Congress Abstracts

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Audit on adherence to the herbal oncology treatment regime

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Purpose: A clinical audit was conducted at the Traditional & Complementary Medicine (T&CM) Unit, Kepala Batas Hospital to evaluate the adherence of T&CM staffs to Chinese Herbal Medicine (CHM) treatment regime based on "T&CM Practice Guidelines on Herbal Therapy as an Adjunct Treatment for Cancer". The percentage of adherence to the guideline was determined, with the standard being 100% adherence.

Methods: Frequency of first week prescription, second appointment within one week and herbal free period of newly referred patients were audited over 4 months (January to April 2016). The adherence of T&CM staffs to appropriate CHM treatment regime was analyzed. A questionnaire survey was conducted to analyze the contributing factors. Improvement measures were then implemented and another audit over 4 months was conducted (mid-May to August 2016).

Result(s): Initial audit showed overall adherence of Inconsistency of adherence may lead to suboptimal treatment efficacy. Short and long-term adverse reactions may not be closely monitored. Non-adherence was contributed by staff and/or patient Re-orientation, Continuing Medical Education distribution of guiding aids, familiarization of guideline as well as stringent monitoring and interventions by pharmacists and head of department had been carried out. After implementing improvement measures, subsequent audit revealed an adherence of 83.33%.

Conclusion(s): Additional cooperation between T&CM staffs, pharmacists and herbal practitioner may help to increase adherence. Periodic surveillance by HOD and pharmacist is needed to ensure sustainability to the guideline adherence.

Keywords: Chinese herbal medicine, Herbal oncology, Traditional & Complementary Medicine

Phytochemical screening and cytotoxic activity of *Alstonia angustifolia* aqueous leaves extract on epidermoid carcinoma cell line

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Purpose: Alstonia angustifolia was used traditionally to treat remittent fever by rubbing on the spleen area. The previous study proves that this plant can act as an anti-malarial and antibacterial agent. The aims of the study are to screen the presence of potential bioactive phytochemicals in A. angustifolia leaves extract and evaluate its cytotoxicity potential against epidermoid carcinoma cells.

Methods: Aqueous extract of *A. angustifolia* leaves extract was obtained by the boiling method. Separation and identification of bioactive phytochemicals were performed by Liquid Chromatography-Q-TOF Mass Spectrometry with dual ESI source in both positive and negative modes. The cytotoxicity activity was evaluated by 3-(4, 5-dimethylthiazol-2-yl)-2-5-diphenyltetrazolium bromide (MTT) colorimetric assay against epidermoid carcinoma cell line at various concentrations of extract ranging from 15 to 1000 µg/mL.

Result(s): A total of 75 phytochemical compounds were identified in which 32 compounds were believed to possess medicinal values such as vasodilator, antihypertensive, an antioxidant agent, an apoptosis inducer, therapy for chronic arthritis and anti-inflammatory agent. The majority of phytochemical compounds belong to the alkaloids and some compounds were classified as phenolic acids, flavonoids and aldehyde. Quebrachitol was the major compound found in this extract. It is methyl-derivatives of inositol. The cytotoxicity assay showed that the aqueous extract of A. angustifolia leaves extract had an anticancer activity with IC50 of 183.4 $\mu g/mL$ on epidermoid carcinoma cell line (A431).

Conclusion(s): This study may suggest the potentiality of *A. angustifolia* as a chemotherapeutic agent. However, further research must be carried in order to determine the exact mechanism of action.

Keywords: *Alstonia angustifolia*, Liquid Chromatography-Q-TOF Mass Spectrometry, MTT assay, IC₅₀, epidermoid carcinoma.

Evaluation of the chemical composition and antibacterial activity of essential oil of eastern Algerian *Laurus nobilis* L, against isolated bacteria from dental clinic

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Purpose: The present work is focused on the evaluation of the antibacterial activity of the essential oil of Laurel on some bacteria isolated from dental clinic; it represents a contribution in the search for means of biological control against the bacterial strains.

Methods: The extraction of the essential oil of the *Laurus nobilis* was carried out by hydrodistillation. Essential oil obtained was analyzed by gas chromatography coupled with mass spectrometry (GC-MS). The antimicrobial activity of oil was tested using the diffusion method by determining the inhibition zone and the Minimal Inhibitory Concentration (MIC) against pathogenic bacterial stains.

Results: essential oil yield of *Laurus nobilis* was determined at a rate of 0.45%. Fifty-two compounds were identified representing 99 % of the total oil. The principal components are: Eucalyptol (23.75%), Cis-Methyl eugenol (11.38%) and α -Terpinyl acetate (10.04%) which compose 45.17% of the oil. seven bacteria were identified: *Escherichia coli, Hafnia alvei, Shigella spp, Staphylococcus aureus, Staphylococcus sp, Streptococcus sp* and *Lactobacillus sp.* The results of antimicrobial activity showed great potential activity against strains identified with a high sensitivity of *Shigella spp* (18,33 \pm 5,80mm) and *E coli* (17,00 \pm 12,12mm) of gram-negative strains than other bacterial tested. The MIC of essential oil were 1.16% and 1.5% for *E coli* and *Shigella spp* strains respectively.

Conclusions: The findings of the present study indicate that $\it L$ $\it nobilis$ essential oil, can well present interesting alternative naturel, which it can be useful for protection applications such as a biological control method based on natural substances.

Keywords: Essential oil, *Laurus nobilis* L, GC-MS, antibacterial activity, CMI.

Determination of total phenolic, flavonoid and antioxidant content of *Tetrigona Apicalis* propolis extract

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Purpose: Propolis is popularly known to have important biological activities whereby its compound is able to promote antioxidant, antiviral, antibacterial, anti-inflammatory, and antitumor activity. The aim of this study is to determine the total phenolic, flavonoid and antioxidant content of ethanolic extract of propolis (EEP) derived from selected Malaysian stingless bees, *Tetrigona apicalis*.

Methods: Propolis was extracted with ethanol and the ethanol was removed by using rotary evaporator. The extract was then freezedried. Spectrophotometer was used to measure total phenolic content (TPC), total flavonoid content (TFC) and 2,2'-Azinobis (3-ethylbenzothiazoline-6-sulphonic Acid) (ABTS) radical scavenging ability. Gallic Acid, Quercetin and Trolox are used for standard curve for TPC, TFC and ABTS, respectively.

Result(s): Total phenolic and total flavonoid contents showed the TPC values at 12.5mg/mL (319.9 mgGAE/g) and TFC values at 0.5mg/mL (66.4 mgQCE/g). The percentage of ABTS scavenging activity by T. apicalis at 0.313 mg/mL showed the inhibition of 9.5% (Trolox equivalent to 49.8%) with IC50 of 1.81mg/ml.

Conclusion(s): The results suggested that EEP of T. apicalis contains considerable phenol and flavonoid and has antioxidant activites.

Acknowledgement: This study is fully funded by RUI grant 1001/CIPPT/8012227

Keywords: *Tetrigona apicalis;* ABTS; Propolis; Phenolic; Flavonoid; Antioxidants

A comparison study of antifungal activity of Andographis paniculata gel, gelenggang cream and salap gelenggang plus against superficial mycoses

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Purpose: Andographis paniculata or known as hempedu bumi and Cassia are among the gelenggang herbaceous plants cultivated in southern Asia, China, and some parts of Europe. These plants traditionally used to treat superficial mycoses. In this study, A. paniculata gel (APG) and two commercial gelenggang product namely gelenggang cream (GC) and salap gelenggang plus (SGP) were compared each other regarding its' in vitro activity against superficial mycoses infections.

Methods: The study was conducted using food poisoning technique. The selected fungi; Trichophyton mentagrophyte, Τ. rubrum, interdigitale, Microsporum gypseum and M. canis were subjected to Potato Dextrose Agar culturing with the mixtures of APG, GC and SGP at different concentrations; 10%, 5% and 1% (w/v). Then the mycelial growth inhibitions were compared to control.

Results: The results indicate the highest percentage of mycelial growth inhibition goes to M. gypseum in 10% of APG which is 88.64%, while the lowest is *T. rubrum* in 1% of SGP which is 29.74%. Among the three products tested, APG showed the best antifungal effect onto fungi tested.

Conclusions: It is concluded that APG is the best choice as a source of natural antifungal treatment against superficial infections. These findings have provided evidence of a potentially APG to be commercialized as other antifungal products. However, there is still a need for further clinical studies in ascertaining the APG as an alternative treatment for superficial mycoses.

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Keywords: Andographis paniculata, Gelenggang, antifungal, superficial mycoses

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Assessment of antiproliferative effect, chemical composition and antioxidant activity of the DCM extracts of *Clinacanthus nutans* leaves on MCF-7 cells

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Purpose: The goal of this study was to investigate the antiproliferative effects, chemical composition and antioxidant activities on properties of *Clinacanthus nutans* dichloromethane leaves extracts (DCMCN).

Methods: DCM CN leaves was extracted using the dichloromethane (DCM) soxhlet extraction method. Antioxidant activity of the extracts was measured using 2, 2-diphenyl-1-picrylhydrazyl (DPPH) scavenging assay. The chemical profile screening of the extracts was determined using gas chromatography-mass spectrometry (GC-MS) analysis. The antiproliferative effect was used Sulphoromide B assay on MCF-7 (breast cancer) and MCF- 10A (normal breast) cell lines.

Result(s): The GCMS screening was identified 8 major phytochemical compounds present in this extract. The total content of DPPH scavenging radicals shown DCMCN extracts was significantly correlated with their gallic acid relaxation effects (r2>0.9, p<0.05). In SRB assay indicated the DCM CN leaves extract inhibit the growth of breast cancer cell and no effect on normal breast cell line.

Conclusion(s): The GCMS analysed present of volatile compounds by used reference from NIST library. Activity of antioxidant was evaluated through DPPH assay. The SRB assay was used to estimate antiproliferative activity against breast cancer and normal cell lines. The SRB assay used for assessing their antiproliferative effects of DCMCN extracts on MCF-7 and MCF-10A. All the experiments used various concentration and compared with control for significant result. This study demonstrated that DCMCN extracts effective role in inhibiting the growth of the cancerous cells and without any side effects on normal cells.

Acknowledgement: This work was funded by a FRGS grant (203/CIPPT/6711340) from the Ministry of Higher Education.

Keywords: antiproliferative, Clinacanthus nutans, DCM extract

In vitro cytotoxicity activity of Acanthus ilicifolius on MCF-7 and MCF-7/TAMR-1 breast cancer cell lines

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Purpose: Breast cancer (BrCa) is a hormone-dependent tumour and estrogen is known to play a major role in the initiation and progression of the disease. The estrogen receptor (ER)-positive BrCa patient who received tamoxifen treatment often acquired tamoxifen resistance which resulted in the treatment failure and relapse for patients. Therefore, it is an urgent need to identify characterize new agents for acquired drug-resistance BrCa. Acanthus ilicifolius (A. ilicifolius) has been reported to have variety of biological potential as anti-tumour, anti-inflammatory, antioxidant antimicrobial properties. However, it is never investigated in the BrCa especially on the tamoxifen-resistant cancer cell line.

