room Female reproductive organs in canine Drs. M^ªD Ayala & G. Ramirez</p>		<p>15:30 Practice. Medicine faculty Microscopic observation of ovary (newborn, Young, menopausal primate, mare). Dr. Concepción Ferrer</p>

Second week

	MONDAY 8	TUESDAY 9	WEDNESDAY 10	THURSDAY 11	FRIDAY 12
Morning	<p>9:30 Theory. Medicine faculty Histological organization of the reproductive tract. Dr. Manuel Avilés</p> <p>12:00 Theory. Medicine faculty Development of the Zona Pellucida. Dr. María Jimenez-Movilla</p>	<p>9:30 Theory. Lecture room Physiology of female reproductive system. Dr. P Coy</p> <p>11:30 Theory Estrous cycle in domestic females Dr. R Romar</p>	<p>10.00 Theory Lecture Room Control of estral cycle in domestic animals with special focus in cow. Dr. Dimitrios Rizos</p> <p>12.00 Theory Lecture room Menstrual cycle in women. Control of menstrual cycle in women Dra. MT Prieto</p>	<p>10:00 Practice. Lecture Room Electron microscopy of the female reproductive organs. Dr. María Jimenez-Movilla</p> <p>SEMINAR SELECTION</p> <p>12:00 Theory Lecture room In vitro oocyte generation from embryonic stem cells Dr. Pablo Ross</p>	UNIVERSITY CLOSED
Break					
Afternoon	<p>15:30 Practice. Medicine faculty. Microscopy observation of uterus, oviduct, etc Dr. Juan Francisco Madrid</p>	<p>14:30 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 Drs. R Romar, S. Cánovas and PJ Ross</p>		

SEMINARS

1. Composition of the uterine fluid. P Coy.
2. Functional relationship between the ovarian artery and vein: O. López Albors
3. Comparative anatomy of the female tract related to the artificial insemination: O. López Albors
4. Follicular atresia: M. Jimenez-Movilla
5. The polycystic ovarian syndrome in women: MJ Izquierdo,
7. Hormonal regulation of the menstrual cycle and its relationship with contraceptives: R.Romar
8. Seasonal reproductive changes in mare and small ruminants. R Romar
9. Communications between cumulus cells and oocytes. Pablo Ross

PAPER FOR ROUND TABLE DISCUSSION:

Zou, K (Zou, Kang); Yuan, Z (Yuan, Zhe); Yang, ZJ (Yang, Zhaojuan); Luo, HC; Sun, KJ (Sun, Kejing); Zhou, L (Zhou, Li); Xiang, J (Xiang, Jie); Shi, LJ (Shi, Lingjun); Yu, QS (Yu, Qingsheng); Zhang, Y (Zhang, Yong); Hou, RY (Hou, Ruoyu); Wu, J (Wu, Ji). Production of offspring from a germline stem cell line derived from neonatal ovaries. *Nature Cell Biology* 11, 631-636 (2009). doi: 10.1038/ncb1869

GAMETES-OVIDUCT INTERACTIONS BEFORE FERTILIZATION (1 week/3ECTS) (15-19th October 2018)

Coordinator: Pilar Coy Fuster

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

	MONDAY15th Oct	TUESDAY16th Oct	WEDNESDAY17th Oct	THURSDAY18th Oct	FRIDAY19th Oct
Morning	<p>9:00: Theoretical session 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 S. Cánovas 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>9:30 Practice III Sperm binding to oviductal epithelial cells. P Coy, C Soriano 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>15:00 Practice I. Culture of oviductal epithelial cells. S. Cánovas and R. Romar</p>	<p>15:00 Practice V Changes in zona pellucida digestion mediated by the oviduct P Coy and C. Soriano</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 29thOctoberth to 9thNovember 2018

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

	MONDAY29	TUESDAY30	WEDNESDAY 31	THURSDAY1	FRIDAY2
Morning	9:00 h. Introduction to the subject P. Coy 9:15 Theoretical session <i>Fertilization. Gamete recognition</i> María Jiménez 10:15 h Theoretical session <i>Signaling mechanisms of mammalian oocyte activation</i> Pablo Ross	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	X	X
	12:00 h. Theoretical session <i>Fertilization. Acrosomal reaction and sperm penetration</i> MJ Izquierdo	12:00Theoretical session <i>Selection of seminars</i> María Jiménez	12:00 h Theoretical session <i>Roles of oviductal proteins in mammalian fertilization and embryo development</i> P Coy	X	X
Break					

Afternoon	16:00 h Theoretical session <i>Fertilization. Fusion of gametes and the polyspermy block</i> M.Avilés			X	X
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2nd WEEK

