THE RESEARCHER

KAIMRC NEWSLETTER

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Innovations: A world of research laid bare

A new magazine and its sister website will offer accessible content on the latest biomedical research conducted at KAIMRC and by the international research community.

KAIMRC is proud to announce the launch of *Innovations*, a biannual science magazine, in partnership with Nature Publishing Group.

The 64-page magazine will give readers a close-up look at the latest biomedical research conducted at KAIMRC and around the world.

KAIMRC's main aim is to conduct innovative biomedical and clinical research and an important aspect of this is to share information on its work with other researchers around the world whose goals and interests converge with or complement KAIMRC's, explains Abdelali Haoudi, head of strategy and business development..

The magazine also targets decision-makers and senior government officials "to regularly remind them about the importance and benefits of supporting biomedical research," says Haoudi. It hopes to reach many members of the public to contribute to an overall better understanding of health, disease and the vital role of biomedical R&D in addressing health-related issues. The magazine will be produced in English and in Arabic to communicate effectively with all sectors of society both locally and regionally.

The articles, covering a wide range of biomedical research topics, are written in an accessible style for a non-specialized reader.

Distribution of the magazine's first issue began in mid-September. It includes KAIMRC-affiliated Mouaz Al-Mallah's investigations into the role of existing fitness for survival from heart attacks; Yaseen Arabi's studies on best-practices in feeding intensive care patients; Naif Al-harbi's work to develop improved malaria and influenza vaccines; and Majed Halwani's new anti-cancer formulations that incorporate naturally occurring sugars into fine-tuned nanocarriers.

Other stories cover international research investigating the molecular triggers of dementia, analysing the latest in gene editing technologies, and searching for potential targets to treat Middle East Respiratory Syndrome.

Complementing the magazine is the launch of the *Innovations* website, where the magazine's content can also be found online https://innovations.kaimrc.med.sa/.

Awarding Research Excellence

Nominations for the 2016 King Abdullah Medical Research Award will start soon in the fall and can be made via the website: kamra.kaimrc.med.sa.

His Royal Highness Prince Muteb bin Abdullah Al Saud, Minister of the National Guard, first launched the award during the 6th Annual Forum for Medical Research in December 2015.

Submissions will be open to all researchers with a doctoral degree who are affiliated to a Saudi-based research institution and are conducting biomedical and health research aiming for direct impacts on healthcare, the economy and society in general.

The award recognizes medical research excellence in the Kingdom of Saudi Arabia and emphasizes the government's commitment to create an environment conducive to high-quality research at the national level. Winners will receive a cash award of SR 1,000,000 and recognition during the annual medical research forum organized by KAIMRC.

80% R&D
20% RESEARCH SERVICES

PLANNING FOR THE FUTURE

A new five-year strategy takes shape after lively discussions.

Senior staff members at KAIMRC gathered on July 17 for a strategy workshop intended to translate the institution's overall strategy into a concrete five-year plan. "The day featured interactive brainstorming sessions including all department chairmen, section heads and programme directors," says Abdelali Haoudi, head of strategy and business development at KAIMRC.

The workshop participants agreed that, in line with KAIMRC's overall strategy, 80% of the institution's efforts and resources would be geared towards research and development (R&D), while the remaining 20% will go to support delivering clinical and academic services.

Participants also worked on developing focused, achievable and measurable milestones for the institution's five-year strategy. "This is not easy for an academic research centre, but it was a very interesting exercise to go through as a team," says Haoudi.

The strategic plan has not yet been finalized, but will be based on six key goals:

Enterprise-wide capabilities, with particular emphasis on developing and retaining a high-quality workforce, in addition to providing excellent facilities and effective management.

Research and development, focusing on the five key areas of cancer, diabetes, cardiovascular diseases, infectious diseases and neurological diseases.

Enabling R&D platforms, developing world-class facilities and shared enabling platforms including, but not limited to, genomics, stem cells, nanomedicine, molecular imaging, animal facilities, biobanks that complement KAIMRC's focus on applied medical research; all supported by strong IT capabilities, with bioethics at the heart of all research.

Training and capacity building, supported by courses for staff that are closely tied to the institution's research and development agenda.