Objective: The aim of this study is to investigate the effect of *A. ilicifolius* extract on the proliferation of ER-positive and tamoxifen-resistant BrCa cell lines.

Methods: Aqueous extract of $A.\ ilicifolius$ was used to treat the ERpositive BrCa cell line (MCF-7) and the tamoxifen-resistant BrCa cell line (MCF-7/TAMR-1). The cytotoxicity of the extract was assessed by MTT assay.

Results: Aqueous extract of *A. illicifolius* was more toxic in the MCF-7 cell line (IC50: $60.38 \pm 1.44 \, \mu g/mL$) compared to MCF-7/TAMR-1 cell line (IC50: $81.37 \pm 0.79 \, \mu g/mL$), p<0.05. The MCF-7/TAMR-1 cell line may express high BARD1 and BRCA1 genes, which led to enhanced DNA damage repair and resistance to the treatment compared to MCF-7 cell line.

Conclusion: A. ilicifolius extract could be considered as a potential cytotoxic agent and promising to be further investigated in BrCa patients including cases with drug resistance.

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Keywords: Acanthus ilicifolius, MCF-7, MCF-7/TAMR-1, MTT assay

Antibiofilm and antibacterial activity of different types of essential oils against *Staphylococcus aureus*

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Purpose: Essential oils may act as a natural antimicrobial agent to substitute the use of chlorhexidine and fluoride in oral care products that have been proven to have adverse side effect to users after long term usage. This study aims to investigate the antibacterial activity of five selected essential oils, cinnamon, lavender, tea tree, clove and peppermint essential oil, against the oral pathogen, *Staphylococcus aureus*.

Methods: The antibacterial activity of the essential oils was evaluated via MTT (3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide) assay, where their minimum inhibitory concentration (MIC) were determined. From the MIC values, only three essential oils, tea tree, clove and peppermint essential oil, were further studied for their antibiofilm activity.

Result(s): The MIC value of cinnamon, lavender, tea tree, clove and peppermint essential oil were 0.0975%, 1.56%, 0.78%, 0.78% and 6.25% respectively. *S. aureus* was shown to be the most sensitive towards cinnamon essential oil as the oil has the lowest MIC value. All three essential oils revealed antibiofilm activity in dose dependent manner. Generally, tea tree essential oil has a better antibiofilm activity than clove essential oil even though both oils have an equal MIC value. Tea tree essential oil was able to inhibit more than 60% of *S. aureus* biofilm. The antibiofilm activity of clove and peppermint essential oil were more than 58% and 52% respectively.

Conclusion(s): This study demonstrated essential oils are potential candidates as natural agents useful in oral disease treatment due to their promising antibacterial and antibiofilm activity.

Keywords: essential oils, natural products, Staphylococcus aureus

The clinical evaluation of integrative East-West rehabilitation therapy for childhood stroke: A case report

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Purpose: Pediatric stroke occurs more commonly than once thought, the diagnosis is often delayed as the symptoms can be subtle and nonspecific. Prompt individualized, interdisciplinary medical treatments Traditional maximize recovery. can Complementary Medicine (T&CM) Practice Guideline on Acupuncture, Malaysia (2017) stated that patients (18 years and above) can be referred for acupuncture therapy in T&CM units, while the effect and of acupuncture for pediatric patients are questionable. Hence, clinical evaluations proper are warranted to assess a patient's recovery throughout treatments.

Methods: Α case report of а 15-year-old male adolescent has complained of right sharp temporal headache for 2 diagnosed presented with left hemiparesis and was with cerebral artery stroke. Acupuncture was provided 3-4 times a week on the same day with the physiotherapy session for 3 months. acu-points were selected at each visit after the consultation of the registered practitioner.

We evaluated the clinical effectiveness and safety of the rehabilitation therapy using Barthel Index for activities of daily living (ADL) status and MRC muscle scale for muscle strength.

Result(s): The Patient showed vast improvement after sessions: symptoms (left-sided facial weakness and tongue deviation) resolved, his independence and muscle strength (Barthel scoring 100, muscle scale of 3-4) regained. No adverse reported throughout treatments.

Conclusion(s): Acupuncture therapy seems effective for function and ADL in pediatric stroke patients when it is used in combination with rehabilitation. This provides evidence-based and consensus-based recommendations assist to childhood in rehabilitation treatment following a diagnosis of stroke.

Keywords: pediatric, stroke, rehabilitation, acupuncture, integrative

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Cloning of native chitinase gene from *Serratia marcescens* as a potential natural source for the control of insects transmitting human diseases

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Purpose: Chitinase is an enzyme that degrade chitin which form fungal cell wall and exoskeleton of some animal such as crustaceans and insects. This study aims to clone and characterize the native chitinase gene from *Serratia marcescens* as a potential natural source of chitinase enzyme for the control of insects transmitting various human diseases such as malaria, chikungunya, dengue and yellow fever.

Methods: Chitinase gene (GenBank Accession No: L41660) was amplified from *Serratia marcescens* by polymerase chain reaction (PCR); denaturation at 95°C for 60 sec, annealing at 50°C for 60 sec, extension at 72°C for 60 sec; for 25 cycles. The amplicon was digested with BamHI and NotI restriction enzymes, electrophoresed on 1% agarose gels, and visualized by FloroSafe DNA stain under ultraviolet transillumination for confirmation. The amplicon was purified and ligated into pCR2.1-TOPO vector using T4 DNA ligase. Chitinase gene sequence was analyzed in BioEdit software. Sitedirected mutagenesis was employed to correct the amplified gene sequence from any misspelling. The accurately cloned chitinase gene was re-sequenced and re-analyzed for confirmation.

Result(s): 1440-bp chitinase gene was successfully amplified from Serratia marcescens. Misspellings from the amplification include substitutions at nucleotides (nt) 670, 872, 948, 953, 954, 1031, 1032, 1069, 1093,1095, 1096, 1152, 1178, 1180, 1186, 1208 and 1272 while deletion/insertion occurred at 1028 and 1090 nt. The errors were successfully corrected by site-directed mutagenesis by overlap extension using 8 complementary oligodeoxyribonucleotide primers and PCR.

Conclusion(s): Amplification of chitinase gene from *Serratia* marcescens induces sequence misspelling which successfully eliminated by site-directed mutagenesis.

Acknowledgement: This work was supported by the Research University (RU) grant (1001/PPSP/8011025) from Universiti Sains Malaysia.

Keywords: chitinase, *Serratia*, mutagenesis

Modulation of pain behavior responses by Tualang honey in a rat model of sleep deprivation

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Purpose: This preliminary study was done to investigate the effects of Tualang honey administration on the pain behavior responses in a rapid eye movement sleep deprivation (REM) rat model.

Method: Forty- eight Sprague Dawley rats were divided into four groups: free moving control (FC), REM sleep deprivation (REMD), REM sleep deprivation with honey (REMH) and tank control (TC). Tualang administered orally for to was 30 days prior deprivation. REM sleep deprivation was achieved using flowerpot technique. Following 72 hours of REM sleep deprivation, 1% formalin was injected on the right hind paw. The rats' behavior was recorded for 1 h in an observation chamber. The pain behavior was assessed, and data were analysed using repeated measurement analysis variance (ANOVA) with post-hoc Bonferroni test. P< 0.05 was used as level of significant in the data set.

Result: There was a significant in time effect F(12, 25) = 479.80, p<0.001, group effect F(3,36) = 18.974, p<0.001 and interaction between time and group effect F(36,74) = 3.180, p<0.001. The pain behaviour score from the REMH group was significantly lower compared to REMD group (p < 0.001). The REMD group also showed significantly higher score compared to FC and TC groups.

Conclusion: The preliminary study showed that administration of Tualang honey for 30 days prior to REM sleep deprivation was associated with modulation of pain behavior responses in the rat model. The results give some light of possible modulation of pain behavior responses by Tualang honey in a rat model of REM sleep deprivation.

Acknowledgement: This study was financially supported by fundamental research grant scheme (FRGS) from Ministry of Higher Education of Malaysia (Grant number: 203.PPSP.6171211).

Keywords: REM sleep deprivation, pain behavior, Tualang honey

Isolation, characterization and molecular docking study of cyclic polyketides with α-glucosidase inhibitory activity from Malaysia *Endiandra kingiana* Gamble (Lauraceae)

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Purpose: The present study was conducted to determine the chemical constituents of the methanolic crude extract from the bark of <code>Endiandra kingiana</code> Gamble. The selected compounds were then screened for their $\alpha\text{-glucosidase}$ inhibition activity. Molecular docking studies were also performed to explore the binding interaction of the active compound.

Methods: The methanolic crude extract of *E. kingiana* bark was subjected to various chromatographic techniques for separation process. The structures of the isolated compounds were elucidated by 1H- and 13C-NMR data and then being established through depth analysis of 2D-NMR; DEPT, NOESY, COSY, HSQC and HMBC in combination with HRMS experiments. Antidiabetic activity was evaluated by α -glucosidase inhibition activity. Docking study was conducted using AutoDockTools 1.5.6 on the crystal structures of N-terminal (PDB ID: 2QMJ) and C-terminal (PDB ID: 3TOP) subunit of human MGAM.

Result(s): The purification of methanol crude extract of *E. kingiana* lead to the isolation of 4 major compounds, i.e kingianic acid A (1), tsangibeilin B (2), kingianins A (3) and kingianin F (4). Among the selected compounds being screened, compounds 3-4 showed potent $\alpha\text{-glucosidase}$ inhibition activity with IC50 value at 11.9 \pm 1.95 μM and 19.7 \pm 1.54 μM , respectively. Molecular docking studies found out that the binding into the active site of N-terminal of MGAM than C-terminal of MGAM agree with *in vitro* $\alpha\text{-glucosidase}$ enzyme inhibition activity result.

Conclusion(s): Four major compounds were isolated from the methanol crude extract of E. kingiana bark. The compound showed potent inhibition on α -glucosidase compared to the acarbose (positive control).

Acknowledgement: The research was financially funded through Universiti Sains Malaysia Research Grant RUI (1001.PKIMIA.8012310).

Keywords: Endiandra kingiana; Cyclic polyketides; Endiandric acids; Kingianins; α -glucosidase inhibitory activity; Molecular docking Tualang honey

Role of tocotrienol rich fraction in bone formation and resorption activity in a rat model of breast cancer-induced to bone

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Purpose: Breast cancer cell has the ability to invade the bone microenvironment and facilitated by the nature of osteoblast and osteoclast differentiation. Anti-metastatic, anticancer and antiresorptive properties exert by tocotrienol has been shown by previous literature in *in-vitro* studies. Thus, we aimed to investigate the role of Tocotrienol Rich Fraction (TRF) in bone turnover activity in a rat model of breast cancer-induced to bone.

