◆ VISION

‘To be the leading institution in molecular medicine by the year 2006 and to achieve world-class status by 2013’

◆ MISSION

‘Be competitive and achieve excellence in molecular medicine by utilising all available resources and expertise, by adopting and developing latest technologies, and by conducting cutting edge and world class research’
Universiti Kebangsaan Malaysia (UKM), already one of the premier universities in Malaysia, launched another research institute in July 2003 to consolidate further its position as one of the leading universities in the nation. The UKM Medical Molecular Biology Institute (UMBI) is now operational and is set to be one of the main players in UKM as the latter charts its course towards achieving the status of a research university.

The noble mission of UMBI is to be competitive and achieve excellence in molecular medicine by utilizing all available resources, potential and expertise, by adopting and developing the latest technologies, and by conducting cutting edge and world class research. Besides aiming to provide the most conducive place and the ideal environment to do research in molecular medicine, the institute will also offer postgraduate training in MSc. and PhD degrees in this field, as well as postdoctoral fellowships. The institute will also have twinning programmes with other local and international research institution and the private sector and industry to ensure maximum productivity and quality. Amongst the niche research areas covered by UMBI are cancer research, molecular basis of disease, tissue engineering, stem cell and gene therapy, molecular epidemiology and pharmacogenomics, metabolism and anti-oxidants, neurosciences, infectious diseases and molecular immunology. A business arm is being planned to look into aspects of innovations and commercialisation of services and products.

UMBI currently has 2 principal and 2 senior research fellows leading research in their own specialised fields. Each of the research fellows lead a group of researchers and each group are conducting many funded research projects. A council of scientific advisers has been set up and the first of its members has recently been officially appointed by the UKM Senate. UMBI also has a strong and efficient research and administrative secretariat to support the researchers. It should be noted here that UMBI is tightly linked to the Faculty of Medicine UKM and Hospital UKM (HUKM) within an excellent and collaborative venture with a win-win approach for everyone.

We believe that UMBI has the potential to be one of the main players in research in molecular medicine in Malaysia and help put UKM and the nation on the global map of research excellence.
◆ ORGANIZATION CHART

VICE CHANCELLOR

DIRECTOR

Council of Scientific Advisers

Management committee
Council of Fellows
Research & Ethics Committee
Working Committees

Administrative Office and Support Staff
- Administrative Officers
- Scientific Officers
- Medical Technologists
- Secretaries
- Laboratory Assistants

Head of Molecular Basis of Disease

Head of Cancer Research

Head of Tissue Engineering

Head of Metabolism and Anti-oxidants

Head of Pharmacogenomics and Molecular

Head of Infectious Disease and Molecular Immunology

Head of Stem Cell and Gene Therapy

Head of Innovation and Commercialisation
WHO’S WHO AT UMBI

Director
Professor Dr. A Rahman A Jamal (appointed in 2003)

Principal research fellow
Professor Dr. Wan Zurinah Wan Ngah (appointed in 2004)

Senior research fellows
Associate Prof. Dr. Roslan Harun (appointed in 2003)
Associate Prof. Dr. Ruszymah Idrus (appointed in 2003)

Scientific adviser
Professor Dr. Farzin Farzaneh (appointed in 2003)

Scientific officers
Bahiyah Tuah (Administrative)
Siti Azma Yusof (Bioinformatics)
Nor Azian Abdul Murad (Scientific Research)

Administrative assistants
Narimah Khaliani
Nurul Izza Umar

Laboratory assistant
Zuiraini Abdul Razak

RESEARCH PROGRAMME AT UMBI

Our research in molecular medicine includes fundamental, applied and experimental/developmental research. Eight niche and thrust areas of research have been identified and will be the core research activities of UMBI, based on the strength of the faculty and university. Four of these research areas (cancer research, genomics and proteomics, tissue engineering, metabolism and anti-oxidants) are currently fully operational. Two other additional areas are being planned.

