

# A focus on excellence

An interview with Iain Mattaj, former Director-General of EMBL and Director of the Human Technopole

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**EMBO reports (ER):** When you took over as Director-General from Fotis Kafatos in 2005, what would you have wished to have known before you started?

**Iain Mattaj (IM):** I had been scientific director, and had worked closely with Fotis for 5 years prior to that period. What I did not fully realise was the administrative load that the position carried. That, in retrospect, was because Fotis had previously protected me from almost everything of that sort. I just did not expect the administration involved in the position to be so hugely time- and concentration-intensive.

**ER:** Was this a reason that you eventually gave up your research group?

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**IM:** Many people, including Fotis, felt that in order to be respected as the Director-General of EMBL, you had to retain scientific credibility, and the most straightforward way to do that was through the output of your own lab. Initially, I downsized my lab because I did not have a hierarchical lab with senior people who organised and led the research and the younger researchers—my lab depended upon direct interactions between pre- and post-docs and me. I didn't want to establish such a hierarchy: if someone was good enough to run my lab, they were good enough to run their own lab. I realised in advance that I would not have enough time to speak regularly to all the lab members: these short conversations are very important in terms of stopping people

heading off in the wrong direction or not getting advice between possible sets of priorities and efficiency drops quickly in their absence. Knowing I was not spending enough time mentoring became a guilt generation machine that ultimately led to the decision to close the lab.

**ER:** Many other directors of research institutes or funding agencies still have an active lab. The other model is a professional administrator running the institute, such as the VIB in Belgium. What do you see as the merits and the downsides?

**IM:** There are lots of different models for running organisations and labs. There is not one that is better or worse, it is just what works for each situation. Harold Varmus and Tom Cech directed NIH and HHMI and ran their labs at a distance. Different people in very time-demanding positions work out different ways that they are comfortable with to do research. The way I liked to run my own research lab was incompatible with the DG position.

**ER:** What have you learned as DG of EMBL?

**IM:** I learned to be a lot more patient. It is about how to interact with and work with people. Most aspects of behaviour of people in a population correspond to a bell curve over a huge distribution. For example the range from honesty to cheating and lying is a bell curve. It means that people like myself or the heads of human resources spend an inordinate amount of time with people at one end of each behavioural bell curve trying to solve problems that wouldn't be a problem for the person at the mean or the median of the curve. Those cases are extraordinarily difficult to deal with because you have to make allowances for the fact that they don't react in the way that the average member of

the population would. Running a lab, one thing you learn is that everyone is an individual and you have to treat everyone differently. But, unless you are very unlucky, your entire lab is not going to be made up of people at the extreme ends of bell curves. Whereas, if your job involves solving problems, you tend to spend a lot of time with those people and you just have to learn to find solutions, which take time.

*“I feel that dealing with research ethics, misconduct and fraud are very important institutional issues.”*

**ER:** There is currently a huge debate about a reproducibility crisis in biomedical research. Do you agree that this as a growing crisis or is just becoming more obvious?

**IM:** There has always been fraud and lack of reproducibility in science: is it getting better or worse? Show me the data and I will tell you the answer. I don't think it exists. My impression is that it affects certain areas of research more than others, and one area where lack of reproducibility became a big problem was signal transduction in general and in particular in cancer research on mammalian systems. One could see that problem coming from the 1980s on, because it was so clear that people were doing very non-definitive experiments, but interpreting them along particular, easily publishable, lines. With biochemical experiments, you can frequently make something happen by changing the relative concentration of the ingredients. This is real, but whether it reflects *in vivo* biological reality is in question and overexpression studies in cells and

animals suffer from the same problem. These methods were employed for much of the research in signalling and cancer, so I am not surprised that these are among the areas where reproducibility is a problem. Is it getting worse? Better? The technologies we have today are more reliable and more quantitative than before and it is therefore likely more difficult to produce a result to order to satisfy a referee or an editor, and I guess it is therefore probably getting better.

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**ER:** There are many reasons for fraud in research and one is a structural and institutional problem: The more you increase pressure on people, the more likely they begin to cut corners.

**IM:** People say that, but where is the data? There are countries with a very competitive funding system like the USA and there are countries where at a young age you get a research job for life. Is there any data that proves there is more fraud in the USA than, for instance, in France? I have never seen any. There are many different ways of funding research—from giving everyone a bit of money, to concentrating lots of money in a few labs that have good ideas or proven records. The second is definitely more competitive, but does it cause more fraud? We don't know.

