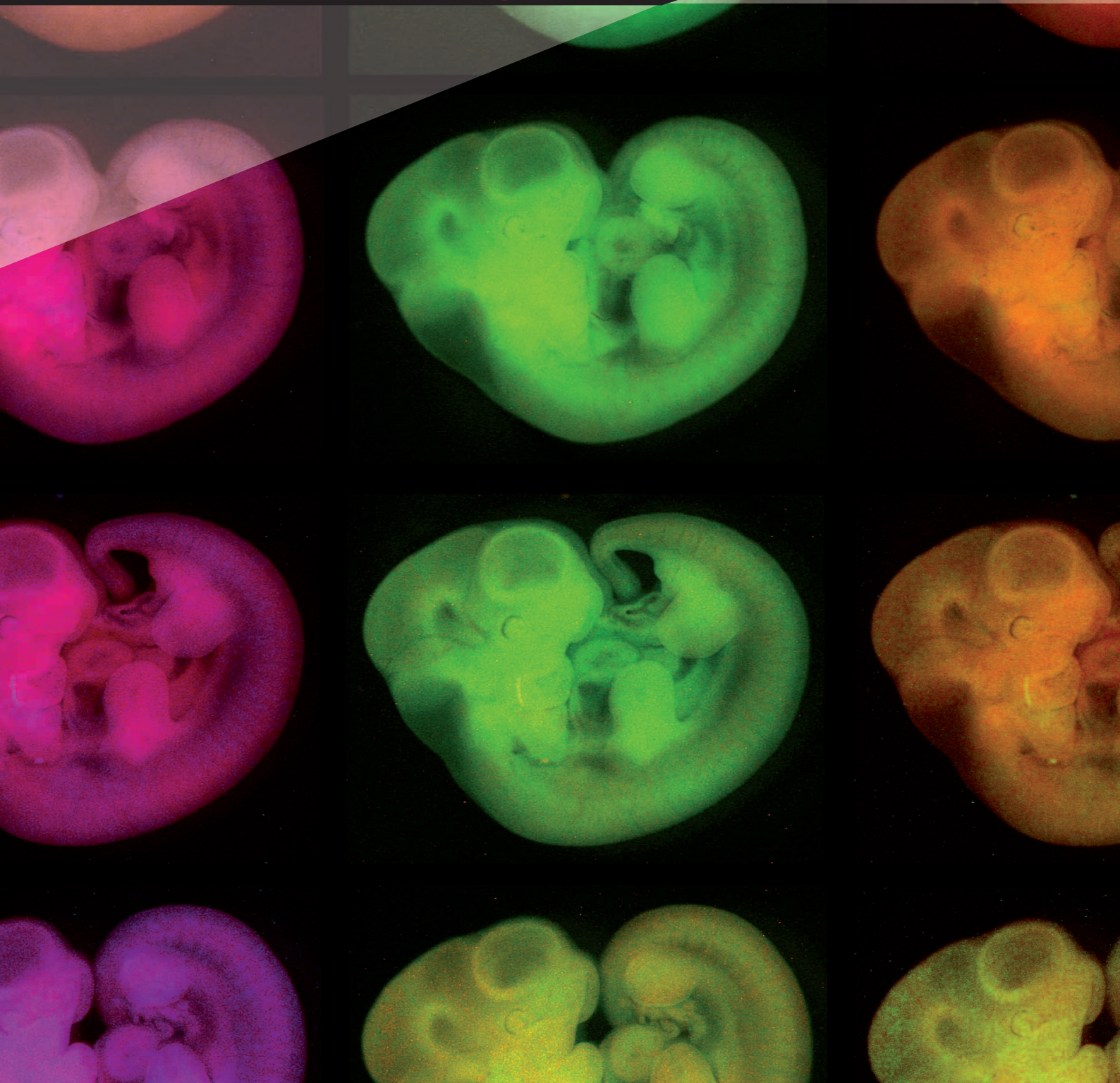


INSIDE SCIENCE  
TRAIN2GAIN  
WHAT'S ON  
CNIC & SOCIETY

...  
*cnic*PULSE  
autumn'13



# contents

# autumn'13



Fundación **pro**cnic



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## CONTRIBUTORS:

**Miguel Manzanares**  
Supervising editor

**Miguel Torres y Julia Redondo**  
Editorial committee

**Ainhoa Iriberry**  
Writing

**Fátima Lois y Simon Bartlett**  
Content editing

More on the CNIC at [www.cnic.es](http://www.cnic.es)  
Please send any comments or suggestions to  
[flois@cnic.es](mailto:flois@cnic.es)





In these difficult times I think it is important to underline the fact that scientific activity is not only the motor of quality and productivity in our society, but is also a model of the rigor, effort and honesty that is so important for establishing a better future. With this newsletter, which couldn't have a more apt title, we take the pulse of the CNIC's activity—our contribution to this great enterprise of science and how we apply ourselves for the wider benefit. We will look at the more visible facets of our work, best exemplified by the articles published in high-impact scientific journals, but also at areas that tend to receive less attention, such as the



Dr. Valentín Fuster, CNIC Director

# A CENTER OF EXCELLENCE with character

I often hear that we are lucky to work at the CNIC. My reply is always the same. More than luck, working here is a responsibility. But it is undeniable that at the CNIC we are passionate about our work, and it is this passion that we want to share with you through this Newsletter.

point in Spanish translational research—you only had to see the interest this study generated in the media. As with the other studies, the findings are set to change thinking and practice, which should always be the goal in science.

competitive grants that we are having ever more success in securing.