	MONDAY 5 Nov	TUESDAY 6Nov	WEDNESDAY 7	THURSDAY 8	FRIDAY 9
Morning	9:00 h Theoretical sessions <i>Early stages of embryonic development (from zygote to blastocyst)</i> F. Gil	9:30 h Theoretical session <i>Implantation and placentation</i> F. Gil 10:00 Practice: Dissection room <i>Comparative anatomy of placentation (II)</i> F. Gil G Ramirez R Latorre	9:00 h Practice: Dissection room <i>Comparative anatomy of placentation (I)</i> F. Gil O. López	9:30 h. Theoretical session <i>Embryology of reproductive organs and mammary gland</i> F Gil	10:00 Practice: <i>Visit to the Veterinary Farm : cow and goat milking parlors.</i> P. Coy
	12:30. Theoretical session <i>Molecular control of preimplantation embryo development.</i> Pablo Ross	12:00 h Theoretical session <i>Physiology of pregnancy in domestic animals</i> Pilar Coy	12:00 h Theoretical session <i>Fetus development in humans.</i> MT Prieto	12:00 h Theoretical session <i>Physiology of parturition</i> Raquel Romar	
Break					
Afternoon		16:00 h Theoretical session <i>Molecular basis of sperm-egg recognition in mammals: open questions and novel approaches</i> Enrica Bianchi		15:30 Theoretical session <i>Physiology of lactation in domestic animals</i> S. Cánovas 16:30 Theoretical session <i>Human lactation</i> Veronica Muñoz Ricardo García de León	

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. S Cánovas
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. *Sci Transl Med*. 2016 Apr 27;8(336):336ra60. doi: 10.1126/scitranslmed.aad 9946.

Programación curso: **ANÁLISIS DE LA FUNCIONALIDAD ESPERMÁTICA** (curso 2018-19)

LUNES 19	MARTES 20	MIÉRCOLES 21	JUEVES 22	VIERNES 23
Presentación Análisis seminal Dra. V. Luño. (U Zaragoza)	Capacitación espermática Dra. R. López-Ubeda. (U Murcia)	Práctica: Preparación de muestras para IFI Dras. Matas y López- Úbeda	Fundamento de técnicas de evaluación de Dr. Gadea	Fragmentación de ADN Dra. Rosa Roy (U. Autónoma Madrid)
Practica: Contrastación seminal rutinaria Dras. Matás y Luño.	Práctica: Inducción de capacitación y reacción acrosómica. Dras. Matas y López- Úbeda.	Quimiotaxis Dr. S. Pérez-Cerezales (INIA, Madrid)	Sesión práctica por grupos reducidos*: Citometría de flujo, CASA, evaluación técnicas fluorescentes.	Práctica: Determinación de la fragmentación del ADN Dra. Rosa Roy.
COMIDA				
Análisis Seminal en la especie humana Dra. E. Sellés (IVI-Alicante)	Práctica: Inducción de capacitación y reacción acrosómica. Dras. Matas y López- Úbeda	Calidad microbiológica del semen: hacia la excelencia sanitaria Dr. A. Gómez. (U. Cardenal Herrera, Valencia)	Sesión práctica por grupos reducidos*: Citometría de flujo, CASA, evaluación técnicas fluorescentes	

Todos los días se comenzaran las clases a las 9.30h. La teoría se impartirá en el aula **-1.2** y las prácticas en el laboratorio de Fisiología

Sesión práctica en 3 grupos reducidos*: Citometría de flujo, CASA, evaluación técnicas fluorescentes Dra. Matás Dr. LA Vieira Dra. C. Soriano D. S. Navarro Dr. Gadea

Programación curso: **ANALISIS DE LA FUNCIONALIDAD ESPERMATICA** (curso 2018-19)

LUNES 26	MARTES 27	MIERCOLES 28	JUEVES 29	VIERNES 30
	Nuevos sistemas de análisis seminal Dr. Gadea	Casos clínicos de esterilidad relacionados con el gameto masculino. Dr. Martínez Soto. (IVI-Murcia)		Sesión informativa sobre asignaturas optativas.
Valor predictivo del análisis seminal (Dr. Gadea)	Motilidad evaluada por sistema CASA Dr. C. Soler (U. Valencia)	Sesión informativa sobre prácticas		
Ensayos ovocito-espermatozoide Dr. Gadea	Subpoblaciones espermáticas Dr. Soler			

SUBJECT "IN VITRO MATURATION, IN VITRO FERTILIZATION AND EMBRYO CULTURE". 10th-21st December 2018

Master Course "Biology and Technology of Reproduction in Mammals". 2018-19.

Theoretical Sessions: Room -1.2. Library (Veterinary Faculty).

