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ABSTRACTS

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OB02

Tualang honey protects against hypoxia-induced hippocampal damage in adult male rats

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Introduction: Hypoxia induces hippocampal damage. The effective natural therapeutic approach has not been much investigated. Interestingly, our previous research team has found that Tualang honey improves hippocampal damage in ovariectomised rats.

Objective: To investigate the efficacy of Tualang honey in amelioration of hypoxia-induced hippocampal damage in adult male Sprague-Dawley rats exposed to normobaric hypoxia.

Methodology: The rats were divided into four groups (n=12 per group); i) Non-hypoxic treated with sucrose, ii) Non-hypoxic treated with Tualang honey, iii) Hypoxic treated with sucrose, and iv) Hypoxic treated with Tualang honey. Oral Tualang honey (0.2 g/kg body weight) and sucrose (1 mL of 7.9%) supplementations were given to the rats daily for 14 days. Then, the rats were subjected to ~11% continuous hypoxia for 7 days. The rats were anaesthetised with thiopental sodium (i.p. at a dose of 30 mg/kg body weight). The right hemispheres were fixed in 10% formalin for histological studies. The blood was collected from inferior vena cava and centrifuged. Elisa test was performed to detect the level of corticosterone in the serum.

Results: The hypoxic rats treated with sucrose showed significant decrease in neuronal count and increase in corticosterone level ($p<0.05$) when compared to non-hypoxia sucrose treated groups. Significant increase in neuronal count and decrease in corticosterone level ($p<0.05$) were observed in hypoxic rats treated with Tualang honey when compared to sucrose treated rats.

Conclusion: The results suggest that pre-treatment with Tualang honey has a therapeutic potential to protect against hypoxia-induced hippocampal damage possibly through its antioxidant properties.

OB03

Effects of Tualang honey on thalamic changes following formalin injection in prenatally stressed male rat offspring

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Introduction: Exposure to prenatal stress might lead to oxidative stress and contribute to alteration of the nociceptive responses in the offspring.

Objective: To determine the effects of an antioxidant, Tualang honey, on nociceptive behavior score, morphological changes and malondialdehyde (MDA) level in thalamus of rat offspring exposed to prenatal stress.

Methodology: Pregnant Sprague Dawley rats were randomised into control (C), stress (S) and stress treated with Tualang honey (SH) groups. The stress groups were subjected to repeated restraint stress from day 11 of pregnancy until delivery. Adult male offspring (n=6 per group) were given intraplantar injection of 1% formalin followed by behavioural testing. The rats were then sacrificed, and their brains were removed to assess the morphological changes and MDA level. Data were analyzed using SPSS software. Nociceptive behaviour score was analysed using repeated measures analysis of variance (ANOVA); Meanwhile, one-way ANOVA was used to assess the neuron number and MDA level. The significance level was taken as 0.05.

Results: The study demonstrated that nociceptive behaviour score and MDA level were significantly reduced ($p<0.05$) in SH compared to S group. Morphological changes showed a significant improvement in thalamic neuron number ($p<0.05$) in SH compared to S group. The results for SH group were not significantly different when compared to C group.

Conclusion: These findings suggest that Tualang honey reduced nociceptive behavior and inhibited changes in the morphology and MDA level in the thalamus of the rat offspring exposed to prenatal stress.

OB04

The role of Toll-like receptor-4 in inducible nitrogen oxide synthase expression and nitric oxide release by macrophages stimulated with recombinant BCG expressing MSP-1C of Plasmodium falciparum

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Introduction: Our laboratory had earlier developed a recombinant BCG (rBCG) expressing the MSP-1C of *Plasmodium falciparum* malaria vaccine candidate which induced both humoral and cellular responses including the production of inducible nitric oxide synthase (iNOS) and the free radical, nitric oxide (NO). Nitric oxide is both cytostatic and cytotoxic to *P. falciparum*. The mechanism through which the rBCG achieved these effects though not characterised, are suggestive of roles played by pattern recognition receptors of the innate immune system such as Toll-like receptor-4 (TLR-4).

Objective: To determine the role of the TLR-4 signaling pathway in eliciting the expression of iNOS and subsequent production of NO.

Methodology: Six groups of mice were injected with phosphate buffered saline (PBS), BCG or rBCG in the presence or absence of a TLR-4 inhibitor; TAK-242, and the peritoneal macrophages were harvested and cultured. ELISA and Western blot analyses were then carried out to determine NO production and iNOS expression.

Results: The expression of iNOS in rBCG-immunised mice was significantly higher (1.196 ± 0.003 MRI), than BCG (0.955 ± 0.006 MRI) and PBS (0.917 ± 0.003 MRI) groups. These were

significantly reduced by TAK-242, ($p < 0.001$, and mean difference -0.933), ($p < 0.001$, mean difference -0.670) and ($p < 0.001$, mean difference -0.706), respectively. Similarly, NO production in rBCG-immunised mice ($62.320 \pm 0.891 \mu\text{m}$), BCG ($31.200 \pm 0.923 \mu\text{m}$) and PBS ($18.740 \pm 0.375 \mu\text{m}$) was significantly reduced by TAK-242, ($p < 0.001$, and mean difference -48.506), ($p < 0.001$, mean difference -20.779) and ($p < 0.001$, mean difference -13.657), respectively.