Entrepreneurship and commercialisation, designed to move fundamental research into real-world applications, while protecting intellectual property rights for the benefit of KAIMRC as a whole.

Global reputation, widening and developing excellent international partnerships while promoting high-profile worldwide communication of key results.

"This plan places special emphasis on clarity and focus on the R&D agenda," says Haoudi. He emphasizes that a central pillar of future strategy will be to achieve tangible outcomes, such as new medical treatments and diagnostic and analytical techniques. This focus on real-world applications will lie at the heart of all the decisions that target specific investment on new resources.

BUILDING COLLABORATIONS

KAIMRC will host its 7th annual forum for medical research in December 2016, with an ambitious aim to generate national interest. Previous forums have provided KAIMRC scientists, alongside King Saud bin Abdulaziz University for Health Sciences and the hospitals of King Abdulaziz Medical City, with a chance to showcase their research.

The theme of this year's forum, Aligning with the Saudi National Vision 2030: Innovative Medical Research Impact on Economy, highlights the importance of building a knowledge-based economy and of innovation in national development. "The national objectives fit well with the research and development strategy KAIMRC outlined last year - strong emphasis on applied research, development and commercialization, along with building strong partnerships on both a regional and international scale" says Dr. Ahmed Alaskar, Executive Director of KAIMRC. It is hoped that new research opportunities will be identified during the forum that will help KAIMRC and its affiliated institutions towards a position at the forefront of international medical research.

Some of the highlights of the forum will include sessions on the role of medical biotechnology in knowledge-based economy, the impact of medical research on health and economy, and advice on setting up successful phase I clinical trials in Saudi Arabia and the wider region. Other key sessions will include advice on publishing high-impact research articles and discussion on new developments in KAIMRC's disease research focus areas including cancer, diabetes, cardiovascular diseases and infectious diseases.

The forum is open to researchers, clinicians, health and economic government representatives, as well as students and faculty members. Online registration for the event will open 1 September 2016. Interested parties can also contact the forum organisers at ResForum-general@ngha.med.sa

SUPPORTING KAIMRC'S RESEARCH OUTPUT

As part of its strategic focus to conduct innovative and high-impact research, KAIMRC has launched a publication office to support scientists in their research plans and goals.

The office's main objective is the achievement of higher standards in scientific publication by researchers at KAIMRC, King Saud bin Abdulaziz University for Health Sciences, King Abdulaziz Medical City, and hospitals under the umbrella of the Ministry of National Guard—Health Affairs (MNG-HA).

Services provided by the publication office include scientific and language editing, a pre-submission review of manuscripts to ensure quality and the inclusion of institutional affiliation, a written analysis of the manuscript, and advice on how to get papers published in high-impact journals.

The service will also review patents prior to submission to the patent office, as well as search for further patenting opportunities based on research output. This will be provided in coordination with the Office of Technology Transfer.

The publication office will be coordinating with the strategy and business development team to communicate information about the institution's research output through various channels including KAIMRC's website, social media accounts, quarterly newsletter, biannual science magazine and publications' book.

Since its launch in February, the publication office has received 58 manuscripts for editing, reviewed 49 completed manuscripts prior to journal submission, and is in the process of registering several patents.

Manuscripts should be submitted to the publication office by email to: KAIMRC-Puboffice@ngha.med.sa.

49
MANUSCRIPTS REVIEWED SINCE FERBUARY 2016

206
PUBLICATIONS IN FIRST HALF OF 2016

2
POTENTIAL INVENTION DISCLOSURES

NEW GENOME CENTER TO INTEGRATE RESEARCH EFFORTS

KAIMRC is planning to launch a new center to coordinate research activities in genomic medicine.

When KAIMRC opened its new headquarters in Riyadh last year, it placed the 35,000-square-meter facility within the campus of the King Abdulaziz Medical City and next to the King Saud bin Abdulaziz University for Health Sciences. The choice of sites aimed to foster teamwork among clinicians and scientists with a common interest in medical genetics and precision medicine, but collaboration has been sluggish.

Aiming to ignite a spirit of cooperation, KAIMRC is now planning to establish a Genomic Medicine Research Center to serve as a central headquarters for basic, translational and clinical genetics-related research. A ten-person steering committee led by KAIMRC executive director Dr. Ahmed Al Askar first met to discuss the concept in June 2016, and the plans for the center could be finalized before the end of the year.

