THE RESEARCHER
KAIMRC NEWSLETTER
Volume 1, Issue 1, December 2015

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WELCOME TO THE 6th Annual Forum for Medical Research
Dr. Ahmed Alaskar, Executive Director, KAIMRC

As the Kingdom of Saudi Arabia makes the transition from a carbon economy to a knowledge based economy, scientific research is becoming one of the country’s most promising areas of development. In a matter of years, our country has established numerous internationally competitive research institutions, trained a new generation of science leaders, and built a national framework to support and guide the country’s ambitious science and research endeavors. King Abdullah International Medical Research Center, part of the National Guards Health Affairs holds yet again its 6th KAIMRC Annual Forum for Medical Research to showcase the innovative research taking place in projects, programs and initiatives across our departments and sections at the academic medical center wider research community. In its sixth year, the KAIMRC Annual Forum for Medical Research will recognize the incredible research progress being made by the academic medical center stakeholders including KAIMRC, NGHA and KSAU-HS scientists and faculty as well as participation from a number of national partners and, for the first time, establish a roadmap for implementing the newly developed KAIMRC Strategy. The Forum will focus on the academic medical center’s core research disciplines: health, biomedical and clinical research.

6th KAIMRC Annual Forum for Medical Research is a valuable opportunity for all those engaged and interested in science and research in KSA to learn about the full spectrum of groundbreaking research currently underway, and prepare for the road ahead in KSA’s development as an international hub for research excellence and biomedical scientific innovation, as outlined in the KAIMRC strategy.

I hope you find this year’s scientific forum as inspiring and rewarding as previous years, and look forward to your collective participation and effective contribution to its success as we come together in the pursuit of fresh knowledge, scientific research and the development of new technologies for KSA and the world.

Highlights about KAIMRC
• Established in 2015 a focused strategy with an innovative R&D model to support multidisciplinary and multiple teams approach
• Over 50,000 square meter of dedicated basic, translational and clinical research space with state of the art R&D equipment to conduct cutting edge clinical and biomedical research
• 38% of research funding is competitive external funding
• Largest Stem Cell Donor Registry in the Middle East
• Unique and Largest Biobank Infrastructure in the Gulf Region
• Three animal research facilities throughout the kingdom to support translational research
• Established the only FACT accredited Cord Blood Bank in the Middle East to support clinical practice and research
• Over 30 ongoing clinical trials in 2015
• Over 320 peer reviewed research publications in 2015
• Provided, last year only, over 85 competitive research grants, with a total funding amount of SAR 18 million, to all the academic medical center stakeholders

Special Interest Articles:
Welcome to the 6th Annual Forum for Medical Research
Looking Forward
Vision and Mission
Diseases Focus Areas
Annual Forum for Medical Research Dedicated Workshops

Individual Highlights:
Successfully awarded NSTIP grants
New patent registration from KAIMRC
High standards: FACT Accreditation
High Impact Factor Publications
The kingdom of Saudi Arabia has made a very wise decision to develop strong science and technology policy, infrastructure and initiatives to pave the way to a knowledge-based economy.

Biomedical and clinical research is an integral component of this new policy and with the appropriate strategy and implementation, the country is well positioned to be a leading international center for discovery and innovation.

King Abdullah International Medical Research Center (KAIMRC), a member of a vibrant academic medical center led by the National Guards Health Affairs (NGHA), has made tremendous progress to position itself in the forefront of innovative biomedical research. This year, 2015, has witnessed the development of a new strategy aiming at refocusing the research and development (R&D) agenda at KAIMRC with an ultimate goal to position KAIMRC/NGHA among the top 3 national R&D centers, among the top 10 regional R&D centers and among the top 100 international R&D centers in 10 years.

There is no doubt that the way forward will be difficult and we will face multiple challenges but I am confident that with the strong support and commitment of KAIMRC and NGHA leadership and the dedication of the staff and all members of the team, the obstacles ahead will vanish and we will achieve our ultimate goal and help position this center and the country as a whole as a leading hub for discovery and innovation in biomedical and clinical research.
KAIMRC NEWSLETTER

VISION

To be a leading international institution in biomedical and clinical research.

MISSION

To generate cutting-edge scientific research that helps improve the health of the population.