Female Sprague Dawley rats weighing around 200 g were divided into four groups namely Sham, Control, TRF and ZA. Breast cancer cell line, MDA-MB-231 (1x10⁶) were induced via intrafemoral of Control, TRF and ZA groups, whereas Sham were induced with supplementary media only. After 20 days, all groups were subjected SPECT-CT to determine metastasis scan activity radionucleide tracer 99mTc-MDP. The rats were sacrificed the next day and left femurs were collected for enzyme immunoassay analysis. cross-linked Alkaline phosphatase (ALP) and carboxyterminal telopeptide of type I collagen (ICTP) were determined using ELISA methods.

Result(s): SPECT-CT scan showed accumulation of radiotracer in all cancer-induced group. In enzyme immunoassay analysis, a significantly increased bone formation enzyme (ALP) were observed only in ZA group, while in bone resorption enzyme (ICTP), TRF shown no significant difference with ZA and Sham group.

Conclusion(s): It was suggested that TRF showed anticancer and antiresorptive action although it did not show to stimulate bone formation activity. Hence, TRF has the potential to be used as therapies in reducing bone destruction for cancer-induced bone diseases.

Acknowledgement: This study is fully funded by RUI grant 1001/CIPPT/8012227

Keywords: Tocotrienol Rich Fraction, ALP, ICTP, Bone metastasis, Bone cancer-induced to bone

In vitro and in vivo alpha-glucosidase and alpha-amylase activities of nipa palm vinegar

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Purpose: Nypa fruticans Wurmb. vinegar, commonly known as nipa palm vinegar (NPV), has been used as a folklore medicine among the Malay community to treat diabetes. The previous pharmacological studies suggested its antidiabetic effect. Thus, this study is conducted to evaluate the effect of NPV on the suppression of carbohydrate digestive enzymes, alpha-amylase and alpha-glucosidase.

Methods: NPV was tested using *in vitro* α -glucosidase and α -amylase enzyme inhibition assays. Kinetic analysis was carried out in different concentrations of substrates. To confirm the *in vitro* findings, *in vivo* oral carbohydrate tolerance tests of starch were conducted on normoglycemic *Sprague Dawley* rats.

Result(s): NPV inhibited the activity of both enzymes in a dose-dependent manner. The inhibitory effect of NPV in all enzymes was weaker than acarbose as the latter was greater by 10.6-fold and 31.1-fold in the respective $\alpha\text{-glucosidase}$ and $\alpha\text{-amylase}$ enzymes. NPV followed uncompetitive and competitive inhibition respectively alpha-glucosidase and alpha-amylase. These findings were further confirmed through $in\ vivo$ oral starch tolerance test. In agreement with $in\ vitro$ findings, NPV at different doses showed a significant suppression in postprandial hyperglycemia compared to the negative control group.

Conclusion(s): The findings suggested that NPV may exert its antidiabetic effect, partly by suppressing postprandial hyperglycemia.

Keywords: Nypa fruticans Wurmb, vinegar, α -glucosidase, α -amylase, postprandial hyperglycemia

Cytotoxicity of Swietenia macrophylla seed extracts on RIN-5F pancreatic cells

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Purpose: Swietenia macrophylla (S.macrophylla) (family Meliaceae) is three species in the genus, Swietenia found in the neotropics. It is a deciduous tree that can reach heights of up to 50m with a trunk 3 m in diameter, commonly known as "sky fruit" as the fruit seems to be pointing to the sky. It is also planted widely in Southern Asia and in the Pacific region. The plant extracts have traditionally as antioxidant, widely used antidiabetic, antimicrobial, anti-inflammatory, anti-HIV, antiulcer, antifungal, antimalarial and anti-diarrhoeal agents. The objective of the study is to determine the cytotoxic effect of S.macrophylla seed extracts on RIN-5F pancreatic cells in order to further investigate their antidiabetic activities.

Methods: Three S. macrophylla seed extracts namely aqueous (SMAE), 50% ethanol (SM50E) and 95% ethanol (SMEE) were investigated in vitro for their cytotoxic effects on RIN-5F pancreatic cells. MTT assay was conducted at concentrations ranging between 0.03125 to 1.0mg/mL.

Result(s): The results showed that RIN-5F cells treated with SMEE have highest viability within the concentrations range of 0.03125 to 0.5 mg/mL. SM50E displayedno cytotoxicity at two concentrations (0.03125 and 0.0625mg/mL) while all concentrations of SMAE were cytotoxic on RIN-5F cells.

Conclusion: Thus, these findings justify the selection of SMEE for further investigation of its effects on insulin secretion in RIN-5F pancreatic cells.

Acknowledgement: Study supported by RU Grant 1001/PFARMASI/8011030

Keywords: Swietenia macrophylla, seed extract, cytotoxicity, MTT assay

Carica papaya Linn. leaf: A systematic scoping review of clinical safety data, animal toxicity studies, and drug-herb interactions

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Purpose: Safety evaluation of *Carica papaya* (*C. papaya*) are as important as efficacy potential which is complicated by the presence of variable formulations, phytochemical compositions, and extrinsic toxicants. This review aimed to systematically collate all safety related clinical data and animal toxicity studies, as well as reports on drug-herb interactions of *C. papaya* leaf consumption.

Methods: A systematic search using predetermined keywords on electronic databases (MEDLINE, Cochrane Library Central, LILAC, Web of Science) and grey literature was conducted. Relevant clinical and preclinical studies were identified, screened, and analysed to present an overall safety profile of *C. papaya* leaf consumption.

Result(s): A total of 41 articles were included (23 clinical, 5 ongoing trials, 13 preclinical) to evaluate study characteristics, adverse reactions, toxicity findings, and drug-herb interactions; while 13 randomised controlled and quasi-experimental trials were further assessed for risk of bias and reporting quality. Overall, short-term C. papaya leaf consumption is well tolerated by adults across a variety of investigated formulations (mostly as juice and standardised aqueous extract). One randomised controlled trial reported safe consumption of *C. papaya* leaf standardised aqueous extract in children. Minor gastrointestinal side effects were most commonly reported. Animal studies posed concerns for reproductive toxicity and hepatotoxicity in long-term use. Unfavourable drug-herb antidiabetics, interactions with digoxin, ciprofloxacin, artemisinin were reported.

Conclusion(s): In conclusion, *C. papaya* leaf consumption in adults is generally safe for short-term use though cautioned in pregnancy and people with liver impairment. It has potential drug-herb interactions with oral hypoglycaemic agents, p-glycoprotein substrates, and antibiotics with metal ions chelating properties.

Acknowledgement: We would like to thank the Director General of Malaysia, Deputy Director General of Health Malaysia Health (Research & Technical Support), Director of Institute for Medical Research, Head Centre of Herbal Medicine Research Centre for their support and permission to publish this article. We would also like extend our gratitude towards Dr Azuana Ramli, Head of Pharmacovigilance Section, Centre for Compliance and Ouality Control, National Pharmaceutical Regulatory Agency, Ministry of Health Malaysia for providing information on ADR reports from the MADRAC database.

Keywords: Carica papaya, safety, toxicity, drug-herb interaction

Homozygous Filipino β°-deletion genotypes is dominant in β-thalassaemia patients of Kadazandusun descent in Sabah

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Purpose: Filipino β° -deletion has been reported as a unique mutation among the indigenous people of Sabah. The prevalence of β -thalassemia is high in Kadazandusun community, however the molecular characteristic of the mutation is still less known. This preliminary study aims to characterize the socio-demographic profile and genotypes of Filipino β° -deletion mutation in Kadazandusun patients with transfusion-dependent β -thalassaemia.

Methods: A cross-sectional study was conducted on 107 transfusion-dependent β -thalassaemia patient in Likas Women's and Children's Hospital between March 2020 and March 2021. A self-administrative semi-structured questionnaire was designed to collect information on socio-demographics. Blood samples were collected with informed consent for molecular analysis. Detection of Filipino β° -deletion was performed using Gap-polymerase chain reaction. Data were analyzed by GraphPad Prism v8.0.1 and Image Lab v6.0.1.

Result(s): Our data shows that 50.47% of the patient screened were of Kadazandusun descent. Majority of the patients aged between 11-15 years (46.30%) and comes from low socioeconomic status family (42.59%). Sociodemographic analysis shows that the high prevalence of β -thalassaemia among Kadazandusun community is not due to consanguineous marriages (12.96%). Molecular analysis shows that the homozygous type of Filipino β °-deletion represented the majority of β -thalassaemia alleles in Kadazandusun patients (90.74%).

Conclusion(s): Homozygous Filipino β° -deletion was found dominant in Kadazandusun patients. Further genomic studv is essential the racial heterogeneity of B°-deletion characterize Filipino mutation in hope to uncover the correlation between the types of mutation and severity of the disorder. Future genetic counseling of such conditions might be useful to reduce the prevalence of β thalassemia in Sabah.

Acknowledgement: This study was supported by the UMSGreat grant (GUG0437-1/2020)

Keywords: β -thalassaemia, Homozygous Filipino β° -deletion, Kadazandusun, socio-demographics

Delta brainwaves revealed the neuronal activation during Fatihah Chapter listening

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Purpose: Fatihah Chapter is a renowned Islamic spiritual remedy for human mind, body and soul. However, less scientific data were found regarding this. Hence, this study aimed to uncover the human neuronal oscillations from the Fatihah Chapter acoustic stimulation.

Methodology: This study involves 28 respondents with inclusion criteria of habitual daily Quran listeners. This study was performed by using quantitative electroencephalography according to 10-20 system to decode the brain electrical information. Brain electrical analysis was performed by BESA Research 6.1 software followed by Repeated Measures ANOVA, Discriminant Analysis and Agglomerative Hierarchical Clustering upon data pre-processing.

Results: Delta spectral power was significantly reduced (p<0.05) in the 19 electrode channels during listening to acoustic stimulation from the Fatihah Chapter compared to Rest. It is also the dominant brainwaves among the five canonical frequency bands of Delta, Theta, Alpha, Beta and Gamma. The bilateral prefrontal cortex were the most activated areas with the average spectral power value of 1.6432.

Conclusion: Quranic Fatihah Chapter listening stimulates cortical reorganization in the brain areas which underlie deep relaxation, healing, recovery of function and plasticity processes.

Keywords: Brainwaves, Delta rhythms, Multivariate Analysis, Quantitative Electroencephalography, Quranic listening.

Acknowledgment: This study has been supported by USM Short Term Research Grant (304/PPSP/61313160) and Incentive Grant and approved by the Human Ethical Committee of University Sains Malaysia (USMKK/PPP/JEPeM[234.3.(09)]

The prevalence of complementary and alternative medicines among allergic rhinitis patients in Malaysia

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Purpose: Allergic rhinitis (AR) is a common disease in Malaysia, with many patients using complementary and alternative medicine (CAM) to alleviate their symptoms. However, there is no prevalence study done for CAM users among allergic rhinitis patients in Malaysia. Because of the rising interest in CAM in the treatment of allergic rhinitis, this study was conducted to estimate the prevalence of CAM among allergic rhinitis patients in Malaysia and understand the practice of CAM usage.

