



Perspectives from Roberto di Lauro

Professor at the University of Naples Federico II and EMBO Member

Italy has been promoting excellence in the life sciences in Europe through EMBC and EMBO since 1972. You have been deeply involved in overseeing the EMBO Programmes as a member of the EMBO Council. Can you share your learnings?

I knew EMBO from the time when I came back to Italy from the United States. In 1985, I became a group leader at EMBL. At that time, I also became a full professor in Udine. I have always cherished initiatives that promote excellence in life sciences, have been part of them, and in general, have been in favour of them. There has, however, always been a debate about the promotion of excellence and the support of those that could become excellent. Sometimes there is a contradiction between these two

trends, because if you pick excellence, then you will leave those behind that would benefit from support on their way towards excellence.

Can you elaborate?
This is also about the discussion on the fair return for all countries that participate in excellence initiatives. I have to say I am very much in favour of the adamant criterion of excellence. But I think a discussion is already going on about initiatives that support scientists in countries that want to advance and excel, and the debate should be continued. It is not easy to reconcile these two approaches, because if one has excellence as the exclusive target, a vicious circle might occur in which those who are stronger become even more strong, and those who show potential but are weaker cannot grow.

What could be a way to reconcile these differing approaches?

EMBO can support setting standards for how science should be evaluated, and how scientists should be promoted. It can also support scientists to reach the necessary standards and establish specific schemes that help flatten the gradient of participation of scientists from different countries. The initiative to increase participation in the EMBO Programmes throughout Europe is going in this direction. I do not have an ultimate answer to solve the issue, but the issue should be a matter of an ongoing discussion.

What are current initiatives in Italy in this respect?

Current initiatives in Italy are addressing investment in research, schemes to support the best researchers in the country, and an efficient system to evaluate research. Very recently, the Ministero dell'Istruzione, dell'Università e della Ricerca (Ministry of Education, University and Research) launched a programme to support individual investigators that was suggested by the Italian EMBO Members. To help kick off this initiative, the Italian community of EMBO Members got together, ran an election, and created a steering committee of the Italian EMBO Members. This steering committee prepared the proposal and brought it to the attention of the science ministry.

What was the result?

Now there is the Fondo Italiano per la Scienza (Italian Fund for Science) which is the first initiative of this kind in many years that promotes the establishment of an improved peer-review system and supports individual scientists. The fund is an important new element in Italian science. I would like to acknowledge that EMBO was fully supportive of our proposal.

How can promotion of excellence tie into enlarging research capacity?

We need to talk about the relationship between exceptionally good, excellent science in a few centres, and equally important, good science as it is conducted in many labs at several institutions in the country. Both systems are important and need to interact, because new research findings are distributed, leveraged, and further expanded through the entire community of researchers in the country. Excellent science cannot be built up broadly because it would cost too much. So it is important that there are centres of excellence that help drive the research that is done in the entire country.

How should the centres of excellence interact with the other labs across the country?

The centres of excellence, such as the Italian Institute of Technology and the newly created Human Technopole in Milan, help the broader research community to perform research that would not be possible without collaborating with the centres. The debate about the co-existence of centres of excellence and venues for good science elsewhere is ongoing. The centres have helped revive the flow of brain power into Italy. Now there are more scientists who look at Italy with interest than previously. I think that Italy should continue to work on promoting the concentration of excellent scientists in a few centres, as it has happened in many other countries.

The centres not only have a role in attracting people from outside Italy, but also in functioning as support for all other labs.

Meet scientists from the EMBO communities



Aleksandra Grujevska Growing up in science

EMBO Scientific Exchange Grantee at University of Valencia in Spain

EMBO Scientific Exchange Grantee Aleksandra Grujevska grew up wanting to improve people's health. After obtaining a degree in pharmacy in her home country Macedonia, Grujevska went on to do a Master in Pharmacological Research at the University of Valencia in Spain, where she's now completing a PhD.