| Niche areas which are operational
<table>
<thead>
<tr>
<th>Themes</th>
<th>Head</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cancer Research</td>
<td>Professor Dr. A Rahman A Jamal</td>
<td>Director</td>
</tr>
<tr>
<td>Molecular basis of disease</td>
<td>Associate Prof. Dr. Roslan Harun</td>
<td>Senior Fellow</td>
</tr>
<tr>
<td>Tissue engineering</td>
<td>Associate Prof. Dr. Ruszymah Idrus</td>
<td>Senior Fellow</td>
</tr>
<tr>
<td>Metabolism and antioxidants</td>
<td>Professor Dr. Wan Zurinah Wan Ngah</td>
<td>Principal Fellow</td>
</tr>
</tbody>
</table>

| Niche areas which are being set up
| Stem cell and gene therapy    | Professor Dr. A Rahman A Jamal | Director       |
| Pharmacogenomics & Mol. Epid. | To be appointed                | Senior Fellow   |
| Innovation & commercialisation | To be appointed                | Senior Fellow   |
| Infectious diseases           | To be appointed                | Senior Fellow   |

| Niche areas being planned
| Genetic behaviour             | To be appointed                | Senior Fellow   |
| Neurosciences                 | To be appointed                | Senior Fellow   |
LOCATION

UMBI is located at the Faculty of Medicine within the Hospital UKM complex in Cheras, Kuala Lumpur. The interim office and laboratories for UMBI is located at 7th floor, clinical block HUKM. There are 6 main laboratories being planned as listed below. Both the Genomic and the Tissue Engineering laboratories are fully operational.

1. Genomic and Proteomic Laboratory
2. Metabolic and Anti-Oxidants Laboratory
3. Tissue Engineering Laboratory
4. Stem Cell and Gene Therapy Laboratory
5. Infectious Disease Laboratory
6. UKM BioBank
JOINT MANAGEMENT COMMITTEE

UMBI  HUKM  FACULTY OF MEDICINE

DIRECTOR  DIRECTOR  DEAN

IRPA Panel Health Sector Research and Ethics Committee
Animal Ethics Committee

Deputy Dean (Postgraduate and Research)

RESEARCH SECRETARIAT

UMBI SECRETARIAT  IRPA SECRETARIAT (HEALTH SECTOR)  MEDICAL RESEARCH CENTRE

Scientific Officer (3)
Admin Assistant (2)
Lab Assistant (1)

Scientific Officer (1)

Scientific Officer (1)
Medical Technologists (2)
Research Nurses (3)
Clerk (2)
General Assistant (2)

- Research projects in UMBI (IRPA, Non-IRPA, Fundamental Grant, Contract Research)
- IRPA projects (EA, PR, SR)

- Research projects in the faculty (Non-IRPA, Fundamental Grant, Clinical Trials)

UMBI-HOSPITAL UKM- FACULTY OF MEDICINE: A SMART PARTNERSHIP
◆ PROFILING OF FELLOWS

PROFESSOR A RAHMAN A J AMAL

Qualifications

MD (UKM), MRCP (Ireland), PhD (London)

PhD thesis in Haematology (awarded by the University of London in 1996)

Analysis of gene rearrangements and protein expression of RB1 and p16 tumour suppressor genes in acute myeloid leukaemia: Possible roles in leukaemogenesis

Research interests

- Molecular biology of cancers
- Multi-drug resistance in leukaemias
- Thalassaemias: Molecular profiling and morbidity studies
- Stem cell and gene therapy

List of selected publications

Journals

ASSOCIATE PROFESSOR DR. ROSLAN HARUN

Qualifications

MD (UKM), MRCP (UK), PhD (Leeds)

PhD thesis in Molecular Biology (awarded by the University of Leeds in 1998)

Identification of candidate gene for atopy and asthma in B cells

Research interests

- Differentially expressed genes in atopy and asthma
- Genomics and proteomics of lung cancer
- Clinical trials in respiratory medicine

List of selected publications

Journals

- Roslan Harun, Bingham B, Markham AF, Morrison J FJ. Function of SHC, C-ABL and NF-kB in B cell activation in atopy. Am J of Resp and Crit Care Med. 1997; 155: 611
ASSOCIATE PROFESSOR DR. RUSZYMA IDRUS

Qualifications  
MD (UKM), PhD (UKM), Post-Doc (Harvard)

PhD thesis in Physiology (awarded by Universiti Kebangsaan Malaysia in 1996)

Research interests
- Molecular genetics of deafness
- Tissue engineering

List of selected publications

Journals

Abstracts/Proceedings
PROFESSOR DR WAN ZURINAH WAN NGAH

Qualifications
BSc/Hons (UK), PhD (New Zealand)

