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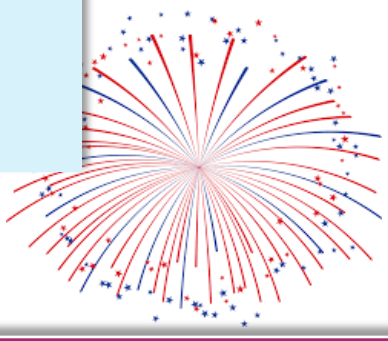
WINNERS OF RESEARCH GRANTS



NO.	NAME	GRANT
1.	**Assoc. Prof. Dr. Ho Kok Lian** *Department of Pathology*	1. MOSTI-Combating Covid-19 Fund 2022 2. Prototype Research Grant Scheme (PRGS) 1/2022
2.	**Dr. Hakimah Mohammad Sallehuddin** *Department of Medicine*	Fundamental Research Grant Scheme (FRGS) 1/2022
3.	**Dr. Lim Chee Woei** *Department of Medicine*	Fundamental Research Grant Scheme (FRGS) 1/2022
4.	**Assoc. Prof. Dr. Zulfitri 'Azuan Mat Daud** *Department of Dietetic*	Fundamental Research Grant Scheme (FRGS) 1/2022
5.	**Assoc. Prof. Dr. Karmegam Karuppiah** *Department of Environmental and Occupational Health*	Fundamental Research Grant Scheme (FRGS) 1/2022
6.	**Dr. Siti Yazmin Zahari Sham** *Department of Pathology*	Fundamental Research Grant Scheme (FRGS) 1/2022
7.	**Dr. Nurul Iftida Basri** *Department of Obstetric and Gynaecology*	Fundamental Research Grant Scheme (FRGS) 1/2022
8.	**Assoc. Prof. Dr. Abdah Md Akim** *Department of Biomedical Sciences*	Fundamental Research Grant Scheme (FRGS) 1/2022
9.	**Assoc. Prof. Dr. Ling King Hwa** *Department of Biomedical Sciences*	Fundamental Research Grant Scheme (FRGS) 1/2022
10.	**Dr. Siti Saleha Masrudin** *Department of Human Anatomy*	Fundamental Research Grant Scheme (FRGS) 1/2022

2022

Fundamental Research Grant Scheme (FRGS)

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DR. HAKIMAH MOHAMMAD SALEHUDDIN
Principal Investigator
RM150,200

Development and Feasibility of a Multi-domain Intervention Program for Post-stroke Bone Health (BOUNCE – Bone Health in Older Adults' Intervention Post Acute Stroke) in Hospital Pengajar Universiti Putra Malaysia (HPUPM)

01.09.2022 - 31.08.2025 (3 years)

https://www.researchgate.net/project/Bone-Health-Research

Team members:
1. Prof. Dr. Sazlina Shariff-Ghazali (UPM)
2. AP Dr. Salmiah Said (UPM)
3. Dr. Terence Ong (UM)
4. Dr. Vina Phei Sean Tan (USM)
5. AP Dr. Geeta Appannah (UPM)
6. AP Dr. Subashini Suppiah (UPM)
7. Dr. Mazatulfazura SF Salim (UPM)

Aim:
To develop and test the feasibility of a multi-domain intervention program for post-stroke bone health among older adults in HPUPM.

Why is it important?
- Stroke is a known cause of secondary osteoporosis, with associated impaired mobility, falls, and femoral neck fracture.
- The risk of hip fracture is quadrupled in stroke survivors compared to healthy individuals.
- To date, no specific intervention is recommended for maintaining bone health or reducing bone loss in post-stroke older adults in Malaysia.

How will it be done?
This study is divided into 3 phases:
•**Phase 1**- A systematic review to identify evidence on non-pharmacological interventions for post-stroke bone health.
•**Phase 2-** Development and validation of a novel multi-domain intervention protocol for BOUNCE program through expert consensus development conference.
•**Phase 3-** A mixed-method feasibility trial of BOUNCE program, which is further divided into two components;
3(a)- A two-arm parallel, single-blinded, randomized controlled trial
3(b)- An exploratory qualitative study using FGDs among BOUNCE participants, family and healthcare providers.