This first edition of *CNIC Pulse* is filled with good news. In **INSIDE SCIENCE**, we present news of major, long-term scientific significance—three discoveries that will be key talking points in the scientific community. In the Spring, Toño Enríquez and his team published results that redefine the classical model of mitochondrial electron transport, a change that has implications for the text books. This work was published in *Science*, a journal that needs no introduction. Just a little later, it was Miguel Torres and Cristina Clavería who caused a stir, with an article published online in *Nature* that the journal editors then chose as the cover for the print edition. The third study, which appeared in *Circulation*, represents a new high

In **TRAIN2GAIN**, we present real-world examples of some of our training programs. Both the Pro-CNIC Foundation and I take a strong interest in these programs, because we are convinced that the targeted training they provide holds the key to the fight against cardiovascular disease.

We hope you also enjoy the other sections, in which we present interviews with important players in the cardiovascular field (in **WHAT'S ON**), and report on events related to our commitment to the public communication of science and medicine (in **CNIC & SOCIETY**). Our Center's philosophy is categorically not about staying shut inside our ivory tower, and we hope that CNIC Pulse will make this clear and stimulate readers' participation in this scientific adventure.



The team led by **José Antonio Enríquez** is revolutionizing understanding of this cellular compartment, which converts energy from nutrients into a form useful to the organism.

# A blow to the classical picture of MITOCHONDRIA





Graduates of any bioscience degree are familiar with the textbook 'Principles of Biochemistry', more commonly known by the surname of the original author, Lehninger. Now, the magnitude of the discovery made at the CNIC is set to rewrite this and similar textbooks, because the published findings completely reformulate our understanding of the functioning of mitochondria, the cellular structures tasked with converting energy from food nutrients into a form that cells can use for their vital processes. The study, published in *Science*, is complemented by another in *Cell*, in which Dr. Enríquez and Dr. Scorrano (of the University of Padua and the Dulbecco Telethon Institute) describe how the gene OPA1 could form the basis for future treatments for many mitochondrial diseases, which are currently incurable.

The first study, done in partnership with groups at several Spanish universities (Zaragoza, Oviedo, Santiago de Compostela and Pablo de Olavide) and hospitals (La Princesa and Miguel Servet), provides confirmation of the hypothesis proposed by the same research team in 2008. As often happens in science, progress toward a breakthrough started with observations that couldn't be explained by current models. As Dr. Enríquez explains, "Understanding how energy is generated in cells is fundamental to understanding life, and during a great part of the last century this was a major focus of research in biochemistry. Around the beginning of 80s the mystery of how mitochondria carry out this task was considered to be solved, and in the 90s the molecular structures that perform it were described in incredible detail; mitochondrial energy metabolism was considered to be the best understood of all the processes taking place in the cell."

But questions about this perception were raised by research into mitochondrial diseases. If we understood mitochondrial function so well, how come we didn't understand the manifestations and symptoms of these diseases? Why couldn't we predict who was going to suffer from them? And above all, why were we unable to develop successful treatments? These questions prompted scientists to look again at this issue, and in 2008 José Antonio Enríquez and his group came up with an idea, now confirmed by the results of the new study.

Mitochondria convert energy into a universally utilizable molecular source—ATP—through five molecular machines—complexes I, II, III, IV and V. Until very recently these complexes were believed to 'swim' freely in the internal membrane of mitochondria.

What the CNIC scientists demonstrate is that the system is not so simple. Dr. Enríquez explains that "the mitochondrial complexes in fact interact with each other dynamically, and in this way are able to exist either as free-floating forms or in specific physical associations with each other. This gives the system enormous versatility and adaptability, enabling mitochondria to optimize the extraction of energy from the available nutrients to match the needs of the cell."

This improved understanding of how mitochondria work is complemented by the findings published in *Cell*, which identifies a mechanism that regulates this versatility, and that if activated could help 'tired' cells in patients with mitochondrial diseases—all good news that brings us a step closer to being able to treat these diseases. When this eventually becomes a reality, this will be in part down to the team at the CNIC.

In white, the mitochondrial network surrounding the cell nucleus. In red and green, two types of respiratory complex that convert nutrients into cellular energy inside mitochondria.