PhD thesis in Biochemistry (awarded by Victoria University of Wellington, New Zealand, 1982)

Research interests
- Anti-oxidants
- Metabolism
- Carcinogenesis

List of selected publications

- Suzana M, Zalinah A, Suhana M, Wan Ngah WZ. Polymorphisms in the glutathione S-transferase M1 (GSTM1 and T1 (GSTT1) and cytochrome P450 (CYP2E1) genes in a Malaysian study population. Mal J Biochem Mol Biol 2003; 8:30-37
- Shamaan NA, J arien Z, Khalid BAK, Top AGM and Wan Ngah WZ. Effect of Lingzhi and vitamin E supplementation on enzyme activities in the liver and plasma of normal and chemically induced hepatocarcinogenic rats. Intl J Medicinal Mushroom 2000; 2: 131-139
- Shamaan NA, Khalid BAK, Rahmat A and Wan Ngah WZ. Vitamin C and Aloe vera supplementation protects from induced chemical hepatocarcinogenesis in the rat. Nutrition 1998; 14: 846-852
- Makpol S, Shamaan NA, J arien Z, Md. Top AG, Khalid BAK and Wan Ngah WZ. Different starting times of vitamin E supplementation and tumour marker enzyme activities in rats which were chemically induced with cancer. Gen. Pharmacol 1997; 28:589-592
AWARDS WON BY ASSOCIATE PROFESSOR DR. RUSZYMAH IDRUS


**I-TEX Gold Medal Award** For The Invention Of Formation of Tissue Engineered Human Skin For Clinical Application At The 14th International Invention, Innovation, Industrial Design & Technology (2003). 16-18 May 2003, Kuala Lumpur.

**Silver Medal** For ‘Molecular genetics of deafness: Mutation Screening Among Deaf Schoolchildren In Malaysia: Aiming For early Diagnosis And Intervention at the UKM Exposition on Research and Innovations 2003. 3 - 5 May 2003. Dewan Canselor Tun Abdul Razak (DEKTAR) UKM, Bangi.


CURRENT INFRASTRUCTURE

Currently, the management office is located at the first floor, Clinical Block, Hospital Universiti Kebangsaan Malaysia, Cheras, Kuala Lumpur. An interim set-up consisting of administrative offices and research laboratories covering a total of 9000 square feet is being planned. A permanent building is being targeted for UMBI in the near future once funding has been acquired from the Ministry of Education. A request for funding totaling RM64 million has been submitted to the Ministry of Education for both infrastructure and equipment. Currently, the institute provides a well-equipped genomic laboratory, a tissue-engineering laboratory and a cancer genetics laboratory for researchers in UMBI and Faculty of Medicine.

THE GENOMIC LABORATORY

The genomic laboratory of UMBI is located at the ground floor, clinical block HUKM. The laboratory is equipped with the ABI PRISM 3100 genetic analyzer, the iCycler Real Time PCR machine, gel documentation system, biophotometer and other equipments for molecular biology research.

The ABI PRISM 3100 is an automated capillary electrophoresis system that can separate, detect and analyse up to 16 capillaries of fluorescently labeled DNA fragment in one run. DNA sequencing of 16 samples can be electrophoresed in 2 ½ hours with a simple and easier method. UMBI will provide a service for DNA sequencing which will cost about RM 80.00 for each forward and reverse primers. The system can also be used for the single nucleotide polymorphism (SNP) analysis and genotyping.

The iCycler is a real time PCR thermocycler with an optical module and provides a real time measurement of the PCR process. This enables truly quantitative analysis of template concentration. Real time and on line PCR monitoring also reduces opportunities and speeds time-to-results because traditional post PCR steps are no more necessary.

Researchers from the Faculty of Medicine and other faculties are allowed use of the instruments with guidance from the scientific officers in UMBI.