**ER:** How do you deal with misconduct—not just fraud but also issues like bullying and harassment—at an institutional level?

**IM:** I feel that dealing with research ethics, misconduct and fraud are very important institutional issues. I do not think that there is much that you can do to police those behaviours at a higher level. What helps is to create an atmosphere at an institutional and at lower levels of an institution that both identify and help to prevent such behaviour. I think for fraud the secret is to have an open culture where people talk about what they are doing all the time,

show each other their results and are aware of the grey area between good research practice and bad research practice. Those things need to be discussed.

Similarly, with issues such as harassment and bullying; again, prevention is helped by an open culture where people talk about these things and don't keep them hidden. But there has to be someone to talk to if you are bullied or harassed who will do something about it. EMBL has many people, Human Resources, the Staff Association, the PhD and postdoc training staff, second mentors, the ombudsperson, Heads of Research and Service Units, etc. to whom affected staff members can talk and who can help them find a solution.

**ER:** EMBL does not put pressure on group leaders to publish and perform—is this only possible at institutes like EMBL, or can other universities or research institutes adopt this model?

**IM:** This depends on what the research institute or university wants. What EMBL is looking for are people who are ambitious and want to do original research. It is fine and true that we don't put pressure on people to publish quickly. But of course if they sit back and do nothing they will be out, so it is not that there is no pressure. Indeed, a lot of people at EMBL feel under a lot of pressure, because if you are in an environment where a lot of your peers are doing extremely well, you tend to generate a lot of pressure on yourself to perform.

**ER:** But this is different to a university tenure track where you are expected to have your first grant within say 1.5 years, or many universities that measure people merely on the cumulative impact factor of their publications.

**IM:** An institution can decide whether to do that, or to use other measures. From my point of view, it would be much more sensible to decide not to do that. There is a tendency to look for conventional signs of any kind of activity rather than creativity and originality. I think creativity and originality are good for science and there is a way, expert peer review, to assess them. But I realise that there are funding systems that force individuals and institutions to produce publications quickly, even if they are not high quality. I just don't think these systems are very sensible. Places where a lot of the best research comes from tend to offer researchers some level of stable funding—enough to enable long-term

research projects research ticking along and to generate sufficient output to be competitive for additional funding that allows a more ambitious research programme. In Europe, most research institutions have this model with some stable funding, that to a greater or lesser extent you have to supplement with competitive funding and it is also used in some institutions and by some funders in the US.

**ER:** If you reach the level of excellence and quality that EMBL has, how do you maintain that or even notch it up? It's the people who do this, so what are you looking for when you are recruiting?

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**IM:** I think it is mysterious how you maintain institutional quality. The historical perspective is that there have been many institutes that have been very good for a period and then cooled off. But all of the institutes that I know that are very good have somehow developed a particular culture. I think the EMBL culture is a very collaborative and open one. People can very easily feed off each other and many collaborations enable people to do things that they would not be able to do on their own. Another aspect is this peer pressure that is generated if you are in an environment where your peers are performing at a very high level: you want to perform at that level too.

How do we try to maintain this culture? Job applicants talk to lots of people across the institute and one item of feedback we always look for is “were the people interesting to talk to? Were they interested in your research as well as their own?” We are interested in people who want to discuss, who are saying “maybe we could collaborate because I can do this, you can do that, why don't we do something together?” Collaboration is a very frequent outcome of job interviews, even unsuccessful ones. We are not interested in people who have published fantastically if they are not interested in anything or anybody except themselves or

their own research. Essentially, we are looking for people who are interested in doing things that are interesting, new, original, and that are going to make a difference not just to their own research, but for many people, either at EMBL or elsewhere.

**ER:** What would you regard as your greatest successes during your time as DG?

**IM:** The thing I am most proud of is the remarkable quality of the work—research, service, support—being done all across EMBL. Next, and more focused, is creating conditions at EMBL to deliver on the promise of bioinformatics—firstly by making it financially possible to stabilise EMBL-EBI [the European Bioinformatics Institute], which was in a very unstable state when I took over as Director General. It was something that everyone thought was important but nobody wanted to fund. EMBL Council went along with my arguments, which were in part numerical ones: what is the EBI dealing with in terms of data volumes? What is the growth in data volume in different areas? How many people use the data resources? It took quite a bit of persuasion that these are indeed valuable indicators to persuade Council and other funders to increase data-resource funding.

