

Comparative Pathology Core Unit



Marta Cañamero

Unit Head

Marta Cañamero was born in Madrid and obtained her MD degree from the *Universidad Autónoma de Madrid*. She was awarded her MIR as a Fellow in human pathology at the *Hospital Fundación Jiménez Díaz* in Madrid. Her PhD thesis focused on the characterisation of a lymphoma mouse model induced by gamma radiation.

In 2000 she joined the Nuffield Department at Oxford University (UK) where she carried out the immunophenotypic characterisation of molecules implicated in lymphoma transformation.

Since 2001 Marta has been appointed as a general pathologist in several hospitals of the Spanish National Health System and has set-up the histology laboratory at the School of Veterinary Medicine, *Universidad Alfonso X el Sabio*, Madrid.

In 2006 she joined the CNIO as Head of the Comparative Pathology Core Unit. Her contributions are recognised through co-authorships of several papers with CNIO researchers in journals of scientific prestige.

Summary

Genetically engineered mice (GEM) are considered one of the most useful scientific tools in the study of many diseases. This includes tumoural processes since they develop unique tumour phenotypes, facilitating new structural-functional insight and re-evaluation of current concepts.

Histopathology, with the aid of histochemistry, *in situ* hybridisation, immunohistochemistry and biocomputing tools (such as digital slide analysis software) can help investigators correlate specific alterations in the mouse genome with relevant physiopathological processes and has become paramount in basic and translational biomedical research.

The Unit provides support to CNIO researchers working with animal models to maximise the value of their research, including assistance on the proper handling of samples, a broad range of histopathology and immunohistochemistry techniques, as well as technical advice on the characterisation and interpretation of mouse model phenotypes.

Main Objectives

- Provide state-of-the-art histopathological and immunohistochemical services, develop and implement new strategies as well as increase available antibodies and techniques for mouse paraffin sections
- Give technical advice ranging from mouse model experimental design to histopathological characterisation in order to validate mouse models of human cancer
- Evaluate and implement innovative tools and technologies of potential interest to the CNIO



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Highlights

The Unit offers a full range of histology services, encompassing grossing, processing, tissue microarray (TMA) as well as over 25 specialised stains. Further characterisation is possible through immunohistochemistry (with 237 primary antibodies working on mouse paraffin sections) and TUNEL techniques. We are also setting up different probes for *in situ* hybridisation.

simultaneous comparison of different images, including an on-line teleconsultation which users can access via an intra- or internet setting. Using the AxioVision® module quantification can be done on virtual slides.

The Unit has collaborated with different CNIO groups to characterise diverse mouse models and is also involved in the Cancéropôle and EUMODIC projects leading the Histology and Cancer Work Package and acting as Member of the expert panel of pathologists.

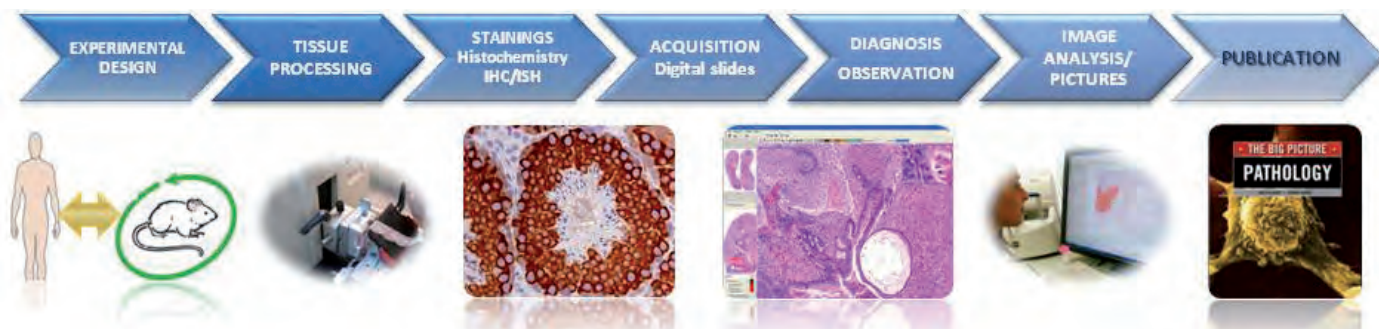


Figure: The Comparative Pathology Core Unit workflow.

To achieve highly reproducible results the Unit has automated equipment (two Discovery XT, Roche® and two Autostainers, DAKO®). A special LIMS application has been developed for the Unit which allows the tracking of samples and helps researchers with a database of the completed or pending laboratory work.

Histology and tissue protocols have been adapted in the fixation and processing methods for tissue specimens from mouse embryos, blastocysts and spheres (embedded in gelatin); specific X-Gal staining in order to study the LacZ (beta-galactosidase) activity; as well as Carnoy and red Carmine whole-mount staining to visualise mammary ductal tree morphology.

Digital technologies are crucial tools in pathology labs which have been incorporated for routine use within our Unit. The Mirax scan (Zeiss®) offers whole-slide images (digital or virtual slides) that can replace conventional microscopy thanks to excellent image quality. The system includes a free and user-friendly software interface that facilitates the

Publications

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