Expected output:
A feasible multi-domain program that will be further tested for effectiveness in a larger RCT.
- Post-graduate student: 1
- Publication: At least 4

DR. JONATHAN LIM CHEE WOEI
Principal Investigator
RM 163,400

The Role of Peroxisome Proliferator-activated Receptor-β/δ antagonist in Melanogenesis

01.09.2022 - 31.08.2025 (3 years)

Team members:
1. Prof. Dr. Johnson Stanslas (UPM)
2. AP Dr. Lam Kok Wai (UPM)
3. Dr. How Kang Nien (UPM)
4. Dr. Benedict Wong Charng Choon (MSU)
5. Dr. Azhar Ali (NUS, Singapore)

Aim:
To elucidate the role of PPAR-β/δ in melanogenesis with 10h or PPAR-β/δ shRNA transfection in both B16/F10 and human melanocyte cell lines challenged with α-MSH.

Why is it important?
- The production of melanin, also known as melanogenesis, is important for skin pigmentation.
- Overproduction of melanin leads to hyperpigmentation disorders such as Café au lait macules, Addison's disease, Ephelides (freckles), etc.
- Regulation of melanogenesis is a way to control hyperpigmentation.
- Three types of peroxisome proliferator-activated receptors (PPAR-α, PPAR-β/δ, and PPAR-γ) have been identified in human melanocytes.
- Our previous study showed treatment with a PPAR-β/δ antagonist in α-melanocyte-stimulating hormone (α-MSH) challenged mouse melanoma B16/F10 cells led to significant inhibition of melanogenesis in melanoma.
- However, the exact mechanism of action of PPAR-β/δ antagonist was not addressed.

How will it be done?
- The mechanism of action will be determined with differential gene and transcript expression analysis via RNA-sequencing. The affected pathways will be determined by transcriptome analyses and confirmed using RT-PCR or western blot.
- The anti-melanogenic effect of PPAR-β/δ antagonist will also be studied in a UVB irradiation-induced hyperpigmentation animal model.

Expected output:
✓ The mechanism of action of PPAR-β/δ antagonist in melanogenesis will be unraveled.
✓ PPAR β/δ antagonist to be developed as a molecule for the treatment of hyperpigmentation or inhibition of melanogenesis.
  - 1 Ph.D. student
  - ~2 publications

Fundamental Research Grant Scheme (FRGS)

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DR. SITI SALEHA MASRUDIN
Principal Investigator
RM 138,500.00

Benign prostatic hyperplasia and metabolic syndrome: Potential role of daidzein against oxidative stress

01.09.2022 - 31.08.2024 (2 years)

Team members:
1. AP Dr. Che Norma Mat Taib (UPM)
2. Dr. Nur Izah Ab Razak (UPM)
3. Dr. Nurul Huda Mohd Nor (UPM)
4. Dr. Siti Fadziyah Mohd Asri (UPM)
5. Prof. Dato' Dr. Khairul Asri Mohd Ghani (UPM)

Aim:
To evaluate the inhibitory effects of daidzein on benign prostatic hyperplasia (BPH) accompanied by metabolic syndrome.

Why is it important?
- BPH is one of the most frequently occurring urologic diseases in men age above 50 years old.
- BPH induces lower urinary tract symptoms, where obstruction of bladder outlet leads to unfavourable clinical symptoms including urinary retention, voiding, nocturia, urgency, and hesitancy. It becomes the atypical direct cause of adverse quality of life and mortality.
- Accumulating evidence showed that metabolic syndrome and/or its components are linked to BPH.
- Daidzein have shown to be beneficially alleviated BPH symptom and against the complications of diabetes.

How will it be done?
- The study will be using BPH animal model.
- Duration of the study 12 weeks.
- The biochemical analysis, BPH marker, and structural study will be conducted.
- The study will be conducted mainly in the FPSK, UPM.

Expected output:
- Postgraduate students (1)
- Publications (2)

ASSOC. PROF. DR. KARMEGAM KARUPPIAH
Principal Investigator
RM141,880

Psychosocial Factors and Ergonomics Assessment for the Development of Educational Ergonomic Module in the prevention of Musculoskeletal Disorders (MSD) among Malaysian Traffic Police

01.09.2022 - 31.08.2024 (2 years)

Team members:
1. Prof. Dr. Shamsul Bahri B. Md. Tamrin (UPM)
2. AP Dr. Irniza Rasdi (UPM)
3. Dr. Vivien How (UPM)

Aim:
To assess the psychosocial and ergonomics factors for the development of Educational Ergonomic Module in the prevention of Musculoskeletal Disorders (MSD) among Malaysian Traffic Police.

