

Course Title	Body systems histology and development II			
Course Code	VET-107			
Course Type	Required			
Level	Undergraduate			
Year / Semester	Year 1/ Semester 2 (Spring)			
Teacher's Name	Course Lead: Dr. Sergi Olvera-Maneu Contributor: Dr Georgios Nicolaou			
ECTS	6	Lectures/week	3 or 4	Labs/week 1
Course Purpose and Objectives	<p>The main objectives of the course are:</p> <ol style="list-style-type: none"> 1. To acquire a basic background in histology and to understand the properties of cells and their interactions with one another as components of tissues and organs. 2. To understand how structure and function correlate at the microscopic level. 3. To be able to describe the normal structure and function of various cell types, tissues, and organs, and to differentiate their histological structures from each other through examination. 4. To acquire a basic background knowledge on embryonic development of the various organ systems. 5. To understand how undifferentiated embryonic structures develop into differentiated mature organs. 6. To acquire basic knowledge in some birth defects of various systems of the body. 			
Learning Outcomes	<p>The body systems to be covered are:</p> <ol style="list-style-type: none"> 1. Cardiovascular system 2. Musculoskeletal System 3. Central and Peripheral Nervous Systems 4. Sensory organs (eye & ear) 5. Reproductive system 6. Urinary system 7. Respiratory system 8. Endocrine system <p>The following list provides the learning objectives that will be covered in the lectures, lab practicals and tutorials of each week:</p> <p><u>WEEK 1: GENERAL EMBRYOLOGY</u> Embryology (L1, L2, L3) LOBs covered during lectures:</p> <ol style="list-style-type: none"> 1. Discuss and describe the ectodermal germ layer and its evolution. 2. Discuss and describe the mesodermal germ layer and its evolution. 3. Discuss and describe the endodermal germ layer and its evolution. <p><u>WEEK 2: PLACENTATION</u> Embryology (L4, L5) LOBs covered during lectures:</p> <ol style="list-style-type: none"> 1. Describe the macroscopic and microscopic features of the different types of placentas. 2. Describe the placental circulation and the placental blood barrier. <p><u>WEEK 3: CARDIOVASCULAR SYSTEM</u> Embryology (L6) LOBs covered during lectures:</p> <ol style="list-style-type: none"> 1. Describe the formation of the heart. 2. Describe the formation of the major blood vessels. <p>Histology (L7, L8) LOBs covered during lectures:</p> <ol style="list-style-type: none"> 1. Describe the histology and function of the different layers of the heart. 2. Outline the different microscopic features of arteries and veins. 3. Identify the differences between different types of arteries (from elastic artery to arteriole) and veins (from large vein to venule). 			

Practical 1 (P1)

LOBs covered during practical:

1. Distinguish and describe arteries and veins in a microscopic specimen.
2. Identify and describe the heart tissue features in a microscopy specimen.

WEEK 4: ENDOCRINE SYSTEM

Histology (L9, L10)

LOBs covered during lectures:

1. Describe the major histological features of the pituitary gland, hypothalamus, pineal gland, thyroid, adrenal gland.
2. Outline the three classes of hormones secreted by the endocrine system.
3. Describe the general mechanism of hormone secretion regulation.

Practical 2 (P2)

LOBs covered during practical:

1. Differentiate and describe the features of the pituitary, thyroid, parathyroid, adrenal gland, and endocrine pancreas.

WEEK 5: NERVOUS SYSTEM

Embryology (L11)

LOBs covered during lectures:

1. Describe the development of the nervous system.
2. Briefly describe the development of the spinal cord
3. Outline the stages of the brain development.
4. Outline the stages of the development of the cranial nerves.

Histology (L12, L13)

LOBs covered during lectures:

1. Describe the morphological characteristics and function of all types of neurons.
2. Describe the histological morphology and function of glial cells of the nervous system.
3. Describe the morphological organization of the Central Nervous System.
4. Describe the morphological organization of the Autonomic Nervous System.
5. Describe the morphological organization of the Peripheral Nervous System.

Practical 3 (P3)

LOBs covered during practical:

1. Distinguish and describe different types of neural tissue and cells.

WEEK 6: SESORY ORGANS

Embryology (L14)

LOBs covered during lectures:

1. Outline the stages of the eye and ear development.
2. Describe the development of the internal, middle and external ear.
3. Describe the development of the eye and the optic nerve.
4. Outline the congenital malformations of the eye.
5. Outline the congenital malformations of the ear and hearing loss.