Conclusion: Our results presented evidence on the probable role of TLR-4/macrophage attachment mechanism in the increased production of iNOS and NO by our rBCG expressing MSP-1C of *Plasmodium falciparum*.

OB05

Expression of the lysyl oxidase family in odontogenic lesions

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Introduction: Lysyl oxidase (LOX) and LOX-like (LOXL) 1-4 are enzymes whose primary function is to maintain connective tissue homeostasis, but they have been linked to aggressive behaviour in some cancers.

Objective: To investigate LOX family proteins and genes in locally aggressive odontogenic lesions [ameloblastoma and odontogenic keratocyst (OKC)] in comparison with non-aggressive odontogenic lesions [dentigerous cyst (DC) and hyperplastic dental follicle (DF)] using immunohistochemistry (IHC) and quantitative reverse-transcriptase real-time polymerase chain reaction (qRT²-PCR).

Methodology: For IHC, formalin-fixed paraffin-embedded (FFPE) tissue samples of ameloblastoma ($n = 10$), OKC ($n = 15$), DC ($n = 6$) and DF ($n = 9$) were stained with antibodies against LOX family. Automated quantitative assessment of digitised IHC images was performed using Fiji Software (Image J 1.51K). For qRT²-PCR, RNA samples from FFPE tissue sections of ameloblastoma, OKC and DC were used.

Results: Significant reduction of LOXL3 was observed in ameloblastoma at both protein and gene levels. The expression of LOX family genes and proteins in DC showed a significant variation compared with ameloblastoma and OKC, whereas the protein expression patterns were similar between ameloblastoma and DF.

Conclusion: LOX family expression was distinct in aggressive odontogenic lesions compared with non-aggressive odontogenic lesions, particularly DC. Variable LOX family expression between ameloblastoma and OKC may be a reflection of the differences in the pathogenesis and biological behaviour of these lesions. Similarities of LOX family expression observed in ameloblastoma and DF may reflect molecular dedifferentiation of ameloblastoma toward more rudimentary state.

OB06

Suppression effect of semipurified fraction from *Clinacanthus nutans* on xenograft model for human cervical cancer

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Introduction: Cervical cancer is a leading cause of death in women, worldwide, and second in Malaysia. Nowadays, traditional medicinal plants become popular alternative treatment due to side effects of conventional treatment and easily available. *Clinacanthus nutans* has been locally recognized for its medicinal properties and was claimed for cancer treatment. According to our pilot study, semipurified fraction (F1) of *C. nutans* has shown a potent inhibition on human cervical cancer in *in vitro* culture.

Objective: To evaluate the antitumor effect of F1 against human cervical carcinoma by using xenograft model.

Methodology: Nude mice were subcutaneously inoculated with human cervical cancer, SiHa cells. When tumor volume reached 100 mm³, F1 was daily administered intraperitoneally for 28 days. Cisplatin, an anticancer drug was used as positive control and negative control received vehicle only. Blood was collected by cardiac puncture for assessment of aspartate aminotransferase (AST) and alanine aminotransferase (ALT) level.

Results: Findings showed that tumor size in F1-treated mice were significantly reduced compared to negative control. Upon F1 treatment, 43.74% of relative tumor growth ratio (T/C) and 0.64±0.03 of relative tumor volume (RTV) were calculated. F1 showed a good inhibition rate with more than 50% of tumor were suppressed. ALT and AST level in F1-treated mice were remained in normal ranges compared to cisplatin group indicating no sign of toxicity effects.

Conclusion: F1 demonstrated inhibition suppression effect on growth of SiHa tumor transplanted in mice. Histopathological and mechanism of action studies of F1 are currently performing to provide information for potentially being develop as anticancer drug.

OB07

Antioxidant potential and comparative studies of different types of honeys

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Introduction: Honey is commonly used as a natural sweetener. Recently, extensive studies on honey have reported the potential benefits of honey as an antioxidant.

Objective: To determine the total antioxidant content differences between Tualang 1, Tualang 2, Manuka, Taiwan, Sialang and Apicalis honeys from different regions.

Methodology: Physical characteristics such as pH, moisture content, colour, electric conductivity, total dissolved solids and antioxidant properties through DPPH and FRAP methods; phenolic and flavonoid content of seven honeys samples have been studied.

Results: The phenolic content of the honeys ranged between 25.33 ± 2.27 mg (Sialang) and 97.05 ± 1.06 mg GAE/kg (Tualang 1); while flavonoid content ranged between 46.22 ± 9.62 mg (Sialang) and 111.78 ± 5.09 mg CEQ/kg (Tualang 1). The antioxidant activity through DPPH radical scavenging activity revealed the range starting with 28.89 ± 0.66% (Taiwan), and 84.94 ± 0.69% (Tualang 1); while FRAP assay showed the results ranged between 211.79 ± 14.55 μm Fe (II) for Sialang and 947.24 ± 27.43 μm Fe (II) for Tualang 1. A positive correlation was found between total phenolic content (TPC) and DPPH activity ($r = 0.912$) as well as FRAP activity ($r = 0.908$) and positive correlation between total flavonoids content (TFC) and DPPH activity ($r = 0.924$) as well as FRAP

activity ($r=0.712$). A p -value less than 0.05 is considered as significant.

Conclusion: The current study revealed that Tualang 1 honey exhibited the highest antioxidant activity and this further indicates that it may be used as the potential antioxidant.