As part of her PhD project, Grujevska is identifying new pharmacological targets for chronic liver disease and liver fibrosis – a process that occurs when liver tissue becomes scarred. "We found that one antiretroviral drug had protective effects on the liver, but we don't know all the molecular mechanisms behind these effects," she says. Thanks to her EMBO Scientific Exchange Grant, Grujevska was able to spend three months in a laboratory at the University of Florence, in Italy, to learn how to isolate and grow a specific population of liver cells called hepatic stellate cells. Hepatic stellate cells promote fibrosis in response to liver injury or long-term inflammation. Using these and other populations of cells, Grujevska and her colleagues can study the signaling pathways involved in the processes

of wound healing and regeneration of the liver.

"I liked very much my experience in Italy, on a professional and personal level," Grujevska says. "I met wonderful people who helped me to see things differently and grow as a scientist." The international experience also spurred new collaborations between the University of Valencia and researchers in Italy, she says. "This grant was very important – for me and for the lab."



Nikolai Klena Peeking inside a cell's antenna

EMBO Postdoctoral Fellowship at the Human Technopole in Milan, Italy

To EMBO Postdoctoral Fellow Nikolai Klena, cilia are some of nature's most fascinating structures. These hair-like organelles that protrude from the cell surface help algae and single-celled eukaryotes to move around. In mammalian cells, they function as an antenna – playing key roles in regulating cellular signaling. Cilia have been implicated in a group of disorders that affect the development of essential organs, including the brain, heart and liver.

After obtaining a PhD from the University of Geneva in Switzerland, Klena

was awarded an EMBO Postdoctoral Fellowship to join the Human Technopole in Milan, Italy. There, he investigates the structure of cilia using electron microscopy and other structural biology techniques. Understanding the structure of cilia will help to elucidate how they work and what goes awry in disease. "We know that primary cilia are important for signaling pathways, but we really don't know what's in there," Klena says.

At the Human Technopole – Italy's new hub for research in the life sciences – Klena can take advantage of expert advice and state-of-the-art equipment. "The microscopes and the facilities are truly incredible, and they've brought in some world-class talent to help you learn and use these pieces of equipment," he says. Besides doing exciting science using advanced technologies, Klena also benefits from the training and network opportunities provided by EMBO. "An EMBO fellowship really opens your possibilities," he says. Living in Italy, which offers a high quality of life and a rich cultural heritage, is "the icing on the cake."



Carmine Settembre An escape turned into passion

Professor of histology at Federico II University of Naples | Group leader at the Telethon Institute of Genetics and Medicine in Pozzuoli, Italy

