

## EMBRYOLOGY AND DEVELOPMENTAL BIOLOGY

**Study Programme: MIMV    Curricular Year: 1<sup>st</sup>    Semester: 1<sup>st</sup>    Compulsory    Credits: 4,5 ECTS**

**Lecturer(s):** Fernando José da Silva Garcia e Costa (CCP) e José Ferreira da Silva (R)

### 1. Contact hours:

**Lectures 28    Practicals 28    Total 56**

### 2. Objectives:

Learning of morphological and molecular aspects concerning fertilization, cleavage, gastrulation, neurulation and organogenesis. Learning of cellular and molecular mechanisms of embryonic and fetal development. Introductory notions to the mechanism of some congenital malformations.

### 3. Programme:

Fertilization – morphological and molecular aspects.

Embryogenesis – morphological and molecular aspects of cleavage, gastrulation and neurulation; fate of the ectoderm, mesoderm and endoderm.

Mechanisms of development - differentiation (genome inalterability; restriction, determination and differentiation; regulation of cell diversity and differentiation); patterning; cellular migration; apoptosis; growth.

Organogenesis – serous membranes (body cavities), respiratory system, digestive system, urinary system, genital systems (male and female), pharyngeal arches, endocrine glands, skin and appendages, musculoskeletal system.

### 4. Bibliography:

Sadler, T.W. (2010). *Langman: Embriologia Médica*. 11<sup>a</sup> edição. Editora Guanabara Koogan S.A.

McGeady, T.A. Quinn, P.J., FitzPatrick, E.S. & Ryan, M.T. (2006). *Veterinary Embryology*. Blackwell Publishing, Oxford.

Climent, S., Sarasa, M., Domínguez, L., Muniesa, P. & Terrado, J. (1998). *Manual de Anatomía y Embriología de los Animales Domésticos. Mecanismos do desenvolvimento* (Capítulo 7) Editorial Acribia S.A., Espanha.

Carlson, B.M. (2009). *Human Embryology and Developmental Biology*. 4<sup>a</sup> edição. Mosby-Elsevier – fertilização e segmentação (Capítulos 2 e 3)

### 4. Assessment:

Practical learning will be evaluated by elaboration of three reports during the semester. The mean note of those reports will account for 30% of the final note. If this assessment is not possible or when the mean note is lesser than 10, a practical (oral) exam is performed, which grade will represent 40% of the final grade. Theoretical learning will be evaluated by a written exam, which note will represent 70% or 60% of the final note, according to the mean of practical evaluation.