Facilities in the laboratory includes:

1. ABI PRISM 3100 Genetic Analyzer
2. dHPLC (Varian system)
3. Real time iCycler PCR Machine
4. Gel photodocumentation system
5. Horizontal and vertical submarine gel electrophoresis system
6. Power packs
7. Bench top centrifuges
8. Spectrophotometer
9. Freezers (4°C, -80°C)
10. Autoclave
11. Water bath
12. Oven
13. PH meter
THE TISSUE ENGINEERING LABORATORY

The Tissue Engineering research group was founded in the year 1999 by Dr. Aminuddin Saim and Dr. Ruszymah Haji Idrus. Starting with a humble laboratory with 2 researchers, it now supports a research team comprising of 2 chief investigators, 3 PhD students, 3 masters students and 3 research assistants. On top of that there is a vast network of collaborators from various universities and government institutions. Working on the principle of reconstructing functional human tissues to permanently replace, restore and repair the diseased tissues, the research team has since successfully constructed human cartilage in the shape of ear and trachea from chondrocytes isolated from nasoseptal, ear and joints. This has won them the Gold Medal Award in the Ministry of Science, Technology & Environment Exposition, 2002 and subsequently the Geneva Bronze Medal for innovative invention in the same year. With these achievements, they embarked on the reconstruction of human skin. The breakthrough in skin tissue engineering was when they successfully constructed a human bilayer skin (epidermis and dermis). Preliminary animal studies showed promising results and a clinical study is underway. Their efforts also won other recognition as evidenced by the presentation of Gold Medal Awards in I-TEX, 2003 and in the Ministry of Science, Technology & Environment Exposition, 2003. More recently, they have initiated the generation of human bone by incorporating osteoprogenitor cells with biomaterial. A branch of their main interests now focuses on the development of biocompatible, osteoinductive and osteoconductive biomaterial.

A patent-pending culture medium was developed by the team that increases the chondrocyte proliferation rate at a thousand fold as compared to using standard media. Being a team with a strong belief in autologous implantation, various refinements had been made by the group to the culture medium to avoid the use of animal sera such as fetal bovine serum. Another milestone for the research team was the invention of a new approach to generate autologous tissues using patient-based biomaterial (PBB), yet another patent-pending technology.

The Tissue Engineering Laboratory is currently active in research on tissue engineering of human skin, cartilage and bone. Biomaterial such as synthetic polymers and ceramic serve as a scaffold for the formation of 3-dimensional bio-engineered tissue. The lab currently embarked on the development of a novel biomaterial for clinical application.

Cartilage
There are 3 types of cartilage in human body i.e. hyaline, fibrocartilage and elastic. Adult human cartilage shows poor capacity to repair and regeneration, thus the motivation for tissue engineering is to promote biological repair and regeneration. Our study is now to focus on reconstructing human cartilage with various biomaterials and to regenerate human cartilage for reconstructive surgery.

Skin
Skin is highly organized, complex structure consist of essentially two layers; an epidermis consisting of keratinocytes that is constantly proliferating and a dermis consisting mainly fibroblasts, a deeper layer that provides high tensile strength. We have isolated and determined the most optimum condition for human cell culture. We have successfully form a bilayer bio-engineered human skin. Preliminary animal trials shows excellent healing and the absent of scarring using our bio-engineered bilayer skin. Our objective is to reconstruct in vitro full thickness human skin using the tissue engineering technique for future clinical applications.

Bone
The repair of bone defects caused by fracture or disease very often requires the application of bone substitute (metal or ceramic) or autologous bone grafting. However, this poses the problem of non-union at the defect sites or morbidity at the donor sites. To overcome this, autologous tissue engineered bone which incorporates patient-derived osteoprogenitor cells with synthetic biocompatible material is being developed. We have isolated osteoprogenitor cells from various source i.e. periosteum, bone chip and bone marrow. Study is now underway to optimize culture condition for these cells. Various biomaterials are also being evaluated for formation of a good bio engineered bone graft.
Facilities in the Tissue Engineering Laboratory include:

1. Laminar flow cabinet
2. CO₂ incubator
3. Freezer (4°C and -30°C)
4. Incubator shaker
5. Temperature regulated centrifuge/ Benchtop centrifuge/ Mini centrifuge
6. Inverted microscope/ light microscope
7. PCR machine
8. Electrophoresis set
9. Gel documentation system
10. Oven
11. Vacuum pump
12. Water bath
13. Autovort
14. Flow cytometer
15. Fisher stirring hotplate
THE CANCER GENETICS RESEARCH LABORATORY
[CGRL]

