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Europe has the tools to advance in both basic and translational research but on the latter, it perhaps needs to simplify its processes and expand both scope and working models

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Professor Susan M. Gasser, now director and group leader emeritus of the Friedrich Miescher Institute for Biomedical Research (FMI), shares the crucial aspects behind the FMI's world-class reputation in basic research, her thoughts on the importance of public-private collaboration, and her perspectives on the European research ecosystem. Since February 1, Dr Gasser is the Director of the ISREC Foundation, which has established a new translational cancer research institute in Lausanne, called the Agora.

Susan, having been with the FMI for over 16 years, can you outline the journey it took to become the world-class research institution it is today? What lies behind the vision and the success of the FMI, from your perspective?

The FMI was founded 50 years ago with a vision that was not far from what it is today: it was created to provide a pure research and training environment at the cutting edge of new life science developments. When I joined as director in 2004, I was asked to ensure that it was "world-class", which meant having international recognition across all levels of its research landscape. In short, that would imply that when the name FMI is mentioned, everyone in the room would know someone working at the FMI that they respect.

Beyond that, a simple quantifiable criterion is to be highly successful with respect to competitive grant funding, something we achieved in aces: we are the most efficient institution in Europe in terms of successful European Research Council grants, which are the gold standard of innovative research in Europe.

On the other hand, we are also funded by the pharma industry – specifically Novartis – so it is important that we also generate insights that are translatable and thus valuable for the pharma industry, even if we do not do the translation ourselves. This means staying ahead of the curve. For instance, if targeted protein degradation is going to be the next big drug development trend, we should have been there five years before that.

The question is, how does one see the future? For me, it is simply a matter of hiring the right people and then giving them the freedom to do excellent research. We are very hard-nosed about quality and excellence. We want substance, not flash. We do not care if it takes a researcher five years to generate a solid data set, with no publication during that time, as long as the end result is important and robust. Yes, we have to maintain our competitiveness when it comes to applying for grants, but for the bigger goals we benefit enormously from the core funding we receive from Novartis. That funding is not earmarked for specific projects, and has been critical for giving room for bright and ambitious researchers to develop cutting-edge technologies.

For instance, a junior group leader developed high throughput organoid screening. Another developed adeno-associated virus (AAV) delivery to retinal cells, based on relevant cell-type specific promoters. Yet another developed molecular glues for targeted protein degradation. None of these researchers were big names when they did these projects – FMI helped them establish international reputations, but their own performance was key. The trick is to hire the right young talent and give them the freedom and funding to work on their projects without having to spend a lot of time applying for funds or writing reports.

Has it been challenging for FMI to recruit top scientific talent? How do you assess the competitiveness of the FMI versus institutions in the US?

We have actually hired many people from the US, usually Europeans that had left to work in the US, who wanted to return. Once they come to FMI, they almost never leave. FMI currently has 20 group leaders, and all but two I either hired or tenured. Moreover, only two group leaders chose to leave the FMI during my tenure: one spun out his own institute, which is also a measure of success for us, and another returned to Yale University in the US. As a scientist, the very open and efficient

research atmosphere at FMI is highly attractive.

It helps as well that Switzerland provides an excellent environment for scientific research. Support people are extremely well trained, and salaries are generally high – not specifically at FMI, as we pay the standard Swiss National Science Foundation salaries – but salaries are high on global standards, so we can afford to be extremely selective in recruiting.

Finally, living in Switzerland is attractive, as it is generally safe and secure, the schools are excellent, public transportation is excellent, services are reliable and there is a deep appreciation of culture and the arts.

You have also been involved with advising the European Research Council (ERC). Taking a step back, looking across the EU, do you think the current financing mechanisms for science in Europe are working as they should?

The ERC has been outstanding for fostering individual excellence and creative ideas in science and research; there is not a lot to improve there. The ERC is perhaps the greatest success story Europe has in research administration, and it has made the continent extremely competitive with the US in terms of open-ended research.

But the other side of the coin is the translation of research and scientific insight into application. We are often behind in terms of technology development and innovation. Recently, the ERC has added this type of funding to its repertoire: if an ERC grantee identifies a promising lead or proof of concept that could be translated into a product, they can receive additional money. I do not necessarily think that this add-on is the best way to go about it, but it shows that even the ERC recognizes that there is a gap.

A new proposal has been put forth to establish a European Innovation Council for the translation of research findings into proofs of concept or even start-ups, which will, like the ERC, have Europe-wide calls for proposals, rigorous review boards, and funding that is not too proscriptive. I have been involved in a number of European translational science programs with very defined goals, for instance the Seventh Framework Program (FP7) and Horizon 2020, and each time I was contacted for input, I was shocked at how narrowly defined the calls were. There was very little freedom or room for the unexpected, which meant that applicants often did intellectual acrobatics to adapt their proposals to the call. These were not highly successful programs, thus I hope the EIC will be more flexible.