Methods: A cross-sectional study using self-administered questionnaire among patients with allergic rhinitis who attended the allergic clinic in the ORL-HNS department in 2 selected hospitals were enrolled after consented on a first-come, first-serve basis as convenience sampling from June 2020 till February 2021. A selfquestionnaire in administered, 16-item Bahasa Malaysia distributed to the participants with subsets to inquire about the sociodemographic data and pattern of usage of CAM and its effectiveness.

Results: 372 patients were enrolled in this study consisting of 217(58.3%) females and 155(41.7%) males. 231(62.1%) participants had used CAM for AR in the past ten years. A higher proportion of females (p=0.015) and those with higher income (p=0.004) had used CAM. Among the users, 87.9% found CAM to be effective.

Conclusion: CAM is widely used in Malaysia to alleviate allergic rhinitis symptoms, with a large proportion of users think it is effective. Therefore, more randomized controlled trials and lab researches should be done in the future to provide evidence and guidance to integrate CAM into allergic rhinitis management.

Acknowledgement: Geran Penyelidikan Sarjana Perubatan (GPSP) 2020 from Pusat Pengajian Sains Perubatan, USM for providing the research fund for this project

Keywords: allergic rhinitis, prevalence, complementary, alternative

POPDC in underlying mechanism of colon cancer metastasis

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Purpose: Colon cancer is the second leading cause of cancer death worldwide and it has reached the third commonest cause of cancer death in Malaysia as reported by Malaysian National Cancer Registry (MNCR). The survival rate is low with a poor prognosis due to relapse and metastasis. In recent years, POPDC protein has been shown to correlate with cancer progression in various cancers. However, how the POPDC family regulates colon cancer metastasis remains unanswered. In our current study, we aim to elucidate the expression pattern of POPDC1, POPDC2, and POPDC3 in stage 1 to stage 4 colon cancer cells.

Methods: The colon cancer cell lines at different stages (SW1116, SW480, HCT-15, and COL0205) were cultured in Dulbecco's modified Eagle's medium supplemented with 100 U/mL penicillin G, 100 mg/mL streptomycin, and 10% fetal bovine serum at 37°C in a humidified 5% $\rm CO_2$ incubator before subjected to protein extraction. Western blot assay was used to detect the expression of POPDC1, POPDC2, and PODC3 in the cancer cell lines.

Result(s): We found that all POPDC proteins were expressed in all stages of colon cancer cells. There was a down-regulation of POPDC1 expression in stage 2. Moreover, POPDC2 and POPDC3 expression were decreased significantly in all stages of colon cancer cells.

Conclusion(s): The findings propose that POPDC protein plays an integral part in colon cancer metastasis, and its down-regulation might promote invasion and metastasis in colon cancer cells.

Acknowledgement: This study is supported by the Fundamental Research Grant Scheme (FRGS048-2019).

Keywords: colon cancer, POPDC1, POPDC2, POPDC3, metastasis

The effectiveness of Kelulut honey as an adjunct therapy for patients with allergic rhinitis

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Purpose: Stingless bee honey or commonly known as "Kelulut" Honey (KH) in Malaysia is well known locally for its beneficial effect to alleviate symptoms of allergic rhinitis. Previous established studies showed KH has antimicrobial and anti-inflammatory property. However, there is no clinical study yet conducted to compare the changes in symptom score, endoscopic score and total IgE level between KH and control group in moderate to severe allergic rhinitis (AR) patients.

Methods: This was an open-label randomized controlled trial on 64 subjects recruited from otorhinolaryngology clinic at two tertiary referral centres in the East Coast of Peninsular Malaysia from July 2017 to February 2018. The control group received standard care of treatment while the intervention group received standard care plus KH 190 mg/kg/day for 4 weeks duration. Total nasal symptom score (TNSS), Sinonasal Outcome Test Score (SNOT-22), Modified Lund Kennedy (MLK) were scored at start, week 4 and week 8 and analysed using repeated measure ANOVA.

Results: Significant improvement seen in time effect for TNSS and SNOT-22 in KH group at week 4 (p<0.001). There was significant different in treatment effect (p= 0.014) and time-treatment effect (p<0.001) in KH group compared to control group which patients showed lower MLK score in KH group. However, for total IgE level, there was no significant difference between the two groups.

Conclusions: Kelulut Honey ingestion only showed mild improvement in the symptoms of AR and endoscopy findings; therefore, further study should focus on specific IgE and we also recommend for a longer study duration.

Acknowledgement: Short Term Grant USM for providing the research fund for this project

Keywords: allergic rhinitis, stingless bee honey, adjunct

Anti-angiogenic potential of a water soluble standardised extract (SEEL30) from *Eurycoma longifolia*

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Purpose: Eurycoma longifolia which is locally known as tongkat Ali and Pasak Bumi had been traditionally used for maintenance of general health and also had been reported scientifically to have a wider medicinal potential including anti-malarial, anti-pyretic, anti-cancer, to name a few. Various compounds and extracts can be prepared from different plant parts of *E. longifolia*, thus different may preparations yield different composition of ingredient(s). The aim or this study was to investigate on the antipotential of a water soluble extract that standardised with EL30 biomarker (a degraded triterpene) using ex vivo and in vitro models. The extract was named as SEEL30.

Methods: The standardised extract SEEL30 had been prepared and the method is currently under patent filing. SEEL30 was investigated on its anti-angiogenic potential using *ex vivo* rat aortic ring assay and anti-migration employing human endothelial (EA.hy926) cell line.

Result(s): The extract demonstrated significant inhibitory effect on sprouting of growth of the microvessels with IC₅₀ value of 17.57 μ g/ml when tested *ex vivo* whereas, extract tested on anti-migration assay *in vitro* had gave IC₅₀ value of 350 μ g/ml.

Conclusion(s): These findings may suggest that this extract had an anti-angiogenic potential and can be incorporated in herbal formulation in the future with further safety tests need to be conducted subjected to the regulatory requirements.

Keywords: *Eurycoma longifolia*, standardised extract, *in vitro*, *ex vivo*, anti-migration

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Keywords: SEEL30, anti-angiogenesis, rat aortic ring assay, anti-migration assay

Comparison between methanolic and ethanolic extracts on antioxidant activity of *Moringa oleifera*

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Purpose: To determine the total phenolic content (TPC), total flavonoid content (TFC), FRAP and DPPH of Moringa oleifera (MO) leave extract.

Methods: MO leaves collected from Taman Bukit Tiram, Johor Bahru, Malaysia were ground with liquid nitrogen and extracted with methanol and ethanol. Each of the extracts was used to determine the TPC, TFC, FRAP and DPPH.

Results: The methanolic extract (ME) showed higher TPC (2.6783 \pm 0.0555 mg/g, 0.2678 ±0.0055 mg/g, 0.0586 \pm 0.0037 mg/g) and TFC (0.8079 \pm 0.0050 mg/g, 0.0808 \pm 0.0005

mg/g, 0.0140 \pm 0.0018 mg/g) than ethanolic extract (EE) when tested with concentration of 100 mg/mL, 10 mg/mL and 2 mg/mL. ME also exhibited higher FRAP reducing power

(5.6515 \pm 0.0983 mM Fe!" , 2.0751 \pm 0.0410 Fe!" , 0.6015 \pm 0.0128 Fe!") and DPPH

radical scavenging activity (87.99 \pm 0.24%, 16.21 \pm 0.17%, 5.82 \pm 0.80%) than EE in each of the concentrations.

Conclusion: Methanol would be a better choice compared to ethanol for the extraction of MOleaves. The higher the TPC and TFC, the stronger the antioxidant activities.

Acknowledgement: Contract Research Grant with CLM R&D Sdn. Bhd, vote no. 4C276

Keywords: Moringa oleifera, ME, EE, TPC, TFC, FRAP, DPPH.

Evaluation of antimicrobial activity of propolis on oral pathogens

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Purpose: Propolis is a natural resinous substance collected by bees from various plants and has excellent antibacterial effects. It's effect on oral microbiota is debated and varies depending on geography & source of propolis. Our study aims to evaluate antibacterial activity of propolis-UAE on selected oral pathogens in-vitro, followed by clinical study to assess antimicrobial activity and biofilm-inhibition potential of UAE-propolis.

Methods: Propolis from (China-Brazil-UAE, Bulgaria and India) were tested in-vitro against oral pathogens: S.aureus, S.mutans, E.faecalis C.albicans & E.coli. Well-diffusion method performed for antibacterial activity. Clinical study was performed on 30-children with Baseline-saliva-(T0) collected and test-group subjects given 15ml of propolis-UAE and saline for control. Children rinsed mouth with diluted(1:10) propolis-UAE for 1-minute and follow-up saliva sample-(T1) collected 30 minutes later. For adults (n=30), same method with chlorhexidine-0.2% as control-(T1). saliva samples were taken after 2-days of propolis use twice-daily. Biofilm-forming potential of isolates was determined by crystalviolet dye binding assay using spectrophotometry.

Results: Majority of propolis showed positive antibacterial effects against major oral pathogens in-vitro. Propolis from China-Brazil showed no effect on oral pathogens, except *S.aureus*. Propolis-India showed moderate effects against *E. coli, S.mutans & S.aureus*. Finally, raw propolis-UAE and Bulgaria showed highest inhibition-zone(25-26mm).

Conclusion: Our pilot study confirmed beneficial effect of propolis on oral pathogens. Clinical study in children (n=18/30)-60% samples showed decrease of bacteria post-propolis rinse which was statistically significant. Adult study also demonstrates significant decrease of total-viable bacterial count post-propolis mouth rinse. Therefore, propolis-UAE is an excellent candidate for potential natural mouthwash

Acknowledgement: -

Keywords: Propolis, Honey bee, Antimicrobial activity, Oral pathogens

Combination of tannic acid and cisplatin enhances anti-proliferative activity and causes nuclear morphological alteration in human osteosarcoma cell line (U2OS)

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Purpose: Osteosarcoma is a primary malignant bone tumor that mostly affects children. Chemotherapy is actively used for treatment, but the survival rate remains low especially in metastasis cases. Tannic acid (TA) is a polyphenolic compound that presents in numerous plants. Several studies previously reported that TA capable of enhancing the effect of chemotherapeutic drugs on other types of cancer. Based on this knowledge, we investigated the effect of TA combined with cisplatin on the human osteosarcoma cell line (U2OS).

Methods: MTT assay was used to determine the half-maximal inhibitory concentration (IC50) and synergistic activity of TA, and cisplatin was assessed using CompuSyn software based on the combination index (CI) value. Trypan blue exclusion assay was applied to evaluate the anti-proliferative activity, while nuclear morphological changes were assessed using Hoechst 33258 staining.

