ABDULMOHSEN ABDULRAZZAQ HEALTH SCIENCES CENTRE

KUWAIT UNIVERSITY – RCF NEWS

The newsletter of the HSC Research Core Facility, Kuwait University / Issue No.2 – May 2012

Project No. GM01/01 **Principal Investigator: Prof. Widad Al-Nakib**

Co-Investigators: **Prof. Eino Honkala, Prof. Samuel Kombian, Prof. Chacko Mathew**

Director: Prof. Abu Salim Mustafa

An institution specialized in health-care, like the AbdulMohsen AbdulRazzaq Health Sciences Centre (HSC) at Kuwait University, must value advanced research as a basic foundation to fulfill its objectives of teaching, training and community services. To successfully achieve these noble goals, three major issues must be addressed, which include, I. Suitably qualified and motivated manpower. II. The quality infrastructure, as evidenced from the availability of state-of-the-art equipment and resources, to encourage innovative research, and III. A proficient administrative hierarchy, which encourages independent and original thinking and facilitates the work of researchers by establishing a progressive and forward looking support system. Towards the implementation of the above ideas and goals at HSC, the Research Sector (RS) at the Office of Vice President for Research, Kuwait University has generously supported the establishment and functioning of the research core facility (RCF) through the General Facility grant GM 01/01.

The RCF at HSC houses most-modern and state-of-the-art equipment, required for cutting edge research in health sciences, and suitably qualified manpower. All these human and material resources are oriented to achieve the highest quality of scientific research output, as well as to provide community services (in terms of teaching and training) in human health. The RCF marks the culmination of HSC's relentless efforts in spatial adjustments, equipment acquisition and technical empowerment to offer best of the facilities, resources and services to increasingly complex and specialized demands for macro/micro-analysis and in depth studies, particularly in the fields of Proteomics, Genomics and other areas of Molecular and Cell Biology. A specialized internet site has been created and details of all the equipment available at RCF can be accessed by logging on to http://www.hsc.edu.kw/rcf.

The conceptual basis for RCF revolves around the optimum utilization of these resources by the academic and research staff/students of various Faculties and Departments at HSC, and other health-related institutions in Kuwait, to accomplish the goal of excellence in research. This newsletter is aimed at providing a brief review of activities at RCF and provide a glimpse of the faciliteis available. For details, we hope you will contact us and visit the RCF by yourself.

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RCF STAFF & THEIR SPECIALIZATIONS

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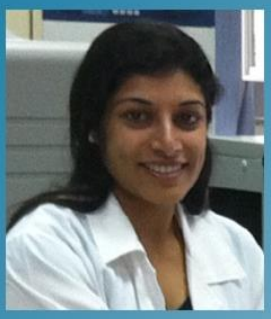

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INSTRUMENTS & TECHNOLOGIES AVAILABLE AT RCF

GENOMICS

- 3400 DNA Synthesizer – Primer Synthesis
- WAVE 4500 System – DHPLC-high through put mutation detection system
- ABI 3130 Genetic Analyzer – DNA sequencing & Fragment analysis
- CEQ™8000 Genetic Analysis System – DNA sequencing & Fragment analysis
- ABI 7500 Real – Time PCR System
- ABI 7900HT Low Density Array Analyzer - QRT-PCR
- Affymetrix – GeneChip Microarray System
- Automated Karyotyping System – Multicolor FISH
- Agilent DNA Microarray for CGH & Gene Expression Analyzer
- Ultra Lum Omega 16vS – Gel Documentation system
- UVP - Biospectrum®AC Imaging System
- Biorad Experion™ - Automated Electrophoresis Station
- Agilent 2100 Bioanalyzer – Electrophoresis on a chip

PROTEOMICS

- ABI 4800 MALDI TOF/TOF Analyzer – Mass Spectrometry
- ProteomeLab™ PF 2D – Protein Fractionation System
- ProteomeLab™ PF 800 – Protein Characterization System
- Fluoroskan – Fluorescence Reader
- Multiskan – Spectrophotometer
- Appliskan – Luminescence, fluorescence and absorbance reader

CELL BIOLOGY

- LSM 510 Meta – Confocal Microscopy
- Culture Cell Imaging System
- Invitro Fertilization System
- Cell Observer – Complete System for Live Cell Imaging
- PALM Microbeam – Laser micro-dissection

FLOW CYTOMETRY & TISSUE CULTURE:

- Flowcytometer Cytomics FC 500
- Vi-Cell Series Cell Viability Analyzers
- GC 1000-Gamma Cell 1000 Elite – Irradiation of cells
- Tissue Culturing Facilities – Laminar Flow Hoods + CO_2 incubators
- Thermo CryoPlus 3 – Storage of cells

For more information about the instruments and the technologies visit:

http://www.hsc.edu.kw/rcf/

or you are most welcome to arrange a visit to the Research Core Facility.

