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**As well as being the KAIMRCâ??s executive director, you are still a practicing blood and marrow surgeon. Why is continuing to practice important to your work?**

Innovative Medical research requires a blend of expertise and background as well as mix of support staff including clinicians, patients, scientists, research laboratory technologists, students, and faculty. Maintaining my practice as a physician and a researcher keeps me constantly updated through consultation with patients and communication with stakeholders, and contributors to our research projects, about the latest challenges and recent R&D and clinical developments in my field. I see my role not only as an administrator ensuring optimal operations of my Biomedical R&D centre, but equally if not more importantly as being with all these stakeholders on the ground to better understand the challenges they are facing and work together to overcome these challenges and set

common research goals. In this sense, we are well aligned with Saudiâ??s Vision 2030, expanding our countryâ??s research capabilities, empowering Saudi talent to be more productive, enhancing the knowledge-based economy to diversify the countryâ??s economy, and contributing to the global biotechnology field more broadly.

**Having been a physician long before Vision 2030 was crafted, what were your first impressions upon seeing biomedical research featured so prominently in the Saudi national development strategy?**

It came as no surprise to us that biotechnology R&D was included in Vision 2030. We were, however, very happy to see this commitment in writing. This will be crucial to helping us overcome some of the numerous challenges we are currently encountering. Although Saudi Arabia has adequate infrastructure and capabilities, historically, we have been missing the internal organisation and unified vision to bring all our institutions and efforts together towards a common goal. Vision 2030 is correcting this, creating greater stakeholder alignment, and making Saudi Arabia a more attractive destination for pharma industry investment, especially in clinical trials at this stage, where we have strong clinical capabilities.

Thanks to Vision 2030 we are now in dialogue with various stakeholders, not only those concerned with the medical field traditionally. For example, we are in continuous dialogue with the Ministry of Investment which now understands that the pharma industry needs to be attracted to the Kingdom and is putting incentive packages in place to promote it. The Ministry of Industry is another important stakeholder who is helping to shed more light on the importance of the pharma industry, and the vital role that research and development plays within the pharma industry. Additionally, with the Saudi Public Investment Fund (PIF), the countryâ??s sovereign fund and the largest sovereign fund in the world, we are now exploring enhancing the biotechnology development in the country, given its growth and increasing contribution to GDP with direct impact on the economic diversification and growth of KSA.

**Are the therapeutic areas on which the KAIMRC focuses based on the epidemiology of Saudi today or are they set with the future in mind?**

Overall, our focus therapeutic areas address local health challenges with global impact. Taking the example of COVID-19, when the first case was discovered in Saudi Arabia back in March 2020, we did the whole genome sequencing of the virus. Once the virus genetic fingerprint was identified, our bioinformatics and artificial intelligence (AI) teams screened thousands of molecules in combination with potential target sites within the virus sequence, to find potential therapeutic targets against the virus. At the end of this process, we identified a few of the highest potential molecules and tried them on the virus itself in the lab before they were taken into clinical trials. These trials, led by KAIMRC, are still ongoing across multiple centres in the country.

Prior to this, we had a similar experience with Middle East Respiratory Syndrome Coronavirus (MERS-CoV) back in 2015, where KAIMRC also initiated multicentre clinical trials. We also had a collaboration with Oxford University on vaccine research and development for the disease, which was tested in camels in our labs, the intermediate host for MERS, and which displayed good levels of immunity. The vaccine then progressed into Phase I clinical trials, which recently concluded with all the results published in international peer-reviewed journals. This candidate is one of only three potential MERS vaccines worldwide, and KAIMRC has been a major contributor to its development. We donâ??t currently have MERS cases, so we have stopped our clinical trials at Phase I, but we

are ready to progress to Phase II if the virus emerges again and enough patient cases become available.

KAIMRC also has a well-established programme on antimicrobial resistance (AMR) across multiple hospitals whereby in addition to our own resistant bacterial samples, we import samples of resistant bacteria, sequence their genomes, and try to identify where that resistance comes from. Globally, we are working with the WHO on this and showcasing KAIMRCâ??s efforts as a key regional player in this significant health challenge.

**Given the still relative underdevelopment of the domestic research-driven Saudi pharmaceutical industry, how do you see the role of KAIMRC evolving on both a domestic and regional level?**

Saudi Arabia has put in place a biotechnology strategy, which aims to enhance the entire biomedical R&D and innovation ecosystem and to boost our ability to spin off biotech companies from research centres and universities. Some products from KAIMRC projects have now been patented in both Saudi Arabia and the USPTO. However, Saudi biomedical research centres are facing currently the â??valley of deathâ?? syndrome in terms of charting a course from concept to market without a system that allows them to easily spin off biotech companies and later be acquired by bigger companies or license their products to them, or alternatively bring their products to market themselves. We are anticipating that Saudiâ??s new biotechnology strategy and implementation plan will help bridge this valley of death and allow Saudi R&D and innovative products to reach the market.

