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With the new university and faculty leadership, attention has been turning from a traditionally strong basic research focus to a more innovation- and development-based programming

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elaborates on his priorities to implement a more practical, experience-focused curriculum as the recently appointed Dean of the Faculty of Medicine of Semmelweis University. Dr Kellermayer goes on to speak about the universityâ??s critical role within the Hungarian healthcare ecosystem and the initiatives taking place during the universityâ??s 250th anniversary to increase collaboration with private industry and drive innovation.

Please begin by introducing yourself and your research areas of interest.

I have been Dean of the Faculty of Medicine here at Semmelweis University since July 1st, 2019. I trained as a physician at the University of PÃ©cs and soon after graduating turned my attention to research. I then spent a number of years in the US at the University of Washington in Seattle, then at Washington State University in Pullman. My main research focus is on biophysics and within that, single-molecule biophysics using special methodologies. I was fortunate to be in the research group to stretched and unfolded the first protein molecule, titin, in 1997, the result of which was published in *Science.*

In 2008, I was invited to take over the chairmanship of the Department of Biophysics and Radiation Biology here at Semmelweis University which was when I relocated from the University of PÃ©cs. Upon arrival with my research group, we were able to establish a unique research centre of nanobiotechnology and *in vivo* imaging. The mission of this centre is to bring any research topic from a single molecule all the way to the bedside â?? meaning truly translational research. To accomplish this, we implemented the so-called 3M program: from molecules to mouse to man. In the upcoming months, we will install our first large animal imaging tool which brings us one step closer to deliver these innovations to the bedside.

Although I am a trained physician, I am focusing my energy on research and education. In the department, we teach medical biophysics and medical statistics primarily to medical students but to pharmacy and dental students as well. I have been quite involved within the university administration as the vice-rector for research and international programs and afterwards the vice dean of educational affairs before taking on my current position.

What have you identified as your initial priorities in the role of Dean of the Faculty of Medicine?

Since last December, the rector of Semmelweis, Dr Merkely BÃ©la, asked me to oversee the medical curriculum reform. Therefore, I had a six-month jumpstart on my deanship where I planned and strategized the initiative. This reform is the current flagship program at the university and is a central issue for me as the Dean of the Faculty of Medicine. Our vision is that this restructuring of the medical curriculum will become a key concept for the standardization of medical training throughout Hungary.

Semmelweis University has always held the position of being the champion of medical training in Hungary, which comes with some intellectual responsibility. We have realized the need for a more efficient transition into residency and more practical skills for our graduates. In the theoretical part, we are removing futile redundancies by making certain subjects like classical anatomy more compact and practice-oriented, for example.

Another step was to move pharmacy, a massive two-semester-long subject, from the clinical module into the third-year preclinical module. Furthermore, in the clinical module, we introduced a block-based system in which students will spend a given number of weeks at only one training site rather than having to travel between locations. By changing the semester structure in favour of block scheduling â?? a novelty in Hungary â?? this will greatly improve the experience of students in their fourth and fifth years. In the final sixth year, the most significant change has been an introduction of a fully elective six-week block where students may select any clinical discipline they like, which allows them to have a better orientation regarding their residency decisions.

We have launched this curriculum not only for the first-year students but for the third-, fourth- and sixth-year students as well. Although this requires an accommodation period over the next few years, we decided for this bold step so that every student would be able to benefit from the change.

What is the role of an academic and research institution like Semmelweis in enhancing local healthcare?

Semmelweis University runs the single largest healthcare provisional institution in Hungary. In the Hungarian language training program alone, our number of students is twice as large as in either of

the three other main medical schools in the country. Our clinical hospital system is very professional, and we carry the highest-ranking hospitals in most, if not all, medical fields.

On the other hand, our indirect contribution to Hungaryâ??s healthcare system is through our medical, dental, and pharmacy training programs. We have a key responsibility to cultivate the next generation of skilled healthcare professionals. Semmelweis University also has a faculty of health which trains nurses and other medical professionals.

Furthermore, in a regional sense, we have a very high-flying German and English language program. More than 60 countries are represented at Semmelweis University, with students coming from Israel, Iran, the US, Japan, and South Korea to name a few. In fact, our international students even outnumber our Hungarian students!

How important is cooperation between academic and industry players in building a stronger and more innovative health paradigm?

