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MARIA A. BLASCO
Director

FOREWORD

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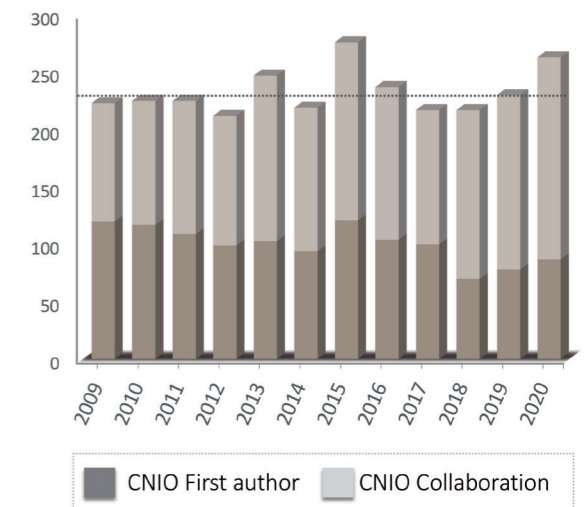
This year started with the arrival of the COVID-19 pandemic in early 2020 which, although it has changed our lives in so many ways, has not stopped, but instead increased the importance of scientific research. Indeed, it is thanks to science that the world is slowly returning to normality.

Despite the initial limitations imposed in the workplaces by this health crisis, I am proud to convey that the CNIO has been able to overcome those difficulties and to achieve our goal of scientific leadership and international impact. In 2020, CNIO researchers authored a total of 263 papers, 36 of which were published in journals with impact factor between 10 and 15, and 36 publications in journals with impact factor greater than 15. This year was very productive in terms of number of high-quality publications, which increased by 26% with respect to 2019. According to the *Nature Index*, considering our scientific contributions in the life sciences and healthcare field, the CNIO ranked second among cancer-focused institutions in Europe and holds the eighth position worldwide. These indicators are a testimony of our scientific efforts in basic and translational cancer research.

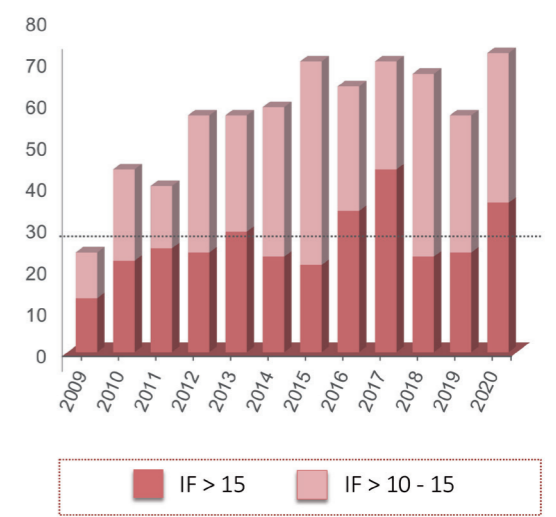
In 2020 the CNIO was awarded for the third time the Spanish Government accreditation as Centre of Excellence within the *Severo Ochoa / María de Maeztu* call from the Ministry of Science and Innovation. The CNIO is thus one of the only 6 research centres in Spain that have been granted this distinction without interruption since the launch of this flagship programme of Spanish science in 2011.

Also, 2020 was particularly successful for CNIO researchers in getting access to top-level funding opportunities in international calls, with 3 Group Leaders being awarded prestigious ERC Grants during 2020: Maria Blasco, Telomeres and Telomerase Group Leader (ERC Advanced Grant, project SHELTERIN); Marisol Soengas, Melanoma Group Leader (ERC Advanced Grant, project METALERT-STOP); and Manuel Valiente, Brain Metastasis Junior Group Leader (ERC Consolidator Grant, project ALTER-BRAIN).

TOTAL NUMBER OF PUBLICATIONS



TOP PUBLICATIONS



Aiming to contribute to the fight against the COVID-19 pandemic by using our best resource, which is excellent science, this year several Groups and Units at the Centre became involved in projects focusing on different aspects of the disease, such as the association of telomere length with the severity of the pathologies related to COVID-19; the identification of genetic variants correlated with disease severity; the generation of humanised mouse models susceptible to SARS-CoV-2 infection for preclinical studies; the development of a new and rapid diagnostic method using phi29 polymerase amplification; and the evaluation of the modulation of the viral receptor ACE2 with drugs already approved for medical use, to name a few. It is clear that understanding the molecular mechanisms of life can be useful not only to solve cancer but other diseases as well.