Result(s): The IC50 of TA and cisplatin were determined at 4.09 $\mu g/ml$ and 16.52 $\mu g/ml$, respectively. Combination of TA and cisplatin at the percentage ratio of 90:10 showed to have the lowest IC50, which is at 3.64 $\mu g/mL$. The combination at ratio 90:10 also demonstrated to have synergistic interaction with the CI value of 0.699. In addition, a prominent anti-proliferative effect as well as notable chromosomal condensation and nuclear fragmentation were indicated in the cells treated with combination of TA with cisplatin.

Conclusion(s): In conclusion, TA enhances the therapeutic effect of cisplatin towards U2OS cells. Thereby, TA might be highly potential to be developed and included in the cisplatin-based chemotherapeutic regimen of osteosarcoma.

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Keywords: tannic acid, phytochemical compound, cisplatin, osteosarcoma

Identification of potent multitarget-directed inhibitors of SARS-CoV-2 from natural products

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Purpose: Coronavirus disease-2019 (COVID-19) remains a major global challenge while several drugs identified to ameliorate the syndromes are associated with incessant resistance and lack prospects to permanently curb the infection, thereby creating an impetus for developing therapeutic candidates with improved efficacy. This study is aimed at evaluating the potentials of plant-based drugs to overcome the viral resistance through multitarget inhibition mechanisms.

Methods: Molecular docking and molecular dynamics simulations have been extensively applied to virtually screen 2826 drugs from Selleckem.com against some key bio-receptors implicated in the pathology of COVID-19 such as the viral nucleocapsid phosphoprotein for replication, the viral spike glycoprotein for infection and the human host ACE2, using their crystal structures. The experimental study of the selected drugs was also considered.

natural product drugs D-(+)-Raffinose Four namely pentahydrate, (-)-Epicatechin gallate, Rutin DAB10 and Hyperoside display higher inhibition potentials against the N-terminal domain of severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) (PDB 6M3M) with docking scores of -16.20, -11.98, -11.83, -11.81 and remdesivir and ribavirin with -10.27 and than respectively. Their estimated molecular dvnamics binding energies are -27.80, -27.91, -32.39, -27.91 and -29.50 kcal/mol while remdesivir and ribavirin have -24.27 and -15.37 respectively. Similar inhibition patterns were observed against the viral S-protein (PDB 6VSB) and the human ACE2 (PDB 6M17) with good bio-functionality, stability and consistently with experimental results against some virulent strains including SARS-CoV-1 and murine CoV.

Conclusion: The identified compounds show promising potentials amenable for breakthrough against the drug-resistant COVID-19 upon further studies.

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Keywords: SARS-CoV-2, human ACE2, inhibition, computational bioinformatics, natural products, antiviral therapy

The antioxidant and antimicrobial activities of *Curculigo latifolia* leaves and rhizome

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Purpose: Qualitative and profiling studies of bioactive crude extract of *Curculigo latifolia* leaves and rhizomes.

Methods: The leaves and rhizomes of the *Curculigo latifolia* were collected from Negeri Sembilan, Malaysia. The samples were air-dried and soaked in methanol to obtain methanol crude extracts. The antioxidants (2,2-diphenyl-1-picrylhydrazyl radical (DPPH), total phenolic content (TPC), and beta-carotene)) and antimicrobials (disc-diffusion method, minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) were evaluated.

Results: The antioxidant capacity was significantly higher in the rhizomes crude extract, with IC50 of 18.10±0.91 μg/mL of DPPH activity. The rhizomes extract showed the highest TPC (175.75±0.43 $(\mu g/g)$) gallic acid equivalent, GAE and β -carotene bleaching (35.20%). For antimicrobial activities, the leaves crude extract was strongly inhibited the growth of Staphylococcus aureus (16 mm) and Salmonella choleraesuis (8 mm) using disc-diffusion test with streptomycin as positive control and methanol as negative control. Leaves crude extract showed MIC value of 0.25 µg/mL against µg/mL Staphylococcus aureus and 0.25 against Salmonella choleraesuis. The MBC values against Staphylococcus aureus and Salmonella choleraesuis were 0.33 and 0.25 µg/mL, respectively. Further analyses using liquid chromatography-mass spectrometry (LCMS) showed that norlignans derivatives were present in both crude extracts. Crassifoside C contained in the rhizomes crude may be responsible for the antioxidant activities. An unknown compound was found in the leaves crude, and it was believed that this compound was responsible for the antimicrobial activities.

Conclusion: These results showed that the metabolites in the bioactive crude extract are closely associated to the antioxidant and antimicrobial activities.

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Keywords: Curculigo latifolia, antioxidant activity, antibacterial activity

Combination of Cisplatin and Mitragyna alkaloids derived from the medicinal plant *Mitragyna speciosa* Korth. inhibit cell proliferation of Nasopharvngeal Carcinoma (NPC) cell lines

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Purpose: Malaysia has one of the highest national incidences of NPC in Southeast Asia. Cisplatin is the standard of care treatment for patients. NPC Cisplatin is administered concurrently with patients diagnosed radiotherapy with primary locoregionally advanced NPC. Patients respond to Cisplatin well but eventually develop resistance to the drug making subsequent treatment with Cisplatin difficult. One strategy to resensitize cells to Cisplatin is to combine Cisplatin with natural compounds. The broad aim of the study is to investigate the sensitivity of NPC cancer cell lines to combination of Cisplatin and mitragyna (mitragynine, speciociliatine, alkaloids speciogynine, paynantheine - isolated and purified from the leaves of Mitragyna speciosa (kratom).

Methods: NPC cell lines HK-1 and C666-1 were first treated with mitragyna alkaloids or Cisplatin diluted in two/three-fold steps, singly. Sensitivity of the cells to drug combinations were measured by testing a fixed concentration of mitragyna alkaloid with increasing concentrations of Cisplatin. Drug sensitivity was quantified by fluorescence of SYBR Green 1 nucleic acid stain using a plate reader.

Result(s): Drug combination studies showed that mitragynine sensitized the HK-1 cells to Cisplatin. Similar results were obtained when cells were treated with combination of speciociliatine and Cisplatin. Preliminary spheroid studies showed that combination of mitragynine and Cisplatin inhibited growth and invasion of NPC spheroids in a dose-dependent manner.

Conclusion(s): Moving forward, to ensure that the drug combination effect observed in the HK-1 cells is not cell type dependent, similar experiments will be conducted in other NPC cell lines.

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Keywords: Ketum, mitragynine, mitragyna alkaloids, cisplatin, Nasopharyngeal carcinoma

Cytotoxicity and genotoxicity of biogenic silver nanoparticles in A549 cell line

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Purpose: The present study was aimed to investigate the *in vitro* cytotoxic and genotoxic effects of biogenic silver nanoparticles (AgNPs-GA) against human lung cancer (A549) cells towards the development of anticancer agent.

The cytotoxic and genotoxic properties of AgNP-GA were Methods: assessed by 3-(4,5 dimethylthiazol-2-yl)-2,5 diphenyltetrazolium bromide (MTT) and alkaline single cell gel electrophoresis (Comet) respectively. Concentrations (10-100 μg/mL) dependent effects of AgNPs-GA were tested on A549 cells by MTT assay. A comparison was then made of the DNA damage induced by AgNPs-GA and AgNPs-GA+cisplatin with that induced cisplatin or hydrogen peroxide (H₂O₂) under comparable experimental conditions.

Result(s): AgNPs-GA demonstrated cytotoxicity with concentration and incubation-dependent period. The inhibitory concentration at 50% (IC₅₀) of AgNPs-GA was found to be 22.4 \pm 2.66 $\mu g/mL$. The results revealed that AgNPs-GA and cisplatin alone exhibited greater extent of genotoxicity compared to AgNPs-GA+cisplatin and H_2O_2 . Percentage (%) DNA in the tail of AgNPs-GA, cisplatin, AgNPs-GA+cisplatin and H_2O_2 were 87.9 \pm 3.9, 48.3 \pm 4.5, 59.2 \pm 1.6 and 35.6 \pm 9.3, respectively.

Conclusion(s): AgNPs-GA potently induced cytotoxicity and cellular DNA damage against A549 human lung cancer cells. Thus, a comprehensive analysis of biological activity of AgNPs-GA against cancer versus non-cancerous cells deserves further investigation.

Acknowledgement: This work was supported by the Fundamental Research Grant Scheme (FRGS) (203.CIPPT.6711601)

Keywords: biogenic, silver nanoparticles, *Garcinia atroviridis*, cytotoxicity, genotoxicity

In vitro α -glucosidase inhibitory activity of Mahkota dewa fruit flesh using different extraction methods

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Purpose: Before using any plant for medicinal purposes, the proper extraction method must be considered for the bioactive compounds, which can be either polar or non-polar or both, and its advantages and disadvantages, depending on the selection process. The aim of this research was to compare the $\alpha\text{-glucosidase}$ inhibitory activity of Mahkota dewa fruit flesh using conventional and non-conventional extraction techniques.

performed The extraction was by Method: heat reflex (HR), supercritical fluid extraction (SFE), and subcritical (Sub-C02) extraction using different pressure, solvent ratio, flow rate. The optimized extracts were analyzed for a-glucosidase inhibitory activity with Saccharomyces cerevisiae enzyme.

Result: The yields and α -glucosidase inhibitory activity of the Mahkota dewa extracts were analyzed. The yield was obtained in the order of HR>SubCO2>SFE on the other hand the IC50 value of α -glucosidase inhibitory activity was estimated in the order of SubCO2> HR >SFE due to its mild operating temperature and relatively low-pressure condition. Because carbon dioxide is a non-polar solvent that prefers mostly non-polar compounds, adding a cosolvent increases its polarity and improves the ability to extract more polar compounds. Furthermore, after depressurization, carbon dioxide can be easily separated from the end product. As a result, SubCO2 is the most practical extraction method for achieving higher quality of extract.

Conclusion: The composition and bioactivities of extracts of natural products were typically influenced by the extracting method, solvent, and temperature.

Keywords: Mahkota dewa, Extraction techniques, $\alpha\text{-glucosidase}$ inhibitory

Gynura procumbens ethanol extract and its fractions inhibit Th1, Th2 and Th17 but induce Treg cells differentiation during atherosclerosis development

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Purpose: Gynura procumbens (Lorr.) Merr. (GP) displays cardio-protective effect, which may hinder atherogenesis induced by oxidized low-density lipoprotein (oxLDL) and leukocytes. The current study was undertaken to elucidate the effect of GP ethanol extract and its aqueous, chloroform, ethyl acetate, and hexane fractions on CD4+ T cell differentiation during atherogenesis.

Methods: Generated mouse bone marrow dendritic cells (BMDC) were loaded with oxLDL and GP ethanol extract and its fractions for 24 hours and co-cultured with mouse CD4+ T cells for 72 hours. For the determination of T-bet, GATA-3, RORyt, Foxp3, DLL-3, and Jagged-1 mRNA gene expressions using qRT-PCR, the floating cells (CD4+ T cells) and adherence cells (BMDC) were isolated their total RNA and were reverse transcribed into cDNA.