SUMMARY OF ACHIEVEMENTS AND ACTIVITIES AT RCF

We humbly declare that a respectably large number of academic staff and students have been continuously utilizing the RCF since its inception. Therefore, we are excited about the future of RCF. Furthermore, in the year 2011-2012, the equipment available at RCF have helped to publish 30 research papers, most of them in peer reviewed and indexed journals. For details please see the publications on page 5.

To further facilitate the utilization of RCF, we recently have introduced the concept of preparing and distributing RCF newsletters, on a quarterly basis, to the researchers at HSC and other appropriate institutions. The first issue of this newsletter, describing the facilities and equipment available, was circulated in February 2012, to the relevant people/institutions in Kuwait, and this is the second issue of the newsletter. To further advertise the RCF at HSC and other institutions, regular seminars/workshops and group-meetings are being conducted at the RCF and other suitable premises, e.g. various Faculties of HSC and other research institutions in Kuwait, etc. The advertisements for these seminars/workshops are circulated to all concerned institutions/research establishments, including Postgraduate Trainees/Residents of Kuwait Institute of Medical Specialization (KIMS), undergraduate students of the four Faculties of HSC and hospitals in Kuwait. Two such Seminar/Workshop were held on March 14, 2012 and April 3, 2012. Two additional seminars/workshops are planned for May and June.

In addition to advertisements and general seminars/workshops, specific seminar presentations are planned from the users of RCF, in which they will present the results of RCF-supported and recently published papers in an open forum. Furthermore, equipment-focused training workshops are planned on a regular basis to train researchers and technicians of HSC in the use of equipment available at RCF. The first training workshop of this series on Agility Microarray was held at RCF on March 14, 2012 from 1-4 PM. In this workshop, the participants were researchers/technicians (n=10) from various Faculties of HSC and other institutions in Kuwait. In addition to basic research of academic interest, the RCF laboratories are also utilized for highly sophisticated and research-based diagnostic applications to help in the specific diagnosis of disease conditions, and thus helping to take care of the community, as a broader interest.

RCF UTILIZATION

From April 1, 2011 to March 31, 2012:

Number of projects – 39

Number of samples – 11386

Number of researchers – 38

Number of MSc students – 18

Number of PhD students – 2

Number of undergraduate – 3

Number of requests - 842

Faculty	Number of requests
Allied Health, HSC	92
Amiri Hospital, MOH	4
Dentistry, HSC	35
KISR	1
Genetic Center, MOH	9
Medicine, HSC	531
Pharmacy, HSC	168
Science, KU	2
Total	**842**

"We are ready to receive DNA sequencing requests"

To book your orders or for your enquiries please contact the Director by e-mail at:

abusalim@HSC.EDU.KW **or** by dialing Phone Extension: **6426** or **6505**

PUBLICATIONS

Since its establishment, RCF has helped to publish sixty-one papers in scientific journals. A year-wise summary of the number of papers published is given below.

Year	Number of papers
2006	5
2007	6
2008	5
2009	5
2010	10
2011	22
2012	8
TOTAL	**61**

PUBLICATIONS IN 2012 (UNTIL APRIL 30th) :

1. Al-Mulla F, Bitar MS, Feng J, Park S, Yeung KC. A new model for raf kinase inhibitory protein induced chemotherapeutic resistance. PLoS One. 2012;7: e29532.

2. Al-Turab M, Chehadeh W, Al-Mulla F, Al-Nakib W. Evaluation of the PrimerDesign™ genesig real-time reverse transcription-polymerase chain reaction assay and the INFINITI® Respiratory Viral Panel Plus assay for the detection of human metapneumovirus in Kuwait. Diagn Microbiol Infect Dis. 2012; PMID:22300956.

3. Benov L, Craik J, Batinic-Haberle I. Protein damage by photo-activated Zn(II) N-alkylpyridylporphyrins. Amino Acids. 2012;42:117-128.

4. Mehdawi H, Alkhalaf M, Khan I. Role of Na+/H+ exchanger in resveratrol-induced growth inhibition of human breast cancer cells. Med Oncol. 2012;29: 25-32.

5. Mustafa AS. Proteins and peptides encoded by *M. tuberculosis* specific genomic regions for immunological diagnosis of tuberculosis. Mycobacterial Diseases. 2012; in press.

6. Mustafa AS. What's new in the development of tuberculosis vaccines. Med Princ Pract, 2012;DOI: 10.1159/000337919.

7. Narayana K, Al-Bader M, Mousa A, Khan KM. Molecular effects of chemotherapeutic drugs and their modulation by antioxidants in the testis. European Journal of Pharmacology. 2012;674: 207–216.