Adapting the Centre to the constant evolution of science and the new emerging fields in cancer research, by recruiting new groups working at the forefront of science, is key to maintaining our competitive edge. Thus, in 2020 we carried out a selection process that allowed us to incorporate a new Research Group into the Molecular Oncology Programme, which will join the Centre in January 2021: the Cancer Immunity Group, led by Maria Casanova, coming from the Icahn School of Medicine at Mount Sinai Hospital, New York. This new Junior Group will contribute to boosting the activity of the CNIO in the immunology area. We wish this new recruit the best of luck in developing her scientific projects and professional duties at the CNIO, which will ultimately increase our research portfolio and scientific achievements. On the other hand, Javier Benítez, Director of the Human Cancer Genetics Programme, retired after many years of excellent work and dedication to the CNIO. We want to wholeheartedly thank him for his contribution in making the CNIO a Centre of excellence of international reputation and wish him the best for this new step in his life.

In line with our efforts to provide value to society and to foster the visibility of the science of excellence carried out in our country, the CNIO further committed to the SOMMa Alliance of Centres and Units of Excellence *Severo Ocha/María de Maeztu*, through my appointment as new SOMMa President in late 2020 for the period 2021-2022, and by assuming the coordination of the activities of the alliance from the CNIO. At CNIO we are strongly committed to defending the values of research centres of excellence in Spain, and to underscoring the need to provide the proper ground for science and the prosperity of our society.

Another indicator of our societal and scientific impact is the breadth and relevance of our innovation activities. In 2020, our efforts in promoting collaborations with industry resulted in €2.4 million secured through research agreements (an amount 34% higher than in 2019). As much as 60% of CNIO agreements with the private sector were established with international entities. This is a clear reflection of the leadership and influence of the CNIO and our researchers worldwide.

A key achievement in this area this year was the launch of a new spin-off company, Telomere Therapeutics, which is focused on the development of gene therapy based on telomerase, using AAV9 virus as vector, for the treatment of pulmonary fibrosis and other fibrosis conditions, which currently have no effective treatments. This new company is based on the results generated by the Telomeres and Telomerase Group of Maria Blasco at the CNIO, in collaboration with the Group of Fátima Bosch, from the *Universidad Autónoma de Barcelona*. The company has received seed capital from the firm InVivo Capital Partners. It is also worth mentioning the research agreement established with Bionam Biotech and *CRIS contra el cáncer* for a project on pancreatic cancer of the Experimental Oncology Group, led by Mariano Barbacid.

Furthermore, we continue supporting and promoting the participation of CNIO researchers in national and international calls from public agencies and private foundations that fund projects with a strong innovation component. In 2020 an ERC Proof of Concept Grant was awarded to Oskar Fernández-Capetillo, Head of the Genomic Instability Group, to work on the development of SETD8 protein inhibitors with potential for the treatment of neuroblastomas and medulloblastomas, paediatric tumours that currently have poor prognosis. In addition, a project from the Topology and DNA Breaks Group, led by Felipe Cortés, was awarded a *CaixaImpulse* CONSOLIDATE COVID-19 grant to develop a novel detection kit for the simple and rapid diagnosis of SARS-CoV-2 infection. The CNIO holds a total of 4 prestigious *CaixaImpulse* projects that aim to accelerate the transfer of technology from basic research centres to industry.

Our drug discovery programme (Experimental Therapeutics Programme) continues working on the co-development of drug candidates from novel targets validated by CNIO investigators, contributing to the generation of new therapeutic agents to fight cancer and ageing-related diseases, which also represent assets for the CNIO. In 2020 ETP started a collaboration with the company Foxy Pharma and the *Consejo Superior de Investigaciones Científicas* (CSIC), in order to develop compounds triggering a proprietary target relevant in cancer models and aging-related diseases.

Our training programmes are also a key feature of the Centre, as an essential part of our mission. To provide training to the new generations of highly skilled researchers is a priority for the CNIO, and we warmly thank our sponsors as they contribute to supporting all our training initiatives.