I do not mean that all the calls were bad: indeed, there were some great programs on new antibiotics and on drug development for diseases in developing countries. But both the manner in which the programs were defined, and the way advisors were consulted, felt very rigid.

What do you see as the role of industry in translational research? Should academics in Europe be more supported in collaboration with industry?

Definitely! But there must be rules and standards for such support. Of course, private interests should not control where public money is spent, but collaboration and cooperation should be expanded. There need to be widely accepted rules for collaboration between the public and private sectors. For instance, in the case of FMI, we have a hybrid situation: as a not-for-profit foundation, we were free to apply for competitive funding whether private or governmental, but we also had core funding from a private company. The company claimed the first right of refusal on all IP generated at the FMI. Interestingly, none of the public funding agencies we received grants from were against this, so this worked well for us. We have competitive grants from the European government, from the Swiss National Science Foundation, and we receive money from private foundations like the Swiss Cancer League, and from foreign institutions as well.

Another level on which we could collaborate more, is to include individuals working in industry on the boards of academic research institutions. They represent themselves not their companies, and we need their expertise.

The Innovative Medicines Initiative (IMI) – the partnership between the European Federation of Pharmaceutical Industries and Associations (EFPIA) and the EU – is another very good program. Here, pharma companies have defined certain non-competitive or pre-competitive areas in which they find they cannot advance sufficiently on their own. They are willing to team up among themselves to share data and expertise, and to collaborate with academics, who can join projects with multiple companies simultaneously. The projects are reviewed, guidelines are established, and the interactions between the public and private actors are well-defined. This is a highly innovative mode of working, and last year the European Commission released a proposal for the establishment of an Innovative Health Initiative (IHI), which would take this collaboration model beyond pharma and biotech, into the health technologies, imaging and digital health spaces.

Overall, I think Europe has the tools to advance in both basic and translational research but on the latter, it perhaps needs to simplify its processes and expand both scope and working models.

There has been a trend in recent years for companies to focus on technology platforms instead of disease areas per se. Industry executives are now concerned about how to allocate their resources. Of course, there is no single right answer but what insights can you offer on this choice?

Obviously, both are needed; the real question is how to bridge the two. A basic research institute like FMI lacks therapeutic- and disease-specific competence, but usually is on top of new techniques. The gap sometimes creates a hurdle for communicating to industry partners because we speak one language and they speak another. For instance, CRISPR screening did not exist in drug development seven years ago, and if a basic researcher starts talking about it to a disease specialist, they may not necessarily understand each other. It is essential to set up the right interfaces so that people from both sides can interact successfully.

For companies, the priority should be to understand what they can do better internally and what they can procure externally. If they can speak to onsite MD experts on a specific disease-related question, that is probably the best since these MDs have contact with patients. The companies then need to ensure that they have people within the company that communicate well with both MDs and engineers, who can capitalize on new insights for drug development.

In terms of technology platforms, I think if there is a really new technique, it is better to look at the external players first and work with them. Actually, the FMI has played that role for Novartis, transferring a number of technologies into Novartis. But not all pharma companies can afford an institute like FMI, nor can they develop all the platforms in-house. Companies need to be able to tap into the external ecosystem to explore new developments, and then decide if they want to adopt them.

Given your long experience in the field, how do you assess the progress of women in science?

Significant progress has been made, but there is a long way to go. There are impressive numbers, for instance, up to 70 percent of the MDs trained in Switzerland are women, and many research scientists as well. It is a significant step forward from where we were 30 years ago.

However, there is much to be done to ensure that these women assume management positions, especially in the pharmaceutical industry. If the imbalance does not rectify itself by consciously

suppressing bias in hiring and promotion boards, then a quota system should be established, at least for a short while, stipulating that a given number of women should be hired. Far easier is to guarantee that women are fairly represented as speakers at conferences, and support should be withdrawn from conferences where too few women present.

It is important to be pro-active both about gender balance and overall diversity. That means that there should be space for people from all walks of life in science, regardless of gender, ethnic background, sexual orientation, or personality type.

What do you think about the role of big pharma on diversity and inclusion? They have been acquired companies at high speed and can possibly demand as a KPI a certain quota or level of inclusion in the acquired company.

I think big pharma has been doing rather well in terms of diversity, and yes, they continue to have an impact. Academic science is behind overall, and that is where we need to pay more attention. If that means being stricter and insisting on a more diverse participation, then perhaps it must be imposed.

I am soon joining the board of a European mid-sized pharmaceutical company, which I am very excited about. The quality of the work and their mode of interaction within the company are outstanding. They also care about diversity, as evidenced by having people like me on their board. It turns out that I am actually replacing another female colleague. Even if inclusion is high on the agenda, it must be put into practice, from the earliest stages of academic science through translational biotech, venture funds and big pharma.

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