Why is it important?
- Malaysian traffic police officers work in one of the high-risk workplaces. They are exposed to high-demand workload, stress, prolonged standing, awkward posture, and repetitive movement in order to fulfill their work task. However, there is a lack of studies related to psychosocial factors and ergonomics hazards among Malaysian traffic police officers which can lead to developing risk of MSD.

How will it be done?
The study will be conducted in 3 steps:
1. Information on sociodemographic factors, self-reported MSD and psychosocial factors among Malaysian traffic police officers will be assessed using a self-administered questionnaire
2. All potential ergonomics hazards will be assessed using REBA, focus group discussion, and face-to-face interviews
3. The compiled results will be used to develop an educational ergonomic module suitable with traffic police working environment and task.

Expected output:
- ✓ An educational ergonomics training module for Malaysian traffic police officers.
- ✓ Postgraduate students: 1
- ✓ Publications: 3

Fundamental Research Grant Scheme (FRGS)

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DR. SITI YAZMIN ZAHARI SHAM

Principal Investigator

RM127,253

In vitro verification of the molecular mechanisms of miR-101-3p and its target mRNA in diabetic kidney disease

01.09.2022 - 31.08.2024 (2 years)

Team members:
1. AP Dr. Ling King Hwa (UPM)
2. Prof. Dr. Sharmili Vidyadaran (UPM)
3. AP Dr. Intan Nureslyna Samsudin (UPM)
4. AP Dr. Subashini C. Thambiah (UPM)

Aim:
Verification and elucidation of the molecular mechanisms of miR-101-3p in diabetic kidney disease (DKD).

Why is it important?
- DKD is the leading cause of chronic kidney disease worldwide.
- Despite improved clinical management, its progression still occurs, suggesting a need to further elucidate the underlying pathogenesis.
- A trend of upregulation of miR-101-3p in serum of type 2 diabetic patients with macroalbuminuria from a selected Malaysian population has been shown and in-silico prediction of its target mRNA was made.
- This study aims to verify this prediction.

How will it be done?
- Verification of an overexpression of miR-101-3p in hyperglycaemic milieu in vitro.
- Determination of its predicted target mRNA.
- Determination of its target mRNA and protein.
- Determination of the predicted apoptosis.

Expected output:
- Further elucidation of the molecular mechanisms of miR-101-3p in DKD will improve understanding of the disease.
- Outcome from this study include:

1. Verification of an upregulation of miR-101-3p in renal cells in hyperglycaemic milieu.
2. Verification of the predicted target mRNA of miR-101-3p.

DR. NURUL IFTIDA BASRI

Principal Investigator

RM 155,800

Association of Vitamin D deficiency With Selected Vitamin D Receptor (VDR) Gene Polymorphisms In Gestational Hypertension Among Malaysian Women: A Prospective Genetic Biomarker For Early Intervention Strategy

01.09.2022 - 31.08.2025 (3 years)

Team members:
1. Dr. Amilia Afzan Mohd Jamil
2. Assoc Prof. Dr. Norshariza Nordin
3. Assoc Prof. Dr. Loh Su Peng
4. Aida Adha Mohd Jamil

Aim:
This study aims to investigate the prevalence of vitamin D deficiency and its association of VDR SNPs to the development of GH among Malaysian pregnant mothers, with the main focus on Malays, representing the largest ethnic in Malaysia.

Why is it important?
- This study expected to provide more evidence for early personalised intervention of vitamin D supplementation due to anticipated individual genetic variability. This antenatal care programme will reduce the government expenditures, reduce maternal and fetal morbidity and mortality while strengthening Malaysia's healthcare system.

How will it be done?
- This is a prospective study and it will be divided into two phases:
- **Phase 1**-cross sectional study (To determine the prevalence of vitamin D deficiency and the associated risk factors among Malaysian pregnant mothers through a cross-sectional study).
- **Phase 2**- case control study (To understand and associate distributions of VDR allele and genotype with vitamin D deficiency among Malay pregnant mothers).
- All Malaysian pregnant women attending Obstetrics and Gynaecology Department of Hospital Pengajar UPM(HPUPM) who fulfilled the criteria will be recruited.

Expected output:
- ✓ The project will provide excellent opportunities to link molecular understanding of the role of VDR genetic variation and could be a risk factor for the development of GH.
- ✓ The findings of the study could reveal the possible association of VDR gene variants with higher risk GH development among Malay pregnant women in Malaysia.
- ✓ Postgraduate student- 1 PhD student.
- ✓ Publication -3.