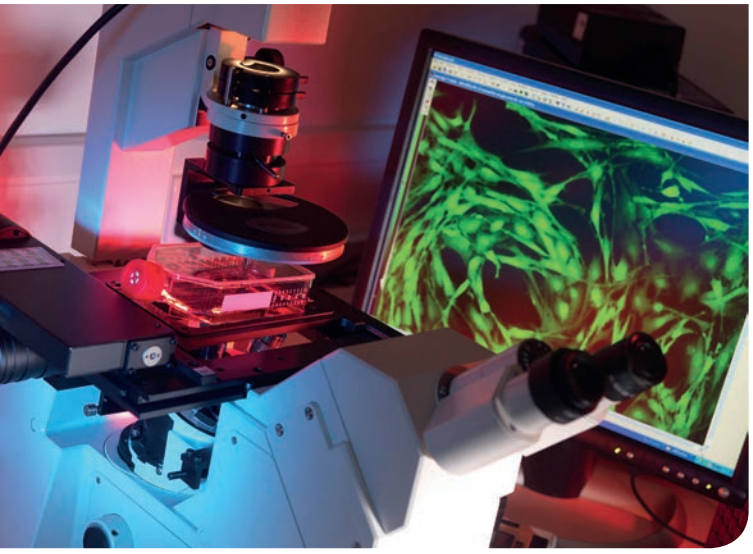
By sharing budgets, staff and infrastructure, Abdelali Haoudi thinks KAIMRC and its neighbours can make more scientific progress toward understanding disease and developing novel treatments than any single institution could. "The goal is to better coordinate the activity of all these entities under one umbrella,"

"KAIMRC is a really young and thriving research center, and we are still building our capabilities and capacities."

says Haoudi, head of KAIMRC's strategy and business development department. The center also hopes to partner with other academic and industrial organizations interested in genomic medicine, in Saudi Arabia and around the world.

Among the first focus projects will be the National Saudi Genome Project as well as other projects of high priority to the clinical genetics team. As envisioned, in addition to the Genomic Medicine Research Center, KAIMRC will concentrate more broadly on four enabling platforms: genomic medicine, stem cells, molecular imaging and medical nanotechnology. These tools will be applied in five main disease areas: cancer, diabetes, neurological diseases, infectious diseases and cardiovascular diseases. Within those broad categories, there will be a particular emphasis on conditions that have a high incidence in Saudi Arabia and the Gulf region.

Alaskar is optimistic that the new center will help nurture a "critical intellectual mass" in genomic medicine. KAIMRC, he notes, is "a really young and thriving research center, and we are still building our capabilities and capacities."



BUILDING NEW BRIDGES ABROAD AGAINST DIABETES

KAIMRC is stepping up its efforts in the fight against diabetes thanks to a potential partnership with the Harvard Stem Cell Institute (HSCI) in the US, which has established a strong and innovative research program on this disease.

From May 17 to 19, Harvard Stem Cell Institute and Boston Children's Hospital hosted a series of meetings with a senior delegation led by KAIMRC's executive director, Ahmed Alaskar, and its head of strategy and business development, Abdelali Haoudi. The visit highlighted several collaborative opportunities in various areas, especially in diabetes, which represents a major health challenge worldwide, but is especially widespread in the Kingdom of Saudi Arabia and neighbouring countries.

Alaskar says the potential for partnership arises from a mutual interest in making a tangible impact on human health using stem cells. "This may soon lead to successful phase I clinical trials," he adds.

"The collaborators will initially focus on the application of stem cells toward the development of therapeutic approaches for diabetes," says Haoudi. Stem cell therapy has emerged as a powerful tool for organ repair and regeneration using cells that can differentiate into any cells in the body.

Diabetes results from insufficient insulin secretion by the pancreas or inadequate body response to these secretions—a problem that these stem cells may solve by producing fully functional pancreatic cells.