Result(s): GP ethanol extract and its fractions increased DLL-3 gene but suppressed Jagged-1 gene expression in oxLDL-treated BMDC. Furthermore, GP ethanol extract and its fractions suppressed T-bet, GATA-3 and RORyt gene expressions but increased the expression of Foxp3 gene in differentiated CD4 + T cells.

Conclusion(s): GP ethanol extract and its fractions may induce antiatherogenic effects by inhibiting pro-atherogenic cells such as Th1, Th2, and Th17 cells while increasing anti-atherogenic cells, Treg cells.

Acknowledgement: The authors would like to acknowledge the Ministry of Higher Education, Malaysia for awarding Fundamental Research Grant Scheme (FRGS), No. 203/CIPPT/6711507 to fund this research.

Keywords: *Gynura procumbens*, Atherosclerosis, Bone marrow dendritic cells, T cells

In vitro effects of Vernonia amygdalina leaf extract and silver nanoparticles on Kasumi-1 and HEPG2 cell lines

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Purpose: Vernonia amygdalina (VA), also known as 'bitter leaf' or 'Pokok Bismillah' is a traditional West African medicine that has been reported to have countless therapeutic effects, including anticancer properties. However, the anti-cancer effect of VA silver nanoparticles is still not clear. This study aims to use the green synthesis method to synthesize VA silver nanoparticles and examine its anticancer properties in Kasumi-1 and HEPG2 cell lines.

Methods: VA leaves were extracted via sequential extraction using ethanol, 50% ethanol and deionized water. The VA silver nanoparticles were synthesised using the green synthesis method using silver nitrate and the absolute aqueous extract of VA. Cell viability of treated cells were investigated using the colorimetric MTT assay.

Result(s): The results indicate that both VA ethanol extract and VA silver nanoparticles inhibit cell proliferation in Kasumi-1 and HEPG2 cell lines in a concentration-dependent manner.

Conclusion(s): This study shows that VA ethanol extract and VA silver nanoparticles display anti-cancer activity, which shows the need for further research on the green synthesis method of VA silver nanoparticles and the mechanisms of action of VA on cancer cells.

Acknowledgement: This work was supported by funding from the grant, FGRS 203.CIPPT.6711842, Universiti Sains Malaysia.

Keywords: Vernonia amygdalina; Green synthesis; silver nanoparticles; herbal medicine.

Immunomodulatory properties of active secondary metabolite from 50% ethanolic *C.nutans* extracts in J774.2 macrophage cell line

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Purpose: Clinacanthus nutans (Burm f.) Lindau (C. nutans) consists of abundant phytomedicinal properties. This work aimed to elucidate the immunomodulatory properties of selected active secondary metabolites from 50% ethanolic extracts of C. nutans in J774.2 macrophage cell line.

Methods: The cytotoxicity effect of succinic acid, artemisnin and betulinic acid on J774.2 cells was investigated by using MTT assay at various concentrations (1-100 $\mu\text{M})$ at 24-, 48- and 72-h of incubation period. For assessment of reactive oxygen species (ROS) production, the macrophages were polarized into M1 and M2 cells by LPS (100 ng/mL) and IL-4 (20 ng/mL) stimulation, respectively, for 4 hours before adding 1 μM of compounds followed by a 48-hour incubation. The ROS production was measured using 1 μM of H2DCFDA dye and assessed by using FACS Canto II flow cytometer. The data were analyzed using FlowJo (version 10).

Result(s): Artemisnin and betulinic acid caused a significant decrease (p < 0.05) in the cells viability at both concentration and time-dependent manner. Interestingly, 1 μM and 5 μM of succinic acid significantly increased the cells viability (p < 0.05) at 24h and 48h in all concentrations tested. Subsequently, 1 μM concentration of compounds and 48h incubation period were used due to its least cytotoxicity. Artemisnin is superior in stimulating ROS production amongst the three metabolites. It caused increment of 14.5% in ROS production in M0, 32.8% in M1 and 57.4% in M2 cells compared to the untreated cells.

Conclusion (s): All three metabolites have different immunomodulatory effects on J774.2 macrophages, with artemisnin having a superior capacity.

Acknowledgement: This work is funded by Universiti Sains Malaysia Research University (RUI) Grant 1001.CIPPT.8012204.

Keywords: Clinacanthus nutans; reactive oxygen species; cytotoxicity

Apoptosis assessment of breast cancer cells treated with astaxanthin extract from *Xanthophyllomyces dendrorhous* strains

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Purpose: The induction of apoptosis in breast cancer cells by astaxanthin extract from wild type and mutant *Xanthophyllomyces dendrorhous* strains was analyzed.

Methods: Untreated and astaxanthin-treated (IC $_{50}$) MCF-7 and MDA-MB-231 cells were harvested after 24 hours and were stained using Annexin-V FITC apoptosis detection kit and analyzed through flow cytometry.

Result(s): MCF-7 and MDA-MB-231 cells treated with wild type and mutant astaxanthin extracts demonstrated a shifting from viable to apoptotic quadrants. Untreated controls showed the viable cell percentages of 92% for MCF-7 and 94% for MDA-MB-231 after 24 hours. For MCF-7 cells, 52% and 20% of viable cells were detected after 24 hours treatment with wild type and mutant astaxanthin extracts respectively. MDA-MB-231 cells showed a similar percentage of 64% viable cells with both wild type and mutant astaxanthin extract treatments. After 24 hours treatment with wild type astaxanthin extract, 34% of MCF-7 cells were noticed to be in early apoptosis while 11% in late apoptosis. Under the same condition, the mutant astaxanthin extract induced an early apoptosis and late apoptosis in with a percentage 47% and cells of 32% respectively. exhibited early apoptosis and late Meanwhile, MDA-MB-231 cells apoptosis percentages of 18% and 15% after treatments with either wild type or mutant astaxanthin extracts.

Conclusion(s): Annexin-V FITC/PI apoptosis assessment signified the apoptosis induction in both MCF-7 and MDA-MB-231 cells by wild type and mutant astaxanthin extracts. The apoptotic effects were exhibited in a cell-type dependent manner whereby the percentages of apoptotic MCF-7 cells were significantly higher than MDA-MB-231 cells under same treatments.

Acknowledgement: This project was partly supported by Universiti Sains Malaysia Research University Grant Scheme (RUI: 1001/CIPPM/8012377).

Keywords: Annexin-V FITC/PI, apoptosis, MCF-7 and MDA-MB-231 breast cancer cells, astaxanthin, *Xanthophyllomyces dendrorhous*

Potential of polychaete ointment as an alternative treatment for acute wound healing

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Purpose: This study intends to investigate the potential of one species of polychaetes available in Malaysia, *Diopatra claparedii*, as a new alternative for acute wound healing. The study was conducted using Sprague dawley rats.

Methods: Three concentrations (0.1%, 0.5% and 1.0% w/w) of D. claparedii ointment was formulated and tested on Sprague Dawley rats through a topical application on full-thickness skin wounds for 14 days. The wound healing effects were investigated via behavior observation, wound contraction, and histopathological analysis. Acriflavine (0.1% w/v) and traditional ointment gamat (sea cucumber extract) (15.0% w/v) were used as controls.

Result(s): Rats treated with 1.0% w/w D. claparedii ointment displayed their activeness after 7 days post-treatment. Meanwhile, other treatments demonstrated similar behavior after day 11. In addition, the same D. claparedii ointment significantly showed the highest wound contraction (99.8 \pm 0.1%) and more collagen deposition after 14 days post-treatment in comparison to the other treatments.

Conclusion(s): The polychaete ointment has potential to become an alternative treatment in acute wound healing. However, further studies are required to confirm the finding.

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Keywords: polychaete, wound healing, alternative medicine

Socio-demographic and psychographic profile of homeopathic consumers: A systematic review

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Purpose: To review the profiles of homeopathy consumers from sociodemographic and psychographic perspectives.

Methods: The study employs a systematic review of scientific databases and manual search on established sources guided by the PRISMA protocol. With the aid of Microsoft Excel 2016, the eligible articles had undergone the critical appraisal and evaluation process by the researchers. The process of developing appropriate themes and sub-themes was done using thematic analysis.

Result(s): Past studies on socio-demographic profiles of homeopathy consumers had mainly focused on gender, age, education psychographic occupation income level. Studies and on characteristics of homeopathic consumers were mainly done on the health reasons for visiting clinics, lifestyle, media preferences, satisfaction of treatment received and opinions towards homeopathy.

Conclusion(s): Findings of the study will hope to be the basis underlying future research in profiling the consumers of homeopathic products and to provide a preliminary guidance to industry players and business practitioners regarding the current trends in homeopathic market.

Acknowledgement: We would like to thank Mr. Mohammed Hatta Abu Bakar for sharing the resources and expertise in homeopathy.

Keywords: Complementary and alternative medicine, CAM, demographic, homeopathy, psychographic, systematic review, therapeutic.

Bilateral frontal unfold the neural activations in cognitive process during receptive listening of Our'an

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Purpose: Music therapy has been used in rehabilitation to stimulate related brain areas involved in movement, cognition, speech, emotions, and sensory perceptions. These areas spanned both brain hemispheres with simultaneous activations of areas such as thalamus, hippocampus, amygdala, prefrontal cortex, orbitofrontal cortex and midbrain. This study focused on Qur'an as it is recited with rhythmic style, which mimics that of music with probable beneficial effects as a complementary and alternative therapy. The aim of this research is to explore the neural mechanism involved in cognitive function by comparing the left and right frontal area during receptive listening of Qur'an.

Methodology: A total of 29 healthy subjects (mean age 26.69) were recruited and divided into dual faith groups, Muslim(n=14) and Non-Muslim (n=15). ANT-cap EEG 61 channels was used to capture signals activated from the brain during resting state as well as Qur'anic recitation (*Tarannum Asli*) with three minutes recording for each. Brainstorm software and MATLAB were used to examine the neural activities.

Results: Both left and right frontal areas were activated during Qur'anic recitation in Muslim group. Anterior Cingulate Cortex (ACC) and ventromedial prefrontal cortex (vm-PFC) were activated the most compared to other areas. In Non-Muslim group, the activation mostly in medial frontal (paracentral lobule) with left frontal dominant. Conclusion: Qur'anic recitation stimulates bilateral frontal and anterior cingulate cortex (ACC) of Muslim group while left dominant activated in Non-Muslim group, which both speculated to have neural circuit linked to positive emotion and reward system.

Acknowledgement: The research was funded under Research University Grant (1001.PPSP.812189), Society for Neuroscience grant, Kelantan Chapter (SFN) and had received the Ethical Approval from USM Human Ethics Committee (FWA Reg No: 00007718; IRB Reg No: 00004494).

