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EXPLORING THE LATEST AI ADVANCEMENTS IN LIFE SCIENCES AND MEDICINE

KAIMRC's first 'AI in Life Sciences' webinar paved the way for international and interdisciplinary collaborations

In March and April 2021, KAIMRC research scientists, bioinformaticians and students attended the first Artificial Intelligence (AI) in Life Sciences webinar and the Medical AI and Bioinformatics symposium and workshop. These virtual events were organised in collaboration with the Ministry of National Guard Health Affairs (MNG-HA) and the Schrödinger Institute in India and Germany. They focused on the impact of new computational technologies on the biomedical field, from fundamental science to individual health assessment.

Fuelled by the growing quantity of data from genomics and health records as well as increasing computational capabilities, AI and machine learning technologies have demonstrated their potential to improve diagnostics and therapeutics studies. For example, AI has made great strides in predicting the 3D shape of proteins—one of the great challenges in biology—providing a major boon to academic research and drug discovery.

"These events aimed to highlight ongoing in-silico research projects pertinent to bioinformatics and drug discovery, as well as to forge collaborations among different entities," explains Lamya Alomair, head of KAIMRC's bioinformatics section.

Workshop participants learned about the latest and most sophisticated tools and methods in bioinformatics and cheminformatics. The workshop covered various topics in the field of computational drug discovery, which aims to identify pathogenic variants, simulate the interaction and movement of molecules and atoms, and help design next-generation drugs.

The programme also included an introduction to Maestro, a bioinformatics software package developed at the Schrödinger Institute and available to KAIMRC researchers for their ongoing research projects. "It was so gratifying to organize this workshop for the first time at KAIMRC in collaboration with researchers from the Schrödinger Institute," says Alomair.

KAIMRC's AI & Bioinformatics Section is taking part in a wide range of sophisticated analyses, making use of machine learning, genomics, next-generation sequencing and proteomics. Several research programmes at the AI & Bioinformatics Section focus on cancer biology and infectious diseases, such as AI-driven analysis of medical imaging to assist and improve cancer diagnosis. "We aim to be among the pioneers in biological and biomedical research, and serve as a hub for research support in the country and the region," says Alomair. "We are collaborating with national and international agencies to solve numerous challenges in biological sciences using advanced research in computational biology."

LEARNING TO USE FREE HEALTH-CARE DATA

KAIMRC offers an online course on how to find, analyse and use health data



Suliman Alghnam

Data is the bread and butter of today's medical research and healthcare. An unprecedented amount of data was collected during the COVID-19 pandemic, and it has played an important role helping decision-makers monitor and understand the disease. Careful analyses of medical data can provide a unique view of the situation in hospitals and medical centres,

highlighting opportunities and barriers.

Entitled "Medical research using US health data," the online course was organized by KAIMRC from 21-23 April 2021 and taught by Suliman Alghnam, head of the population health research department. The three-day event offered healthcare providers, medical students, allied health students and public health researchers the opportunity to familiarise themselves with open-source data collected in the United States, and learn how to analyse and use it in their practice.

Attendees were introduced to freely available biomedical and clinical data sources, in particular the Medical Expenditure Panel Sources (MEPS) and the National Hospital Ambulatory Medical Care Survey (NHAMCS). The former contains data about households and medical insurance, which can be useful in understanding healthcare expenditures and disparities. The latter collects information about visits to emergency and outpatient departments. Analysing these medical records can lead to shorter waiting times for patients.

The second day of the course was dedicated to understanding statistical methods, applied to both hospital data and household surveys. On the third day, Alghnam explained how to select a data source and identify a research question, as well as how to extract and clean datasets. Participants also learned how to summarise statistical results regarding common medical conditions, write abstracts, and identify target international conferences.

"Open-access surveys conducted in the US offer a huge trove of data that our data-savvy researchers and students can dig into and analyse," says Alghnam. "The world is moving faster and faster towards big data collection and analysis. This course offered the fundamental knowledge and skills to navigate, understand and present statistical results based on biomedical and healthcare data to a wide audience of experts and non-experts."



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FORGING THE FOUNDATIONS FOR SAUDI ARABIA'S CLINICAL TRIALS

The Saudi Clinical Trials Enterprise Advisory Board recently convened their second meeting, solidifying a unified plan to increase the country's capacity for clinical trials and draw pharmaceutical investment

As part of the Ministry of National Guard–Health Affairs, KAIMRC has been awarded custodianship of a national initiative to boost the country's capacity for quality clinical trials and to attract pharmaceutical investment. The Saudi Clinical Trials Enterprise (SCTE) Advisory Board, created to oversee the initiative, recently convened their second meeting.