Histology (L15, L16)

LOBs covered during lectures:

1. Describe the microscopic features of the eye.
2. Describe the microscopic features of the ear.

Practical 4 (P4)

LOBs covered during practical:

1. Distinguish and describe different types of cells in the eye and inner ear.

WEEK 7: URINARY SYSTEM

Embryology (L17)

LOBs covered during lectures:

1. Outline and describe the developmental stages of the urinary system.
2. Outline and describe the development of the collecting and the excretory systems.
3. Outline and describe the embryonic development of the bladder and the urethra.

Histology (L18, L19)

LOBs covered during lectures:

1. Identify the different histological structures of the kidney and describe their function.
2. Describe the histophysiological features of the kidney structures.
3. Describe the histological features of the ureter, urinary bladder, and urethra.

Practical 5 (P5)

LOBs covered during practical:

1. Describe and distinguish the morphological features of the kidney structures and relate each to its appropriate function.
2. Describe and distinguish the histological features of the ureter, urinary bladder, and urethra.

WEEK 8: REPRODUCTIVE SYSTEM I

Embryology (L20, L21)

LOBs covered during lectures:

1. Describe the embryonic development of the male reproductive system.
2. Outline the development of the testis and the genital duct.
3. Describe the clinical correlations in male sexual development and the external genitalia.
4. Describe the embryonic development of the female reproductive system.
5. Outline the formation of the ovaries and the vagina.
6. Describe the clinical correlations of the female reproductive system.

Histology (L22, L23)

LOBs covered during lectures:

1. Describe the histophysiological features of the ovaries and the uterine tubes.
2. Describe the histophysiological features of the uterus and vagina.
3. Describe the histological features of the mammary glands.

Practical 6 (P6)

LOBs covered during practical:

1. Recognize and describe the histological features of the ovary, uterine tubes, uterus, and vagina.

WEEK 9: REPRODUCTIVE SYSTEM II

Histology (L24, L25, L26)

LOBs covered during lectures:

1. Describe the phases of the estrus cycle and the cyclical changes that occur to the endometrium in response to hormonal stimuli.
2. Describe the cyclic changes that occur to the canine vulvar epithelium during the estrus cycle and the explain how cytological examination can be used to predict estrus.
3. Describe the histological features of the testes and their ductal system.
4. Describe the histological features of the accessory genital glands and relate the structure to their function.
5. Describe the histological features of the penis.

Practical 7 (P7)

LOBs covered during practical:

1. Describe the histological features of the testis and epididymis.
2. Describe the histological features of the prostate gland.
3. Describe the histological features of the penis and its relationship with other structures (i.e.: urethra, glans, and penile bone)

WEEK 10: RESPIRATORY SYSTEM

Embryology (L27)

LOBs covered during lectures:

1. Describe the formation of the upper and lower respiratory system.

Histology (L28, L29)

LOBs covered during lectures:

1. Describe the histology of the conducting portion of respiratory system (nasal cavity, pharynx, larynx, trachea, bronchi).
2. Discuss the histology of the respiratory portion of the system (intrapulmonary bronchial tree, bronchioles, and alveoli).

Practical 8 (P8)

LOBs covered during practical:

1. Distinguish and describe the trachea, bronchi, and bronchiole in a microscopic specimen.

WEEK 11: MUSCULOSKELETAL SYSTEM

Embryology (L30, L31)

LOBs covered during lectures:

1. Outline the developmental stages of the head and the neck.
2. Outline the development of the structures derived from pharyngeal pouches.
3. Describe the facial development, nasal cavities, and teeth.
4. Describe the facial development abnormalities like facial clefts and cleft palate.
5. Outline the embryonic development of the various types of muscular tissue.
6. Outline the development of skeletal musculature.
7. Outline the developmental stages of the axial skeleton (skull, vertebral column, ribs and sternum)
8. Describe the limb growth and development.

Histology (L32, L33)

LOBs covered during lectures:

1. Describe the major histological features, repair, and renewal of the skeletal muscle tissue.
2. Describe the major histological features, repair, and renewal of the cardiac muscle tissue.
3. Describe the major histological features, repair, and renewal of the smooth muscle tissue.
4. Outline the composition of the Bone Matrix.
5. Describe the function of the cells making up the bone.
6. Describe the different mechanisms of bone formation.

Practical 9 (P9)

LOBs covered during practical:

1. Distinguish and describe skeletal, heart and smooth muscle.
2. Distinguish and describe striated and non-striated muscle.
3. Distinguish and describe the key features of the bones and osteon organization.

