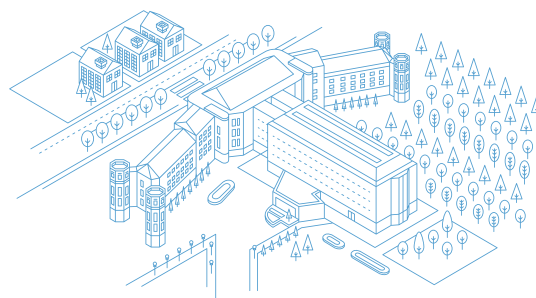


CNIO FRIENDS

newsletter

Latest news from the Spanish National Cancer Research Centre



COLUMN

Welcoming our Friends

Summer is here, and it has brought our Doors Open Day along – the day when we welcome our Friends and express our gratitude for their invaluable support. On June 27, more than 100 people, including CNIO Friends and companions, had the chance to learn about CNIO's latest achievements and the progress made by the projects supported with their donations, they also visited some of our labs and had lunch with us. It was a day to celebrate the friendship between our scientists, who are constantly working to find ways to reduce cancer mortality, and society, to which our efforts are targeted. I want to thank you again for your love and generous commitment.

You are an essential part of our strategy, as set forth in the recently published annual report, where we also describe the outstanding achievements we made in 2018 (CNIO Annual Report 2018). Last year, we kept carrying out CNIO & The City, our educational project for teachers and students. Also, we created the Office of Institutional Image and Cultural Activity to highlight the important role of science in society and to launch projects like CNIO Arte and others we will be sharing with you over the coming months. In 2018, CNIO stood out, as it had before, for numerous basic and applied research papers published in renowned scientific journals. Furthermore, we carried out innovation projects that led to new findings in the interest of society at large and cancer patients in particular. After all, our greatest responsibility as scientists is to contribute to society.

Thank you very much, Friends!

—MARIA BLASCO
Director

CNIO SCIENCE NEWS

Researchers from the Macromolecular Complexes in DNA Damage Response Group at CNIO used cryo-electron microscopy methods to understand the regulation of the mechanism used by the *energy engine* of a protein complex involved in cancer that could become a potential target for inhibition in cancer patients to reduce tumour growth (+). Researchers from the Growth Factors, Nutrients and Cancer Group have published in *Science* a way to provide cancer patients with protection against the side effects of radiotherapy. They found that high levels of a protein helped mice with ionizing radiation-induced gastrointestinal syndrome to regenerate their intestines, leading to survival. This finding will help improve the efficacy of radiotherapy in

cancer treatment (+). Patients with glioblastoma, a brain tumour with very poor prognosis, usually develop treatment resistance. The Telomeres and Telomerase Group at CNIO found an effective drug combination for this type of cancer in mice. The study provided unexpected and valuable information on cancer biology; for example, that the RAS gene, which is involved in numerous types of cancer, also participates in telomere maintenance (+). The Chromosome Dynamics Group described new functions of cohesin, a protein complex whose mutations play a role in some types of cancer (bladder cancer, acute myeloid leukaemia or Ewing sarcoma) as well as in some rare diseases referred to as cohesinopathies, such as Cornelia de Lange syndrome (+).

OUR CENTRE

About twenty experts from around the world gathered at the CNIO-“la Caixa” Frontiers Meeting World Conference on Structural and Molecular Biology of DNA Damage Response, held in May at CNIO. The Conference focused on the relationship between cancer and DNA damage, failures in DNA-repair mechanisms and cellular responses to DNA damage. At the meeting, scientists discussed how research on these processes, which play a key role in cancer development, can benefit from the latest ground-breaking technologies for the development of novel cancer treatments.

The 2nd CNIO & The City, CNIO's education and scientific communication programme, came to a close with a video celebrating passion as a driving force in scientific development. The video features María Blasco, Óscar Fernández-Capetillo, Ana Losada, Diego Megías, Carmen Blanco and Luis Paz-Ares answering the questions made by their children, Ariel, Emma, Paula, Bruno, Luna and Luis about what a researcher does and why their parents

decided to pursue a scientific career. Thanks to the work of more than 100 volunteers, CNIO & The City came to a close with twice as many participants – both educators and students – as last edition. More than 1,200 students and teachers have participated since the programme was launched in 2017.