The Clinical Trials National Initiative is one of many similar national programmes, spanning many sectors, that comprise a part of Saudi Arabia's Vision 2030. Abdelali Haoudi, the head of strategy and business development at KAIMRC and managing director of its Medical Biotechnology Park, says a primary focus is “training all

types of staff related to the conduct of clinical trials.” Another aim of the programme is to improve the regulatory conditions within the country to streamline clinical trials and make Saudi Arabia more attractive to the pharmaceutical industry.

The SCTE Advisory Board is comprised of academic partners and fellow medical centres, as well as national regulatory bodies such as the Saudi Food and Drug Authority, and the Saudi Health Council. Representatives from major pharmaceutical companies, Amgen, AstraZeneca, and Pfizer are also on the board. As the programme develops, more entities will be added to the board, says Haoudi.

The Board's second meeting, which took place in June 2021, saw multiple agenda items discussed. One, says Haoudi, was the development of tools to streamline “communication, coordination and networking” amongst clinical staff and patients/volunteers on trials. This technology was dubbed the Clinical Trial Electronic Management System and was presented at the second meeting for feedback.

Another agenda item was a discussion of how to boost partnerships between academia and pharmaceutical companies. A discussion was also tabled regarding outreach and public awareness—how the necessity and safety of clinical trials can be communicated to the Saudi public.

On the regulatory front, says Haoudi, there was a discussion of the need for coordinated multi-institution clinical trials to get the approval of several ethics boards, an opportunity for significant streamlining. The potential to develop a unified ethics board for pharmaceutical studies was also discussed.

Moving forward, KAIMRC and the SCTE are working towards building a National Command Center for Clinical Trials (NCCCT) “where all developments in clinical trials at the national level will be reported and tracked,” says Haoudi. With this infrastructure, it will be possible to see what efforts are making an impact, how long they are taking, where the challenges lie and where the team can provide more support.

STEM CELL DONORS AWARDED ROYAL MEDALS

KAIMRC honours eight donors whose contributions might save lives



Eight stem cell donors have been honoured for their potentially life-saving contributions to help patients with blood and immune system disorders. They were presented with royal medals by His Excellency Dr. Bandar Al Knawy, CEO of the Ministry of National Guard-Health Affairs (MNG-HA), at a ceremony held at KAIMRC on 8 June.

Those thanked by Al Knawy on behalf of His Royal Highness Prince Abdullah bin Bandar bin Abdulaziz, Minister of National Guard, are among more than 76,000 people on the Saudi Stem Cell Donor Registry (SSCDR). "Donors are saving lives and giving new hope for a normal life," says Dunia Jawdat, associate professor of immunology at King Saud bin Abdulaziz University for Health Sciences (KSAU-HS), and director of the SSCDR, who spoke at the ceremony. "Words cannot describe the gratitude that patients and their families feel."

People listed on the SSCDR have signed up to donate blood-forming hematopoietic stem cells (HSCs) for use in transplants to help patients with leukaemia, the fifth most common type of cancer in Saudi Arabia¹, as well as certain immunodeficiency

"Words cannot describe the gratitude that patients and their families feel."

diseases. HSCs are sometimes taken from peripheral blood, but in other cases they must be extracted from bone marrow under anaesthesia.

HSC transplants involve the injection of stem cells in a patient's bloodstream with matching immune markers. Luckily, those cells are capable of transforming into red and white blood cells and platelets.

An HLA compatible family member is found for 43% of children under five who need an HSC transplant in Saudi Arabia; the proportion rises to 68% for adult patients². The SSCDR helps patients without compatible relatives to find donors. It has been used so far to help facilitate 74 donations, 56 from SSCDR donors and the rest from other registries around the world.

Recently published research by Jawdat found that patients in Saudi Arabia had a 24% chance of finding a fully HLA-matched donor from the SSCDR and another 12% did so from foreign registries³. The SSCDR, which was established in April 2011, is working with a network of 20 donor recruitment centres in hospitals across Saudi Arabia. It aims to improve public awareness of stem cell donation, help find a match for patients in need of an HSC transplant, and provide a rich database for those who do not have a suitable donor within their family.

REFERENCES

1. Bawazir, A. *et al.* The burden of leukemia in the Kingdom of Saudi Arabia: 15 years period (1999–2013). *BMC Cancer* **19**, 703 (2017).
2. Jawdat D, *et al.* Chances of finding an HLA-matched sibling: The Saudi experience. *Biol Blood Marrow Transplant* **15**, 1342–1344 (2009)
3. Jawdat, D. *et al.* Chances of finding matched unrelated donors for Saudi patients in need of hematopoietic stem cell transplantation. *Transplantation and Cellular Therapy* **27**, 423.e1-423.e7 (2021).