With the new university and faculty leadership, attention has been turning from a traditionally strong basic research focus to a more innovation- and development-based programming. This involves the creation of a portfolio of collaborations that incorporate not only other universities but the private industry as well. Pharma has been traditionally present in Hungary for 100 years with originally family-owned companies, some of which were taken over by larger private organizations while some remain Hungarian-owned. This makes the industry a truly strategic player within the Hungarian health ecosystem.

Our partnership with Hungaryâ??s leading domestic company, Gedeon Richter, has been traditionally strong at several levels such as through several R&D projects in which the company and Semmelweis University have been jointly present. For example, ten years ago, generic liposomal doxorubicin was developed collaboratively between the company and university research groups. Besides co-development, Richter has been running prestigious grant programs within the university and for post-doctoral graduates as well.

Recently, Semmelweis University signed a strategic partnership with Gedeon Richter. This important step was part of the kick-off for the universityâ??s 250-year anniversary. Starting this summer, we have begun the 250th celebration of the university, and among the activities, we held a discussion about the future development of the innovation involvement of Semmelweis in Hungary. The two main guests of this discussion included the chairman of Gedeon Richter, Erik Bogsch, and the Minister of Innovation and Technology, LÃ¡szlÃ³ Palkovics, which underscores the importance of this partnership.

Semmelweis is also a key stakeholder in the development of Hungaryâ??s new Healthcare-Biotechnology Science Park. How will this park help to leverage academia-industry relations?

To further enhance our portfolio of collaborators with the industry, we are launching a new biotechnology science park program. The development of novel, bio-based nanotechnology is just one of the five main fields of science which the park will entail. This park will be at the center of three university partnerships: Semmelweis University, PÃ¡zmÃ¡ny PÃ©ter Catholic University, and the University of Public Service.

The new science park will be a unique opportunity for industry-academia collaboration because it will be separated from the often bulky administration of a public university, and act as an interface between the two sides. Through this initiative, Semmelweis offers access to patients, health data, research, knowledge, and university talent while the private industries offer novel technologies, professional administration, and the possibility of translating concepts into tangible pharmacology innovation.

What objectives are you aiming to achieve during your tenure for the Faculty as both an educator and a researcher?

My main ambition is to deliver the curriculum reform to success. Although we have started this transition at several levels, I believe it will still take another two to three years until the first full graduating class has gone through this entire curriculum. Once this happens, I will consider the program a success story.

I do not believe that there is one perfect education system. Each student and faculty have different needs and as a university, it is our job to adapt, which is why I also aim to strengthen our feedback system to better understand our efficiency in this transition.

Speaking about our three language programs, they have been living in a parallel space despite being a huge resource of cultural and intellectual exchange. Therefore, I would like to establish initiatives that would create opportunities to merge these language programs whenever possible.

Next, medical training is one of the most rigorous courses of education anywhere in the world and often times medical students view themselves in a vacuum. They sometimes lack information and resources to help navigate their first years in the program. To meet this challenge, we have launched a mentoring program in which older students support freshmen in decision making on a volunteer basis.

To further enhance the universityâ??s medical training, I advocate strongly for expanding our skill laboratories. I hope to have a core facility that could be openly accessed by students to practice skills that do not need high supervision, such as blood drawing, to have more experience before they perform these activities on patients.

Finally, as a researcher, I would like to contribute to the new Healthcare-Biotechnology Science Park program and oversee at least certain branches of its development. In such a way, I hope that we can run high-flying imaging facilities that are open to both in-house and external researchers. Additionally, Semmelweisâ?? *in vivo* imaging facility is part of the EuroBioimaging Network which I would like to expand as well.

What vision do you have for Hungaryâ??s healthcare environment in the future?

I consider the role of a medical training university to be of the utmost importance in the definition of the healthcare system of a nation. Hungary is a small country with only 10 million inhabitants and four medical training centres. They have traditionally been hubs of knowledge and healthcare activity, but I believe that they can be enhanced even further. I am convinced that the provision of healthcare cannot be separated from the research of medicine and the training of professionals. This merger can only be done under the supervision of a university; therefore, our responsibility stretches beyond the mere campus. We must be able to oversee the entire development of healthcare. It is

essential that we increase our capacity to have a much broader overview of the local healthcare system.

The Hungarian healthcare system has its burdens such as unofficial direct payments to doctors. Many administrations have tried to tackle this issue which is difficult because there must be a mindset change not only from medical professionals but patients as well. I believe by strengthening residency programs from the side of both professionalism and salary will be a key aspect in solving this challenge.

All in all, I see universities like Semmelweis playing a critical role in renovating the Hungarian healthcare system.

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