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Eduardo Moreno

Alone in the Field

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Spain
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A common and sensible strategy for a successful career is to align your research interests with ideas the scientific community thinks are hot and promising. But sometimes a long shot really pays off. When Spanish developmental biologist Eduardo Moreno, 37, set to provide an explanation for an observation that had puzzled scientists for 30 years, he certainly was taking a gamble.

Earlier this year, after what Morena calls "3 years of carrying on a project that almost nobody within the Spanish funding agencies believed in," the gamble paid off when he received an award of €1 million from the European Research Council in a highly competitive research funding call. "I was very happy to get some validation by the best scientists of Europe," Moreno says.

WORK FIRST, PLAY LATER

Born to a family of lawyers, Moreno explored an early taste for science playing with microscopes and chemistry kits with friends. "It was a big thing in the neighborhood," he recalls. Later, he attended a development biology conference at the *Universidad Autónoma de Madrid* while he was a biochemistry undergrad and discovered his passion. "I was fascinated that there were rules to construct the body of animals," he says.

Moreno joined the lab of Ginés Morata at the *Severo Ochoa Molecular Biology Centre* in Madrid. Early in his Ph.D., he encountered a phenomenon called cell competition whereby "one of the cell types start[s] not allowing the other cell type to form part of the body," as Moreno puts it. Thirty years had passed since Morata and colleagues had reported the observation, but "it was very obscure what was going on there. Some people didn't believe [in] it." Morata advised Moreno to gather some solid data for a Ph.D. before taking on such a risky project, Moreno recalls.

Moreno's first job in the lab--helping a postdoc develop a mutagenesis technique to identify new genes involved in organ development and positioning--earned him a second-author paper in *Science* just a couple of years into his Ph.D. He then focused on one of those newly discovered genes, the caudal gene, and documented its role in the formation of the fly's posterior. Another paper resulted, this one in *Nature*, and this one with Moreno as first author. The work earned Moreno his Ph.D.--but not just yet--along with two important awards, the Extraordinary Award from the *Universidad Autónoma de Madrid*, and the Innogenetics Young Scientists' Award from the *Spanish Society for Biochemistry and Molecular Biology*.

PLAY TIME

When Moreno finished gathering data on the caudal gene, he still had a year and a half before the official completion of his 5-year Ph.D. "The pace that research goes today, it's almost a luxury to have a couple of years to play around," he says. His Ph.D. secure, he says he set out to see if cell competition "was a topic we could study with modern genetics methods and explain it."

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During that year, and subsequent years spent as a postdoc in Morata's lab (and later with Konrad Basler at the [University of Zurich](#), Switzerland), Moreno was able to link the previously isolated phenomenon of cell competition to the well-established process of programmed cell death. He hypothesized that normal cells were able to recognize suboptimal cells during development and force them to die, "a lot like an ecological system in a population of cells," he says. He proved the hypothesis in Switzerland and published another first-author paper (this one in *Nature*). The result won him a prize from the Severo Ochoa Molecular Biology Centre and the Young Investigator Award from the [Charles Rodolphe Brupbacher Foundation](#).

Moreno also found a homologue of a human cancer gene involved in cell competition. He demonstrated that, when activated, this gene could transform regular cells into "supercompetitors: cells that ... are able to make the surrounding cells believe that they are bad cells and ... [need] to die."

A RISKY IDEA

Moreno was pulled back to Spain in 2005 by a 5-year junior-leader position at the [Spanish National Cancer Research Centre](#) (CNIO) in Madrid. Start-up funding from CNIO, *Caja Madrid*, and *Mutua Madrileña* "allowed me to do research and have a relatively big group of seven persons," he says.

To establish himself as an independent scientist, he had to attract grant money, and the [Spanish Ministry for Science](#) was the obvious source. But his grant application to the Spanish ministry was rejected; the judges claimed the he was too inexperienced to take on such an ambitious project. Then it was rejected again, and again, and again. "For me, it became personal. I really wanted this project, and I ... kept sending it in the hope [the ministry] would realize their mistake," he says.

The vote of confidence--and investment--Moreno sought eventually came from a less likely source: the [European Research Council](#) (ERC). In one of the most competitive funding calls of European history, Moreno won an ERC [Starting Independent Researcher Grant](#), worth €1 million, to fund his research during the next 5 years. "We had 720 applicants to our panel for 18 grants; in other words, only 2-3% got funded," writes Susan Gasser, chair of the ERC jury panel that made the award, in an e-mail to *Science Careers*. "Eduardo Moreno made it through the first selection because of his strong past record and made it through the last round thanks to the innovative, yet highly relevant, nature of his grant, and his compelling presentation of his ideas."

Good timing also helped. At the time of the initial application, "there was no evidence whatsoever" that cell-competition specific genes exist, Moreno says. By the time he got to Brussels for the second round, he was able to demonstrate their existence--but the genes were only present in multicellular animals. This provocative fact allowed him to argue that cell-competition genes could be linked to the origins of multicellular life and that investigating them could help scientists understand and treat cancer.

"Eduardo's application was ... medically relevant, and yet exploited the genetics of a model organism, which is a powerful combination. Moreover, his approach is highly original. This is what won the review board over," Gasser writes.

CAUTION: SCIENTIST AT PLAY

Moreno and his team already have shown that when cell-competition genes are knocked out in mice, cancer growth is inhibited. He's thinking about translational research. "If these genes would have a role [in humans], it would be very exciting to try to [make] medicines that target some of these genes," Moreno says.

Moreno has always thought of research as a form of play. "There are ... a lot of things to stress you in science, because, simply, you need luck, it's very competitive, it's a bit of a gamble--you have to cope with these things."

But you don't have to give in to them. "If while doing my hobby, I publish, I am happy." But "it can only be a hobby if you do what you want to do."

Elisabeth Pain is contributing editor for South and West Europe.	Comments, suggestions? Please send your feedback to our editor .
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