

THE AUTHOR FILE

Miguel Angel Esteban

A way to study the RNA interactome, baby RNA encounters, a sprinkle of poetry.

It could be a nerdy tattoo. On the back of his hand is the word “RNA” and squiggles of, perhaps, RNAs.



Miguel Angel Esteban

When asked about the drawings, Miguel Esteban laughs. They’re just notes from that day’s meetings with some of the 20 members of his lab, which is medium-sized by Chinese standards. Esteban, a researcher at Guangzhou Institutes of Biomedicine and Health (GIBH) of the Chinese Academy of Sciences, says that science is his hobby, not his job. Being in China feels like an adventure in life’s lessons. “Personally, I think learning about life is as important as learning about science,” he says. “Here, I get the two things.”

To study disease-related processes, Esteban uses models such as stem cells. Given that RNAs and RNA-binding proteins interact in many disease-related ways, he developed RICK, capture of the newly transcribed RNA Interactome using ClicK chemistry. It will help to systematically model the RNA interactome and explore noncoding RNA functions, too. “Coding and noncoding RNAs need to interact with proteins for everything that they do,” he says.

The idea for RICK was born when Esteban considered oligo(dT) capture, the use of oligo(dT)-coated magnetic beads to isolate proteins interacting with mRNAs. It captures polyadenylated mRNAs; this poly(A) tail is a sequence of adenine bases added as the mRNA is cleaved from a gene. But a big part of the transcriptome has no poly(A), he says. RICK captures poly(A) and non-poly(A) RNAs. In this method, RNA is labeled with 5-ethynyluridine (EU), the cells are fixed and the EU is biotinylated using click chemistry. The RNA–protein complexes are captured with streptavidin-coated beads, the RNAs are profiled using RNA-seq and the bound proteins are identified by mass spectrometry.

When the team applied RICK, they learned something unusual about nascent RNAs. These baby RNAs are known to interact with proteins related to splicing, but they also appear to interact with gene-

regulating proteins. “That was surprising to us,” says Esteban. Being open for the unexpected is important in research, he says. As he and his group explore biological implications of their findings, they plan to try and capture RNA-binding proteins *in vivo*. He knows it won’t be easy. “One thing is dreaming, another thing is going back to the world and realizing how tough things are,” he says. “I think it’s going to work out.”

As for RICK, Esteban hopes many labs use it, set it up with the right controls and ensure no contamination. He looks forward to seeing how others optimize or change his technique. If many do so, he says, that would mean RICK “is really cool.”

Esteban always wanted to study disease. He received his MD from Universidad de Navarra, in Pamplona, Spain. When he realized that MDs in Spain have limited options to do research, he completed his PhD in biochemistry and molecular biology at Universidad Autónoma de Madrid and did a postdoctoral fellowship in the Imperial College lab of Patrick Maxwell, now at the University of Cambridge. When the British Council invited Esteban to give a talk in China, at first he didn’t want to go. Later, impressed by the potential he saw, he applied for a position and joined GIBH in 2008.

“You have to admire the person willing to dive into a totally different culture,” says Xiao-Fan Wang, a Duke University researcher, US citizen and external reviewer for the Chinese Academy of Sciences. Esteban encourages his trainees to try what has not yet been tried. “He’s really innovative,” says Wang. “We recognized his talent, and also we appreciate very much the challenges he has to face.” Chinese education and research are beginning to foster more creativity. “This cultural change would be helped by foreigners like Miguel,” he says.

Leaping into an utterly different culture felt right to Esteban, who has learned Mandarin. To do so, one must avoid memorization. “You just need to have intuition and then just open up your mind,” he says. Cantonese, however, is yet too daunting. With his Cantonese girlfriend Elaine, he speaks a mix of English and Mandarin. They are learning photography together. They travel in China and elsewhere and “we like very much learning together about the diversity of the world,” he says. Esteban also loves poetry. “That was my passion,” he says, but, for now, there is little time for reading and writing poems. His favorite poet is Walt Whitman. “I think he is special,” he says. Spanish and French are the best languages for poetry but he likes Whitman for the emotions his work transmits.

Vivien Marx

“...Learning about life is as important as learning about science.”

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