As part of its commitment to education and training, CNIO awarded training positions to six advanced undergraduate biomedical students from Russia, Argentina and Spain as part of the Centre's International Summer Training Programme. They will get a glimpse of what might be their career path in the future. María Carmen Barace, Viktoriia Belousova, Rosa María Gaudioso, Marina Gladkova, Carolina Hernández and Lucía Zanotti will have the chance to see how the leading cancer research centre in Europe develops its basic and translation research. They will also work with state-of-the-art microscopy technology. We want to welcome them all, and we hope they can make the most of their experience here!



“We are studying whether c-MYC inhibitors can protect healthy intestinal cells against intense ionizing radiation”

CNIO scientists have found a possible way to mitigate the side effects of exposure to high levels of radiation. Their study shows that high levels of the URI protein help mice with ionizing radiation-induced gastrointestinal syndrome to regenerate their intestines, leading to survival. Moreover, there are inhibitors currently used to treat cancer that might be useful to mitigate damage to the gastrointestinal tract. We talked with Nabil Djouder, Head of the CNIO Growth Factors, Nutrients and Cancer Group, and leader of the study.

Why are these findings relevant for cancer patients?

Ionizing radiations are used during radiotherapy which represents an effective targeted treatment in cancer patients. Radiotherapy has substantially increased cancer survivorship, however, more than 60% of treated patients suffer severe side effects and develop radiation enteropathy, which is more prevalent than inflammatory bowel disease. The conditions involve histopathological alterations in the gastrointestinal tract, particularly the small intestine. These include gastrointestinal dysfunctions and side effects that can impair quality of life: pain, bloating, nausea, faecal urgency, diarrhoea and rectal bleeding, which may progress in a very small group of patients to a more severe disease, the gastrointestinal syndrome, characterized by intestinal obstruction, fistulae formation and intestinal architecture disruption and perforation. Thus, reducing damage caused by intensive radiotherapy is a key challenge to improve this effective treatment. Understanding the mechanisms by which ionizing radiations affect healthy intestinal cells can greatly facilitate efforts to meet this challenge and discovery of safe and effective pharmacological methods

to improve patient treatment and survival.

Could they be translatable to other side effects of radiotherapy?

We would like to investigate whether our findings can be translatable and beneficial in other contexts and organs out of the gastrointestinal tract, where radiations can also be used for treatment of other cancers: for example, hair loss.

Are you going to continue the research on the efficacy of c-MYC inhibitors to avoid intestinal damage in radiotherapy?

We generated in our lab a genetic mouse model that develop clinical features of the gastrointestinal syndrome. Using this unique genetic tool, we are currently studying the effects of c-MYC inhibitors to protect the intestinal mucosa from intense ionizing radiations. Therapeutic inhibition of c-MYC in cancer treatment has also been considered. Therefore, we believe that these inhibitors could be double edged sword and be more efficient for cancer treatment: first, to reduce secondary effects of high radiation doses, and second, to decrease the tumour burden.



Nabil Djouder
Head, Growth Factors,
Nutrients and Cancer
Group, CNIO

Photo: CNIO

PROFILE



Foto: CNIO

Johanna Joyce
University of Lausanne, Switzerland

Johanna Joyce is Full Professor at the University of Lausanne and Full Member of the Ludwig Institute of Cancer Research (Switzerland). Her team studies how cancer cells *trick* normal cells to help them, how tumour microenvironment contributes to therapeutic resistance, and the

influence of normal tissue stroma -the tissue that supports tumours- and immune cells in cancer progression and metastasis. Their ultimate goal is to apply this knowledge to the clinic and develop targeted therapies that interrupt the conversation between tumour and stroma. Joyce visited CNIO in May to participate in our *Distinguished Seminars* series and explain their findings.

For her contributions to cancer research, Joyce has been recognized with the Cloetta Prize, Swiss Bridge Award, American Cancer Society Scholar Award, Rita Allen Foundation Award, Sidney Kimmel Foundation Award, and the inaugural Pandolfi Women in Cancer Research Award from Harvard Medical School, among other recognitions.

INVITED SEMINARS

DISTINGUISHED SEMINARS

17 MAY
JOHANNA JOYCE
University of Lausanne (Switzerland)

28 JUNE
DAVID SANCHO
Spanish National Center for Cardiovascular Research (Spain)

WOMEN IN SCIENCE OFFICE SEMINARS

7 MAY
M. LUISA DE CONTES
Renault Spain (Spain)

20 JUNE
MARÍA HERVÁS
Actress (Spain)