“KAIMRC to refocus its R&D strategic areas and identify few focus Grand Challenges Programs”

Cancer: Breast Cancer: Colorectal Cancer, Leukemia, Lymphoma, Thyroid Cancer
Diabetes: Metabolic Surgery: β Cell Regeneration
Cardiovascular Diseases: Ischemic Heart Diseases; Congestive Heart Failure
Infectious Diseases: Hepatitis B and C, MERS-CoV, Vaccines
Neurological Diseases: Multiple Sclerosis, Stroke

Innovation is a major focus at KAIMRC:

The Innovation and Technology Transfer Management Office (ITTMO) at King Abdullah International Medical Research Center (KAIMRC) has recently signed a contract with a local Saudi intellectual property law firm to file patents locally at the Saudi Patent Office (SPO). This step aims to support the students at King Saud Bin Abdulaziz University for Health Sciences (KSAU-HS) with filing their patents locally. Additionally, it opens the door for MNG-HA affiliates, including faculty, researchers, and employees, to safeguard their intellectual properties locally, including patents with potential commercialization opportunities in Saudi Arabia. This initiative is a significant step forward towards supporting the national strategic plan of a knowledge-based economy. Currently, ITTMO has filed more than 35 pending patents with the United States Patent and Trademark Office (USPTO) and the European Patent Office (EPO). In alignment with KAIMRC’s strategic plan, ITTMO is currently holding multiple seminars and workshops to spread the culture of innovation throughout MNG-HA facilities and to highlight the importance of safeguarding generated intellectual properties and copyrights. This approach is expected to support the building of a substantial patents portfolio and blaze the trail for entrepreneurship and the initiation of start-up companies, providing essential services and tools for knowledge-based economic development.
We are pleased to welcome you to the 6th KAIMRC Annual Forum for Medical Research with the theme “Research that makes a difference: on the bench, at the bedside, and in the community.”

During the last forums, we recognized researchers and scientists as they produced new research knowledge and innovation through abstract presentations. We aimed to enhance and encourage the process of sharing and disseminating research findings across all areas of health sciences research.

This year, KAIMRC aspires to reach more people focusing on the growth of research studies for the healthcare needs. As we continue to grow and adapt, being motivated and innovative, our organization is confronting a time of changes according to the research related needs in health and in knowledge within Saudi Arabia.

We are very delighted to continue arranging a forum like this to gather active health care providers, to encourage collaborations and to gather more research outcomes.

The annual scientific forum workshops

- Towards Personalized and Precision Medicine for Diabetes and Cancer.
- Certification for Clinical Research Professionals.
- How to publish and rigor and discipline in research.
- Patents, innovations and Intellectual Property registration at MNGHA

8 Dec 2015
Q1. What are the challenges of this kind of research? How long have you been doing this research?

This type of research work will start as soon as funding is received from NSTIP.

Q2. Are you facing any challenges knowing this is a cutting edge research?

We expect to face some challenges in the cumbersome procedures required to make biochemical and equipment available in the right time.

Q3. Is there any other team doing the same research in the country?

No other team in the country has reported doing the same type of work yet.

Q4. What is the impact of this research on human health?

The safety in our hospitals is an issue of paramount importance to our society. Detection of bacteria is essential not only in the healthcare sector, but also in protecting the food industry, water reservoirs and our homeland security. Current lengthy and cumbersome stationary laboratory procedures for bacteria detection with samples collected from the field involves a delay of several days. This costly delay can lead to potential human casualties and increase in bill-cost to our health-care system. This integrated novel microarray is capable of rapid (2-3 min) detection with low non-specific adsorption, without washing steps and use of reagents on-site and eliminates the need for expensive laboratory manipulation tools for sample processing.

Q5. How do you see the future of this research topic in NGHA_KAIMRC and nationally?