OB08

Cytotoxicity of *Catharanthus roseus*-silver nanoparticles on human liver cancer cell line HepG2

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Introduction: The limitation of conventional cancer therapy includes non-selective cytotoxicity, severe adverse effects and less effectiveness in targeting the site area. Application of silver nanoparticles serve as a new approach in cancer treatment due to its unique characteristics. The use of plant products for the synthesis of silver nanoparticles is advantageous since they are easily accessible, non-toxic and produce quicker reaction compared to other green methods.

Objective: To evaluate the cytotoxicity of biosynthesized *Catharanthus roseus*-silver nanoparticles on human liver cancer (HepG2) cells.

Methodology: The anti-proliferative activity of *Catharanthus roseus*-silver nanoparticles was measured using MTS assay. The cytotoxic effects were further evaluated by measuring nitric oxide and reactive oxygen species (ROS). The mechanism of cell death was determined using assays of annexin-FITC/propidium iodide, mitochondrial membrane potential (MMP) and cell cycle.

Results: *Catharanthus roseus*-silver nanoparticles inhibited the proliferation of HepG2 cells in a time-dependent manner with median IC_{50} value of 35 μ g/mL. The concentration of nitrite and ROS were significantly higher than the control. The cell death was due to apoptosis associated with MMP loss and cell cycle arrest.

Conclusion: The findings show that *Catharanthus roseus*-silver nanoparticles produced cytotoxic effects on HepG2 cells and thus may have a potential to be used in anticancer treatment, particularly for hepatocellular carcinoma. Further studies are required to confirm its selective cytotoxicity between normal and cancer cells.

OB09

In-vitro study of antibacterial properties of propolis and *Piper betle* towards *Enterococcus faecalis*

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Introduction: *Enterococcus faecalis* is the main microorganism found in root canal treatment failures and its role in endodontic infections remained as a major obstacle in root canal therapy. With the increasing resistance of *E. faecalis* towards calcium hydroxide, a widely used root canal therapy medicament, consideration of natural products such as propolis and *P. betle* as alternative intracanal medicament is appropriate.

Objective: To evaluate and compare the antibacterial efficacy of propolis and *P. betle* extract against *E. faecalis* within the time interval factor involved (24 hours, 48 hours, 7 days).

Methodology: Fifty extracted intact human permanent incisors were decoronated, and chemomechanical preparation of the root canal was performed. After sterilization of the samples, they were inoculated with pure culture of *E. faecalis* and incubated. Following incubation, colony forming units were recorded before the placement of medicaments. Then, the samples were divided randomly into three groups ($n=15$). Each group was subsequently exposed to different intracanal medicaments. The antibacterial effectiveness of different intracanal medicaments was recorded by determining the percentage reduction in colony count (%RCC) at the end of day 1, 2, and 7. The data were statistically analysed using one-way analysis of variance and Turkey Honestly Significant Difference (HSD) post hoc test.

Results: The highest %RCC was propolis and *P. betle* extract showed 100% reduction at 24 hours. Calcium hydroxide showed a gradual increase in antibacterial activity with maximum reduction of 82.6% on day 7.

Conclusion: Ethanolic extracts of propolis and *P. betle* were more effective than calcium hydroxide against *E. faecalis* at 24 and 48 hours period and both were equally effective at 7 days.

OB10

Effect of natural lipid liposomes on mice bone marrow derived-dendritic cells

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Introduction: Liposomes are lipid based-nanoparticles, mainly composed of synthetic or naturally derived-phospholipid with mixed lipid chain. Due to their lower cost, biocompatible and biodegradable properties, much attention is devoted to them as potential carriers for targeted delivery in biomedical research. They were studied for their adjuvant effects with dendritic cells (DCs), with unique capacity of stimulating primary immune responses.

Objective: To investigate the effects of liposomes derived from *Mycobacterium smegmatis* (Ms) on DCs.

Methodology: Liposomes were synthesized from total lipid of Ms and characterized by scanning electron microscopy (SEM). Bone marrow derived dendritic cells (BMDCs) were generated and cultured with growth monocytes colony stimulating factor (GM-CSF) to obtain mature BMDCs. The recognition and internalization of BMDCs were observed and analyzed with FACS analysis, SEM and confocal microscopy after 24 hours exposure with liposomes.

Results: SEM images of liposomes showing the spherical structures with average size between 20nm - 80nm that can be classified as small unilamellar vesicles. For the cell surface staining of surface marker, the percentage of CD86⁺ surface marker was increase in the BMDCs that were exposed to liposomes compared to the BMDCs without liposomes ($p<0.01$), but the level of expression was lower for CD11c⁺. SEM and confocal microscopy images have shown the uptake of liposomes and it was internalized by BMDCs.

Conclusion: We successfully synthesized natural liposomes derived from total lipid of Ms before introducing to BMDCs. Therefore, liposomes derived from total lipid of Ms were taken up and internalized by BMDCs with a purpose of initiating and modulating the immune responses.

OB11**Elevated expression of VE-Cadherin in stem cells from exfoliated deciduous teeth following migratory and angiogenic induction protocol**

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Introduction: Stem cells from exfoliated deciduous teeth (SHED) exhibit a great potential benefit for cell-based therapy and tissue repair. Vascular endothelial (VE)-cadherin is an angiogenic surface marker that controls the adherent junction during angiogenesis and reacts with fibrin during migration. However, the behaviour of SHED undergoing angiogenesis, in term of its migratory capacity and gene expression pattern have not been fully understood.