Located on the 2nd floor of the clinical block in HUKM, the initial start-up were from the combined IRPA grants of two researchers in this field. Currently, there are 2 post-graduate students undertaking research projects in lung cancer and asthma within the lab. The goal of both projects is similar i.e. identifying differently regulated genes involved in both diseases using mRNA Differential Display. Recently, we have moved forward with our work by utilizing the more powerful technique of DNA microarray. We have identified several novel genes and we are going to do some functional studies on one or two of them by combining the techniques of RNA Interference and high-density oligonucleotide array (GeneChip, Affymetrix)

The lab is also tinkering with a novel idea of developing a new high-throughput gene expression and genome mapping tool which at the moment we called “Double-Tag Serial Analysis of Gene Expression” (DOT-SAGE) and/ or Extra Long Serial Analysis of Gene Expression (XL-SAGE). (Note: We haven’t settled for which name yet). Addressing the shortcomings of SAGE, we proposed a major modification of the original protocol that we think should provide a more meaningful, unambiguous data and rapidly aid in the cloning of full-length genes. Dr D.T Singh and his team at Geneva Biosciences are helping us with the computer software needed to analyze the expression data. Meanwhile IBU, UiTM will provide us with the robotic liquid-handling system (Beckman Biomek FX) and the sequencing platform (48 and 96-capillary MegaBACE Sequencers) to sequence the anticipated several thousand clones in a high-throughput format. Since this is not covered by any grants, we couldn’t allocate much time into this. We are just starting the first phase of the project that is re-engineering a plasmid vector by site-directed mutagenesis and subsequent cloning a PCR-generated an in-vitro recombination cassette within its polylinker region.

Facilities at the Cancer Research Lab include:

1. PCR Mastercycle gradient
2. Programmable thermal controller
3. Centrifuge
4. Hybridization Oven
5. Freezer
6. Kodak Digital Image System
7. Ultra pure deionised water system
8. Vacuum pump
9. Gel dryer
10. Microwave
 EVENTS IN 2003

<table>
<thead>
<tr>
<th>Date</th>
<th>Events</th>
</tr>
</thead>
<tbody>
<tr>
<td>17th November 2003</td>
<td>Visit by a delegation from University of South Australia</td>
</tr>
<tr>
<td>31st November 2003</td>
<td>Visit by a team of scientists from UiTM</td>
</tr>
<tr>
<td>1st November 2003</td>
<td>Visit by Professor Dr. Koji Furuya from Laboratory of Protozoology, National Infectious Diseases, Kyoto, Japan.</td>
</tr>
<tr>
<td>23rd September 2003</td>
<td>Visit Associate Professor Dr. Ross Andrews from University South Australia (UNISA)</td>
</tr>
<tr>
<td>6th August 2003</td>
<td>One-day seminar on ‘Genomics research network architecture g(RNA)-Solutions for genomics challenges’</td>
</tr>
</tbody>
</table>

 ACTIVITIES PLANNED FOR 2004

 Monthly research updates and lectures

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>19th January 2004 (Monday)</td>
<td>MOLECULAR RESEARCH UPDATE (1) • Telomerase activity in human colorectal cancer • Identification of differentially expressed gene in non-small cell lung cancer by mRNA differential display and microarray analysis • Technique of the month: Denaturing Gradient Gel Electrophoresis (DGGE)</td>
<td>Zulhabri Othman, Rosmadi Mohd Yusoff, Azian Murad</td>
</tr>
<tr>
<td>6th February 2004 (Monday)</td>
<td>MOLECULAR RESEARCH UPDATE (2) • Genetic linkage analysis in families with non-syndromic hereditary hearing impairment • Low density lipoprotein (LDL) receptor gene mutation in patients with familial hypercholesterolaemia (FH): Molecular and clinical characterization • Technique of the month: Linkage analysis</td>
<td>Farah Wahida Ibrahim, Nor Azian Abdul Murad, Farah Wahida Ibrahim</td>
</tr>
<tr>
<td>24th March 2004 (Saturday)</td>
<td>LECTURE SERIES IN MOLECULAR MEDICINE (1) • Overview of application of molecular biology in medicine • Basic techniques in molecular biology</td>
<td>Assoc. Prof. Dr. Roslan Harun, Assoc. Prof. Ruszymah Idrus</td>
</tr>
</tbody>
</table>