KAIMRC presents targeted cancer therapy at UK conference

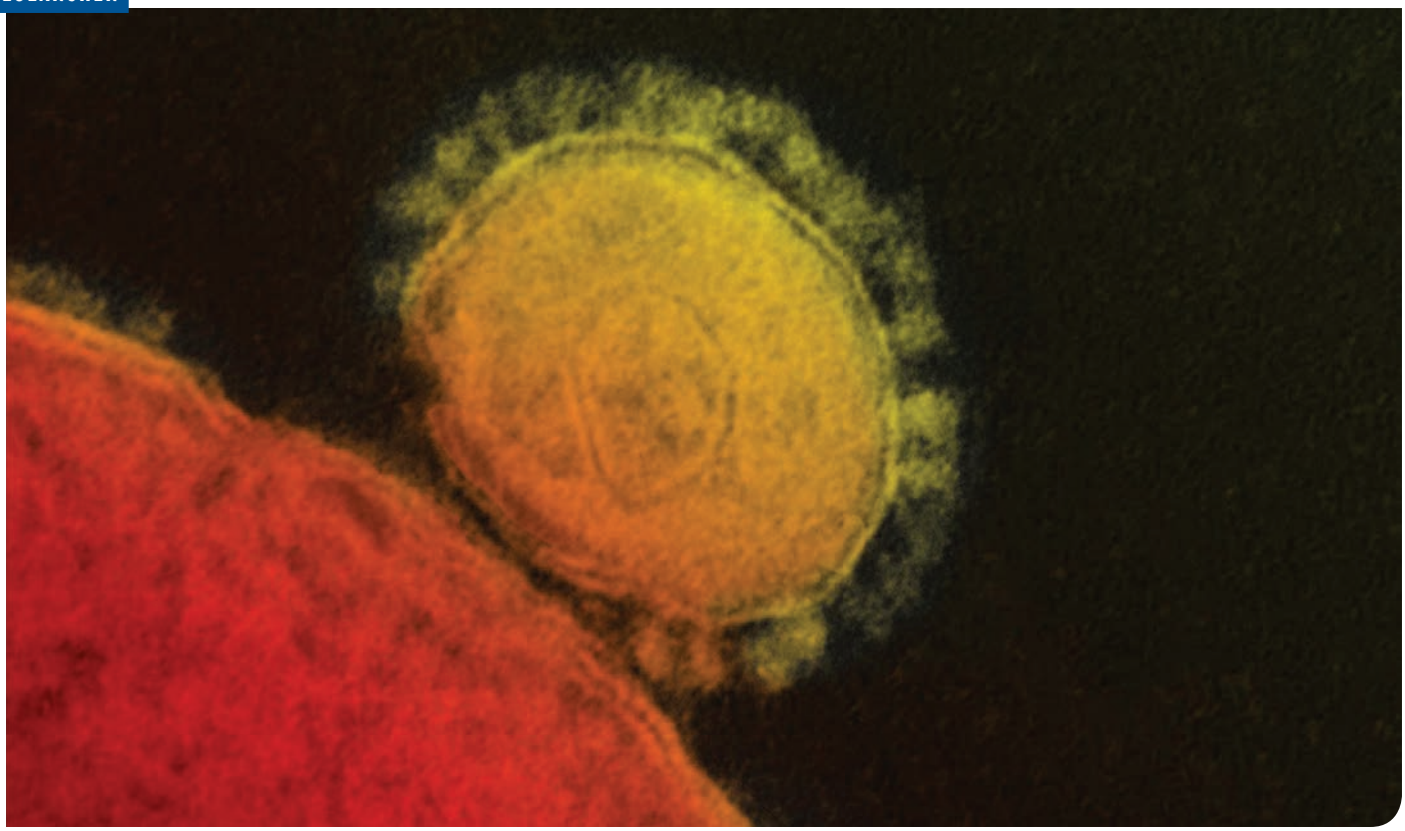
A KAIMRC researcher is using nanotechnology in hopes of delivering targeted anti-cancer drugs effectively to women living with breast cancer.

Nanoparticles carrying an anti-cancer drug could provide targeted therapy for breast cancer patients. KAIMRC nanotechnologist Salam Massadeh presented the results of her lab's study, published in the journal *Nanoreviews*, at the 2nd International Conference on Clinical Sciences and Drug Discovery, held in Dundee, UK from July 27 to 29.

"I discussed the synthesis of methotrexate nano-therapeutics for breast cancer," she explains. This involves loading biocompatible polymer nanoparticles with the anti-cancer drug methotrexate, with the aim of achieving controlled and efficient release of the therapy at the target site in the body.