Objective: To assess the differential gene expression of SHED following angiogenesis and migratory induction.

Methodology: VEGF was supplemented as angiogenic factors to *in-vitro* cultured SHED to form endothelial cells. Scratch test assay was performed to determine the rate of cell migration. RNA samples were extracted at 1, 3, 7, 10 and 14 days following angiogenic induction and Transwell migration assay protocol. Samples were further analysed by RT-PCR for detection of stem cell markers, migration markers and endothelial markers.

Results: VE-cadherin was found to be upregulated throughout 14 days angiogenic induction of SHED. Further comparison made between groups demonstrated higher expression of migratory markers in control group as opposed to those of without migration. Hence, SHED undergoing angiogenesis is postulated to have much lower capacity to migrate to the healing site.

Conclusion: Further investigation is needed to understand the cellular biology of SHED to plan a strategic approach in accelerating tissue repair processes.

OB12**Wound healing effect of petiole extracts of keladi candik (*Alocasia longiloba* Miq.) in rat model**

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Introduction: *Alocasia longiloba* Miq. is a plant traditionally used to treat various skin disorders such as wound. However, there is still lack of scientific evidence to prove its wound healing effect.

Objective: To evaluate the wound-healing effect of different solvent petiole extracts of *A. longiloba* Miq. in full thickness excision wounds in rats.

Methodology: Twenty-two male Sprague-dawley rats (180-200 g) were divided into eleven groups of n=2/group as follows: 10% Solcoseryl gel treated group as positive control, phosphate buffer saline (PBS) treated group as negative control and ethanol-water, ethanol and hexane petiole extracts of *A. longiloba* Miq. treated groups at 1.5%, 3% and 6% doses of each extracts respectively. A full thickness wounds (6 mm) was created on the dorsal of the rat's skin. The wound contraction was photographed on day 1, day 6 and day 12 by

macroscopic appearance and then wound contraction percentage was calculated.

Results: Both 6% ethanol-water and ethanol extracts showed almost similar effect in wound contraction with 82.5% and 82.32% respectively at the end of the experimental period (12th day) and is comparable with the positive control group (82.3%). PBS negative control group showed the lowest wound contraction percentage with 69.86%.

Conclusion: This preliminary study shows the wound healing potential of *A. longiloba* Miq. petiole extracts and the 6% of ethanol-water and ethanol extracts showed the highest wound contraction percentage efficiency. Further studies are needed to understand its mechanism of action.

OB13**Detection of cell senescence in stem cells from human exfoliated deciduous teeth and oral squamous cell carcinoma HSC-2**

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Introduction: Senescence-associated β -galactosidase (SA β -gal), a biomarker of cellular senescence, is a useful marker for detection of senescent cells *in vitro*.

Objective: To investigate cell senescence in early and late passages of stem cells from human exfoliated deciduous teeth (SHED) and oral squamous cell carcinoma cell line (HSC-2), by histochemical detection of SA β -gal activity.

Methodology: HSC-2 cell line was cultured to obtain passages 10, 15, 20 and 25, while SHED was cultured to obtain passages 13, 15, 20, and 23. A total of 100×10^3 cells were seeded in 6-well plate prior to staining. In addition, as a positive control for senescence detection, cells of passage 13 from both cell types, were treated with hydrogen peroxide. Both cell types were stained with Senescence Cells Histochemical Staining Kit (Sigma Aldrich, USA) according to the manufacturer's protocols. The number of blue stained cells expressing SA β -gal within five randomly selected fields in each well were counted under an inverted microscope. The percentages of the SA β -gal were then calculated.

Results: The percentages of stained HSC-2 cell line were passage 10 (11.0%), passage 15 (9.9%), passage 20 (26.5%) and passage 25 (24.7%). As for SHED: passage 13 (5.3%), passage 15 (11.0%), passage 20 (17.2%) and passage 23 (35.1%). There was a significant increment ($p < 0.05$) in the percentages of stained cells for both cell lines when early and late passages were compared.

Conclusion: Our results support the theory where normal and cancerous cells experience senescence after repeated cell division.

OB14**Effect of common medicaments on stem cell viability and their attachment to irrigated dentin: An *in vitro* study**

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Introduction: Regenerative endodontics is a new treatment modality for immature permanent teeth with necrotic pulp. Chemical irrigation followed by intracanal medicaments such as calcium hydroxide ($\text{Ca}(\text{OH})_2$) and double antibiotic paste (DAP) promotes ingress of stem cells. This results in renewal of pulp vitality and further root maturation. Ideally these

medicaments should be dental pulp stem cells (DPSC) friendly and promote cell attachment to dentine.

Objective: To compare the effects of Ca(OH)₂ and DAP on DPSC attachment to irrigated radicular dentin.

Methodology: Thirty dental chips (4x4 mm) were irrigated with 2.5% sodium hypochlorite followed by normal saline rinse. Group 1 dental chips (n=10) were treated with DAP 1mg/ml, Group 2 (n=10) with 500mg/ml Ca(OH)₂ and Group 3 (n=10) with no medicament as controls. After 4 weeks' incubation, the samples were rinsed finally with normal saline. Samples were immersed in neutral phosphate buffer saline (PBS) at room temperature for one hour. DPSC from passage 7- 8 were seeded onto the samples and allowed to attach to the dentinal surface. Presto blue viability assay was performed on day 1, 3 and 7. Data were analysed for stem cell viability. After 7 days, samples were prepared for SEM imaging and analysed to appreciate the attachment of stem cell to irrigated dentin.