Seminars and technical workshops for 2004

- Workshop on Mutation Analysis (August 2004)
- Update in Molecular Medicine (September 2004)
- Workshop on Linkage Analysis (October 2004)
- 1st National Seminar in Molecular Medicine (November 2004)
## POST GRADUATE RESEARCH STUDENTS IN 2003

<table>
<thead>
<tr>
<th>Name</th>
<th>Degree</th>
<th>Project Title</th>
<th>Supervisors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Melati Khalid</td>
<td>MSc</td>
<td>APC gene mutation and methylation status in colorectal cancer</td>
<td>Prof. Dr. A Rahman AJamal Assoc. Prof. Dr. Isa Rose</td>
</tr>
<tr>
<td>Zulhabri Othman (PhD)</td>
<td>PhD</td>
<td>Detection of p53 and K-Ras2 gene mutations and measurement of aflatoxin B1-albumin adducts level and telomerase activity in human hepatocellular carcinoma and colorectal cancer</td>
<td>Prof. Dr. Wan Zurinah Wan Ngah Prof. Dr. A Rahman AJamal</td>
</tr>
<tr>
<td>Rosmadi Yusoff</td>
<td>PhD</td>
<td>Cloning and characterization of novel lung cancer genes by combining the techniques of mRNA Differential Display, Oligonucleotide Microarray and RNA Interference</td>
<td>Assoc. Prof. Dr. Roslan Harun</td>
</tr>
<tr>
<td>Jeenath Banu Jamaluddin (MSc)</td>
<td>MSc</td>
<td>Identification of differentially expressed genes in cord blood CD 4+ T helper lymphocyte in asthma</td>
<td>Assoc. Prof. Dr. Roslan Harun</td>
</tr>
<tr>
<td>Chua Kien Hui</td>
<td>PhD</td>
<td>Effects of various growth factors on the proliferation human nasoseptal chondrocytes reconstruction of human cartilage</td>
<td>Assoc. Prof. Dr. Ruszymah Idrus</td>
</tr>
<tr>
<td>Mazlyzam bin Abdul Latiff</td>
<td>PhD</td>
<td>Formation of tissue engineered human skin for clinical application and future commercialization</td>
<td>Assoc. Prof. Dr. Ruszymah Idrus</td>
</tr>
<tr>
<td>Norazlinda binti Md. Daud</td>
<td>MSc</td>
<td>Identification of deafness gene locus in a family via genetic linkage analysis</td>
<td>Assoc. Prof. Dr. Ruszymah Idrus</td>
</tr>
<tr>
<td>Angela Ng Min Hwei</td>
<td>PhD</td>
<td>Formation of tissue engineered human bone in the presence of various growth factors and the cloning of the telomerase gene</td>
<td>Assoc. Prof. Dr. Ruszymah Idrus</td>
</tr>
<tr>
<td>Munirah Sha’ban</td>
<td>MSc</td>
<td>Effect of growth factors on the proliferation of animal and human articular chondrocyte and reconstruction of articular tissue via tissue engineering method for clinical application</td>
<td>Assoc. Prof. Dr. Ruszymah Idrus</td>
</tr>
</tbody>
</table>
FUNDED RESEARCH PROJECTS

Associate Professor Dr. Ruszymah Hj. Idrus

Project code 06-02-02-003/ BTK/ ER 022
Project title Tissue engineering of human tissues for future clinical applications
Co-researchers Dr. Fuzina Nor Hussein (Institute for Medical Research)
Assoc. Prof. Dr. Fauziah Othman (Universiti Putra Malaysia)
Dr. Robert Penafort (University Malaya)
Duration 3 years (2003-2005)
Value of grant RM2.2 million

Project synopsis
The specific objectives of this project are; 1) to design a system to isolate chondrocytes from hyaline cartilage, keratinocytes/fibroblasts from skin tissues and osteoprogenitor cells from bone which will give the highest yield and viability, 2) to identify the growth factors involved, 3) to promote the proliferation and differentiation of these cells, 4) to formulate a culture medium for optimum cell growth in monolayer culture, 5) to identify suitable biomaterial for the tissue engineering of cartilage and skin, 6) to design a bioreactor or a culture system to support clinical size tissue formation and finally, 7) to construct engineered human tissues for clinical use.