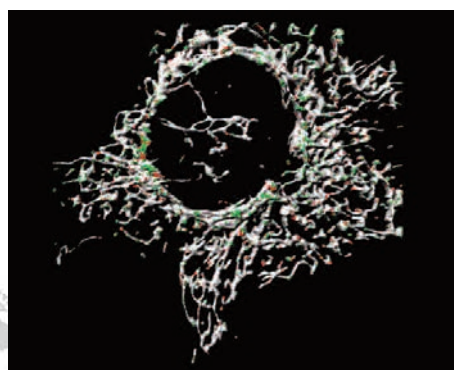


Photo: Cristiane Beninca

**THIS DISCOVERY IS SET TO REWRITE THE TEXTBOOKS**



# IN THE BEGINNING

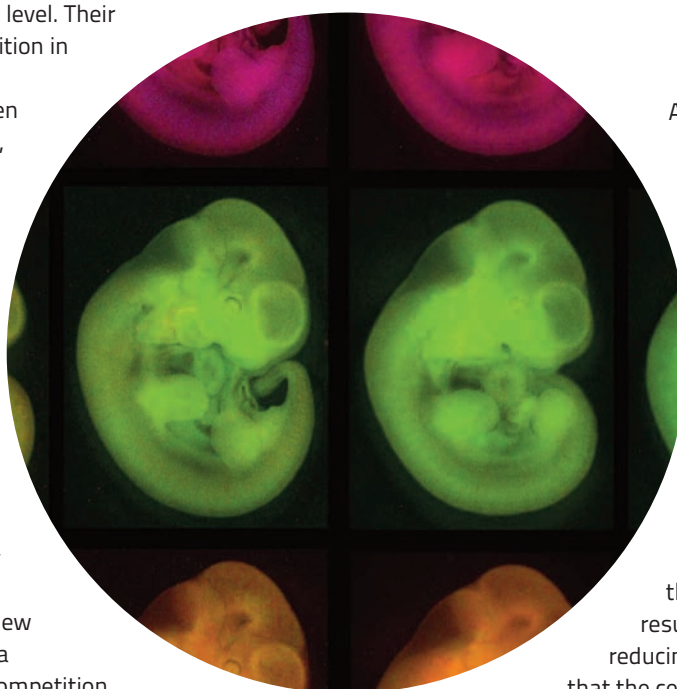
CELLS IN THE  
EARLY EMBRYO  
FIGHT TO BECOME  
PART OF THE NEW  
ORGANISM

## THE CNIC STUDY ON THE COVER OF *NATURE*



In August the CNIC made the front cover of *Nature*. The study in question was the brainchild of Drs. Cristina Clavería and Miguel Torres, and examines the curious process whereby cells in the early embryo fight to the death to form part of the organism. The phenomenon of cell competition was already known from other systems, and in fact was discovered by another team of Spanish researchers in 1975. But Clavería and Torres have taken the field to a new level. Their work shows that cell competition in mouse embryos occurs in a defined time window, between days 3 and 7 of development, during which “the embryo becomes an each-against-all warzone.”

These results could be especially relevant to humans because the data indicate that cell competition is likely to be especially important in long-lived organisms like us. This is because through this early battle only the fittest, most robust cells survive to contribute to the new organism. As Cristina Clavería describes it, “Thanks to cell competition, the developing organism self-optimizes during development, selecting the cells that are theoretically best placed to support vital functions throughout the life of the new individual.”



Another key achievement of the study is that the team were able to determine in advance which cells will come out of this fight as the winners. What distinguishes these cells from their less-fit neighbors is the level of the protein Myc, a regulator of cells’ metabolic capacity. The CNIC scientists did not stop here, but wanted to know what would happen if they could somehow rig the result of the fight. By artificially reducing the level of Myc they found that the cells that normally die are in fact perfectly viable, but are simply not the best ones available for the formation of the organism. The authors explain that “this is a mechanism for optimization, not repair.”

And this brings us to another fascinating feature of this study. In this battle of the cells, no resources are wasted; the loser cells are engulfed and digested by their victorious neighbors, which in this way recycle all the nutrients and materials for the benefit of the developing embryo.