Results: Ca(OH)₂ treated samples showed significantly better cell viability and attachment of DPSC compared to the DAP treated samples ($p<0.05$).

Conclusion: Dentin conditioning with Ca(OH)₂ significantly promotes DPSC survival, proliferation and attachment to the dentinal surface.

OB15

Inhibition of airway inflammation and remodelling by *Lignosus rhinoceros* extract in murine model of chronic asthma

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Introduction: Asthma is a chronic airway disease characterized by airway remodelling, leading to a progressive decline in lung function. Current medications are effective, but these drugs are mostly steroid-based which have various side effects. Thus, natural products should be explored as a safer alternative for the management of asthma. *Lignosus rhinoceros* or locally known as Tiger Milk Mushroom has been used in treating various diseases including asthma by the local communities in Malaysia. However, there is scarce information on its efficacy on chronic asthma.

Objective: To determine the anti-asthmatic activity of *L. rhinoceros* in a chronic airway inflammation model.

Methods: Female Balb/C mice were sensitized on day 0 and 7 and subsequently challenged three times per week with ovalbumin (OVA) for 2, 6 and 10 weeks. *Lignosus rhinoceros* extract (LRE) treatment (125, 250 and 500mg/kg) and dexamethasone (3mg/kg) were given upon the challenged. Another group of mice were left for 2 weeks without any further allergen challenged (12 weeks). Lungs were collected for analyses of inflammation level, mucus secretion and α -smooth muscle actin (α -SMA).

Results: OVA sensitization and chronic challenge had increased the level of inflammation, mucus secretion and α -SMA expression in the lung tissues. 125mg/kg of LRE treatment effectively attenuated the leukocytes infiltration and goblet cell hyperplasia in the peribronchial regions of the lung tissues as well as decrease the smooth muscle cell hypertrophy.

Conclusion: The study indicates that LRE could be a potential alternative for the management of chronic asthma.

OB16

Antimicrobial activity of Malaysian *Cymbopogon nardus* against *Propionibacterium acnes*

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Introduction: Acne vulgaris is a very common skin disease and may cause psychological morbidities such as depression, anxiety, low self-esteem, and unemployment. Current treatments do not achieve the desired effects and are often associated with adverse effects. A natural product such as *Cymbopogon nardus* is an alternative treatment based on its antimicrobial activity reported. However, the study on its activity against *Propionibacterium acnes* is still lacked.

Objective: To evaluate the antimicrobial activity of *Cymbopogon nardus* against *Propionibacterium acnes*.

Methodology: Screening of antimicrobial activity of *Cymbopogon nardus* against *Propionibacterium acnes* was evaluated by using agar well diffusion assay.

Results: The result shown that inhibitory effect of positive control, 10% benzoyl peroxide was 28mm and negative control, DMSO was 6mm. The inhibitory effect of *Cymbopogon nardus* against *Propionibacterium acnes* were 21mm for 50.00% concentration, 16mm for 25.00% concentration, 12mm for 12.50% concentration, 11mm for 6.25% concentration in which it decreases constantly with the concentration of *Cymbopogon nardus* essential oil.

Conclusion: The antimicrobial activity of *Cymbopogon nardus* has been demonstrated and further clinical studies are needed to ascertain the use of *Cymbopogon nardus* as an alternative treatment for acne vulgaris.

OB17

Immunomodulatory properties of gold nanoparticles on human peripheral blood mononuclear cells of asthmatic and healthy individuals

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Introduction: Mechanism of immune disorders such as asthma and dendritic cells (DCs), the sentinel of immune responses, has been well established. Targeting this particular cell population for immunotherapy has received great interests. Gold nanoparticles (NPs) with their advantages such as customisable size, extensive surface functionalities and low cytotoxicity have been proposed as a highly potential tool to target DCs. Studies in human DCs showed varied effects of gold NPs to DCs, in terms of the antigen uptake and further T cell responses.

Objectives: To investigate the effects of gold NPs on peripheral blood mononuclear cells (PBMCs) in healthy and asthmatic individuals by assessing the expression of antigen presenting cells; particularly DCs upon exposure to two different sizes of gold NPs.

Methodology: The cultured PBMCs were analysed with flow cytometry according to the expressions of CD11b, CD11c, CD86, CD103 and MHCII. Phenotyping of DCs was also performed.

Results: Conventional DCs (cDCs), identified as MHCII^{high} CD11c^{high}, showed an increased pattern in asthmatics group compared to controls. A subpopulation of CD11b⁺CD103⁺ DCs, showed a reduced pattern suggesting an imbalance of

immunological responses in asthma. Upon exposure to gold NPs (15 nm and 100 nm), a significant reduction of activated DCs was observed in asthmatics group compared to healthy controls, without altering CD11b⁺CD103⁺ DCs.

Conclusion: These observations suggest the key role of DCs in the pathophysiology of asthma. An exposure to gold nanoparticles provides a protective effect by suppression of pro-inflammatory DCs. Further functional studies are essential to understand the effects of gold NPs in regulating immune responses for the potential in immunotherapies.