This research project involves a major thrust towards technology development, prototyping, low-cost in-situ testing and real-life implementations at strategic locations for timely actions. Over and above, this research work will pave the way for participating in the national knowledge-based economy as a new product is expected to be developed and marketed.
Our scientists have successfully competed for national prestigious research grants

INTRODUCTION:

Dr. Alaamery, Founder and Head of the Developmental Medicine Department (DMD) and instructor at the Harvard Medical School and Children’s Hospital Boston, earned her Postdoctoral Fellowship training in Clinical Genetics form Harvard Medical School Genetics Program/Boston Children’s Hospital and a Doctoral (Ph.D.) degree in Molecular Genetics & Biology from Boston College and a Master of Science in Clinical Microbiology from Thomas Jefferson University. Prior to setting up the DMD Lab, she worked for several years as a Research Fellow at the Harvard Medical School Genetics Program where she completed her clinical training at the Laboratory of Molecular Medicine (LMM) and her Postdoctoral training at the Walsh Laboratory at Children’s Hospital Boston. Dr. Alaamery established herself as a leader in her field of study, and received numerous notable awards for excellence in her field of endeavor, including the Harvard-Partners in Excellence Award in 2009 from Partners HealthCare, the Dubai Harvard Foundation for Medical Research (DHFMR) Award in 2008, and the prestigious Ambassador Award (Prince Bandar Bin Sultan Award) for Academic Excellence in 2003. Dr. Alaamery has established several international and regional collaborations with prestigious research institutions from around the world. Her current research focuses on linkage analysis, next generation sequencing and whole exome sequencing to identify genes that result in genetic developmental disorders such as the some brain defects that cause mental retardation and other genetic structural defects.

Q1. What is the Developmental Medicine Department (DMD)?
The DMD is a research-based laboratory that studies rare developmental disorders and abnormalities with a vision and ultimate goal of finding solutions and developing intervention strategies to prevent familial developmental defects.

Q2. What are the DMD’s main objectives?
To conduct scientific research by utilizing our scientific expertise to promote the health and wellbeing of members of Saudi society and the worldwide population who have been impacted by developmental conditions and birth defects.

Q3. What are the different areas of research at DMD?

Q4. You recently received an approval of a National Science Technology and Innovation Plan (NSTIP) from King Abdul-Aziz city for science and technology (KACST), can you tell us more about this prestigious funding award?
Yes, this was part of the Brain Genome Lab’s research interest. The project’s title is “Genetic Analysis and Gene Mapping in Patients with Neurological Problem (Intellectual Disability, Microcephaly and Brain Abnormalities). We are very honored to have our project approved by the NSTIP, we are very pleased to be able to contribute to the development of scientific research in Saudi Arabia.

Q5. What is the importance of this project?
Disorders that affect the child’s brain represent a huge economic and emotional burden yet remain remarkably poorly understood. Disorders of brain development, such as intellectual disability (ID) formerly referred to as mental retardation, autism spectrum disorders (ASD), Microcephaly (MC) and many other brain malformations reflect a great diversity of causes, largely genetic.
Q6. What are the challenges of this kind of research?

One of the major challenges we face is that we need to search through hundreds of different genes, which can give rise to any one of these disorders. This genetic diversity, or “heterogeneity,” has thwarted attempts to identify genetic causes for more than a handful of conditions, leaving many families of affected children without even the benefit of a specific diagnosis. Yet definitive mechanistic diagnoses are the only way forward towards the treatments of the future.

Q7. How do you see the future of this research topic in MNGHA_KAIMRC and nationally?

A large-scale effort to understand brain disorders affecting Saudis presents a unique opportunity for MNGHA_KAIMRC to be a leading contributor to understanding these conditions both in Saudi Arabia and worldwide.

Q8. What is the significance of conducting this study in Saudi Arabia and its impact on human health?

The ultimate goal is to identify novel genes responsible for neurological and brain disorders and many other brain malformations through a high-throughput genetic screening approach to develop new diagnostic tests and treatments of direct benefit to the Saudi people. Existing gene discovery programs for developmental brain disorders centered in Europe or the USA have not particularly supported the interests of the Saudi people, since Western populations are quite different genetically from the Saudis. The unique structure of the Saudi Arabian population, with its historical and geographical isolation, and with a relatively large percentage of parents sharing traceable common ancestry (consanguinity), presents exceptional opportunities to identify genes responsible for human brain development (Figure 1).

Q9. Would you like to add something else?

This project is funded by KACST, therefore we would like to thank KACST for their support of science and research. In addition we would like to thank KAIMRC for their continuous support. We hope this will be the beginning of many successes to come. This support has motivated and inspired us to continue with our translational research to help impact those who suffer from developmental genetic diseases.