CHALLENGING  
THE STANDARD  
TREATMENT  
FOR HEART  
ATTACK

# metocard



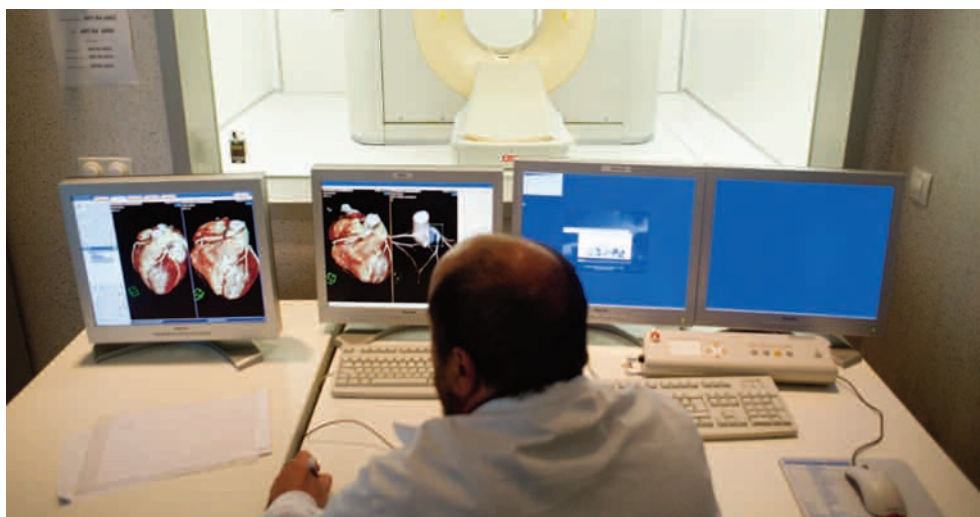
# STRAIGHT TO THE PATIENT



No-one doubts that the transfer of basic scientific discoveries into clinical practice is complicated and, above all, slow. But translational medicine is central to the CNIC mission, which is to say that the Center is fully committed to ensuring that people suffering from or at risk of cardiovascular disease benefit at first hand from the scientific advances made here. The latest success in this area has come from the team led by Borja Ibáñez, who have just published the results of a clinical trial that is 100% 'made in CNIC' in the journal *Circulation*. The METOCARD-CNIC study, which involved the participation of emergency ambulance services and seven hospitals from different Spanish regions, demonstrates that **metoprolol**—a cheap drug on the market for more than 30 years—significantly reduces the damage produced during a heart attack if administered early, during road or helicopter transit to hospital.

The conclusions of the study demonstrate conclusively that this strategy could be rolled out across the world due to its high clinical benefit, low cost, and universal accessibility. This would be a significant change to the standard treatment of heart attack patients, who today do not normally receive this treatment before undergoing angioplasty surgery, the recommended intervention to remove the arterial blockage that caused the infarction.

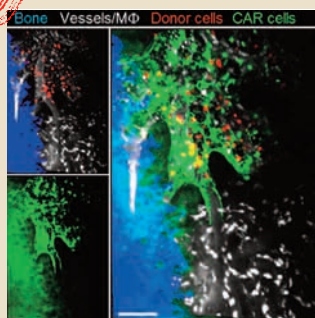
The Imaging Unit, one of the CNIC's 'jewels', played a crucial role in evaluating the efficacy of early intervention with metoprolol in humans



Several features of the METOCARD-CNIC study stand out. Above all there is its potential for immediate translation to clinical practice. Then there is the fact that the project was made possible in part through the additional financing that came with the status of the CNIC as a Severo Ochoa center of excellence, awarded in 2011; METOCARD-CNIC was not a cheap study, but has the potential to yield major savings for the straitened public health budget in Spain.

The authors emphasize that, in addition to the direct cost savings that come with this innovative use of an established drug, the new strategy could produce an even greater financial return because patients with less damage to their heart muscle after a heart attack are less likely to need an implantable cardioverter-defibrillator, which costs more than €20000, or to require costly in-patient treatment for heart failure. METOCARD-CNIC will without doubt be a talking point, now and into the future.

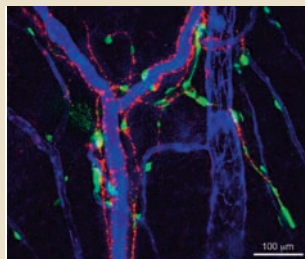
THE  
INNOVATIVE  
USE OF AN  
ESTABLISHED,  
CHEAP DRUG  
COULD MAKE  
MAJOR  
SAVINGS FOR  
THE SPANISH  
HEALTH  
SERVICE



In Cell

## USEFUL WASTE

The body keeps coming up with surprises. Defense cells that our bodies eliminate every day turn out to have a function we didn't know about. The elimination of these neutrophils at the end of their natural life stimulates the relocation of stem cells in the body, as revealed in a recent study published by Andrés Hidalgo and his team. And in addition to publishing the group's findings, *Cell* asked the team to record a publicity video about their work that stands out for its originality. Did Dr. Hidalgo foresee his *Cell* paper in a dream?



In Cell Reports

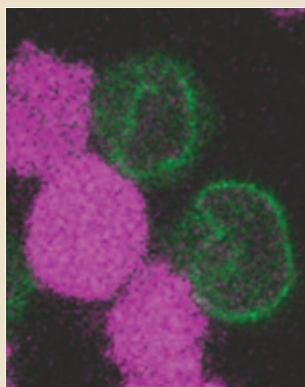
## BETTER CORDS

Transplantation with hematopoietic stem cells from the umbilical cord could (and in fact already does) save many lives. But this therapy is relatively inefficient for the simple reason that the cord contains few of these cells. This is what makes Simón Méndez-Ferrer's work so promising, because he has developed a method for isolating and expanding human mesenchymal stem cells in culture under conditions that promote their capacity to expand hematopoietic stem cells from umbilical cord blood. With luck this will soon be available for patients!

In Circulation

## PUTTING THE BRAKES ON PROGERIA?

The premature aging disease progeria (Hutchinson-gilford progeria syndrome, hGPS), although rare, is well-known in the research community and among the wider public. The findings published by Vicente Andrés and his team in *Circulation* could put the brakes on one of the most important symptoms, excessive vascular calcification. Good news indeed.



Training for excellence

## AN IMPORTANT ITN

An ambitious goal achieved. That neatly sums up the success of Alicia García Arroyo (general coordinator), Mercedes Ricote, Enrique Lara Pezzi, Borja Ibáñez, Valentín Fuster, Jesús Ruiz Cabello and Jesús Vázquez in securing the first initial training network awarded to a single Spanish research center, the CNIC. No less than €2.7 million for an innovative doctoral program that revolutionizes the relationship between research and industry.