Associate Professor Dr. Roslan Harun

Project code 06-02-02-003/ BTK/ ER 032
Project title Identification and analysis of genes underlying asthma using cDNA Microarrays
Co-researchers Dr. Rohaida Osman (C-GAT, Universiti Kebangsaan Malaysia)
Assoc. Prof. Dr. Mohd Saiful Aman Mohd Said (Universiti Teknologi Mara)
Duration 3 years (2003-2005)
Value of grant RM2.4 million

Project synopsis
Background. Asthma is a chronic inflammatory disease of the airways, characterized by an airway infiltration of lymphocytes, mast cells and eosinophils, epithelial shedding, subepithelial fibrosis and oedema. Together with the inflammation, there are changes of an ongoing repair process that constitute airway wall remodeling. Although a great deal has been discovered and described about asthma at the molecular and system levels, more intense work is needed to broaden the understanding of the various parameters of this disease. In this project, we would like to construct a specialized ‘asthma chip’ and use this microarray to (a) identify gene expression changes underlying asthma; (b) generate molecular portraits for distinct types of asthma; and (c) correlate distinct gene expression profiling with various clinical manifestations of asthma.

Research Approach. We use Affymetrix Human Genome GeneChips consisting of 47,000 genes to screen for altered gene expression in various types of inflammatory and structural cells involved in the chronic airway inflammation and airway remodeling in asthma. These differentially expressed genes will be used to construct a focus microarray (‘Asthma chip’). Analysis of gene expression in ‘asthmatic’ and ‘normal’ cell subsets isolated from different types of tissues (peripheral blood, bronchial biopsies, bronchial alveolar lavage and bronchial brushing) will be performed using this specialized cDNA microarray that contains relevant genes that are involved in airway inflammation and remodeling in asthma. Samples are obtained, where appropriate, from patients of different clinical phenotypes: allergic asthma, non-allergic asthma, acute asthma, chronic stable asthma of different severity (mild, moderate, severe), steroid-responsive asthma and steroid-resistance asthma.
FUNDED RESEARCH PROJECTS

Professor Dr. A Rahman A Jamal

Project Code: 06-05-01/003/ BTK/ ER 018
Project title: Molecular studies on disease biomarkers and pathogenesis of cancer: Colorectal carcinoma as a model (UKM leads a sub-project)
Duration: 3 years (2002-2004)
Value of grant: RM0.6 million

Project synopsis:
- Mutational analysis of p53 and K-ras
- Telomerase activity and telomerase length
- Mutational analysis of the APC, MLH1, MSH2 and MSH6 genes the denaturing high performance liquid chromatography (DHP/LC) approach. Methylation status of the APC gene will also be analysed. Protein expression of MLH1, MSH2 and MLH6 by immunostaining will also be performed.

Professor Dr. Wan Zurinah Wan Ngah

Project code: 06-02-02-003/ BTK/ ER 022
Project title: Role of Antioxidants in preventing degenerative damage aging and Down syndrome
Co-researchers: Noor Aini Abdul Hamid, Aishah Adam, Norhani Mohidin, Alini Marzuki, Suzana Makpol, Musalmah Mazlan, Yasmin Anum Mohd Yusof
Duration: 4 years (2002-2005)
Value of grant: RM3.3 million

Project synopsis:
Cellular oxidative processes and free radicals have been recognised to play a causative or exacerbating role in ageing, certain types of cancer, inflammatory-immune injuries, cataract, Down syndrome and several neurodegenerative disorders. Down syndrome is considered as accelerated ageing and can used as a model for ageing. Antioxidants may prevent or slow the progression of these diseases. Supplementation of antioxidants may be a simple and cost-effective measure in improving the health through the diet. Consuming more of the sources of antioxidants (i.e. more fruits and vegetables) or supplementation with a number of key antioxidants (vitamins C, E and carotenoids) can dramatically improve the health of the general population and the individual. These nutrients have been shown to not only prevent acute deficiency syndromes but may help ward off chronic diseases. The latter may be optimally achieved by intake of doses higher than the recommended daily allowance (RDA). Few human studies have been conducted due to the high costs involved but human studies are necessary to confirm biomedical research. This programme attempts to determine the antioxidant status, oxidative stress levels and immune status in selected Malaysian population (in terms of location). The effect of supplementation of antioxidants on subjects with high oxidative levels will be investigated. The molecular mechanisms of the ageing process and Down syndrome will be investigated in animal models and using cells in culture. Production of the algae, Chlorella vulgaris as a new source of antioxidant and novel products will be optimized. The properties and nutritional composition of the algae will be analysed.