Keywords: bilateral frontal; EEG; Qur'an, alternative medicine; complementary medicine

Targeting alpha-synuclein as a novel treatment for Parkinson's disease: a systematic review

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Purpose: Parkinson's disease (PD), is the second most common neurodegenerative disorder that affects the elderly, usually symptomized as resting tremor, bradykinesia, rigidity, and postural instability. The current treatment options are only symptom-targeted while effective therapeutic strategy remains a challenge. Therefore, this study aims at a comprehensive review of $\alpha\text{-synuclein},$ its implications and unique structural features as effective therapeutic target for PD treatment.

Method: A systematic search of the literature regarding PD targeting α -synuclein was conducted using PubMed from the inception of the database to June 18, 2020, between a period 1997-2020. Studies conducted *in vitro* and *in vivo* were included while reviews, short communications, letters, abstracts without full articles, and studies without controls were excluded.

Results: The earmarked structural modifications of the protein target in the pathogenesis of the disease include aggregation and propagation, mis-folding and phosphorylation, while inhibitions of oligomers and fibrils are essentially monomers, implicated Through experimental pharmacological pathways. studies, inhibitors such as myricetin, curcumin, rosmarinic acid, crocin, baicalein, anle138b, EGCG, prolyl oligopeptidase, and nanobodies (VH14*PEST and NbSyn87*PES) are notably identified as therapeutic Others include synthesised compounds acting on α alternatives. synuclein. Although, most of the biological assays were demonstrated through which side effects cannot be adequately understudied and more robust basic and clinical in vivo experimental protocols are required.

Conclusion: This review highlights the implications of α -synuclein in the pathogenesis of PD and some small molecules as therapeutic potentials inhibitors for effective prevention and treatment of the disease amenable for further translational study.

Keywords: Parkinson's disease, alpha-synuclein, natural and synthetic compounds

The efficacy of chitosan hydrogel paste to promote wound bed granulation tissue: A clinical trial

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Purposes. Chitosan has been recognized for its useful biological properties for healing wounds. The objective of this clinical trial was to determine the effectiveness of chitosan hydrogel paste in improving the formation of granulation tissue in the full thickness wound bed with cavity.

Methods. Out of 287 patients enrolled, 143 and 144 were randomized into chitosan hydrogel paste (treatment) and commercial hydroactive gel (control) groups, respectively. The treated wounds were assessed for the percentage of granulation and necrotic tissue, patient comfort, clinical signs and symptoms, and patient convenience in applying and removing dressings.

Results. A total of 111 and 105 patients completed the study in the treatment and control groups, respectively. The mean granulation percent increased significantly over (F(10,198)=4.61, p<0.001), but no significant difference in the effect of treatments (F(1,207)=0.043, p=0.953). The mean necrotic tissue percent was significantly reduced over time (F(10,235)=5.65, significant difference but no between (F(1,244)=0.487, p=0.162). Both results were adjusted for initial wound area and co-morbidity. There were significant mean differences between groups for days of healing (p=0.032), initial wound size (p=0.025), ease of removal (p=0.019) and odour (p=0.020), but no significant differences for sex and age, wound exudate, adherence and all clinical signs and symptoms.

Conclusions. This study found that chitosan hydrogel paste is comparable to commercial hydroactive gel to improve wound bed granulation tissue for full thickness wounds with cavity.

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Universiti Kebangsaan Malaysia, Hospital Kuala Lumpur and International Islamic University.

Keywords: chitosan, chitosan hydrogel paste, wound bed preparation, cavity wound, full-thickness wound, clinical trial, randomized.

Sappanwood a Malay exotic in ancient Middle Eastern medicine

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Purpose: Amongst gifts from the Mother Nature which are deemed as treasure in Malay world is sappanwood plant (Caesalpinia sappan). It was then among commodities of the region which attracted Middle Eastern traders. This study highlights the concern sappanwood secured in the ancient Middle Eastern medicine, as well as in the Malay. Furthermore, as a comparison it delves into the latest evidence-based research on the plant.

Methods: This study embarks upon textual analysis predominantly on classical books in Arabic and Malay. In addition, it conducts a bibliometric analysis of a list of papers on sappanwood dated 2015 to 2019 compiled by PubMed Central (PMC).

Result(s): This study finds that ancient Middle Eastern and Malay used heartwood of sappanwod in medicine. The former utilized it to treat toxicity and skin diseases, while the latter resorted to it to remedy blood and respiratory diseases. Similarly, these particular remedial properties of sappanwood secure concern in medicine.

Conclusion(s): As sappanwood gains the purported concern, this study recommends further insight into its known property in traditional medicine.

Acknowledgement: This study is funded by the Short Term Research Grant of Universiti Sains Malaysia (304/PHUMANITI/6315367).

Keywords: Sappanwood, Middle East, Malay, ancient medicine

Can herbal remedies be integrated into allopathic medicine? Evidence from randomized controlled trials conducted among hypertensive patients

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Purpose: Several studies have reported the use of Herbal Remedies (HRs) namely herbal medicine, herbal products or raw herbs among hypertensive patients; however, a consensus regarding the effectiveness of HRs integration for patients has not been reached. Hence, this is a review to determine the effectiveness of HRs utilization for blood pressure (BP) control among hypertensive patients.

Methods: Articles on randomized controlled trials (RCTs) regarding the utilization of HRs for hypertension management were included in this review. No publication date limitations were used. Articles were obtained using five databases; PubMed, CINAHL, Web of Science, Scopus and PBSC in August 2019.

Results: Nine randomized control trials were selected, including 779 patients with mainly hypertension. The studies evaluated eight HRs which some integrated conventional medicine such as captopril and ramipril. The baseline BP was 140/90. The mean age of patients from five studies was 54.4 ± 4.78 years. Eight trials were compared with placebo and all HRs showed reduction in BP. The HRs reported for patients' hypertensive condition were sumac (*Rhus coriaria*), roselle (*Hibiscus sabdariffa*), saffron (*Crocus sativus*), beet (*Beta vulgaris*), pine needles, kudzu (*Pueraria lobata*), fennel (*Nigella sativa*), and kinkeliba (*Combretum micranthum*).

Conclusion(s): The utilization of HRs among hypertensive patients is evident based on the included RCTs. The HRs were shown to reduce BP. Through identifying the benefits of herbal use for blood pressure lowering purposes, future studies could focus on determining the HRs safety and tolerability via scientific investigations.

Acknowledgement: Ethical approval to perform the study was obtained from UTAR Scientific and Ethical Review Committee, National Malaysia Research Registry and approval from Klinik Kesihatan Kampar.

Keywords: traditional herbs, herbs, crude herbs, home remedies

Squalene Effect on Islet of Langerhans in Type 2 Diabetes Mellitus Rat Model

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Purpose: The study aimed to evaluate the effect of squalene (S) on pancreas in type 2 diabetes mellitus (T2DM) rat model.

Methods: Obesity rats that developed by high fat diet for 14 days were induced with low dose of streptozotocin (30 mg/kg) to obtain T2DM rat. A total of 18 diabetic rats were divided into three groups that treated once daily for 14 days as follows: Group I: Metformin (M) 45 mg/kg as positive control; Group II: S 160 mg/kg; Group III: Aquades (DC) 10 ml/kg as negative control. At the end of the treatment, the rats were sacrificed. The pancreas were prepared for histopathology evaluation using hematoxylline and eosin (HE) staining. The slides were interpreted by anatomical pathologist.

Result(s): The structure of normal pancreas consist of pancreatic asinus (PA) and islet of Langerhans (IL). IL with regular membrane; and granulated cytoplasm small nuclei, dark (alpha-cells) peripheral, and large nuclei, light and granulated cytoplasm (betain central. In diabetic rats, all groups showed irregularity of membrane on IL. M-treated group showed hyperplasia, nuclei, dark and granulated cytoplasm (alpha-cells) peripheral (black arrow), and large nuclei, light and granulated cytoplasm (beta-cells) in central almost similar with SQ-treated group. SQ-treated group showed the slightly hyperplasia. Thus, DCtreated group showed not only irregular but also shrinkage of IL membrane and decreased of number islet cells. Area of IL in M (141.8±41.1 mm²); S (124.78±89.1 mm²); DC (69.54±36.2 mm²); Normal $(162.53\pm39.7 \text{ mm}^2).$

Conclusion(s): The present study concluded that squalene have potency to improve islet of Langerhans in pancreas.

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Keywords: squalene, pancreas, islet of Langerhans, T2DM

Awareness of herbal products among students at local university in Malaysia

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Purpose: Herbal medicines are the most common type of traditional and complementary medicines (T & CM). T & CM have been used to diagnose and prevent diseases, restore the body's function, and maintain or improve health. Malaysia has different ethnic groups with different beliefs and cultures. For the three dominant races, Malay, Chinese and Indian, traditional and herbal medicines are a long-standing practice. Hence, there is a common perception that the use of herbal products is better than the commercially available pharmaceutical drugs, which are deemed to contain harmful chemicals and have adverse side effects. This study aims to determine consumer's usage of herbal products and the respondent's perception of these product's safety and efficacy.

Method: A cross-sectional survey was performed using a self-administered questionnaire on a sample of 377 from different ethnic groups. Chi-square, Mann Whitney, Kruskal Wallis and Spearman correlation were applied for data analysis.

Result: This study found significant differences in perception among the respondents from different ethnic backgrounds. Of 300 herbal product (np) users, Chinese (n=210) respondents are likely to consume natural products compare to Malay (n=54), 'Others' (n=34)and Indian (n=32). Malay respondents have а the safety of the products while Chinese perception towards respondents that herbal products might have lower nutritional value. Lastly, Indian respondents perceive that it is safer to consume natural products after consulting physicians and disagree products more effective that herbal are than conventional medicines.

Conclusion: This study's findings could help policymakers and health service providers to understand the pattern of herbal product consumption among Malaysians.

Keywords: Herbal products, University students,

Perception

Early intervention for children with autism spectrum disorder by holistic therapy

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Purpose: Autism Spectrum Disorder (ASD)/Autism is development and a common worldwide disorder during early childhood. ASD characterized by persistent impairment in communication and interaction and also restricted on repetitive interests. 0ur screening behaviors or integrative intervention shown that the complexity of the disorder, related to mother's holistic health during pregnancy, genetic and environmental factors on communication delay get cured as compared to modern therapy.

Methods: Therapies and behavioral intervention are designed to remedy communication difficulties until the children can communicate better than before. Autism Treatment Evaluation Checklist (ATEC) from the parents of 3 children age below 8 years old from Penang and Klang Valley was administrated on pre and post using Holistic Therapies (HT). HT are employed to find the root cause, to treat ASD. Externally therapies, for behavioral widely used in practice to enhance mind calming, sound sleep and reduce anxiety and stress. Internal therapies of Siddha System of Medicine (SSM), with diet and supplements are controlled.

Results: After 3 to 6 months of intervention, there is improvement in their cognitive skills, eye contact and hyperactivity. This is a positive impact and immensely beneficial on the well-being and quality of life for children on the autism spectrum.