OB18

Combination of Malaysian propolis and metformin ameliorates histological changes and inflammation in the testis of diabetic rats

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Introduction: Propolis has an anti-inflammatory property, and inflammation has been reported to play a significant role in diabetes mellitus (DM)-induced testicular impairment, thus adversely affecting male fertility potential.

Objective: In this study, we examined the effects of Malaysian propolis, metformin and their combination on histology and inflammatory markers in the testis of diabetic rats.

Methodology: Thirty adult male *Sprague-Dawley* rats were randomly assigned into 5 groups (n = 6/group), namely: normal control (NC), diabetic control (DC), diabetic on MP (D+MP), diabetic on metformin (D+Met) and diabetic on MP and Met (D+MP+Met). Diabetes was induced using a single intraperitoneal streptozotocin (60 mg/kg b.w.) injection. MP (300 mg/kg b.w./day) and Met (300 mg/kg b.w./day) were given by oral gavage for four weeks.

Results: Histological observations revealed significant decreases ($p < 0.001$) in seminiferous tubular diameter and epithelial height, and a significant increase ($p < 0.001$) in number of seminiferous tubules with germ cell loss in DC group, relative to NC group. mRNA transcript levels and immunostaining showed significant ($p < 0.001$) up-regulation of nuclear factor kappa B [NF- κ B(p65)], inducible nitric oxide synthase (iNOS), tumor necrosis factor alpha and interleukin(IL)-1 β , and significant down-regulation of IL-10 in the testis of DC group, relative to NC group. Following intervention with MP, Met or their combination, mRNA and immunostaining of pro-inflammatory markers reduced significantly, while IL-10 increased significantly relative to DC group, with the best outcome observed in D+MP+Met group.

Conclusion: Malaysian propolis ameliorates DM-induced alterations in testicular morphometry and decreases inflammation, and these beneficial effects are better when combined with metformin.

OB19

Expression profiles and the potential roles of p18 in diffuse large B-cell lymphoma

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Introduction: Diffuse large B-cell lymphoma (DLBCL) is an aggressive form of non-Hodgkin lymphoma (NHL), and the INK4 family includes p15, p16, p18 and p19 proteins.

Objective: To validate an anti-p18 antibody specific for p18 without cross-reactivity with its family members, and to utilise the antibody for immunohistochemistry (IHC) in DLBCL patient cases. The potential functions of p18 in DLBCL were explored through bioinformatics analysis.

Methodology: IHC was conducted in human reactive tonsils. Western blotting (WB) was conducted on INK4 family of transfectants overexpressing p15, p16, p18 or p19 (pCMV6-DDK-tagged TrueORF clone). WB of p18 protein in DLBCL cell lines (n=8), IHC of local series of DLBCL cases (n=31) and bioinformatics analysis were conducted.

Results: The anti-p18 monoclonal antibody (mAb) clone 18P118 (mAb-18P118) yielded specific staining of the germinal centre (GC) and plasma cells. WB showed that mAb-18P118 detected p18 without cross-reactivity with other INK4 family members. IHC of DLBCL cases (n=31) with mAb-18P118 showed that median p18 frequency (75%) or intensity (moderate) was not significantly predictive of overall or progression-free survival. Gene Ontology enrichment analysis in a microarray dataset obtained from Gene Expression Omnibus database (ID: GSE10846) showed that genes involved in cell cycle progression and mitosis were most significantly and inversely-correlated with p18 expression in DLBCL cases (n=350; FDR<0.001).

Conclusion: p18 potentially plays a role in suppressing the cell cycle progression in DLBCL. However, it is not predictive of survival in DLBCL cases and further studies in independent series of DLBCL cases are recommended.

ORAL: CLINICAL & HEALTH SCIENCES

OC01

Tracking the hippocampal-prefrontal cortex connectivity using diffusion magnetic resonance imaging probabilistic tractography: A pilot study

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Introduction: Neuroimaging studies have delineated functional connectivity between hippocampus and prefrontal cortex (PFC) sub serving cognitive functions and emotional control behaviour. However, less is known about the structural connectivity between hippocampus and the subdivisions of PFC and whether the functional connectivity is achieved through direct or indirect structural pathways.

Objective: To characterize the white matter connectivity between hippocampus and subdivisions of PFC using diffusion magnetic resonance imaging (dMRI) and probabilistic tractography in healthy individuals.

Methodology: Five healthy males aged between 18 to 65 years underwent dMRI and structural MRI to acquire diffusion-weighted and T1-weighted brain images. Probabilistic tractography using FMRIB Software Library (FSL) was

performed to track the relative connection probability between hippocampus and six subdivisions of PFC, namely dorsolateral PFC, ventrolateral PFC, orbitofrontal cortex, frontopolar cortex, ventromedial PFC and dorsomedial PFC.

Results: We found different relative connection probabilities between hippocampus and the PFC subdivisions, with the highest connection probability between hippocampus and orbitofrontal cortex.

Conclusion: Our findings demonstrate that highest connection probability is to the orbitofrontal cortex, which is involved in encoding and retrieval activity during memory processes.

OC02

Prevalence and patterns of impacted teeth in Malaysian population using orthopantomogram (OPG) and cone beam computed tomography (CBCT)

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Introduction: Knowledge of prevalence and patterns of impacted teeth in Malaysian population is essential in facilitating their diagnosis and management.