8. Rahman A, Khan KM, Al-Khaledi G, Khan I, Al-Shemary T. Over activation of hippocampal serine/threonine protein phosphatases PP1 and PP2A is involved in lead-induced deficits in learning and memory in young rats. Neurotoxicology. 2012; 33: 370-383.

WHAT'S NEW

Electrophoresis is now on a chip.

The Agilent 2100 Bioanalyzer & Biorad Experion™ are standardized. Performing electrophoresis using these machines is highly advantageous since the technique is more sensitive, accurate and fast. Results are represented as peaks. Also a gel image can be simulated to show you how your sample would have looked like, if run on a gel.

Another advantage is that the concentration and the quality of your sample can be assessed using the bioanalyzers.

The length of the nucleic acid and the size of the protein are measured accurately unlike normal gel electrophoresis in which they are approximated by comparing with a ladder. RFLP can be performed more accurately using this technology.

Mr. Vishnu R. & Mrs. Sunitha Pramod , both expert users of the Agilent 2100 Bioanalyzer at RCF.

Mr. Chadi EL Farran & Mrs. Faiza Rasheed standardized the Biorad Experion at RCF.

Karyotyping made easy.

The Automated Karyotyping system at RCF is standardized. The technique is useful for cytogenetic research. Disorders associated with chromosomal abnormalities can be diagnosed. Chromosomes can be stained either by banding techniques or by performing M-FISH. FISH can also be performed for more specific diagnosis.

The Affymetrix microarray system at RCF.

Technology platform for Systems Biology at Kuwait University - The Affymetrix Microarray system.

The advanced microarray technology for whole genome gene expression analysis and genome wide SNP analysis is available at RCF. It is indeed a powerful tool for systems level studies and we look forward to using it to the maximum. Equipped with high-resolution scanner, automated fluidics station for washing and staining of arrays and a hybridization oven, the Affymetrix system allows us to utilize the latest versions of high-density arrays for whole genome studies.

A USEFUL PROTOCOL:

This issue of RCF Newsletter contains the protocol for DNA Electrophoresis, using the Agilent 2100 Bioanalyzer. The Agilent DNA 1000 kit is needed for performing this protocol.

The DNA chip and Agilent 2100 Bioanalyzer

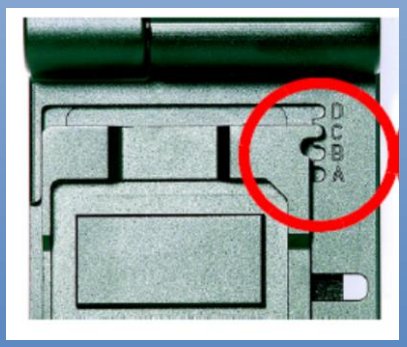
Preparing the gel:

1. Allow DNA dye concentrate (blue in the kit) and DNA gel matrix (labeled red in the kit) to equilibrate to room temperature for 30 min.
2. Vortex DNA dye concentrate (blue) and add 25 µl of the dye to a DNA gel matrix vial (red in the kit).
3. Vortex solution well and spin down. Transfer to spin filter.
4. Centrifuge at 2240 g ± 20 % for 15 min. Protect solution from light. Store at 4 °C.

Loading the gel-dye mix:

1. Allow the gel-dye mix equilibrate to room temperature for 30 min before use.
2. Put a new DNA chip on the chip priming station.
3. Pipette 9.0 µl of gel-dye mix in the well-marked G.

4. Make sure that the plunger is positioned at 1 ml and then close the chip priming station.
5. Press plunger until it is held by the clip.
6. Wait for exactly 60 s then release clip.
7. Wait for 5 s. Slowly pull back plunger to 1 ml position.
8. Open the chip priming station and pipette 9.0 µl of gel-dye mix in the wells marked G.



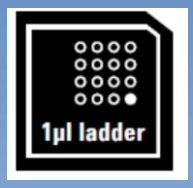
These images indicate the settings required for priming the DNA chip

Loading the Marker:

1. Pipette 5 µl of marker (green in the kit) in all 12 sample wells and ladder well. Do not leave any wells empty.

Loading the Ladder and the Samples:

1. Pipette 1 µl of DNA ladder (yellow in the kit) in the well marked .



2. In each of the 12 sample wells pipette 1 µl of sample (used wells) or 1 µl of de-ionized water (unused wells).
3. Put the chip horizontally in the adapter and vortex for 1 min at the indicated setting (2400 rpm).
4. Run the chip in the Agilent 2100 bioanalyzer within 5 min.

Editor: Chadi Abdul Kader EL Farran

Photography: Vishnu R., Chadi Abdul Kader EL Farran