Conclusion: Raising the awareness of child autism and their health education requires a range of integrated services that include health promotion, care and rehabilitation. The major focus is understanding the needs of a ASD child, usually multidisciplinary involving parent-mediated interventions, and target the child's individual needs.

Keywords: Autism Spectrum Disorder (ASD), Early Intervention Programme (EIP), Holistic Therapies (HT), Integrative Medicine (IM), Siddha System of Medicine (SSM).

A cross-sectional study on the unmet supportive care needs among newly diagnosed breast cancer patients in Pulau Pinang

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Purpose: Supportive care among cancer patients has been identified as a necessary complementary approach to help patients cope with the disease and positively respond throughout cancer treatment. Hence, this study aims to determine the prevalence of unmet supportive care needs among breast cancer patients in Penang and determine the association of their coping strategies, social support and posttraumatic growth (PTG) on the supportive care needs of the patients.

Methods: This cross-sectional study involved 248 breast cancer patients recruited from the oncological clinics in Advanced Medical and Dental Institute, Universiti Sains Malaysia and Penang General Hospital. Data were collected via telephone call or face-to-face interviews using the validated 34 items short-form Supportive Care Needs Survey Malay Version (SCNS-SF34-M) survey.

Result(s): Chinese patients were the majority with 44.8%, with mean age $58.08(\pm 27.58)$ years and majority of them diagnosed at stage 2 (36.7%). The unmet supportive care needs (SCNS) of breast cancer patients ranged from 1.5% to 80.64%. Mostly patients' needs were high in the health system and information domain (39.34(± 21.32)) but low in the sexual domain (13.47(± 16.14)). Linear regression analysis showed that ethnicity, cancer staging and posttraumatic growth were the independent predictors for patients' overall supportive care needs among breast cancer patients.

Conclusion(s): This study highlights the high unmet needs related to the health system and information on the disease and treatment among breast cancer patients involved in the study, which further warranted more efforts to provide enough information to help them during the breast cancer trajectory.

Keywords: Assessment; Cancer; Psycho-oncology; Psychometric properties; SCNS-SF34; Source of social support scale; COPE scale; Posttraumatic Growth Inventory; Supportive care needs

An Internet of Medical Things-Based Wearable Technology: Challenges and Impacts for Better Healthcare Service: Review

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Objective: In this review, the important findings in the literatures up to now have been reviewed, particularly, the experimental details, the advantages and the challenges of the various types of Internets of thing based on wearable device that have been proposed. Furthermore, it highlights the huge potential of this technology and future directions for supplemental research on the healthcare services area.

Method: This research systematically reviewed the existing literature and researches that have been carried out in the Internet of thing based on wearable device technologies. Moreover, this research also presents a comprehensive taxonomy in the Internet of Medical Things, analyze the articles technically in terms of challenges and impacts for better healthcare service.

Result: In general, the futures of IoT wearable device in healthcare is potentially evolved because the wearable device has benefit over other technologies. However, there are still issues arise when developing IoT wearable device such as privacy, security, energy consumption and its functionality issue.

Conclusion: It's clear to say that, it is not boundary to develop better healthcare service based IoT wearable system in future because the challenges need to be overcome for better healthcare services. Therefore, healthcare based on IoT wearable device has the potential to greatly improve the healthcare services but it is not without its challenges.

Keywords: Smart Health, Wearable Technology, Internet of Things (IoT), Healthcare Service

Effect of processing device on Malaria detection using Convolutional Neural Network (CNN)

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Purpose: Malaria is a deadly disease faced by many countries, mainly in tropical countries. Manual microscopy is the current gold standard, which is sometimes inefficient and causes false negatives and positives is high. That happens because manual microscopy depends on the experience and expertise of the people who are examining the samples. The development in artificial intelligence technology has driven progress in detecting disease objectively and less human reliance. The Convolutional Neural Network (CNN) is an effective solution for detecting malaria parasites.

Methods: CNN is an algorithm for determining which objects are the same using the rules of the dataset that has been trained. CNN has been proven to provide excellent results in image classification and has been widely used in previous studies. In classifying the malaria parasite, processing devices have an essential role in producing accurate and fast results. In this study, testing of processing devices and CNN was carried out to produce accurate and fast results. The test scenario is done by comparing each processing device, namely CPU, GPU, and NNAPI.

Result(s): From the analysis, the NNAPI has higher accuracy, with 97.50%. CPU has 96.25% accuracy, while GPU has only 50% accuracy. However, the NNAPI is slower than the GPU, which is on average 40 seconds and CPU which only 67.5 seconds per diagnosis.

Conclusion(s): The results obtained show that the processing device has an effect on the accuracy of the diagnosis of parasite malaria. Furthermore, the diagnosis time is also influenced by the processing device.

Acknowledgement: This research paper is the result of research theses in Master in Computer Science

IOT - towards an early detection and diagnosis system of Parkinson's disease: design and implementation

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Purpose: This study aims to develop a system that can be used to conduct early detection of Parkinson's disease based on a quantitative assessment of tremor by paying attention to the detailed changes in frequency that occur when someone is idle with IOT-based technology.

Methods: The experimental design is an approach that carried out to conduct quantitative research to determine the results of an experimental group which affect the results of a control group by the process of collecting randomly conducted data.

Result(s): The calculated r-value between the x-axis and frequency is 0.681 and greater than the r table of 0.541. Then, Sig. (2-tailed) between the x-axis and frequency of 0.005 where the value interprets that there is a reasonably strong correlation between the two variables with a significance level of 0.01 or 1%.

Conclusion(s): A new generation of the resting tremor detection system has been introduced. This system was built up using arduino nano and ADXL335. The Pearson correlation test interpreted that there was a reasonably strong correlation between the two variables with a significance level of 0.01 or 1%.

Keywords: IOT, rest tremor, Parkinson's disease

IoT – Towards an environmental indoor air quality monitoring and controlling system: Design and development

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Purpose: This research aims to design and develop an environment indoor air quality (EIAQ) system based on environment indoor air quality index (EIAQI). This proposed system will perform the significance of pollution with modeling of potential crisis detection and increasing the adequacy of the assessment to produce more precise assessments.

Methods: The simulation design is conducted to calculate and monitor the environment indoor air quality index (EIAQI) value, also to reduce environment air pollutants automatically based on the EIAQI. The environment indoor air quality (EIAQ) system using fuzzy logic controller can assess and cluster the eight environment indoor air pollutants into two indices called indoor air quality index (IAQI) and thermal comfort index (TCI).

Result(s): The electrical circuit design was constructed using the Proteus software in order to obtain a simulation before-hand of implementing the mechanism construction, while Arduino Compiler let the appropriate required coding to be written on the microcontroller Arduino Mega. The proposed system can evaluate and cluster the environment indoor air pollutants based on its toxicity and human health effects in four stages: excellent, good, bad and worst. So the output process will automatically run based EIAQI value and status.

Conclusion(s): A new generation of environment indoor air quality system has been introduced. The proposed system can do the real-time monitoring of indoor air, thermal comfort pollutants. Also this system can identify, calculate, and assess the indoor air quality index (IAQI) and thermal comfort index (TCI) separately according to similar concentration characteristics and human health impacts.

Keywords: Environment indoor air quality (EIAQ), internet of things (IoT), indoor air quality (IAQ)

Design and development of smart helmet in the mining industry using Internet of Things (IoT) technology

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Purpose: The aim of this study is to develop a smart helmet based on Internet of Things for coal miner that includes various features such as detection of the gas poisoning where GPS is provided to track the location of the miner. It has capable to detect dangerous gases and mining safety information. Various parameters such as Carbon monoxide gas, Nitrogen Dioxide, Temperature and Humidity, fall detection, and miner's heart rate are monitored for the safety of coal miners.

Methods: These sensors must be installed in the coal miner's helmet. Sensor sends a signal to microcontroller. Then microcontroller sends an active signal to other externally connected devices.

Result(s): A quick response rate is provided by this system, the information of safety miners and the environmental situation in the mining area using proteus simulation if the value of logic toggle 1 and 0, detected abnormal situation if the value is 1 and normal situation if the value is 0

Conclusion(s): In this research, the smart helmet system was developed to overcome the problem of increasing work accident rates in the mining industry due to mining environment quality and miner workers (falling and fainting). The system is capable to make a real-time report prototype that monitors the situation of miners and the mining environment quality using sensors and microcontrollers based on Internet of Things (IoT) technology.

Keywords: smart helmet, GPS, real-time and wireless network

Design and development of real-time monitoring and tracking systems for the safety of motorcyclists using smart helmets based on Internet of Things Agung Pangestu¹, M. N. Mohammed², Ariep Jaenul³, Aulia Choiri¹, Eddy Yusuf⁴

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Purpose: The purpose of this research is to design and develop a real-time monitoring and tracking system for the safety of motorcyclists by making smart helmets based on the Internet of Things.

Methods: The method used in this research is the System Development Life Cycle (SDLC) method with the Borg & Gall development model. The research stages carried out were as follows: (1) needs analysis, (2) planning and design, (3) development, (4) testing and repair. In making designs using Solid Works software. This software is used because it can design 3D part by part very well such as designing camera parts, smart glasses parts, gyroscopes, sensors, LED indicators, etc. Implementation is carried out to realize the results of the designs that have been made as a whole of the smart helmet system used.

Result(s): From the design that has been implemented, it can be seen that the design can accommodate all system requirements contained in a smart helmet such as components (hardware) consisting of input, process, and output components.

Conclusion(s): Smart helmet has been implemented from a design that has been made using SolidWorks software. This smart helmet has various features that can assist motorcyclists in driving with a sense of safety, comfort, and with the importance of safety features.

Acknowledgement: Thank you to Management and Science University for providing the opportunity for writers to gain knowledge on this beloved campus.

Keywords: smart helmet, design and development, Internet of Things

Functional Medicine: the future of medicine

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Purpose: Functional medicine embraces much of the philosophy of Integrative medicine as described, as a holistic medical discipline, which takes into account the lifestyle habits of a patient. The physician works to treat the whole person rather than just the disease. Much like integrative medicine, functional medicine treats the individual rather than the disease. The purpose of this paper is to give the overview of functional medicine.

Method: The Functional Medicine model evolved from the insights and perspectives of a small group of influential thought leaders who realized the importance of an individualized approach to disease causes based on the evolving research in nutritional science, genomics, and epigenetics. These thought leaders found ways to apply these new advances in the clinic to address root causes using low-risk interventions that modify molecular and cellular systems to reverse these drivers of disease.

Result: Functional Medicine is a system biology-based approach that focuses on identifying and addressing the root cause of disease. Each symptom or differential diagnosis may be one of many contributing to an individual's illness. A diagnosis can be the result of more than one cause.

Conclusion: Healthcare is undergoing drastic changes in the 21st practitioners who century. Those embrace the Functional paradigms will forefront Integrative Medicine be at the Functional Medicine has gained healthcare in the 21st century. much popularity and without a doubt, the future model of medical care.

Keywords: functional medicine