Simply the best

## A VERY INTERESTING HEART

The research scientist Nadia Mercader is one of the fortunate (and deserving) recipients of around €1.5 million as a 'Starting Grant' from the European Research Council (ERC). Her project will study the zebrafish heart, which through a seemingly magical process is able to regenerate after being damaged. Could something similar one day be achieved in humans?









Another successful year  
for the

# ACÉRCATE PROGRAM

One-day visits aside, it is rare to see senior high school students at an elite research center. And it's even more unusual to see them attired in lab coats and operating pipettes and microscopes like old hands. But this is exactly what happened in July with **Pablo, Ana, Víctor, Elena, Marta, David, Claudio and Cristina**, who spent ten intense days immersed in cardiovascular research at the CNIC thanks to the ACÉRCATE Program.

The finishing touch to this exceptional fortnight, which included a meeting with CNIC director **Dr. Valentín Fuster**, was presenting an overview of what they had learned to their tutors and companions.

These young students received a grant from the CNIC as part of the CNIC-Joven training plan. The goal of CNIC-Joven, an initiative close to Dr. Fuster's heart, is "to attract and train the best young minds to create a strong base of talented researchers in the cardiovascular area."

This year the eight successful applicants were an even split between men and women. But there is no quota system, and women have in fact always been in the majority in previous years, with 39 women and 25 men participating since the launch of ACÉRCATE in 2006.

It will be no surprise if, in a few years, these young scientists are working in the leading hospitals in Spain, because over the years medicine has consistently been the most popular degree subject chosen by ACÉRCATE participants.



## WELL-ROUNDED STUDENTS

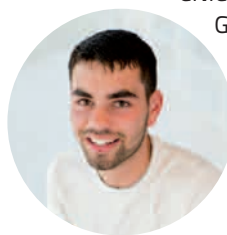
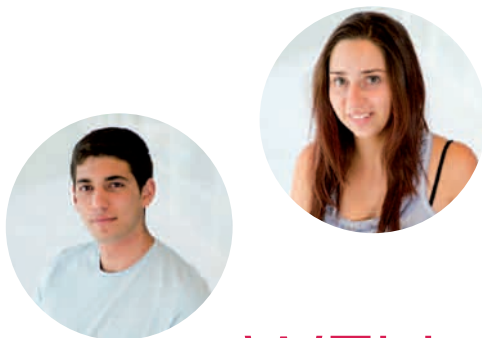
Apart from being studious and hardworking, 'los ACÉRCATES' have many other interests. Among this year's group, there is a dedicated film buff who at one time considered studying cinematography instead of medicine.

One of the students has studied **guitar** at the conservatory and **also paints**, while another defines herself as an 'artist', and combines her passion for **music** with **writing novels and poetry**, for which she has been awarded a prize in her home region.

Music is also the passion of another of the future researchers, **a virtuoso pianist**, while another combines dedication to **literature** and writing with a less usual interest in **ancient Egyptian art**. Classic cinema is the favorite pastime of one, while another complements his studies with **sport and street dancing**.

One of the most gratifying outcomes of the ACÉRCATE program is that the students maintain their connection with the CNIC. So far, five of the 56 participants from the seven previous editions of ACÉRCATE have rejoined the CNIC on another CNIC-Joven program, Cicerone, in which students in the final stages of their undergraduate training undertake a practical project at the CNIC during the summer recess.

Given that ACÉRCATE has been running for just eight years, we hope that this number is set to increase as more former participants progress through their academic career.



Interview with

# Gabriela Guzmán

"IN THE U.S. THERE'S MORE ACCEPTANCE OF THE IDEA THAT PHYSICIANS SHOULD BE ACTIVE RESEARCHERS"

Getting first hand experience of work at the Cardiovascular Institute at New York's Mount Sinai Hospital almost cost Gabriela Guzmán her marriage, she jokes.

"My husband couldn't come for professional reasons, but I was clear that I wasn't going to let being a mother keep me back and stop me from making the most of this experience," says this mother of three who almost four years ago packed her bags for a five-month stint at the prestigious American center. The comment about the effect on her marriage is made in jest, but it is impossible not to talk about the stress inevitably linked to one of the best professional opportunities in her life so far, and that has led her, among other things, to divide her working life between two areas that are "traditionally very separate": basic research and the clinic. Gabriela is a cardiologist at the Heart Imaging Unit of the Hospital Universitario La Paz, in Madrid, where she daily sees patients affected by heart attack, stroke, and other cardiovascular conditions. But when she comes off call, Dr. Guzmán walks barely ten minutes from the hospital to see another type of 'patients', with whom she spends 70% of her time; these 'patients' though incapable of engaging her in conversation, have been the key to discoveries over the last few years that could find applications in human patients in the future.

In 2009 Gabriela received important news: the final decision of a grant call, the first in the Cardio-Image program. This CNIC initiative sends specialists in cardiac imaging from Spain to spend a year in the Cardiovascular Institute at Mount Sinai. This choice of destination is no accident; both centers share the same general director, Dr.



Valentín Fuster. This was a plus point for Dr. Guzmán. "You're going somewhere where there are quite a lot of Spaniards, so you feel protected."

