

# Mouse <sub>vs</sub> Human

## Comparative Morphology

Essentials for accurate interpretation of Precision Medicine models

### INTRODUCTION

Mouse-based studies will be essential for Precision Medicine. This initiative, that will transform the medical practice, envisages more targeted and cost-effective human therapies through the knowledge of individual molecular profiles combined with environmental exposures and lifestyle behaviours. In this context, mouse models offer the opportunity to perform system-level investigations of the effects of genetic variants, environmental exposures, or candidate therapeutic strategies in a way that would be impossible in human studies.

Although human and mouse have similar anatomical complexity, in general, the level of morphological knowledge is lower in mice than in men. Nevertheless, an accurate interpretation of Precision Medicine mouse models requires a considerable degree of knowledge in mouse anatomy, histology, and imaging, as well as their comparison with human.

### COURSE GOALS

The aim of this training course is to capacitate participants for interpreting mouse anatomy, histology and imaging and to provide them the essential knowledge to understand similarities and differences with human.

### DESCRIPTOR

The course will be held in Prague from 3th to 6th September 2018. Lectures will be followed by practical sessions in which participants will dissect specifically the different organs of the mouse body and will work with bone and dissected specimens, radiographs, and images from TEM, micro-CT and MRI, both from mouse and human. For histological practical sessions participants will take tissue samples, fix and process them, and perform a routine Hematoxylin&Eosin stain on paraffin sections. Virtual slides will be interpreted at the end of each histological lecture.

## Lecturers:

- **J. Ruberte.** Full Professor of Veterinary Anatomy  
Head of Mouse Imaging Platform  
Center for Animal Biotechnology and Gene Therapy  
Universitat Autònoma de Barcelona
- **M. Navarro.** Professor of Veterinary Anatomy  
Mouse Imaging Platform  
Center for Animal Biotechnology and Gene Therapy  
Universitat Autònoma de Barcelona
- **J. Prochazka** Head of Bioimaging. Czech Centre for Phenogenomics

## Monday 3th September

- 12-12:30** Welcome address and introductory remarks  
**R. Sedlacek and J. Ruberte**
- 12:30-13:30** General concepts in morphological mouse phenotyping.  
Directional terms and planes of the mouse body  
**J. Ruberte**
- 13:30-15:30** Histological techniques: fixation, processing,  
embedding, sectioning, and routine and special  
staining.  
**J. Ruberte and J. Prochazka**
- 15:30-17** Anatomy of development. Morphology and histology of  
Placenta. Interpretation of virtual slides  
**J. Ruberte**
- 17-18:30** Bone Ontogeny. Skeletal Nomenclature. Histology,  
ultrastructure, and immunohistochemistry of bone  
tissue. Interpretation of virtual slides  
**J. Ruberte**

## Tuesday 4th September

- 9-10:30** Skeleton of thoracic and pelvic limbs. Identification of main anatomical features in isolated bones, X-ray and microCT images  
**M. Navarro**
- 10:30-12** Skeleton of the head and trunk. Identification of main anatomical features in isolated bones, X-ray and microCT images.  
**J. Ruberte**
- Lunch
- 13-14** Arthrology: anatomy and histology of main synovial joints. Interpretation of virtual slides.  
**M. Navarro**
- 14-15:30** Myology: types of muscles, histology, ultrastructure and immunohistochemistry. Interpretation of virtual slides.  
**M. Navarro**
- 15:30-16:30** Anatomy and histology of the heart. Interpretation of virtual slides  
**J. Ruberte**
- 16:30-17:30** Structure of blood and lymphatic vessels. Components of the vascular wall  
**J. Ruberte**
- 17:30-18** Blood and bone marrow: histology and ultrastructure. Interpretation of virtual slides.  
**J. Ruberte**

## Wednesday 5th September

**9-11** Lymphatic system. Anatomy and histology of spleen, thymus and lymphatic nodes. Interpretation of virtual slides. Demonstration of lymphatic nodes by Evan's blue injection

**J. Ruberte**

**11-12.30** Respiratory apparatus: nasal cavities, larynx, trachea and lungs. Anatomy, histology and imaging. Interpretation of virtual slides.

**M. Navarro**

Lunch

**13:30-15** Dissection of the thorax

**M. Navarro and J. Ruberte**

**15-17** Digestive tract: oral cavity, pharynx, esophagus stomach, intestine, liver and pancreas. Anatomy, histology and imaging. Interpretation of virtual slides.

**M. Navarro**

## Thursday 6th September

**9-11** Urinary organs and male and female genital organs. Anatomy, histology and imaging. Interpretation of virtual slides.

**J. Ruberte**

**11-13** Dissection of male and female abdomen and pelvic cavities

**M. Navarro and J Ruberte**

Lunch

**14-16** Anatomy, histology, and ultrastructure of hypophysis, adrenal, thyroid and parathyroid glands. Interpretation of virtual slides.

**M. Navarro**

**16-18** Central nervous system: Development, anatomy and imaging.

**J Ruberte**

### Friday 7th September

**9-11** Histology of specific areas of the central nervous system: spinal cord, cerebellum, neocortex, hippocampus and olfactory bulb. Interpretation of virtual slides.

**J Ruberte**

**11-12:30** Vestibulocochlear organ. Anatomy, histology and imaging. Interpretation of virtual slides.

**M. Navarro**

Lunch

**13:30-15** Eye and related structures: Anatomy, histology and Imaging. Interpretation of virtual slides.

**J. Ruberte**

**15-17** Dissection of the central nervous system, eye and ear

**J. Ruberte and M. Navarro**

**CONCLUDING REMARKS**