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Other things include keeping all the member states on board in the aftermath of the financial crisis. It was not that any member state would have left EMBL happily, but many were in a very difficult situation and we had to persuade them that EMBL was doing something useful for their community and not just doing something useful but not connected to them. They luckily all saw the value of membership and made it a priority.

And then the growth of EMBL in terms of the number of member states. It is a fantastic reflection of how the reputation of EMBL continues to grow and the attractiveness of becoming part of a successful international

community. A ray of hope in these times of nationalism.

**ER:** EMBL has a new outpost in Barcelona—how big do you think EMBL could grow?

**IM:** There is no clear answer. I think Janet Thornton’s dedication to setting up ELIXIR whilst she was Director of the EBI came partly from the difficulty of funding EMBL-EBI, but mainly from her realisation that running all the necessary biomedical data infrastructures was far too much for a single location or institute. She realised that it was going to take a lot of partners working together. EMBL-EBI is not as big as it might ever get, but it is not going to grow at the rate it did between 2007–2014, when it was growing very quickly to catch up with a pre-existing need.

Looking at EMBL as a whole, EMBL’s headquarters in Heidelberg has not grown substantially, nor have the EMBL Hamburg or EMBL Grenoble sites, both of which have increased activity by making connections with local institutions to create something that is bigger than just the individual institutions. I think the model of having more partnerships and more EMBL sites elsewhere that grow to a certain size and then stabilise—that is manageable. And all of the current sites are doing excellent and valuable services and research. I don’t think that adding new moderately-sized EMBL sites in additional countries will reach a limit beyond which it gets inefficient anytime soon.

**ER:** You are going to become head of the Human Technopole in Milano, another huge research institution. There is Janelia Farm, the Crick Institute, new large Max-Planck sites like Dresden—does this expansion of research institutes come at the expense of universities? Do you see increasing competition for funds and scientists? Could it come at the expense of teaching and training at universities?

**IM:** Is the growth of research institutes detrimental to universities? European countries chose 100 years ago to divide their scientific activities into institutes that more or less carry out only research, and universities. A healthy system of this sort requires good research institutes, well-funded research universities and research infrastructures that serve communities. The US system is a very different model: mainly, but not entirely, based on universities and research infrastructures. But the US model

of charging overheads to research grants enables universities to, among other things, buy good researchers free time—the best researchers give very few lectures. So even that system, to some extent, divides teaching and research. Do I think it is a good thing to prevent the best researchers from teaching? No I don’t. But that’s the system we have in Europe.

**ER:** What was the main goal behind prioritising funding of communications and outreach?

**IM:** Essentially, research is paid for by taxpayers. Therefore I think research institutes and universities have a duty to tell people what they are doing with their money. Not only to tell people, but to have a dialogue about what is good, what is bad, what do people worry about, what do people want or not want to happen.

**ER:** This raises the issue of fake news, post truth and post science—do you see there is an increasing need for scientists and scientific institutions to address this trend?

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**IM:** I see this as a huge problem for society, if people think someone who does not know anything about a subject is equally likely to be correct about something than someone who has spent many years studying that subject. If you go to a doctor, you do not then go and get a diagnosis from the baker next door and then do what the baker says. I think this anti-expertise attitude is damaging our society enormously—the fact that people are ready to believe stuff that manifestly is wrong because that belief is comfortable for them is incredibly negative. It is not new, but it has reached a level that, within my lifetime at least, is unprecedented.

A lot of scientists do a lot of work to make people aware of major problems that society has created—for instance lack of biodiversity and global warming, and what the dangers leading from these are. These are very large issues and it was the people who studied them that put them on the agenda and created the organisations to monitor them on behalf of all of us.





Iain Mattaj was born in 1952 in St Andrews, Scotland. After completing his undergraduate degree in Biochemistry at the University of Edinburgh in 1970, he attended the University of Leeds, England, for his PhD studies under John Wootton. Iain Mattaj carried out postdoctoral research at the Friedrich Miescher Institute, Switzerland, and the Biocentre, University of Basel, Switzerland, before joining the EMBL as a Group Leader in 1985. He became Programme Coordinator of the Gene Expression Programme in 1990 and Scientific Director in 1999. In May 2005, he was appointed Director-General until he stepped down at the end of 2018. Iain will become the Director of the newly founded Human Technopole research institute in Milano, Italy.