While in New York, Gabriela had time to see the differences between the American and Spanish systems. And although they say that comparisons are never easy, she brought some very clear ideas back to Spain. One example is the approach to work. "It's very different from Spain, and there is an expectation that you will be available almost 24 hours a day," she recalls, even though on paper her working day ran from

seven-thirty in the morning to five in the afternoon. The two countries also differ in the status of research within the medical profession. "There's more acceptance of the idea that physicians should be active researchers; here patient care consumes all your time."

And what about resources? Can the mighty Mount Sinai be compared with a hospital within the Spanish public health system? The answer is inconclusive. Guzman says that "the difference in terms of resources is total," but then qualifies her answer. Because, while recognizing that the technology patients experience in the US is more advanced, she is proud of her country's quality of patient care. "Patient care in Spain compares very favorably with the US. Though it's true that if we had more resources this would speed up diagnosis, I don't think that this would have any effect on the final treatment that patients receive." So Gabriela's point of view is clear: although she happily moved to New York for professional reasons, she doesn't believe it's necessary to take that step if you suffer from a serious cardiovascular illness.





## DECEMBER 2013 International PhD La Caixa

The La Caixa Foundation has increased the value, if that's possible, of the CNIC's status as a Severo Ochoa Center of Excellence, awarded in 2011. With this second round of grants, providing up to four years' financing for five predoctoral researchers, the CNIC reaffirms, this year as a Severo Ochoa center, its commitment to graduate students carrying out their research through to the completion of their PhD thesis.

Candidates for these grants must meet the following conditions:

- A degree in a biomedical-science-related discipline, obtained within the last two years, that qualifies the candidate to enter a PhD program in his or her country of origin.
- An excellent academic track record and previous research experience.
- A professional level of English.
- No scientific connection to the CNIC for more than six consecutive months before the deadline for applications.
- Under 30 years of age.



## JANUARY 2014 Masters in Molecular Biomedicine: Cardiovascular Diseases Module (BMM9).

The CNIC partners with the Universidad Autónoma de Madrid (UAM) in the university's postgraduate program in molecular biosciences: *Programa Oficial de Posgrado de Biociencias Moleculares de la UAM* (<http://biociencias.bq.uam.es>) The CNIC coordinates and teaches the Cardiovascular Diseases Module of the UAM Masters in Molecular Biomedicine, an optional module that offers students the chance to acquire specific knowledge about different aspects of cardiovascular biology, from basic science to clinical and translational perspectives. The course is open to students with a Bachelor's degree in an experimental or health-related science discipline, and includes theory and practical content.



## FEBRUARY 2014 CICERONE Program

The CNIC offers advanced undergraduate and masters students in biomedicine-related disciplines the chance to learn at first hand about biomedical research and further their training through a lab-based practical project during the summer recess.

The goal of this program is to equip university students to make informed decisions about their professional trajectory and place them in a strong position to pursue a scientific career.

The program consists of summer grants for the lab-based practical project and attendance at lectures and seminars related to biomedical investigation organized by the CNIC.



## FEBRUARY 2014 CNIC International Incoming Fellowships: CNIC IIF

In February the CNIC will launch the second round of applications for the CNIC International Incoming Fellowships program, which is supported by European Commission funding totalling €2.4 million through the Marie Curie COFUND scheme within FP7.

The CNIC IIF aims to increase the mobility within Europe of experienced researchers in the cardiovascular research area. The program has been designed to support transnational mobility of researchers and to broaden and deepen their individual competencies, particularly in terms of acquisition of complementary skills needed to attain or strengthen a senior independent position in biomedical research.

A longer term aim is for investigators on this program to have the opportunity to extend their connection to the CNIC after the end of the grant period, thus contributing to the creation of a critical mass of excellent researchers in the cardiovascular area.

Four annual calls are planned, with each call offering a maximum of six grants targeted at two career stages: Starting Fellowships and Advanced Fellowships. Selected candidates sign a 36 month contract, which includes a salary on the standard CNIC scale and core funding to establish the laboratory. Fellows also receive an annual budget for travel, help with relocation costs, and all the social benefits enjoyed by CNIC employees. Complete details about the grant call can be found in the CNIC-IIF Application Guide, available on the CNIC website.

Donna Arnett has visited the CNIC twice in 2013, but has never spent more than 24 consecutive hours in Spain. This might change in a little under a year, when she leaves her current post (immediate past president) and ends her spell at the American Heart Association (AHA), of which she has been president for the last two years. In this time, the first epidemiologist to direct the AHA has visited almost all the continents and has confirmed with her own eyes that cardiovascular disease doesn't leave any country untouched, prompting the need to be "creative and fast" if we are to put an end to it.

**With the widespread knowledge about risk factors, why do people continue to be careless of their health?**

It's not a question of blaming the individual. We have evolved our society very quickly over the last five decades to be very inactive. Our food is now predominantly processed, and so we've created an environment where as individuals it's very difficult to live a healthy lifestyle. Rather than focusing all the blame on the person we need to look at our systems.