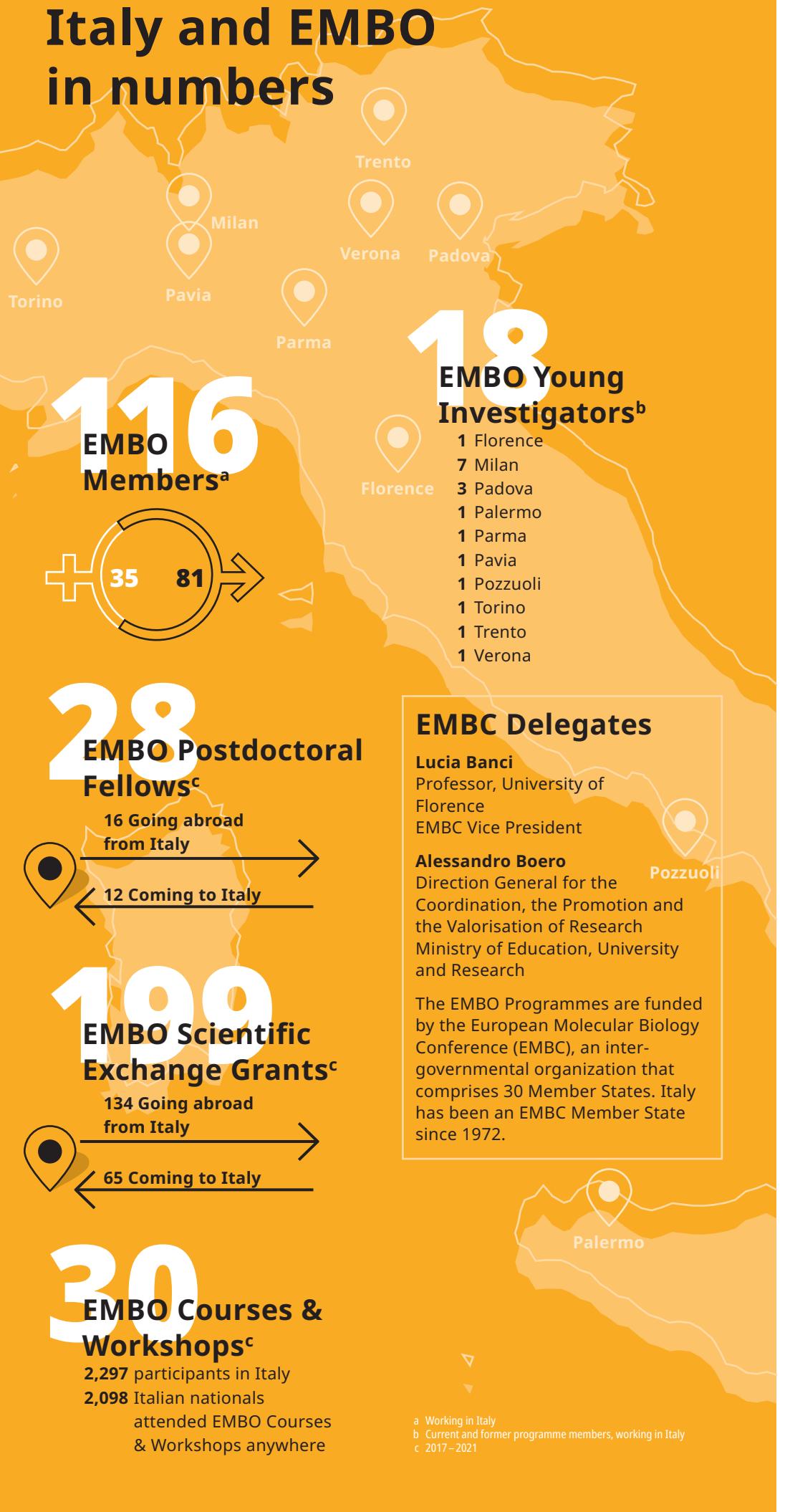
Carmine Settembre started to work in a lab only to skip military service, but he soon fell in love with research –

and never looked back. Now a professor of histology at Federico II University of Naples and a group leader at the Telethon Institute of Genetics and Medicine in Pozzuoli, Italy, Settembre leads a team of eight researchers studying the molecular mechanisms of autophagy – the process through which the body gets rid of damaged cells or cellular components.

Settembre and his team are investigating whether selective autophagy may be exploited to treat genetic disorders such as endoplasmic-reticulum storage diseases – a group of disorders in which misfolded proteins accumulate within the cell's endoplasmic reticulum. "There's no cure for these diseases, and we want to use autophagy as a way to remove misfolded proteins from the endoplasmic reticulum," Settembre says.

Settembre's research has been supported by numerous funding awards, including ERC Starting and Consolidator Grants. Since 2017, he is an EMBO Young Investigator. The prestige of the EMBO Young Investigator Programme helped Settembre get more visibility in his field. Through its annual meetings, the Programme also allowed him to network with scientists from different backgrounds – so much so that after one meeting, Settembre joined forces with another EMBO Young Investigator and wrote a grant proposal to study how organelles involved in autophagy may help corals to adapt to changing environments. The project didn't get funded, but working with someone from a different scientific field was refreshing, Settembre says. "I could have never experienced something like this without being part of the EMBO Young Investigator Programme."

