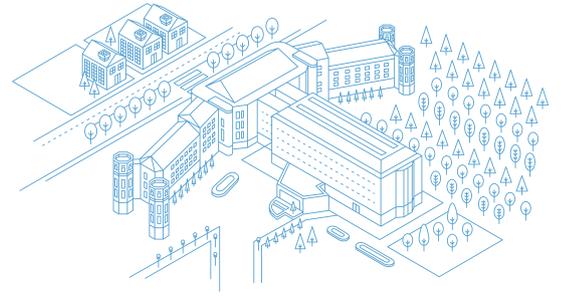


# CNIO FRIENDS

## newsletter

Latest news from the Spanish National Cancer Research Centre



### COLUMN

### CNIO SCIENCE NEWS

## Don't stop research

World Cancer Research Day is recognised on 25th September each year. This day reminds us that research is the only path to cure this disease. There have been huge advances over the past 50 years, but we still don't have effective treatments for 50% of the tumours, including for processes such as metastasis. This indicates the importance of ongoing research for the future of medicine.

This year, we celebrated this day with the participation of Elizabeth Blackburn, Nobel Prize winner in Medicine, Laura García Estévez, Director of the Breast Tumours section at MD Anderson Cancer Center, María José Alonso, Professor of Pharmacy and Pharmaceutical Technology at Santiago de Compostela University, and Luz Casal, musician, singer, author, composer and former cancer patient. We would like to thank all of them for contributing to the success of this event, as well as our co-organisers *Compromiso Atresmedia* and *Constantes y Vitales, laSexta* and the AXA Foundation corporate responsibility campaign.

Since we launched the Postdoctoral Contract 'CNIO Friends' Programme in January 2016, seven researchers have joined our Centre. They have been able to receive specialised training at a state-of-the-art centre, and we have incorporated new international talent, ideas and points of view. This year, we still have open positions for three new researchers, who will be able to enhance their knowledge about cancer with us for a period of two years. All of this is thanks to your valuable contributions.

—MARIA A. BLASCO  
Director

The CNIO Cell Division and Cancer Group, led by Marcos Malumbres, has discovered that mutations in the MASTL protein cause an inheritable type of thrombocytopenia. Furthermore, the finding may have implications in combating cancer metastasis.

To date, it is known that MASTL plays a role in the regulation of cell division, but not much more is known about it.

In 2003, an American research team identified a group of patients with inherited thrombocytopenia carrying a mutation in the gene coding for this protein.

Thrombocytopenia is a condition characterised by a low blood platelet count, which leads patients to

suffer from uncontrolled bleeding that may give rise to haematomas and haemorrhages.

CNIO researchers have discovered that mutation in MASTL causes defects in the cytoskeleton, the structure that gives shape to the cells and conditions their mobility and grouping capacity, and which, in the case of platelets, is essential to form the thrombi that protect against bleeding.

However, the finding may also be used in metastatic cancer research, as the cytoskeleton also determines cell properties related to migration and invasion.

The findings have been published in the *Journal of Clinical Investigation* (1).

### OUR CENTRE



Extracting DNA from a tomato. /CNIO

On 28th September, the CNIO once again opened its doors, like every year, to welcome participants in the European Researcher's Night.

In this ninth edition, we broke two records: firstly, the event was fully booked in less than an hour; and secondly, we far surpassed the number of researchers who signed up to meet the participants – 64 scientists, from pre-doctoral

students to heads of units – confirming our commitment to science dissemination and fostering scientific culture as part of our core values.

For one evening and night, children, teenagers and adults discovered our centre, carried out an experiment with products that are available to all and took part in a 'speed-dating' activity with our scientists.

On 21st October, 'The Tree of Life' group, from Pedroñeras (Cuenca), held its 3rd Cancer Charity Race, in which almost 3,000 people participated. Part of the funds raised in the charity run, jumble sales and auction will support cancer research carried out at the CNIO. We would like to thank them for thinking about us in each edition. Thanks to you, we continue to increase our knowledge of the disease.