Interview

## Donna Arnett

Past president of the  
American Heart Association



**And what can we do to fix the system?**

We really don't know the answers. We know a lot about what the risk factors are in themselves, but how do we create

workplaces and schools—the places where we spend most of our time—that are healthy environments to be in? How do we stay active during the day while we're working, given that our jobs have evolved to be very sedentary? For example, I just bought a treadmill desk, but I have to tell you it's hard to use because I get nauseous when I try to type!

**What is the biggest challenge in the fight against cardiovascular disease?**

For me, it's changing people's belief systems so that they come to think of their personal health as a

resource that needs to be sustained. Just as with the environment we focus on sustainability and have programs for recycling and energy conservation, we need to think about conserving our health. And this needs to start with young children, because a lot of people don't take care of themselves and think "I'll start a healthy lifestyle when I hit retirement because I'll be at risk then". I think we have to change that mindset.

**You're here at the CNIC today to participate in the Cicerone Lectures, which promote interest in cardiovascular research among young physicians. Do you think that there is a need for more cardiovascular research?**

Of course! In my own area of genetic epidemiology we're at the leading edge now of discovering and understanding how genes impact risk factors and disease. With the power of metabolomics and proteomics, we're right at that intersection where we're going to be able to individualize prevention and treatment recommendations. We also still don't understand how to change behaviors of populations. What's most effective? For cigarette smoking for instance, is it a taxation policy? For food, is it subsidies to make fruits and vegetables not only the healthy option but also the more affordable one? How do we get people to change habits?

**The AHA is well known, among other things, for its public awareness campaigns. Of all the campaigns you have been involved with, which is your favorite?**

There are so many, but let me just pick Go Red for Woman, now in its tenth year. When we started the campaign, fewer than one in three women knew that heart disease is the leading cause of death in women. Now that number is almost eight out of ten. So we've helped women to understand that they are at risk of heart disease, and we've educated millions of women and convinced them to take on some new healthy behavior to eliminate or reduce their risk.

**In spite of medical advances, many people continue to suffer from cardiovascular disease. You have experienced this at first hand, having had a stroke in your late twenties. What message would you give to patients?**

For stroke, I'd stress that it's now preventable, treatable, and beatable. When I had my stroke there weren't really interventions. Now there are therapies that can really reduce the damage done to your brain from a stroke, if you can get to the emergency room within three hours. So for those who have disease now there's hope for the future.

For more information, visit our website : <http://www.cnic.es/en/eventos/>



January 13, 2014

**CNIC Seminar**

**"Innate control of metabolism and regeneration"**

**Ajay Chawla**

University of California,  
San Francisco,  
Cardiovascular Research Institute,  
USA



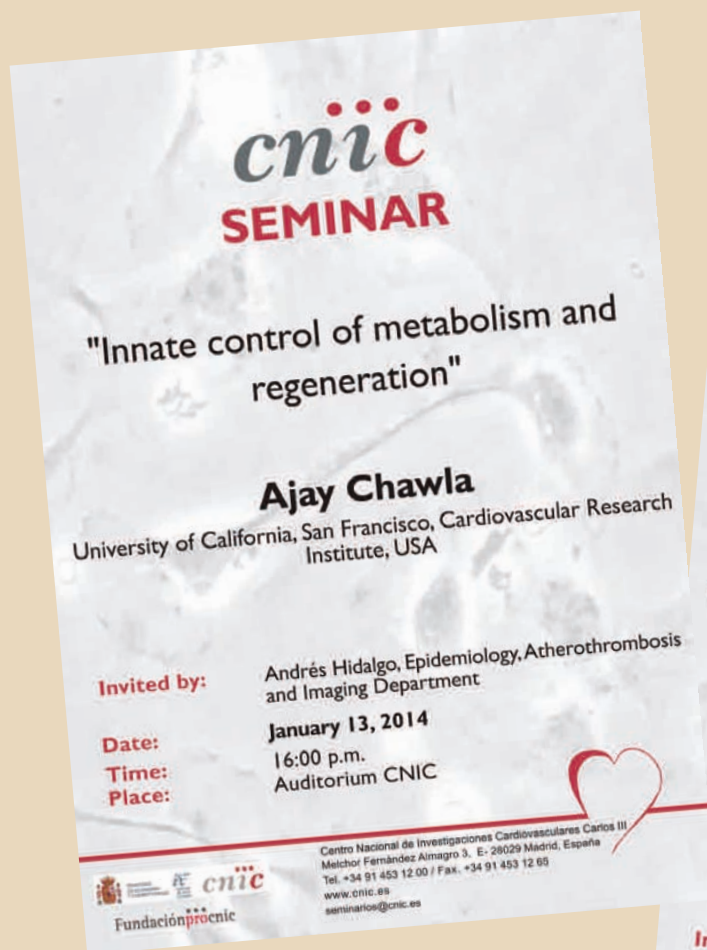
February 10, 2014

**CNIC Seminar**

**"New insights into the role of pericytes in health and disease"**

**Christer Betsholtz**

Uppsala University,  
Karolinska Institutet,  
Stockholm,  
Sweden





No more excuses. That neatly sums up the main conclusion of the round table discussion 'Controversies in aging', held in June in the CNIC auditorium, and presided over by none other than Her Majesty Queen Sofía of Spain. The panel of invited experts could not have been more appropriate. The leading scientific experts in the field came to Madrid from such standout organizations as the Mount Sinai Hospital in New York and the World Federation of Neurology. And while everyone was agreed that there is still much to resolve, they were also very clear that aging can be delayed through the adoption of a healthy lifestyle.