MONDAY 10 Dec	TUESDAY 11 Dec	WEDNESDAY 12 Dec	THURSDAY 13 Dec	FRIDAY 14 Dec
<p>9.30-10.00h. Subject Presentation. Groups arrangement. <i>R. Romar</i> <i>A-groups: 4 students/group</i> <i>B-groups: 3 students/group</i> <i>C-groups: 10 students/group</i></p> <p>10.00-11.15h Lesson 1. Composition and preparation of culture media. <i>S. Cánovas</i></p> <p>11.30-13.00h. Practice 1. Department Physiology Groups A1 (11.30-12.15h), A2 (12.15-13.00h) and A3 (13.00-13.45h). 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. Department of Anatomy. Obtaining, manipulation and in vitro maturation of pig oocytes. <i>R. Romar and C. Soriano</i></p>	<p>9.30-11.00h. Lesson 4. IVM results evaluation (slides). <i>J. Sena</i></p> <p>11.15-13.00h. Lesson 5. In vitro fertilization I (IVF): generalities and current status. <i>C. Matas</i></p>	<p>9.30-11.00h. Practice 4. Group C2. Department of Anatomy. Porcine IVF. <i>C. Matas and E. Paris</i></p> <p>11.30-13.00h. Practice 4 (cont.). Group C1. Department of Anatomy. Porcine IVF. <i>C. Matas and E. Paris</i></p>	<p>9.00-10.30h. Practice 5 (cont.). Groups B7 and B6. Microscopic evaluation of oocytes and zygotes. SACE microscopy service. <i>C. Soriano and S. Cánovas</i></p> <p>10.30-12.00h. Practice 5 (cont.). Groups B5 and B4. Microscopic evaluation of oocytes and zygotes. SACE microscopy service. <i>C. Soriano and E. Paris</i></p> <p>12.00-13.30h. Practice 5 (cont.). Groups B3 and B2. Microscopic evaluation of oocytes and zygotes. SACE microscopy service. <i>R. Romar and E. Paris</i></p>
<p>15.00-17.00h. Practice 1 (cont.). Department Physiology Groups A4 (15.00-15.45h) and A5 (15.45-17.00h). Preparation of culture media for manipulation of oocytes. <i>JA. Carvajal and S. Cánovas</i></p>	<p>15.30-18.00h. Practice 3. All group). Department of Anatomy. Staining and fixing of oocytes. <i>C. Soriano and E. Paris</i></p>	<p>15.30-17.00h. Lesson 6. In vitro fertilization II (IVF): evaluation of results after IVF. <i>C. Matas</i></p>	<p>15.00-16.30h. Practice 5. Group B1. SACE microscopy service. Microscopic evaluation of oocytes and zygotes. <i>R. Romar</i></p>	

SUBJECT "IN VITRO MATURATION, IN VITRO FERTILIZATION AND EMBRYO CULTURE". 10th-21st December 2018

Master Course "Biology and Technology of Reproduction in Mammals". 2018-19.

Theoretical Sessions: Room -1.2. Library (Veterinary Faculty).

MONDAY 17 Dec	TUESDAY 18 Dec	WEDNESDAY 19 Dec	THURSDAY 20 Dec	FRIDAY 21 Dec
<p>9.30-10.45h. Lesson 7. Intracytoplasmic sperm injection (ICSI). <i>FA. García</i></p> <p>11.00-12.15h. Practice 6. Group B7. ICSI of pig oocytes. EmbryoCloud laboratories <i>FA. García</i></p> <p>12.30-13.45h. Practice 6 (cont.). Group B6. ICSI of pig oocytes. EmbryoCloud laboratories <i>FA. García</i></p>	<p>10.00-11.15h. Lesson 8. Embryo culture (EC I): generalities. <i>M. Hamdi (INIA, Madrid)</i></p> <p>11.30-13.00h. Lesson 9. Embryo culture (EC II): problems derived from in vitro culture. <i>M. Hamdi (INIA, Madrid)</i></p>	<p>9.30-11.00h. Lesson 11. Embryo classification in humans. <i>V. Hurtado de Mendoza (ASEBIR)</i></p> <p>11.30-12.30h. Practice 7. <i>Evaluation of embryo development. (video and slides). Room -1.2 Vet library.</i> <i>J. Sena</i></p> <p>13.00-14.00h. Practice 8. <i>Evaluation of embryo development (steromicroscopes). Department of Anatomy.</i> <i>J. Sena and E. Paris.</i></p> <p><i>Journal club (Grullón et al. 2013)</i> <i>R. Romar</i></p>	<p>9.30-10.45h. Practice 6 (cont.). Group B2. EmbryoCloud laboratories ICSI of pig oocytes. <i>FA. García</i></p> <p>11.00-12.15h. Practice 6 (cont). Group B5. EmbryoCloud laboratories ICSI of pig oocytes. <i>FA. García</i></p> <p>12.30-13.15h. Practice 6 (cont.). Group B1. EmbryoCloud laboratories ICSI of pig oocytes. <i>FA. García</i></p>	
	<p>15.30-17.30. Lesson 10. Embryo culture and development in humans. <i>V. Hurtado de Mendoza (ASEBIR)</i></p>	<p>15.30-18.00h. Practice 6 (cont.). Group B3 (15.30-16.45h), Group B4 (16:45-18.00h). EmbryoCloud laboratories. ICSI of pig oocytes. <i>FA. García</i></p>		