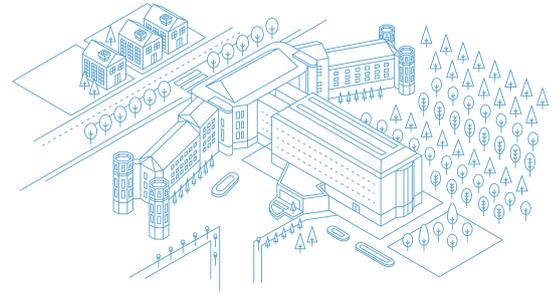


CNIO FRIENDS

newsletter

Latest news from the Spanish National Cancer Research Centre



 COLUMN

 CNIO SCIENCE NEWS

Making a mountain out of a grain of sand

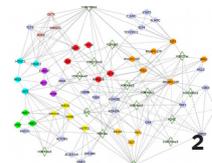
At 'CNIO Friends' we continue to welcome exciting initiatives. On this occasion, it was the *Club Baloncesto Pizarro* – the Pizarro Basketball Club from Fuencarral in Madrid – that has designed sports clothing in solidarity with the CNIO. Part of the proceeds from selling these items will go to our philanthropic programme. When they contacted us, they mentioned how pleased they were to be able to add their grain of sand to our work. It is us who feel lucky to have their support and yours. Together, all of you can help the CNIO to fund more research. To this end, we have just launched the 'CNIO Friends' research contracts. This programme will enable the Centre to attract new talent to develop new projects to beat cancer. This is only possible thanks to you, our donors.

The 4th of February was World Cancer Day, a very important day for raising awareness about this illness. At the CNIO, we also reported on the latest developments in the fight against cancer. Remember, more research, less cancer.

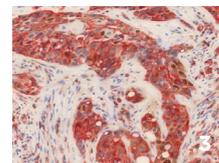
—MARIA A. BLASCO
Director



The MYC gene is found in an altered state in more than half of human cancers and is often associated with extremely aggressive tumours. A study led by Paco Real, head of the CNIO Epithelial Carcinogenesis Group, has just discovered a second gene, BPTF, which plays an important role in MYC activity. This finding opens up new avenues for specific treatments (1). The CNIO Structural Computational Biology Group, headed by Alfonso Valencia, has described the communication method of the elements that form the epigenome, a *make up* of the DNA used by cells to interpret the information written in their genes. This knowledge may provide new data on the functional mechanisms of the epigenome of cancer cells and



that of neurodegenerative diseases (2). Scientists from the CNIO Tumour Suppression Group, led by Manuel Serrano, and from the Central University Hospital of Asturias, have found new tumour markers for the prognosis of head and neck cancer. These markers could help predict clinical outcome and allow to choose the best therapeutic option to treat these cancers (3). The CNIO Experimental Oncology Group, headed by Mariano Barbacid, have discovered that a combination of two drugs reduces highly aggressive lung cancer in mice. If the results are confirmed in humans, it will be possible to treat a type of tumour for which there is currently no specific therapy and that has a low survival rate (4).



 OUR CENTRE

In January, we announced the first post-doctoral appointments thanks to the contributions of our donors: the 'CNIO Friends' contracts. The new researchers are expected to join the Centre by the middle of this year after a selection process that will assess the professional excellence of the candidates.

Alejo Efeyan, an Argentinian researcher, has been heading the new Metabolism and Cell Signalling Group at the CNIO from January. In the USA he was a pioneer in the design of animal models to study the relationship between the mTOR protein and cellular metabolism. He has now returned to Spain to employ these models to study cancer, ageing and diabetes.

The Network of Excellence for Research and Innovation on Exosomes (REDiEX) was launched in mid-February. Héctor Peinado, head of the CNIO

Microenvironment and Metastasis Group, is part of this network. This network of Spanish centres investigates the therapeutic potential of exosomes (tumour particles that determine metastasis) to improve personalised cancer therapy as well as other diseases.