Fundamental Research Grant Scheme (FRGS)

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ASSOC. PROF. DR. ZULFITRI AZUAN MAT DAUD
Principal Investigator
RM164,670

Delineating the Complex Interplay among Dietary Exposure, Genome and Epigenome for Cardiovascular Risk among Adult Type 2 Diabetes Patients using Stage-based Structural Equation Modelling, Artificial Neural Network, and Nutritional Genomics Approach [Diet-GenEpiC Study]

01.09.2022 - 31.08.2025 (3 years)

Team members:
1. Prof. Dr. Tilakavati Karupaiah (Taylor's University)
2. Prof. Dr. Chia Yook Chin (Sunway University)
3. Dr. Nurul Husna Shafie (UPM)
4. Mr. Alvin Lim Jun-Hao (PhD Student –UPM)

Aim:
To determine the complex interplay among dietary exposure, genome and epigenome for cardiovascular risk among adult type 2 diabetes patients using stage-based structural equation modelling, artificial neural network, and nutritional genomics (SEANGE) approach.

Why is it important?
- Although past research has shed some light on gene-diet interactions on CVD risk factors, our knowledge on the complex interplay among dietary exposure, genome and epigenome for CVD remains far from adequate to enable translation of nutritional science into useful policy and practices. To foster the understanding, the following noteworthy research gaps from the current state of the science must be addressed:

- **Research gap 1:** Previous Gene-diet Interaction Studies for CVD were Limited to CVD Risk Factors rather than Absolute Risk of CVD due to the Absence of Valid CVD Risk Calculator.
- **Research gap 2:** Lack of Local Study to Generate Genetic Risk Score for Malaysian T2D Patients.
- **Research gap 3:** Incomplete Molecular Mechanism to Explain the Modulation Effect of a Heart-Healthy Dietary Pattern.

How will it be done?
The study will be conducted in 3 stages:
- **Stage 1** is a 10-year retrospective study among 2834 T2D patients to develop a CVD risk calculator using partial least square structural equation modelling (PLS-SEM) and artificial neural network (ANN).
- **Stage 2** is a cross-sectional study among 270 adults T2D patients to assess the modulation effect of dietary pattern on the genetic risk of CVD.
- **Stage 3** involves an integrative analysis of mRNA and miRNA to explain the modulatory mechanism of dietary patterns using iPathwayGuide.

Expected output:
Structural Equation Modeling-Artificial Neural Network based CVD calculator to stratify and mitigate CVD risk for T2D patients.

ASSOC. PROF. DR. MICHAEL LING
Principal Investigator
RM165,036

Investigation of cell-specific REST expression and its repression on JAK-STAT signalling pathway to revert the neurogenic-to-gliogenic shift in Down syndrome cerebral organoids model

01.09.2022 - 31.08.2025 (3 years)

Team members:
1. AP Dr. Cheah Pike See (UPM)
2. AP Dr. Norshariza Nordin (UPM)
3. Dr. Elysha Nur Ismail (UPM)
4. Dr. Shahidee Zainal Abidin (UMT)
5. Prof. Dr. John Mason (University of Edinburgh, UK)

Aim:
The study aims to understand how REST dysregulation can affect JAK-STAT signalling pathway in specific cells in the brain organoids derived from Down syndrome patients. The interactions between the two are important for us to understand how neurogenic-to-gliogenic shift in Down syndrome (DS) happen and formulate a therapy to revert the phenomenon.

Why is it important?
- The molecular interactions between REST and JAK-STAT will define why Down syndrome individuals have more astrocytes than neurones at birth.
- The shift of neuron-to-astrocyte genesis underlying the impaired connectivity in DS brain and therefore lead to intellectual disabilities.
- When characterised, we can repurpose various FDA-approved drug to target either REST or JAK-STAT to pharmacologically revert the shift with the hope to revert intellectual disabilities in DS individuals.

How will it be done?
- Induced pluripotent stem cells from DS individuals will be grown into 3D cerebral organoids or commonly known as the mini brain.
- Different cell types in the organoids will be isolated for molecular characterization.
- Gain-of-function and loss-of-function models will be established to study the role of REST and its effects on JAK-STAT signalling pathway in the organoids.

Expected output:
- Proof of concept evidence – regulating REST/JAK-STAT can revert the shift.
- Establishment of REST and JAK-STAT as future pharmacotherapeutics targets to revert intellectual disabilities in DS.