Prof. Mattaj has made numerous important contributions to understanding how RNA, proteins and ribonucleoproteins are transported between the nucleus and the cytoplasm. His more recent work at EMBL described the role of Ran GTPase in the regulation of mitosis, including the reorganisation of the cytoskeleton to form the mitotic spindle assembly and nuclear envelope assembly.

Prof. Mattaj is a distinguished scientist whose contributions have been recognised by his election as a Fellow of the Royal Society (London), Fellow of the Royal Society of Edinburgh, Member of Academia Europea, Foreign Honorary Member of the American Academy of Arts and Science, Fellow of the Academy of Medical Sciences (London), Foreign Associate of the National Academy of Sciences (US) and EMBO Member. He received among other prizes the Louis-Jeantet Prize for Medicine and has served on several editorial positions, including Executive Editor of *The EMBO Journal* from 1990 to 2004. [Editorial disclaimer: Iain was Executive Editor of *The EMBO Journal* and is a member of the Advisory Editorial Board of *The EMBO Journal* and *EMBO reports*]

EMBL is Europe's flagship laboratory for the life sciences. It was established in 1974 as an intergovernmental organisation, and is now financed and supported by more than 20 member states. EMBL performs fundamental research in molecular biology, offers services to the scientific community, trains the next generation of scientists and strives to integrate the life sciences across Europe. EMBL's more than 1,700 staff, from over 80 countries, operate across six sites in Barcelona (Spain), Grenoble (France), Hamburg (Germany), Heidelberg (Germany), Hinxton (UK) and Rome (Italy). EMBL scientists work in independent groups and conduct research and offer services in all areas of molecular biology. Photo credit: Photolab/EMBL

**ER:** The Human Technopole is more focussed on medically relevant research than EMBL—do you see even more need to do outreach and public communication?

**IM:** Yes. In terms of planning it is too early to say how exactly HT will do that. In some ways it is easier to persuade people of the need for technological solutions to health problems. Public acceptance of green versus

red biotech in Germany is a good example of this, where medical biotechnology and recombinant drugs are great, but GMOs are life-threatening. But there are very few countries where people are not concerned about the consequences of technological solutions to problems. The Human Technopole will be focused on human biology rather than human health per se, so we will have a

broader remit. Nevertheless, working in the area of health does bring with it the requirement, even more than basic biology research, to explain what it is you are doing and what are the possibilities. Being careful not to oversell things in terms of potential health benefits and ensuring people understand that what you are doing is usually just step one on a long road towards something

medically useful is very important. In some areas of human biology research, that road can be quite short—things like cancer diagnostics and new discoveries about the molecular basis of disease can in some cases change diagnostic and treatment practices very quickly, but in general, it is a slow process.

**ER:** Would you have done anything differently as DG if you could have?

**IM:** Probably everything! But it did not turn out too badly. A negative answer would imply a level of planning and strategy of which I am incapable. Many things that I have done or EMBL has done were the result of the situation on a week-to-week, month-to-month basis, rather than long-term planning. However, there were things that did depend on long-term

planning after lots of thought and I would not change any of those because they all worked out well. Examples were the scientific and financial planning for EMBL Barcelona or the Advanced Training Centre or the expansion of EMBL-EBI.

**ER:** What advice do you have for Edith Heard, your successor?

**IM:** Edith doesn't need my advice, as it would be to do what she intends to, which is to get to know the place before she starts to change too much. It is important that she develops (collegially) ideas about what she would like to do that are ambitious and are difficult for other individual research institutes to do. EMBL has been able to integrate with multiple collaborators to make very ambitious projects happen, for

example, pan-cancer genomes, ENCODE, Tara Oceans, EuroBioImaging, ELIXIR, etc. I think a place that is as collaborative and outward-looking as EMBL is a natural home for such projects because people are prepared to invest the time and effort that it takes to put them together and they are used to treating partners with respect. It is part of the organisational culture to get involved with large ambitious community projects and they are of huge benefit as a complement to individual research projects.

**ER:** Dr Mattaj, many thanks for the interview.

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*The interview was conducted by Adam Gristwood and Holger Breithaupt*