Objective: To determine the prevalence and patterns of impacted teeth in Malaysian population using orthopantomogram (OPG) and cone beam computed tomography (CBCT).

Methodology: One thousand two hundred OPG of 18 to 40 years old subjects were examined to determine the prevalence of impacted tooth. Five hundred CBCT of the same aged subjects were examined to determine the patterns of impaction which include the angulations and depth of impactions. Planmeca Promax 3D and Planmeca Romexis 2.9.2 software (Planmeca Oy, Helsinki, Finland) were used to obtain CBCT images and performed measurements respectively.

Results: Almost 30% (n=356) of subjects showed at least one impacted tooth. The prevalence of impaction was significantly higher ($p < 0.05$) in the mandible ($154/356 = 43.3\%$) than in the maxilla ($40/356 = 11.2\%$). There is no significant difference of tooth impaction between the sexes ($X^2, p = 0.73$). About 24.6% (n= 72) of the impacted teeth were mandibular right third molars with mesio-angular impaction and Level B depth of impaction i.e. the level of the most coronal aspect of the impacted teeth located between the cemento-enamel junction (CEJ) and occlusal surface of adjacent mesial tooth, being the most common.

Conclusion: The prevalence of impacted teeth was high in Malaysian population with mandibular third molars being the most common. CBCT has the added advantage of facilitating accurate analysis of the patterns of impaction which will greatly aid clinicians in the management of impacted teeth.

OC03

Depression, anxiety and stress status and dental caries experience among adult patients attending outpatient dental clinic in Hospital Universiti Sains Malaysia

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Introduction: Poor oral health is common amongst people with severe mental illness and remains as a largely forgotten problem in the community.

Objective: To evaluate mental health status and dental caries experience among adult patients attending outpatient dental clinic in Hospital Universiti Sains Malaysia.

Methodology: This was a cross-sectional study involving 106 adult patients who attended the outpatient dental clinic. Sociodemographic profiles were obtained, and mental health status was evaluated using the Depression, Anxiety and Stress Scales (DASS-21) questionnaire. Clinical oral examination was conducted to determine the caries experience using the decayed, missing and filled teeth (DMFT) index.

Results: Majority of the patients were Malay (92.5%), female (60.4%) and young adults (73.0%). The prevalence of moderate to extremely severe symptoms of depression, anxiety and stress was found in 5.7% (95% CI:1.2-10.1), 19.8% (95% CI:12.2-27.5) and 6.6% (95% CI:1.8-11.4) of the patients respectively. The median (IQR) of the caries experience was 7.0 (IQR=7). There was significantly higher caries experience in normal/mild (9.0) compared to moderate/severe/extremely severe (5.0) group of anxiety symptoms (p -value < 0.05). However, there were no difference of caries experience between the group of depression symptoms and stress symptoms.

Conclusion: The prevalence of symptoms of depression, anxiety and stress among the patients were low with high dental caries experience. Even though screening of mental health is not warranted in primary dental settings, but it would be beneficial to check on oral health status in mental health clinic settings.

OC04

Preliminary research of correlation between pulp chamber volume of mandibular third molar and chronological age on Deutero-Malay subrace population

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Introduction: Teeth are the hardest structures in human body hence they are considered as one of the most reliable identification media in forensic sciences. Due to the deposition of the secondary dentin, the volume of the pulp decreases with age.

Objective: To analyse the correlation between pulp chamber volume of mandibular third molar and chronological age in Deutero-Malay subrace population.

Methodology: The analytical research design was done on cone beam computed tomography (CBCT) images of 173 mandibular third molars of Deutero-Malay patients by using the method of purposive non-random sampling technique from secondary data in the oral and maxillofacial radiology installation in the Dental Hospital, Faculty of Dentistry, Padjadjaran University. The inclusion criteria of the subjects are intact mandibular third molars with no caries, no excessive tooth wear, no pulpal calcification and no dental restoration. DICOM data of CBCT images were processed using a three-dimensional segmentation application ITK-

SNAP v3.6.0. The data were analysed statistically with Pearson correlation and results were obtained.

Result: The correlation value (r) is -0.963, -0.970, -0.980 for male, female, male and female respectively. The results showed that there is a very strong and significant relationship between chronological age and pulp chamber volume (Sig. 0.000 value $< \alpha = 0.05$).

Conclusion: The study shows that there is a correlation between pulp chamber volume of mandibular third molar and chronological age in the Deutero-Malay subrace population.

OC05

Dental caries and oral health care challenges among learning disabled children in northeast Peninsular Malaysia

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Introduction: Dental caries affects learning disabled (LD) children. Therefore, oral health awareness among their caregivers is imperative to maintain optimal oral health.

Objective: To determine caries experience of LD children, oral health knowledge, attitude, practice (OHKAP) and problems encountered by caregivers during tooth brushing.

Methodology: A cross-sectional study was conducted on 65 caregivers and their LD children aged 6 to 12 years old in Hospital USM, Kelantan. Caries experience for permanent and deciduous teeth of LD children was determined through decayed missing filled teeth (DMFT) and decayed filled teeth (dft) indices. OHKAP and problems encountered by caregivers were assessed using validated questionnaires.