Massadeh's presentation focused on the successful *in vitro* trials conducted at KAIMRC's Therapy Development Lab, making the research ready to move into in vivo testing.

In recognition of her well-received talk, she was presented with a certificate of appreciation from the session chair, microbiologist Bradford Powell, president of US-based Cernomics Solutions."It was great to participate in a world-class program of invited speakers from industry and academia," says Massadeh. She says she benefited from lively interactions and feedback among a multidisciplinary group of experts. The focus of the conference on the translation of academic research into industry-driven drug development perfectly matched one of KAIMRC's main aims of moving medical research into real-world applications.



JOINING FORCES AGAINST INFECTIOUS DISEASES

Collaborative initiatives are cementing the foundations of world-class medical research capabilities and facilities in Saudi Arabia.

KAIMRC has taken on a new ally – the US National Institutes of Health – in its fight against emerging infectious diseases, such as Middle East respiratory syndrome (MERS), parasitic diseases and other pathogens.

A single-stranded RNA virus was found to be at the root of MERS during a flu outbreak in Saudi Arabia in 2012. Since then, this newly identified virus has spread to other countries, including the US, and has caused a major outbreak in South Korea. The infection, whose symptoms include diarrhoea, fever, cough and shortness of breath, remains a puzzle for researchers and medical practitioners. It is thought that infection can happen through direct or indirect contact with camels but the mechanism of transmission is still unclear. This has prevented scientists from finding a suitable vaccine or treatment.

"I believe that this partnership is critical for developing our knowledge and accelerating innovative findings through sharing efforts, infrastructure, and financial and intellectual resources between institutions."

To tackle these challenges, a senior KAIMRC delegation visited the US National Institutes of Health in Bethesda, Maryland on May 12 and 13. The delegation, led by KAIMRC's executive director, Ahmed Alaskar, and its head of strategy and business development, Abdelali Haoudi, signed a memorandum of understanding with the National Institute for Allergy and Infectious Diseases (NIAID), a world-leading research centre in these fields. "KAIMRC and NIAID share a common interest in addressing MERS and other infectious diseases," says Haoudi, noting that this partnership strengthens previous ties between these institutions.

According to Alaskar, the partnership will initially focus on establishing the clinical epidemiology of the MERS virus and developing a vaccine. "I believe that this partnership is critical for developing our knowledge and accelerating innovative findings through sharing efforts, infrastructure, and financial and intellectual resources between institutions," he adds.

REVIEWING INSTITUTIONAL ACHIEVEMENTS AND CHALLENGES

KAIMRC's second-quarter general staff meeting, on July 12, was attended by H.E. Dr Bandar Al Knawy, the chief executive officer of the Ministry of National Guard – Health Affairs and the president of King Saud bin Abdulaziz University for Health Sciences.

The launch of the institution's new publication office was announced during the meeting, chaired by KAIMRC executive director Dr Ahmed Alaskar. Participants were also updated about the upcoming 2016 King Abdullah Medical Research Awards.

The institution's challenges were also addressed, including delays in infrastructure development hindering some projects. Updates were provided on KAIMRC's continual liaising with its researchers working abroad to ensure their plans align with the institution's overall strategy, promising them a successful career path upon their return.

"Research and development (R&D) are a priority for our medical city," stressed H.E. Dr Al Knawy during discussions on strategy.

Alaskar supported H.E. Dr. Al Knawy, highlighting that KAIMRC aims to position itself as a leading national and regional biomedical and clinical research centre in the short-term and as a major player in medical R&D at the international level in the near future.

Trends in cancer research meeting fosters international collaborations

KAIMRC has gathered scientists from around the world to discuss the latest in cancer research and promote the development of mutually beneficial research partnerships.

The conference, held on May 24 and 25 under the title of "Trends in Cancer Research: From Bench to Bedside", was "the first meeting of its kind at KAIMRC," says the organizer, Mohammed Aziz, team leader of KAIMRC's colorectal cancer program. The event brought together 300 scientists, healthcare providers, policymakers, and students to discuss effective ways of tackling cancer locally and globally, he says.