Italy and EMBO in numbers



EMBO opportunities in Italy

EMBO Postdoctoral Fellowships

grant proposals. Applications open all year around.

EMBO Courses & Workshops

fund internationally mobile researchers for a period of up to two years. Five additional fellowships are reserved for those applying to work in participating countries, and an interview is guaranteed provided their application passes initial quality screening. Applications open all year around.

EMBO Scientific Exchange Grants

Researchers at any career stage and from any discipline in the life sciences can apply for a grant up to 700 euros to cover registration fees, travel and accommodation cost to participate at any EMBO Course or Workshop.

EMBO Lecture Courses

support new international collaborations, enabling the transfer of expertise unavailable in the applicant's laboratory. They fund research visits of up to three months. Applications open all year around.

EMBO Lecture Series

train PhD students and postdoctoral researchers. Application deadline: 1 March.

EMBO New Venture Fellowships

help early career scientists to explore topics outside their current area and enter a new research direction. They fund research visits of up to three months. Application deadline: 2 May 2022.

EMBO Core Facility Fellowships

support training for staff of core facilities that provide services to research institutions or universities. They fund international exchanges of up to one month. Applications open all year around.

The EMBO Young Investigator Programme

supports group leaders in the early stages of setting up their independent laboratories for a period of four years. Networking is a key aspect. Application deadline: 1 April.

EMBO Advanced Collaboration Grants

fund exchange visits of group leaders with scientists in other EMBO Member States to develop or carry out collaborative projects, or to prepare joint

EMBO Press

publishes five journals that serve the global life science community: *The EMBO Journal*, *EMBO Reports*, *EMBO Molecular Medicine*, *Molecular Systems Biology*, and *Life Science Alliance*, which is published in partnership with Rockefeller University Press and Cold Spring Harbor Laboratory Press.

Focus on Italy



Facts and figures

Italy has more than 1.7 million students¹ enrolled across 97 universities, of which 67 are under public law². Nearly 20% of Italy's population aged 15 – 64 has completed tertiary education, and 35% of employed people have tertiary education and/or work in science and technology³.

The country's R&D expenditure was 1.47% of GDP in 2019⁴. Business companies invested 16.6 billion euros, about 63% of total expenditure, while universities and non-profit organizations contributed about 24% of total expenditure. The share of the Italian government was 12.5%⁴.

Italy ranks among the top 30 most innovative economies, with Milan representing a top Science & Technology cluster worldwide⁵. In 2020, the European Patent Office granted 3,813 patents to first patentees residing in Italy⁶. According to the Organisation for Economic Co-operation and Development, Italy is a frontrunner in work-life balance, civic engagement, social connections and health⁷.

Researchers in Italy have been successful in securing international funding, for example through EU's Horizon 2020 scheme, European Research Council grants, Marie Skłodowska-Curie Actions programs⁸ and EMBO fellowships⁹.

The Ministry of University and Research (MUR) oversees higher education and research institutions in Italy, and is one of the main national funding agencies¹⁰. MUR's National Research Program 2021 – 2027 is a multiannual framework program aimed at achieving important goals, including the Sustainable Development Goals of the United Nations and the Next Generation EU initiative¹¹.

In line with EU's new funding program Horizon Europe, MUR's National Research Program 2021 – 2027 uses a cross-sectoral clusters approach

to boost key technologies, promote international research and strengthen interdisciplinary collaborations¹².

Key figures

Population: 59.2 million¹³

R&D spending: 1.47% of GDP⁴

Life scientists: 1.8 million¹⁴

Foreign researchers: ~ 2%¹⁵

Patents: 3,813⁶

**Number of universities: 97
(67 under public law)²**

Horizon 2020 funding⁸:

17,031 organizations involved in H2020 projects

478 ERC Principal Investigators

2,646 Marie Skłodowska-Curie Actions funded researchers

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