PARTNERING TO ENHANCE EXPERTISE FOR CLINICAL TRIALS IN SAUDI ARABIA

An ambitious partnership between Saudi Arabia and South Korea aims to put the Kingdom on the international map of clinical trials.

A visit by a South Korean delegation in April 2021 was the latest step in a collaboration that aims to enhance the infrastructure and expertise for clinical trials in Saudi Arabia.

In October 2017, Saudi Arabian and South Korean delegates met in Seoul to discuss a partnership to enhance Saudi Arabia's clinical trial infrastructure. The meeting involved representatives from KAIMRC, the Korea National Enterprise for Clinical Trials (KoNECT) and Seoul National University Hospital (SNUH).

The partners agreed on a collaboration which would help Saudi Arabia enhance its clinical trial infrastructure and raise its profile globally, with KAIMRC acting as national command center for clinical trials (NCCCT). "KAIMRC will lead the clinical trials in the country by building and enhancing the human capacity of other national research institutes," says Dr. Majed Al Jeraisy, director of clinical trial services at KAIMRC.

In March 2018, the South Korean partners came to Riyadh to assess KAIMRC's clinical trial infrastructure and the capacity and competencies of clinical trial teams. They reported that the clinical trial infrastructure is very good and the research teams are skilled, but noted a lack of experience in conducting clinical trials, according to Al Jeraisy.

Following the assessment, a contract was signed by KAIMRC, KoNECT and SNUH in June 2019 with the intention of developing the Kingdom's clinical trial infrastructure and human capacity. The partnership included training, online courses and mutual visits between South Korea and Saudi Arabia to share experiences.

KoNECT was selected as a partner from a pool of potential international candidates, including European and North American organisations. Similarities between South Korea and Saudi Arabia played a role in the decision, says Al Jeraisy. "We found that they were very welcoming to collaborate and willing to help us build our clinical trials infrastructure," he explains.

KAIMRC learned from their partners that quality research is essential for building trust among pharmaceutical companies to make the country attractive for clinical trials. "Without building a very strong system with high-quality conduct of clinical trials, it will be a waste of time," says Al Jeraisy.



FIRST REGIONAL CLINICAL TRIALS WORKSHOP KICKS OFF

KAIMRC hosts a highly successful workshop on clinical trials



Majed Al Jeraisy

A KAIMRC event held to support research institutes running clinical trials in the Middle East attracted four times the expected number of attendees after it was moved online due to COVID-19 restrictions. Over 400 people, including research coordinators, nurses and principal investigators took part in the 1st Regional Clinical Trials Workshop in February.

Around 70 clinical trials are initiated at KAIMRC every year. In 2019, KAIMRC launched the National Command Center for Clinical Trials (NCCCT) to develop the clinical trials ecosystem in Saudi Arabia, foster clinical research talent and attract international expertise.

The 1st Regional Clinical Trials Workshop, which was free to attend, was held in association with the US-based Association of Clinical Research Professionals (ACRP). It included sessions on internationally accepted principles and practices in the design and conduct of clinical trials, with particular emphasis on informed consent, protection of trial subjects and safety data reporting.

Speakers also provided training in project and time management skills. While most attendees were based in Saudi Arabia, others worked for research institutes elsewhere in the Middle East and further afield.

Organisers were initially disappointed when they had to postpone the workshop, which had been planned as an in-person meeting at KAIMRC in November. However, the switch to an online conference allowed many more people to attend. "We expected no more than 100 attendees, so it exceeded my expectations, and was very successful," says Majed Al Jeraisy, associate professor at KSAU-HS and director of clinical trial services at KAIMRC, who led the team that organised the workshop.

Increasing the number of clinical trials that take place in Saudi Arabia can help ensure that medications approved for use are the most effective and safest available for the local population. It also supports the current drive to encourage research and development, which is one of the key priorities of Vision 2030.

"Pharmaceutical companies have realised the Middle East could be a rich source of clinical trials data, and they are keen to conduct more trials here," says Al Jeraisy. "We are making good progress in strengthening our clinical trials infrastructure to meet their needs and expectations."



CRISPR-CAS9 TRAINING TO BOOST LIFE-SAVING GENE TECHNOLOGY IN THE KINGDOM

A new course on human DNA modification could help researchers, clinicians, and university staff and students improve precision medicine in Saudi Arabia

In June 2021, KAIMRC sponsored a Kingdom-wide crash course on gene editing technologies and stem cell research tools. Its creator has big dreams for the initiative and says it carries the promise of improving precision medicine in Saudi Arabia.