## Every cloud has a silver lining OR HOW TO ENJOY A HEALTHY OLD AGE



controversies

'Controversies in aging' was a public communication event organized jointly by the Pro-CNIC Foundation and the Queen Sofía Spanish Institute. The panel had time to cover many of the most important topics relevant to aging, but the key focus of interest to all those present was, 'Can the aging process be slowed?' Attendees learned that this has in fact already been achieved in mice—work described by panelist María Blasco, director of the Centro Nacional de Investigaciones Oncológicas (CNIO).

The good news is that the same can be achieved in humans. And not with complex, drug-based therapeutic interventions; it's enough to take regular exercise and to eat a balanced diet. Better yet, Samuel Gandy, a world opinion leader in Alzheimer's disease, commented that even this disease could be delayed through participation in sports, "although there is a significant influence from genetic predisposition."

Paradoxically, we can learn a lot about slowing down the aging process by studying its acceleration in certain diseases. This is the reasoning behind research by panelist Vicente Andrés, of the CNIC. He is an expert in progeria, a rare disease that has nonetheless become very familiar from the shocking images of the young patients, who appear old aged when only ten years old.

In his intervention, Dr. Andrés spoke about the relation between senile dementia and cardiovascular disease and how both are connected to the passage of time. Recognition of this relationship has broadened our understanding of the benefits of a healthy lifestyle.

While we have become familiar with how a healthy lifestyle can prevent heart attack and stroke, we are now coming to appreciate how lifestyle choices can also slow the onset of forgetfulness and dementia. And the fact is, as Valentín Fuster said, that aging is simply what happens when "things stop working properly."

But the panelists also recognized that we still don't have the definitive answer to why people don't age at the same rate.

This led on to discussion of the hot topic of biomarkers, and the possibility in the near future of identifying those likely to age the soonest or to develop a disease like Alzheimer's.

This rapidly developing technology brings with it a number of difficulties. Valentín Fuster mentioned the high cost of these tests, and also highlighted another difficulty related to the ethics of screening. This theme was picked up by World Federation of Neurology president Vladimir Hachinski, who conceded that at



in aging

present we don't know what to recommend to people scoring positive on these tests, and have to "insist on healthy habits."

And this was the main conclusion of the the meeting, although some sceptical voices spoke of the difficulty of instilling this message in the general population. The one ray of hope was that healthy habits are more likely to be long lasting if learned in early childhood. Perhaps in this way we can keep old age at bay for longer.



PROMOTING  
HEALTHY HEART  
HABITS  
IN THE  
VERY YOUNG

More than 500 children playing, jumping and, it can't be denied, making lots of noise. And no wonder. The event at the open-air sport center at Madrid's Autonomous University on October 5 was everything except calm. This was the third annual **VIVE DAY** and, although it might not have seemed that way, these little children were learning that taking care of your heart can be fun.

# FUN AND CARDIOVASCULAR CARE GO HAND IN HAND





Third Annual



The boys and girls—children of workers at the 13 member institutions of the Pro-CNIC Foundation and its various projects—were thrilled to be greeted by familiar faces from the Muppets, with Elmo acting as master of ceremonies. Many of the children have gotten to know these characters from watching the TV series 'Monstruos supersanos' (superhealthy monsters), in which Bert, Ernie and company show them how to look after their hearts. The children got to hug a giant Elmo after being given two souvenirs of the day—a red T-shirt, colored for the blood pumped by the heart, as featured in the rear design, and a passport which, instead of countries, listed all the activities scheduled for this unforgettable day.



But before this the children were welcomed by their hosts, led by Dr. Valentín Fuster, who didn't hesitate to pose with Elmo and one of the many giant hearts that marked the event, which went under the slogan 'Dale tun-tún a tu corazón' (Make your heart go boom boom).



One of the most popular activities on the day was sliding down the giant inflatable shark, and many of the children repeated the experience. This year the children also had a new playmate, an inflatable octopus only for the brave-hearted. Earlier, they had learned about a lifestyle habit that will have a big influence on keeping their health in check: start the day like champions, or in other words eat a hearty, healthy breakfast. The children also sang 'La canción del

cardio' (The healthy heart song) and painted T-shirts with their own designs, later taking these home as a memento of an unforgettable day. Another new feature this year was the 'FotoBesón', where parents and their children shared a kiss and took away a keepsake photograph.

Some of the activities during **VIVE DAY** really just gave the children a taste of what they will be able to do when they get a little older. An example of this is the climbing wall, where the little ones bravely climbed several meters, to the amazement of their onlooking parents. And for the older children,

professionals from the Spanish Rugby Federation, which recently formed a partnership with the Pro-CNIC Foundation, were on hand to introduce them to this sport, showing them how to tackle and form a scrum.

It was an intense and fun day. So much so that all the participants are sure to be looking forward to the next Vive Day. What new surprises lie in store for our hearts next year?