Also in February, the CNIO Director, Maria A. Blasco, received this year's *Miguel Catalán Prize*, which recognises the brilliant scientific careers of researchers linked to the Community of Madrid. Throughout her career, Blasco has demonstrated that the shortening of telomeres (the ends of chromosomes) is at the origin of diseases associated with ageing, including cancer. Additionally, she has also discovered how the reactivation of the telomerase enzyme reduces the incidence of these diseases and delays the ageing process.



“Nutrient level intervention could be a tool to curb tumours”

The Argentinian scientist, Alejo Efeyan, joined the CNIO in January. Since then, he has been directing the New Metabolism and Cell Signalling Group, which will explore the relationship between metabolism and cancer. Efeyan comes from David M. Sabatini’s laboratory at the Whitehead Institute for Biomedical Research, MIT (USA), a pioneer in the study of the mTOR protein.

What do we know about mTOR?

In healthy cells, mTOR controls cell proliferation when there are nutrients in their environment. However, in tumour cells, mTOR related proteins contain mutations that make them behave as if they were surrounded by high levels of nutrients, even when there are none, allowing the tumours to proliferate.

One of my goals in the CNIO will be to provide medical significance and a specific use to this mechanism: learn how it works in pathological processes such as cancer, ageing or diabetes. This is a cell mechanism of which we knew nothing seven or eight years ago. Now that we have largely defined it, we must understand its context within these diseases. In the case of cancer, intervening on nutrient levels and their detection by the cell could be a way of curbing tumours.



Alejo Efeyan
CNIO Metabolism and Cell Signaling Group leader

Are you trying to develop a technique that will ‘starve’ tumours?

Rather, we want to make tumour cells *think* there are no nutrients even if there are, in order to turn off that signalling path so that the cell will stop dividing. There is already a cancer treatment drug, rapamicin, which acts as a brake on mTOR. However, we would have to develop better inhibitors because it is not a complete inhibitor, and this requires understanding the biology and physiology controlled by this path.

How do you feel after joining the CNIO?

Personal and professional reasons have played a significant role in my return to Spain, but one of the most important, at the professional level, is that the CNIO is one of the leading cancer research centres in the world. The support that I have received during my transition from the US has been amazing. Due to the crisis, having obtained a European Research Council (ERC) Starting Grant was another reason that influenced my decision to join the CNIO.

PROFILE



Sarah Teichmann
European Bioinformatics Institute, EMBL-EBI (United Kingdom)

Sarah Teichmann, researcher at the European Bioinformatics Institute (EMBL-EBI) and the Wellcome Trust Sanger Institute, and co-founder of the Single Cell Genomics Centre, visited us on February 5 to take part in the CNIO ‘Distinguished Seminar’ series.

Teichmann is a leading figure in systems biology, a field of study that studies how cellular

components cooperate with each other to allow cells to function. Her work on protein folding is also noteworthy. This knowledge allows us to predict how they interact with each other and opens the way to the design of drugs to treat many diseases.

As biology studies become more complex, with achievements such as genomic sequencing, more sophisticated working methods are required. In this regard, Teichmann defends the integration of various disciplines and the use of computer technologies, physics and mathematics, as indispensable strategies to understand and respond to the challenges posed by biology. For her approach and scientific contributions, she was awarded the Gold Medal of the European Molecular Biology Organization (EMBO) in 2015 and became a member of the UK Academy of Medical Sciences.

INVITED SEMINARS

DISTINGUISHED SEMINARS

- 15 JANUARY**
GIULIO DRAETTA | MD Anderson (USA)
- 5 FEBRUARY**
SARAH TEICHMANN | EMBL (United Kingdom)
- 12 FEBRUARY**
ROMAIN QUIDANT | The Institute of Photonic Sciences (Spain)
- 19 FEBRUARY**
JOSEPH JONKERS | Netherlands Cancer Institute (Netherlands)
- 26 FEBRUARY**
CORY BRAYTON | Johns Hopkins University (United States)

CNIO WOMEN IN SCIENCE OFFICE SEMINARS

- 12 JANUARY**
MARÍA CONCEPCIÓN FERRERAS | YouTube (Spain)
- 19 JANUARY**
MARGERY RESNICK | MIT (USA)
- 23 FEBRUARY**
PILAR GARRIDO | Ramón y Cajal Hosp. (Spain)