- To determine the antioxidant, oxidative status & immune parameters of a selection of the population aged 20-70 years.
- To determine the antioxidant, oxidative status, immune parameters & ocular & visual status in Down syndrome (DS).
- To investigate the effect of 6 month supplementation of palm oil vitamin E to subjects with high oxidative stress by determining the above parameters
- To investigate the effect of exercise on oxidative stress status and antioxidants in the healthy exercising aged
- To determine the molecular mechanisms of ageing and DS (chromosomal aberrations, signaling pathway) and the effect of palm oil tocotrienols using primary rat neuron cells and neuronal cell lines in culture.
- To determine the mechanisms of ageing and DS using animal models and the effect of antioxidant vitamin
NETWORKING & COLLABORATION

UMBI has already established networking and collaborations with several international and local research institutes as listed below. We will embark on establishing a wide network with other institutions in the coming years.

International

- King’s College Medical School, London, United Kingdom
- University of South Australia
- Shemyakin Institute of Bio-Organic Chemistry, Moscow, Russia

Local institutions

- Institute of Biotechnology UiTM
- Institute for Research in Molecular Medicine USM (INFORMM)

Industries

- BioSynTech Sdn. Bhd
- Aventis Pharma
- Siber Hegner
ABSTRACTS AND PUBLICATIONS IN 2003 BY RESEARCH FELLOWS OF UMBI

Journals

6. Suzana M, Zalina A, Suliana H, Wan Ngah WZ. Polymorphisms in the glutathione S-transferase M1 (GSTM1) and T1 (GSTT1) and cytochrome P450 (CYP2E1) genes in a Malaysian study population. Mal J Biochem Mol Biol 2003; 8:30-37

Abstracts of posters and presentations


15. KH Chua, BS Aminuddin, BS Lokman, BHI Ruszymah. Synergistic action of bFGF and TGFβ on human nasal septum chondrocytes culture expansion. Faculty of Medicine UKM 5th Annual Research Week. 26-27 July 2003. Pg 3

16. AL Mazlyzam, KH Chua, BS Lokman, H Fuzina, BS Aminuddin, BHI Ruszymah. Full thickness human skin formation via tissue engineering techniques. Faculty of Medicine UKM 5th Annual Research Week. 26-27 July 2003. [Best Oral Presentation (Lab)-First Prize]. Pg : 5


33. MD Norazlinda, I Farah Wahida, BS Lokman, BS Aminuddin BS, BHI Ruszymah. Mutations in the GJB2 gene among cochlear implantless is ethnic specific. Faculty of Medicine UKM 5th Annual Research Week. 26-27 July 2003. pp81


43. Then Sue Mian, Musalmah Mazlan, Abdul Gapor Mat Top and Wan Ngah WZ. Effects of oxidative stress and neuroprotection of gamma-tocotrienol towards astrocytes. MCBN-UNESCO/ COSTAM/ SFRR (MALAYSIA/ ASEAN) Workshop: Micronutrients: Molecular Basis of Health and Disease, 16-20 July 2003 Kota Kinabalu, Sabah.


53. Noor Aini AH, Illyana I, Wan Ngah WZ, Gapor MT and Musalmah M. Effects of Long Term Palm Oil Vitamin E Supplementation on Rate of Wound Closure and Lipid Peroxidation at Different Age Groups in Rats. Oxidants and Antioxidants in Biology, Cadiz, Spain 6–9 February 2003.


55. Then SM, Musalamah M, Gapor MT & Wan Ngah WZ. Neuroprotective effect of γ-tocotrienol against H₂O₂-induced oxidative stress in astrocytes culture. 28th Annual Conference of the Malaysian Society for Biochemistry and Molecular Biology 12th August 2003, Putrajaya Marriott Hotel, Putrajaya.


◆ UMBI OPERATING BUDGET 2003

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<th>Budget Code</th>
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Registrar, UKM
Bursar, UKM