“If we create stem cell in-vitro disease models where we can do drug screening or understand the pathogenesis of a disease, that would really help pharmaceutical companies and researchers around the world understand disease mechanisms and come up with drugs that will [potentially] cure disease and reverse phenotypes,” says Khaled Al-

sayegh, associate director of biomedical research at KAIMRC-WR and creator of the course.

Alsayegh says the course “was designed for peers, faculty members here and all around the kingdom, to introduce [DNA] editing tools such as CRISPR-Cas9 and the therapeutic concept of correcting genetic mutations.”

Initially, participants in the course—upwards of 50 researchers, PhD students and faculty members—were to be trained on-site, doing a mock experiment in changing the identity of cells from specialised to stem cells and back again. However,

COVID-19 restrictions meant the course had to be hosted online instead.

Alsayegh says that in coming years he is looking forward to the researchers getting extensive

“If you come up with an interesting idea that you want to explore, time is of the essence. You have to order the reagents, and you want them to arrive quickly so you can test the idea.”

hands-on experience with CRISPR-Cas9 editing.

“We already ordered the reagents and the material that we’re going to use for the training, so hopefully we can make it happen again in 2022. We have one workshop on creating stem cell lines, and another one on using CRISPR to edit these cell lines. We want people to walk away from this course and start establishing these techniques in their labs, because this is what we hope to see in the kingdom; more people using these really promising and high-potential techniques to improve research overall.”

KAIMRC will soon launch a stem cell bank project, a life-saving endeavor where stem cell lines are generated and stored for use in research and therapy. “We will use induced pluripotent stem cells [iPS] in the lab. These are cells that can be differentiated in the lab or directed to become any cell type found in the human body,” says Alsayegh. “We get the cells from normal peripheral blood samples from patients so it’s very easy to achieve. And we are now on the verge of starting this endeavor to make this iPS bank within KAIMRC.”

However, Alsayegh adds that logistics are still the biggest hurdle against stem research progress in the kingdom. “If you come up with an interesting idea that you want to explore, time is of the essence. You have to order the reagents, and you want them to arrive quickly so you can test the idea.

“If the reagents take months and months to arrive then someone else might come up with that same idea and test it in another country, and it will be too late for you. Fortunately, we have created a new agency in the kingdom to take care of this part of research, and hopefully this problem will be solved.”

KAIMRC HOSTS RIYADH GLOBAL MEDICAL BIOTECHNOLOGY SUMMIT

KAIMRC recently hosted its 12th annual global conference, dedicated this year to medical biotechnology, bioinformatics and biotherapeutics

In mid-September 2021, the Riyadh Global Medical Biotechnology Summit (RGMBS 2021) brought together 55 speakers from the global biotechnology community, including academic, industrial and governmental organisations, to discuss developments in biotechnology in light of the COVID-19 pandemic.

“We are now, along with a number of national stakeholders and international partners, bringing biomedical R&D with a stronger clinical trials system even closer to biotech and biopharma development in the country, in particular in light of the COVID-19 pandemic which has fuelled this development,” said Bandar AlKaway, CEO of the Ministry of National Guard Health Affairs and president of King Saud bin Abdulaziz University for Health Sciences, during the summit’s welcome speech.

At the forefront of the summit’s discussions was a session on the challenges and opportunities facing the Kingdom in biotechnology. One of the opportunities highlighted was Saudi Arabia’s progress in pharmaceuticals and the investment potential that it offers.

“Saudi Arabia is the 15th largest pharmaceutical market in the world. No multinational can



ignore Saudi Arabia. I can see that the leadership of the country is very clear in their goals, and it’s a lesson from COVID that the world has moved from competing to collaborating,” said Ashraf Allam, CEO of the Pharmaceutical Investment Company (PIC). “To succeed you need to look to the entire ecosystem otherwise you will be side-lined. The other thing KSA is doing is improving the ease of doing business with multinationals.”

“To succeed you need to look to the entire ecosystem otherwise you will be side-lined.”

Collaboration was a theme that ran across various sessions. Speakers from multinational companies addressed issues such as the development and manufacture of biosimilars and biotherapeutics; stem cell biotechnology and cellular and gene therapy; and genomics, genetics, gene editing and bioinformatics. The conference also included thought leaders from renowned medical research institutes, including Paul Rothmann from Johns Hopkins Medicine, Ronald DePinho from MD Anderson Cancer Center and Amin HAJITOU, Imperial College London.

Cementing its collaboration with leading partners around the globe, KAIMRC signed Memorandums of Understanding with Cytiva, Abzyme Therapeutics, and Rockland Immunochemicals Inc to contribute to global biomedical and health R&D and innovation. These efforts will turn Saudi Arabia into what AlKaway hopes will be “a gateway to thriving biotechnology.”



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