Participants came to Riyadh from around Saudi Arabia, Europe, the US and elsewhere to strengthen and develop strategies to contribute toward global efforts in cancer research.

KAIMRC researchers discussed new work in cancer therapeutics, including cancer chemo-resistance, molecular subtyping of colorectal cancer and its implications for treatment decisions, and the evaluation of the status of the HER2 gene in diagnosing breast cancer. They also discussed oncology research priorities in Saudi Arabia, new treatment opportunities for reversing drug resistance, new leukaemia treatments, and priorities for global cancer prevention.

300 INTERNATIONAL ATTENDEES

Scientists from elsewhere discussed current cancer prevention and treatment trends in Saudi Arabia and the Gulf region, personalizing treatment, and the evaluation of novel biomarkers associated with the development of pancreatic cancer for early diagnosis.

Among the conference's outcomes were plans for a number of collaborative projects between KAIMRC and institutions in Finland, in Bradford and Nottingham in the UK, and with Mount Sinai Medical Center in the US, which all have different expertise and capabilities, notes Aziz.

A CLEAN GETAWAY: DELIVERING MEDICAL MATERIALS WITH MINIMAL DISRUPTION

A KAIMRC surgeon has patented a device that could make many medical procedures easier and safer. It will enable doctors to deliver drugs or medical implants, such as coils and stents, to precise locations in the body with minimal disruption.

The device consists of a biocompatible membranous sac attached to a shaft of tubing. A small puncture is made in the skin to insert the apparatus into the body and guide the sac to its target area, where the sac is expanded, avoiding the need for open surgery or stitches. The sac is used as a delivery vehicle and has been designed for clinicians to disrupt or burst the membrane once it is in place, releasing its contents to the target location.

Unlike existing technologies, the new device can be positioned in a highly controlled manner and can deliver material with a minimal risk of leakage. For example, a doctor using this device could guide the sac to a punctured blood vessel, fill the sac with a clotting agent and then disrupt the membrane, releasing the clotting agent and sealing the wound. Alternately, the device could be used to seal a brain aneurysm by positioning the sac to block blood flow.

The device was invented by KAIMRC neurosurgeon Riyadh AlOkaili, who has several other patents to his name. "I do this for fun," he says. "I'm not a researcher. My work is all clinical. But I've always liked doing this kind of thing in my spare time."

He invented the device as an alternative way to deliver treatment for brain aneurysms, but the final design is suited to a wide range of applications. "I'm in discussions with a surgeon to modify it to treat hernias," he says, adding that it can also be used in many other procedures, such as drug delivery and injecting bone cement, or delivering stents to open up occluded heart vessels.

AlOkaili expects to start animal testing with the device in the next few months and hopes to see it available to patients within several years. "The prototyping company wants to shift the tests to the US, but I'm pushing to get it done in Saudi Arabia," he says. "I want to do it. I want to supervise it myself."

SAFER IMPLANT FOR DAMAGED JOINTS

A new invention registered with the Saudi Patent Office could relieve joint pain and avoid many of the complications of existing surgical techniques.

The prosthetic implant is designed to replace cartilage lost through arthritis or injury. KAIMRC engineers are currently designing a prototype that could be tested in patients within the next couple of years.

"If this patent becomes successful in trials, it will make a big contribution," says Abdullah Alotaibi, an internist at King Abdulaziz Medical City and the implant's inventor. "This will be more convenient for patients, will shorten the duration of surgery, and it will help avoid complications like weakening of the bone."

Osteoarthritis of the knee is a degenerative joint disease that affects an estimated 13% of the Saudi population. Through the condition, cartilage becomes inflamed and eventually destroyed, leaving the bone unprotected and vulnerable to erosion. Orthopaedic surgeons today often treat the problem by shaving away part of the bone to shift the body weight away from the destroyed part of the knee. But cutting the bone increases the risk of fractures, infections and other serious complications.

Alotaibi's idea was to replace the cartilage instead. His implant, which can be made from a variety of materials including metals and plastics, would help maintain the normal joint anatomy to allow for pain-free movement, without cutting and repositioning bones.

In the patent, Alotaibi outlines how the device could be used in a knee joint. But, he says, "it's not only for the knee cartilage — it can be used for other joints," including those of the hips and shoulders.