**Building a globally competitive biomedical institute able to create truly translational therapies implies competencies, time and financial resources. How far away is KAIMRC from achieving this dream?**

We are not that far at all. Our own Biomedical R&D centre was set up initially with a total of over SAR1.2 billion mostly dedicated to infrastructure, not counting the operational yearly cost since the inception of the centre in three different locations of the country. There is so much movement now in Saudi Arabia towards taking initial biomedical research into translational medicine and clinical trials and bridging the gaps that exist so far. A few biotech companies have already been established in Saudi, although we still need smaller biotechs, which is currently being discussed and which will hopefully come to fruition soon. Each research centre in Saudi Arabia already has ready-made projects that need to be translated, meaning that once the door has been opened, the pipeline will surely follow.

**Building up Saudi as a clinical trials destination has to be a key component of this biotechnology strategy; what kind of infrastructure does Saudi currently have to offer to international sponsors and where are the gaps?**

Some of the key challenges to bringing more clinical trials to Saudi Arabia include the lengthy approval process, the quality of data that is generated, and the scarce talent and deep expertise in clinical trials. We have worked hard and diligently on these three elements at both KAIMRC level and at the country level. In fact, we submitted a proposal to improve the clinical trial infrastructure when Vision 2030 was being put in place which was eventually accommodated within the planâ??s

National Industrial Development and Logistics Program (NIDLP).

Within this remit, we scanned several entities worldwide and found the model used by the Korea National Enterprise for Clinical Trials (KoNECT) in South Korea to be particularly interesting. South Korea has been able to jump from the bottom of the global list in terms of clinical trial recruitment and investment to the top five by raising the level of the countryâ??s infrastructure and increasing connections between hospitals. We are now aiming to establish a similar program in Saudi.

To this end, we have established the Saudi Clinical Trial Enterprise (SCTE) managed through an advisory board including in its membership different academic medical and health regulatory stakeholders in the Kingdom, as well as global pharmaceutical partners. SCTE focuses on the elements that will improve the setup of clinical trials in Saudi Arabia and attract the pharma industry to conduct more trials here. We now have dedicated teams working on improving the approval process, the quality of data, and the building up of talent and capabilities. We are also building incentivisation to participate in and lead clinical trials to include busy clinicians who may otherwise be reluctant to do so. We have already conducted several training sessions, some of which through our partnership with KoNECT.

**The success clinical trials model you had picked is related to several factors, from quality infrastructure to price competitiveness and regulatory equivalence with other nations. How does Saudi Arabia compete on these metrics?**

Firstly, our prices are very competitive and a lot lower than much of the Western world. In terms of infrastructure, the number of available beds is one of our KPIs and we are working to ensure that once a clinical trial is approved, the investigators will have access to several hospitals across the country, ensuring that the recruitment process can move more quickly. Our medical institution by itself possesses over 10,000 beds in addition to a number of other healthcare providers in the country.

However, there is still major room for improvement, Taking the USA as a benchmark, patients with almost all diseases there will likely be able to find a clinical trial relevant to their condition. However, less than one percent of patients in Saudi have this advantage. We are aiming to increase this number to between five to ten percent in the next five years, giving Saudi patients a better chance of finding a clinical trial that suits their disease, should they be willing to participate. Public awareness, a topic on which we have a dedicated team working as well, is also important to ensure that we have both patients and healthy volunteers for clinical trials.

We are also developing an investigator database that will allow the pharmaceutical companies to identify which investigators to communicate with, and in which hospital. This database will help the pharma companies to identify experts in specific fields with the interest and capability to drive the clinical trials forward.

**Precision and regenerative medicine are in everyone future plans today. What is your position on new technologies like CAR-T and how well can they be integrated into the Kingdomâ??s development strategy?**

We try and stay on top of promising new trends and technological developments which can potentially have a positive impact on patients. CAR-T fits absolutely within our strategic priorities. We already have two sites in the Kingdom working on cell therapy and engineered cells to be able to

attack cancer cells, building on our existing footprint in stem cell research and transplantation.

KAIMRC has identified CAR-T as a strategic area, with a dedicated team including some researchers and research support staff who have been sent abroad for further training. We have built up our equipment and facilities now considered for certification, and we are about to submit our first clinical trial. Therefore, we are hopeful, we will not only be providing CAR-T to Saudi patients but also producing these biotherapeutics to the region.

**What would be your final message to the international life sciences community about Saudi Arabia?**

On September 14-16, 2021, KAIMRC will hold the first Riyadh Global Medical Biotechnology Summit, with over 55 global leaders in medical biotechnology from academic, government and biotech and biopharma sectors, contributing through specialized expert presentations as well as expert panel discussions.

I would like to invite all your readers and other interested individuals to attend virtually (registration is free) and learn more about the rapid development of our medical biotechnology ecosystem and the numerous opportunities available here for global partnerships. The summit program and speakersâ?? profiles can be assessed through the following link: https://riyadhbiotechsummit.com

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