

Elisa Izaurralde 1959–2018

Elisa Izaurralde, a leading RNA biologist and director of the Department of Biochemistry at the Max Planck Institute for Developmental Biology in Tübingen, Germany, passed away on 30 April at the age of 58 after battling cancer. Elisa was born in Montevideo, Uruguay, and moved to the University of Geneva to study biochemistry. She pursued a PhD in molecular biology studying the interaction of DNA with nuclear protein scaffolds, under the guidance of Ulrich Laemmli. She then moved to Heidelberg to a postdoctoral position in the laboratory of Iain Mattaj at the European Molecular Biology Laboratory (EMBL). There, she contributed seminal work leading to the identification of the nuclear cap-binding complex (CBC), a protein heterodimer that recognizes the m⁷GpppG cap that is added to the 5' end of eukaryotic RNA polymerase II transcripts. Further efforts established roles for the CBC in pre-mRNA splicing and in nucleocytoplasmic export of mRNAs and uridylate-rich small nuclear RNAs, and uncovered an elegant mechanism for coupling of RNA export from and protein import to the nucleus, mediated by importins.

When Elisa returned to the University of Geneva to start her own independent research group, she remained fascinated by the question of how mRNAs are exported from the nucleus to the cytoplasm, at the time a largely unexplored area. Her detailed knowledge of the literature, an analytical mind and her intuition led her to use a sequence motif involved in the export of viral mRNAs as a probe to investigate the mechanisms underlying the export process. This triggered the discovery of TAP, a human protein that mediates mRNA export. TAP interacts with other RNA-binding proteins as well as with nucleoporins, thus offering a paradigm for how an export factor negotiates interactions between mRNP complexes and the nuclear pore. This was a defining moment in Elisa's career, which swiftly made her a leader in the field of RNA trafficking. The work already carried her signature of a multidisciplinary approach, strong biochemistry, rigorous functional dissection of mechanisms and attention to detail, which remained a constant of her scientific endeavors.

When Elisa joined the Gene Expression Programme at EMBL as a group leader in 1999, she naturally expanded her interests into other aspects of mRNA metabolism and their interconnections.



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An early highlight of this work was the discovery and characterization of the exon junction complex in collaboration with Hervé Le Hir, Melissa Moore and Lynne Maquat. This seminal discovery led to a long-term collaboration with the structural biologist Elena Conti, who had also established her group at EMBL. Their collaboration unearthed major insights into the molecular basis of mRNA transport, the function of the exon junction complex and mechanisms of mRNA degradation, especially by nonsense-mediated decay. Elisa and Elena jointly received the Leibniz Prize, Germany's highest research award, in 2008 for the "exceptional value, originality and elegance of the mechanisms identified." Elisa also developed an interest in microRNA-mediated regulation and quickly became a point of reference in this particularly complex field. Following her genuine thirst for mechanistic understanding and her uncompromising attention to detail, her group made landmark discoveries on the role of the CCR4–NOT deadenylase complex and the DCP1–DCP2 decapping complex in microRNA-induced mRNA turnover.

After highly productive years at EMBL, where she was promoted to senior scientist and coordinator of the Gene Expression Programme, Elisa was recruited as scientific director to the Max Planck Institute for Developmental Biology in Tübingen in 2005. There, she built a widely admired Department of Biochemistry, integrating molecular, structural and systems biology approaches to unravel particularly intricate questions in translational repression and mRNA decay. Research at this department

established key roles for SMG proteins in mRNA surveillance and delved into the molecular architecture of complexes that regulate mRNA translation by modulating the activity of the cytoplasmic cap-binding protein eIF4E.

Elisa's institute not only excelled in its sustained, top-level productivity, but it also became an ideal training ground for students, postdocs and junior faculty. Elisa made it a priority to dedicate time to mentoring, conveying high standards of excellence and a supportive, can-do attitude that made her a true role model. We remember how, without exception, every student and postdoc from Elisa's lab would give outstandingly crisp, convincing, perfectly prepared and professionally delivered presentations at international meetings, while her fellows cherished Elisa's generosity with time and her empowering smile. Unsurprisingly, many went on themselves to successful careers in research.

Elisa was a force of nature, passionately motivated to dissect molecular mechanisms, scientifically rigorous, intellectually fearless and wholeheartedly dedicated to her work, her group and her collaborators. She was also a generous supporter of her field and beyond, serving on numerous advisory boards of institutes, funding agencies and journals. She was an elected member of the European Molecular Biology Organization (EMBO), of the German Academy of Sciences Leopoldina and a former member of the board of directors of the RNA Society. For her outstanding contributions, she also received the Ernst Jung Prize for Medicine in 2012.

Elisa lived and breathed science. Her scientific contributions will have a long-lasting impact, as they fill many wonderful pages of the fascinating, life-like saga that mRNA molecules follow from their transcriptional birth to decay. She will be sorely missed by her family, friends and by a legion of colleagues around the world, and remembered for her brilliant intellect and her warm, winning smile. □

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Published online: 18 June 2018
<https://doi.org/10.1038/s41594-018-0081-1>