During 2020, Sonia Laín, from the *Karolinska Institutet* in Stockholm (Sweden), was beneficiary of the *Jesús Serra* Foundation's Visiting Researchers Programme. In addition, thanks to the "Science by Women" programme of the *Mujeres por Africa* Foundation, Mai Tolba, from the Faculty of Pharmacy of the Ain Shams University, in Abbasiya, Egypt, was awarded

a grant as Visiting Scientist to join the Breast Cancer Unit at the CNIO for a 6-month stay.

In a year marked by COVID-19 in the media, CNIO news hit the headlines, keeping the good pace of previous years and marking over 3,400 appearances in press (printed and online) and over 250 audio-visual hits. Not only did our cancer research news attract the attention of journalists, but initiatives such as the #CNIOStopCancer campaign by CNIO Friends, or the third edition of CNIO Arte, were also covered by general interest media, which we do not usually reach.

But raising awareness about cancer research must go further. In spite of the situation generated by the pandemic, we did not want to miss the celebration of World Cancer Research Day. Thus, we organised an online session entitled "A New Era of Cancer Research: Towards the Engagement of the Entire Society" on September 24, with the participation of renowned scientist Francis Mojca as keynote speaker, and a discussion panel on the challenges of cancer research and the need for society to get involved in order to face those challenges. With initiatives like this, we keep working towards our goal of bringing science closer to society.

The Institutional Image and Outreach Office is leading several projects that aim to open new avenues to gain society's trust and attention, as well as to emphasise the value of science. Thus, in 2020, the third edition of our CNIO Arte project co-funded by the *Banco Santander* Foundation, which explores the common territories between scientific research and artistic creation, brought together the Spanish paleoanthropologist Juan Luis Arsuaga and the visual artist Carmen Calvo. The funds raised from this initiative totalled €100,000, which contributed directly to our CNIO Friends philanthropic initiative. To increase the impact of this initiative, in 2020 we organised the first edition of a new series of "Art and Science Symposia", which aims to bring those two areas closer by inviting renowned professionals from both fields to facilitate an open and enriching discussion on a selected topic. The symposium was held jointly with the presentation of the 3rd edition of the CNIO Arte project, under the title "The relations between art and archaeology", chaired by Prof. Carlos Jiménez (Emeritus Professor of Aesthetics, historian and art critic). Also in 2020, the second event in the series "CNIO Workshop on Philosophy, Science and Medicine, Socio-environmental factors of health and disease" was held at CNIO, with the support of the *Banc Sabadell* Foundation. Discussion topics illustrated the social impact of current molecular biology: longevity, human enhancement and transhumanism, personalised medicine, and gene editing.

The recently created CNIO Office of Development and Philanthropy kept working on identifying and providing new philanthropic funding sources that contribute to hiring new research talent for the CNIO. All donations to the CNIO go

directly to the CNIO Friends initiative, to cover the salaries of new post-doctoral research fellows. Our philanthropic programme actively seeks to build collaborative partnerships with corporate partners, individuals and philanthropic foundations. In 2020, CNIO Friends received €813,000 in philanthropic donations and €258,000 from legacies and bequests. The funding derived from the CNIO Friends initiative, implemented in 2015, has thus far enabled the hiring of 17 postdoctoral fellows and 2 PhD students, with a record 6 new postdoctoral positions hired through philanthropy this year. We would like to thank all of our generous donors for their support of the CNIO. Every single donation directly supports cancer research and will contribute to society for generations to come.

Our commitment to gender equality was consolidated in 2020 through the activities spearheaded by our CNO Women and Science Office (WISE). This is an effort from CNIO volunteers that has contributed to impactful changes that are facilitating both cultural changes and institutional improvements. Despite the pandemic and thanks to the Zoom platform, our WISE office was able to keep bringing outstanding female speakers to the CNIO who inspire and encourage us to explore new perspectives and visions on the role of women in society. In our efforts to educate the future generations without gender bias, the WISE Office organised the science workshop *CNIOptics#* with the title "The power of the light" in which the most talented students from the Technovation platform participated.

With great pleasure and pride, we provide our society once again with a story of our achievements in 2020, and convey our commitment to continue making our best efforts to fulfil our mission of conducting research of excellence in oncology, translating scientific knowledge into clinical practice, and transferring the technology developed at the CNIO to the productive sector for the years to come.

Finally, I would also like to wholeheartedly thank visual artist Amparo Garrido for kindly contributing the fabulous artwork that illustrates the cover of our Annual Report.



Presentation of CNIO Arte at ARCOmadrid 2020.