Innovation and early economic impact of our research at KAIMRC

Dr.Salam Massadeh

Dr. Salam Massadeh from the therapy development lab- a section under the Developmental Medicine Department led by Dr. Manal Alaamery, has been rigorously working on the development of a specific anticancerous agent, for breast cancer treatment. The current marketed dosage form, of this specific drug, is given once daily as an oral tablet and exhibits severe side effects.

Dr. Massadeh has discovered a novel alternative therapy using a fast robust synthesis method, resulting in a highly stable biocompatible and biodegradable therapeutic prototype. With a release profile extended up to 72 hours, which is an advantage of this dosage form that can be administered by the patients twice a week, replacing existing treatments (of the same drug) that are administered daily. This prototype has recently been registered as a novel therapeutic product by the US patent office. The improvements and advantages provided by the invention:

1. The basis of cancer treatment has been the same for many years. These types of treatments can be invasive at times, as it involves physically removing the tumour bulk, or introducing chemicals/agents to the whole body which will result in killing cells non-selectively; causing harm to the DNA of both tumour and healthy cells. The previously mentioned treatments have limited effectiveness, high cytotoxicity, and many side effects. Therefore, there is a massive need to advance in cancer treatments.

2. Dr. Massadeh applied her skills and knowledge in the field of drug delivery systems and therapy development to mark the bench with a therapeutic prototype synthesized utilizing a fast robust technology, using a minimal amount from the drug of interest. The results obtained from her experiments indicate that Dr. Massadeh has synthesized a unique sustained release targeted delivery system. The produced novel therapeutic prototype will directly target diseased cells; hence the anticancerous agent will not be released in non-target tissue, putting an end to the many undesired effects produced by the conventional tablet form (of the specific drug used). Once this prototype becomes commercially available, it will be a first line breast cancer treatment that can be given twice a week, compared with the available oral tablet (of this specific drug) which is currently prescribed once daily.

About Dr. Salam Massadeh in Brief:

Dr. Salam Massadeh is an Associate Research Scientist at KAIMRC. She has earned her Ph.D. degree in the field of nanotechnology in bio-imaging; University of East Anglia, United Kingdom through a funding award from the Engineering and Physical Sciences Research Council (EPSRC), United Kingdom. She also holds a Bachelor degree in Pharmacy and a Master
degree from the College of Pharmacy, University of Reims Champagne Ardennes, France.

Dr. Massadeh is the principal investigator of projects directly related to drug delivery systems and gene therapy. Her long-term research goal is to synthesize an ideal system to transport drugs and genetic material to eventually minimize side effects and enhance bio-availability of the drugs of interest. She has authored several peer reviewed publications and was granted funding through different funding bodies. Dr. Massadeh has also supervised several masters and undergraduate students throughout her career.

International recognition of high standards at KAIMRC: The Cord Blood Bank has been accredited by FACT

Riyadh, November 22, 2015 – By demonstrating compliance with the NETCORD-FACT International Standards for Cord Blood Collection, Processing, Testing, Banking, Selection and Release, King Abdullah International Medical Research Center – Cord Blood Bank (KAIMRC-CBB) has earned FACT Accreditation for banking cord blood for both public and intended patient’s family use. NETCORD-FACT Standards are defined by leading experts based on the latest knowledge of the field of cord blood banking. KAIMRC-CBB has been found to be in compliance with these rigorous Standards as well as governmental regulations.

“We intended to obtain the FACT accreditation for our institution since it is recognized as basis for the competitiveness in the field of cellular therapy,” says Dr. Ahmed Al-Askar, Executive Director of King Abdullah International Medical Research Center. “The FACT accreditation will make our patient realize that our institution perseveres to achieve only the highest quality for cord blood bank program.”

“The bridge of trust between our bank and patients is based on the quality of service we provide” stated Dr. Dunia Jawdat, Director of the KAIMRC Cord Blood Bank. “Achieving FACT accreditation validates the continuous hard work given by our staff to provide high quality products. Being internationally recognized as a high quality service provider will continuously drive us to aim for excellence and quality improvement and further discover advancement in cord blood stem cell therapy.”

“We are pleased that King Abdullah International Medical Research Center – Cord Blood Bank has met the requirements of the Foundation and has been granted accreditation for banking cord blood for both public and intended patient’s family use,” said Dr. Phyllis Warkentin, FACT Medical Director.

