

HISTOPATHOLOGY CORE UNIT

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RESEARCH HIGHLIGHTS

Despite all the difficulties and restrictions imposed by the Covid-19 pandemic, the Unit has maintained the portfolio of services demanded by its users in accordance with the needs of their projects. Particularly during the initial months of the pandemic, the Unit established a system to ensure that the most basic activities were covered, to avoid losing valuable research materials and to guarantee the provision of essential services to the CNIO community. Thus, more than 25,000 paraffin blocks of tissue samples were generated, and ca. 22,000 techniques were performed, including histological and IHC techniques, *in-situ* chromogenic hybridisation, tissue microarrays, slide scanning, etc. These numbers are very close to those recorded in 2019, before the pandemic.

During 2020, the Unit placed a particular focus on optimising and consolidating in its portfolio the *in situ* hybridisation technology branded as RNAScope, using the Ventana-Roche automatic platform for IHC stains. This new technique allows us to efficiently detect specific mRNAs directly on sections from formalin-fixed paraffin-embedded (FFPE) tissues, thus providing a spatial dimension to gene expression analysis. The applications of this new technology are manifold, e.g., as an alternative to IHC whenever it is difficult to find specific antibodies that work well on FFPE tissues, or to validate results from other technologies, among others. This technology has already been used in numerous projects and has proved its value for CNIO researchers.

The high quality of the techniques run by the Unit continues being endorsed by External Quality Assessment Schemes. Thus, our histochemical techniques were evaluated by UK

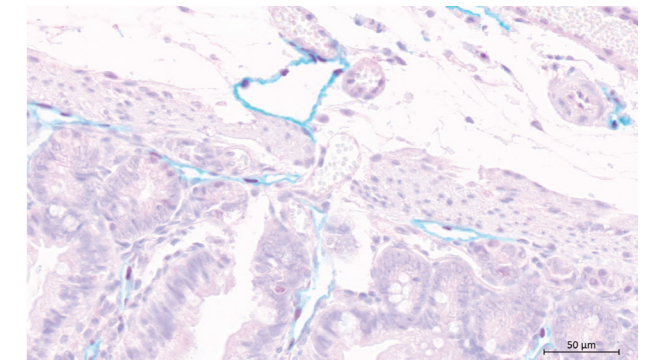


FIGURE Detection of lymphatic vessel endothelium using as markers for dual staining PROX1 (Purple), localising the nuclei, and LYVE1 (Teal, in blue) at the cytoplasm. Blood vessel endothelium (visible at the right edge of the main lymphatic vessel in the figure, with erythrocytes inside) is negative for this dual staining (in collaboration with the CNIO Melanoma Group).

NEQAS. On the other hand, NordiQC and SEAP evaluated a subset of our IHC techniques under different modules, including general markers, breast cancer markers and PD-L1; these all obtained good scores.

Training and outreach activities are also a critical component of the Unit's activities. Although most of the usual activities in this area were compromised due to the pandemic, the Unit was still able to participate in a Master's course on oncological research, providing a practice session on the technologies offered by the Unit. We hope that these activities will resume in full next year. ■

OVERVIEW

Pathology is the branch of science devoted to the study of the structural, biochemical and functional changes in cells, tissues and organs underlying disease. The Histopathology Unit offers support and expertise through a full set of services ranging from paraffin embedding and tissue sections to histochemical stains, research and diagnostic immunohistochemistry (IHC) testing, antibody validation, *in situ* hybridisation techniques (including *in situ* detection of mRNAs by RNAScope), as well as the generation of tissue microarrays. Furthermore, the Unit offers other value-added services assisted by a team of highly specialised technicians, such as laser-capture microdissection; slide digitalisation; image analysis; and quantification. The Unit collaborates with CNIO researchers in the histopathological characterisation of animal models of disease, providing them with the required pathology expertise. Also, the Unit offers its portfolio of services to other institutions, including hospitals, research centres and private companies.

“Despite the difficult situation generated by the Covid-19 pandemic, the Unit was able to adapt its workflows and procedures to meet the needs and demands of our customers.”

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