## “We are analysing the therapeutic value of proteins that control cell division in breast cancer”

On 19th October, we commemorated World Breast Cancer Day. Marcos Malumbres, Head of the Cell Division and Cancer Group, told us about his team’s research and its application for the treatment of this disease.

### Your studies into the role of CDK proteins in tumours have helped to make better drugs to treat this type of cancer.

Our group focuses on deciphering the mechanisms by which cell division and cell proliferation are regulated, and it has been known for more than three decades that the CDK proteins control these mechanisms. However, many of these studies were conducted in yeast, flies or cultured cells, and it was difficult to generate data that could be translated to benefit patients. Through the study of genetically modified mice, we are trying to understand the role that these proteins play in cell proliferation, tissue maintenance and tumour development. Moreover, all our cells contain various CDKs and we need to know which one is important in each tissue or in each tumour using a mammalian model. These studies have helped to define which CDK may be a good therapeutic target and in which types of tumours it may be beneficial for patients to inhibit, or in other words, block their function. Fortunately, the first inhibitors of two members of this family, CDK4 and CDK6, were approved in 2015 for the treatment of metastatic breast cancer.

### What role has your group played in the development of therapies for metastatic breast cancer?

We are currently trying to understand why patients respond or not to CDK4 and CDK6 inhibitors. In the clinic, there are patients who do not respond to these therapies and others who are responding, but eventually, their tumours become resistant. We are studying how to select those who can benefit from



**Marcos Malumbres**  
Head, Cell Division  
and Cancer Group

Photo: CNIO

these therapies and we are trying to predict which therapeutic combinations may work in patients in which inhibiting CDK4 and CDK6 is not sufficient. Furthermore, we are analysing the possible therapeutic value of new proteins that control cell division in breast cancer, in such a way that we can propose the use of inhibitors against these proteins in the future.

### Where is the future of research into this type of cancer headed?

Breast cancer groups together various pathologies with different characteristics. The global medical cure rate is relatively high compared to other types of tumours, but there are two main problems. First of all, there is a group of tumours characterised by the lack of hormonal markers (markers that are routinely analysed during diagnosis) for which there are no new treatments and traditional chemotherapy is still not very efficient. Secondly, breast cancer is hard to treat when it becomes metastatic, or in other words, when it invades other tissues. In both cases, current therapies are not very effective yet. Research into these types of negative tumours for hormonal receptors and in metastasis is the great challenge for the future.

## PROFILE



Photo: Rafael Bravo/Atresmedia

### Elizabeth Blackburn

Elizabeth Blackburn was born in Tasmania, Australia, in 1948. She studied biochemistry at Melbourne University and obtained her PhD from Cambridge University, United Kingdom. She later moved to the United States, where she worked at Yale University and the University of California

in San Francisco. The latter is where she spent most of her career. In 2016, she was appointed President of the prestigious Salk Institute for Biological Sciences.

In 1982, Blackburn and Jack Szostak proved that the telomeres (the ‘caps’ that protect the ends of the chromosomes and determine the lifespan of the cells) did not break down cell multiplication in some organisms, and foresaw the existence of an enzyme that should extend them.

Two years later, Blackburn discovered this enzyme, telomerase, along with Carol Greider.

In 2009, they were both awarded the Nobel Prize for Physiology or Medicine for this finding, which has opened up a new area of research related to ageing, cancer and age-related illnesses in general.

## INVITED SEMINARS

### DISTINGUISHED SEMINARS

**21 SEPTEMBER**  
**KARIM LABIB**  
University of Dundee (Scotland)

**5 OCTOBER**  
**RAFAEL YUSTE**  
Columbia University (USA)

### WOMEN IN SCIENCE OFFICE SEMINARS

**25 SEPTEMBER**  
**ELVIRA SASTRE**  
Writer and translator

**23 OCTOBER**  
**EULALIA PÉREZ-SEDEÑO**  
Institute of Philosophy, CSIC (Spain)