FACT conducted an on-site evaluation of KAIMRC-CBB on April 6th-7th, 2015. The accreditation process involved the submission of documentation to demonstrate compliance with the Standards and a subsequent on-site inspection conducted by inspectors qualified by training and experience in cord blood banking.

High impact factor publications

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<tr>
<th>Author</th>
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<tr>
<td>Al-Masri M, Alkeem RF, Assiri AM</td>
<td>King Abdulaziz Medical City &amp; Advisor Royal Court, Riyadh, Saudi Arabia</td>
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<td>Alrabeeah AA</td>
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Presence of Middle East respiratory syndrome coronavirus antibodies in Saudi Arabia: a nationwide, omni-sectional, serological study

Journal: Lancet Infect Dis

Impact Factor: 19.4
HIGH IMPACT FACTOR PUBLICATIONS

Tackling cancer control in the Gulf Cooperation Council Countries.

Author
Haoudi A

Journal
Lancet Oncology

Affiliation
King Abdullah International Medical Research Center, King Abdulaziz Medical City, Riyadh, Saudi Arabia; Division of Genetics and Genomics, Boston Children Hospital, Harvard Medical School, USA

Impact Factor
24

Adipose Tissue Free Fatty Acid Storage In Vivo: Effects of Insulin Versus Niacin as a Control for Suppression of Lipolysis.

Author
Ali AH

Journal
Diabetes

Affiliation
Division of Endocrinology, Diabetes, Metabolism, and Nutrition, Mayo Clinic, Rochester, MN; King Abdullah International Medical Research Center, Ministry of National Guard Health Affairs, Riyadh, Saudi Arabia

Impact Factor
8
Immediate Impact of our research on society:

Jeeluna study: a national assessment of adolescent health status in the Kingdom of Saudi Arabia.

Adolescence is a transitional period from childhood to adulthood corresponding to 10-19 years of age. Although adolescents comprise a considerable portion of the Kingdom of Saudi Arabia’s (KSA) population, they have received insufficient attention to their health needs. National indicators of their health status are unavailable, and hence evidence to inform decision making is lacking. Jeeluna study was conducted with the aim of identifying the health needs and health status of adolescents in KSA. This study is a national school-based study that was carried out in all 13 regions of the Kingdom. Through a multistage cluster random sampling technique, intermediate and secondary school students from all over the country were invited to participate. Data were collected by means of a self-administered questionnaire addressing health risk behaviors and health status, clinical anthropometric measurements, and laboratory investigations. A total of 12,575 adolescents participated in the study. Twenty-eight percent of adolescents reported having a chronic health condition. Figure 1 below describes gender differences among the reported chronic illnesses. Obesity/overweight was very common, with a prevalence of 30%. Vitamin D deficiency affected the majority, with 95% of adolescents found to be vitamin D deficient. Fourteen percent of adolescents reported having frequent/persistent symptoms of depression, whereas 7% reported frequent/persistent symptoms of anxiety. Various health risk behaviors were detected. Only 55% reported consuming breakfast sometimes/daily. Overall prevalence of adolescents who did not engage in any physical exercise was 45%. Forty two percent of adolescents were found to spend at least 2 hours per day watching television. Only 14% reported seat belt use sometimes/always when passenger in a vehicle. Regarding tobacco use among adolescents, the study results showed that 16% and 10% had ever smoked cigarettes or sheesha, respectively. Bullying and violence were prevalent, exposure to bullying and physical violence at schools was 25% and 21% respectively. Moreover, 10% reported exposure to cyber bullying.

Through the Jeeluna study, indicators for the health status of adolescents in the Kingdom of Saudi Arabia have been identified and reflect the urgent need for addressing the unmet needs of adolescents. Jeeluna provides solid evidence for policy and decision makers, communities, schools, and parents to take the necessary measures to promote the health and well-being of this population. Upstream approaches addressing policy and system’s approach to adolescent health care, along with downstream approaches addressing individual behaviors and choices are both necessary and will positively impact adolescents’ health and future adult health outcomes.


Dr. Fadia Saleh AlBuhairan
Dr. AlBuhairan is a consultant physician specialized in Pediatrics & Adolescent Medicine in King Abdullah International Medical Research Center (KAIMRC) where she initiated along with other researchers the national study ‘Jeeluna’. The study addresses the health status and needs of a nationally representative sample of adolescents in the Kingdom of Saudi Arabia.