WEEK 12: CONSOLIDATION

LOBs covered during lectures:

1. This lecture is dedicated to clarifying any doubts that may have arisen during the course, ensuring a clear and comprehensive understanding for all students.

Practical 10 (P10)

LOBs covered during practical:

1. Observe and describe the developmental early stages of the sea urchin (from fecundation to gastrulation).

Prerequisites	Body systems histology and development I	Required	None
Course content	<p>Lectures:</p> <p>L1: Ectoderm derivates (Dr. Sergi Olvera-Maneu) L2: Mesoderm derivates (Dr. Sergi Olvera-Maneu) L3: Endoderm derivates (Dr. Sergi Olvera-Maneu) L4: Placentation (Dr. Sergi Olvera-Maneu) L5: Placentation (Dr. Sergi Olvera-Maneu) L6: Development of the cardiovascular system (Dr. Sergi Olvera-Maneu) L7: Histology of the cardiovascular system (Dr. Sergi Olvera-Maneu) L8: Histology of the cardiovascular system (Dr. Sergi Olvera-Maneu) L9: Histology of the endocrine system (Dr. Georgios Nikolaou) L10: Histology of the endocrine system (Dr. Georgios Nikolaou) L11: Development of the nervous system (Dr. Sergi Olvera-Maneu) L12: Histology of the nervous system (Dr. Sergi Olvera-Maneu) L13: Histology of the nervous system (Dr. Sergi Olvera-Maneu) L14: Development of the eye & the ear (Dr. Sergi Olvera-Maneu) L15: Histology of the eye (Dr. Sergi Olvera-Maneu) L16: Histology of the ear (Dr. Sergi Olvera-Maneu) L17: Development of the urinary system (Dr. Sergi Olvera-Maneu) L18: Histology of the urinary system (Dr. Sergi Olvera-Maneu) L19: Histology of the urinary system (Dr. Sergi Olvera-Maneu) L20: Development of the female reproductive system (Dr. Sergi Olvera-Maneu) L21: Development of the male reproductive system (Dr. Sergi Olvera-Maneu) L22: Histology of the male reproductive system (Dr. Sergi Olvera-Maneu) L23: Histology of the male reproductive system (Dr. Sergi Olvera-Maneu) L24: Histology of the female reproductive system (Dr. Sergi Olvera-Maneu) L25: Histology of the female reproductive system (Dr. Sergi Olvera-Maneu) L26: Histology of the female reproductive system (Dr. Sergi Olvera-Maneu) L27: Development of the respiratory system (Dr. Sergi Olvera-Maneu) L28: Histology of the respiratory system (Dr. Georgios Nikolaou) L29: Histology of the respiratory system (Dr. Georgios Nikolaou) L30: Development of the head & neck (Dr. Sergi Olvera-Maneu) L31: Development of bone & muscle (Dr. Sergi Olvera-Maneu) L32: Histology of the musculoskeletal system (Dr. Sergi Olvera-Maneu) L33: Histology of the musculoskeletal system (Dr. Sergi Olvera-Maneu) L34: Consolidation (Dr. Sergi Olvera-Maneu) L35: Consolidation (Dr. Sergi Olvera-Maneu)</p> <p>Practicals:</p> <p>P1: Histology of the cardiovascular system (Dr. Sergi Olvera-Maneu) P2: Histology of the endocrine system (Dr. Georgios Nikolaou) P3: Histology of the nervous system (Dr. Sergi Olvera-Maneu) P4: Histology of the eye & the ear (Dr. Sergi Olvera-Maneu) P5: Histology of the urinary system (Dr. Sergi Olvera-Maneu) P6: Histology of the male reproductive system (Dr. Sergi Olvera-Maneu) P7: Histology of the female reproductive system (Dr. Sergi Olvera-Maneu) P8: Histology of the respiratory system (Dr. Georgios Nikolaou) P9: Histology of the musculoskeletal system (Dr. Sergi Olvera-Maneu) P10: Sea urchin development (Dr. Sergi Olvera-Maneu)</p>		
	Teaching Methodology	Lectures, Tutorials, Laboratory Practical Sessions.	
Bibliography	<ol style="list-style-type: none"> Comparative Veterinary Histology AUGHEY Color Atlas of Veterinary Histology BACHA Dellmann's Textbook of Veterinary Histology EU Veterinary Embryology McGeady Wheater's Functional Histology. Burkitt. 		
Assessment	Exam: 60%; Practical exam: 30%; Attendance: 10%		
Language	English		