MONOCLONAL ANTIBODIES CORE UNIT

Giovanna Roncador
Core Unit Head

Technicians
Álvaro García, Scherezade Jiménez-Villa, Lorena Maestre (TS)*, Ana I. Reyes

Titulado Superior (Advanced Degree)

OVERVIEW

Since the discovery of hybridoma technology by Caesar Milstein and Georges Köhler in 1975, monoclonal antibodies (mAbs) have become one of the most relevant methodological advances in biomedicine.

MAbs have provided researchers with the ability to study biological processes reliably and with unprecedented accuracy, improving our knowledge about the processes involved in tumour generation and development. Beyond their applications in the laboratory as research tools, mAbs are also used in the area of diagnostics, and serve as therapeutic agents in the treatment of cancer.

The Monoclonal Antibodies Unit provides CNIO Research Groups with *à la carte* generation of mAbs using hybridoma technology. We are highly specialised in the production of mouse and rat monoclonal antibodies. The Unit also offers mAb characterisation and validation, medium-scale mAb production, as well as a *Mycoplasma* testing service for the cell culture facility.

"The Monoclonal Antibodies Unit is highly specialised in mAbs production and characterisation, providing CNIO researchers with reliable and well-validated reagents that represent an added value for their research projects."

Student in Practice
Davide Mazzeo (March-June)
(*Università degli Studi di Pavia*, Pavia, Italy)

RESEARCH HIGHLIGHTS

During the last 21 years, the Monoclonal Antibodies Unit has generated a large number of mAbs, directed against more than 170 different antigens, mostly targeting molecules for which mAbs are not commercially available. Many of those mAbs have been licensed to external companies, generating royalties that represent an important source of revenue for the CNIO.

Each year, we prepare and update a detailed CNIO mAbs catalogue, which contains the datasheets of more than 100 thoroughly validated, high-quality mAbs (accessible at http://www.cnio.es/ing/servicios/anticuerpos/default.aspx). This catalogue is offered to specialised companies looking for licensing opportunities.

Research activities

CD229 (LY9). In collaboration with Professor Pablo Engel, from Barcelona University, we produced and characterised a new mAb against the cytoplasmic region of CD229 (Ly9) protein. CD229 is a homophilic receptor that belongs to the SLAM family of cell-surface molecules and acts as a signalling molecule, regulating lymphocyte homoeostasis and activation. In our study we investigated the expression of CD229 in normal tissues and B cell malignancies using tissue microarrays. We found CD229 to be restricted to haematopoietic cells, and it is strongly expressed in all cases of myeloma and splenic marginal zone lymphomas. CD229 represents a new biomarker of B cell malignancies, especially in myeloma.

Optimised panel of mAbs for the detection of lymphocyte subpopulations in animal species. Immunohistochemistry (IHC) has proved to be one of the most important ancillary techniques in the characterisation of neoplastic diseases in humans and, because oncologists demand such diagnostic specificity, it has become equally important in veterinary medicine. The number of immunohistochemical tests offered by veterinary diagnostic laboratories has increased exponentially over the last decade, but the use of this technique has been hampered by the lack of specific mAbs able to work across animal species.

For this reason, in collaboration with the Madrid Zoo, with several departments of veterinary sciences, and with the CNIO Histopathology Unit, we tested more than 100 mAbs in several domestic and wild animal species, generating an extended panel of mAbs able to detect and discriminate different lymphoid subpopulations by IHC. Our study will serve to facilitate further research needed to define the role played by lymphocyte subpopulations in immunological diseases and cancer in animal species. ■

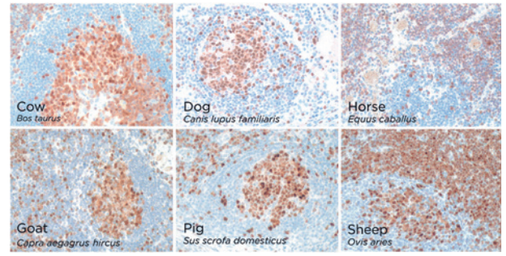

FIGURE Immuno-histochemical staining of TOX mAb in paraffin sections from lymph nodes of domestic animal species.

PUBLICATIONS

- Carreras J *et al.* (incl. Roncador G)(2021). High PTX3 expression is associated with a poor prognosis in diffuse large B-cell lymphoma. *Cancer Sci* 113, 334-348.
- Carreras J *et al.* (incl. Roncador G) (2021). Artificial neural networks predicted the overall survival and molecular subtypes of diffuse large B-cell lymphoma using a pancancer immune-oncology panel. *Cancers (Basel)* 13, 6384.
- Monteagudo M, Martínez P, Leandro-García LJ, Martínez-Montes ÁM, Calsina B, Pulgarín-Alfaro M, Díaz-Talavera A, Mellid S, Letón R, Gil E, Pérez-Martínez M, Megías D, Torres-Ruiz R, Rodriguez-Perales S, González P, Caleiras E, Jiménez-Villa S, Roncador G, Álvarez-Escolá C, Regojo RM, Calatayud M, Guadalix S, Currás-Freixes M, Rapizzi E, Canu L, Nölting S, Remde H, Fassnacht M, Bechmann N, Eisenhofer G, Mannelli M, Beuschlein F, Quinkler M, Rodríguez-Antona C, Cascón A, Blasco MA, Monteiro-Conde C, Robledo M (2021). Analysis of telomere maintenance related genes reveals NOP10 as a new metastatic-risk marker in pheochromocytoma/paraganglioma. Cancers (Basel) 13, 4758.

PATENT

- Paz-Ares L, Martinez Torrecuadrada JL, Roncador G, Ojeda L, Ferrer I (2020). Interleukin 11 receptor alpha subunit (IL-11RA) neutralizing antibodies and uses thereof. *PCT/EP2021/069630*. PCT application (2021).