Results: Most LD children were Malay (90.8%), male (84.6%), with mean age of 9.2 ± 2 years, while mean age of their caregivers was 40.6 ± 6 years. Median DMFT(IQR) was 1.5(4.7) and dft was 1.0 (6.0). Majority caregivers had acceptable knowledge on causes, signs and prevention of caries and periodontal disease. About 50.8% of caregivers thought their children's oral health was good but only 8% practiced regular dental visit. Most LD children (84.6%) brushed on their own, using children's toothbrush and fluoridated toothpaste (89.2%). Amongst 41.5% caregivers who encountered problem during tooth brushing, 23.1% reported their child liked to close mouth and 13.8% turned head away.

Conclusion: Caries experience among LD children was relatively low. Caregivers' oral health knowledge and attitude were acceptable but oral health practices were inadequate. Improvement in caregivers' OHKAP are crucial towards facing the challenges in maintaining their children's oral health.

OC06

Effect of malocclusion severity on oral health related quality of life in a sample of Malay adolescents

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Introduction: Malocclusion is an important health issue throughout the world. Epidemiological studies of malocclusion reported a high prevalence of this condition in different countries and it seems that malocclusion and orthodontic treatment need become a health care issue and subsequently a quality of life problem. Malocclusion can cause difficulties in oral hygiene, chewing, swallowing, speech, breathing, and predisposition for oral habits that can result in pain and discomforts.

Objective: To determine the impact of malocclusion on oral health related quality of life (OHRQoL) among 13 to 16 years old Malay school children.

Methodology: To assess the OHRQoL of children, Malay version of OHIP-14 was used. This questionnaire has 14 questions with seven domains which are functional limitation, psychological discomfort, physical pain, physical disability, psychological and social disability, and handicap. A 5-point Likert system is used in Malay version. Overall score can range between 0 to 56. Index of Orthodontic Treatment Need Dental Health Component (IOTN DHC) was used to assess the orthodontic treatment need.

Results: Females had higher mean score of OHIP-14 than male ($p < 0.05$). A weak positive correlation was found between malocclusion severity and OHRQoL ($p < 0.01$). Malocclusion had a negative impact on OHRQoL of the students in the present study. This impact was prominent in psychological discomfort and psychological disability domains of OHIP-14 ($p < 0.05$).

Conclusion: Increase in severity of malocclusion caused a negative impact on OHRQoL. Females exhibited more negative impact of malocclusion on their OHRQoL. Psychological domain was the most affected one.

OC07

The limitation of root pulp visibility for age estimation in young adults

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Introduction: Age estimation in adults for legal purposes has been a daunting task to forensic odontologist. Post development method relied on physiological changes in tooth structures. Among several structural changes that were commonly used, root pulp visibility has been proposed. This raises a question of the timing when the earliest detectable changes in root pulp visibility among young adults occur.

Objective: To investigate the earliest age where root pulp visibility changes are detectable in young adults.

Methodology: One thousand and nineteen orthopantomographs (OPGs) were selected from Hospital Universiti Sains Malaysia archives which consist of 494 males and 525 females. The age ranged between 16 to 39 years old. Those with good quality OPG, matured root and healthy patients were included. A two-scaled score was used: '0' root pulp fully visible, '1' part or all of root pulp obliterated. The age was calculated by subtracting date of birth and the date of OPG taken. The data were presented as minimum-maximum age.

Results: The earliest detectable visibility changes in females was 20.1 years old while in males 22.7 years old. However, there were overlapped in terms of age for score '0' and '1' (wide age range appear having both scores).

Conclusion: Root pulp visibility may be used in the age estimation for above 18 years old sample with caution of individual variability.

OC08

Association of rheumatoid factor and anti-citrullinated protein antibodies in rheumatoid arthritis with chronic periodontitis

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Introduction: Rheumatoid arthritis (RA) is a chronic autoimmune inflammatory disease of the joints. Positive rheumatoid factor (RF) and anti-citrullinated protein antibody (ACPA) in RA patients have been found to be associated with periodontitis. Periodontitis is a chronic inflammatory disease of teeth's supporting tissues. It is caused primarily by *Porphyromonas gingivalis*, which produces peptidyl-arginine deiminase (PPAD) enzyme causing protein citrullination. Citrullinated proteins predisposes susceptible individuals to develop autoantibodies which results in RA.

Objectives: To determine the association of RF and ACPA with RA disease activity in CP and non-CP RA patients.

Methodology: A comparative cross-sectional study involving 98 RA patients was conducted at Hospital USM, Kubang Kerian, Kelantan, Malaysia. Oral examinations were carried out to determine the periodontal status. RF, ACPA, erythrocyte sedimentation rate (ESR) were measured and 28-joint Disease Activity Score (DAS-28) of RA patients was assessed.

Results: Forty-five of RA patients (45.9%) were found to have CP (0.36-0.56, 95% CI). There was no significant association between RF positivity and RA disease activity in CP ($p=0.927$) and non-CP ($p=0.43$) RA patients. There was also no significant association between ACPA positivity in CP ($p=0.78$) and non-CP ($p=0.611$) RA patients respectively.

Conclusion: In our cohort of RA patients with or without CP, we did not find significant association between RF or ACPA positivity and RA disease activity, likely due to small sample size. Further study with larger sample size is needed to obtain more conclusive findings.

OC11

The effect of Nd:YAG laser irradiation distance on the changes in temperature of human teeth

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Introduction: Thermal effect of laser irradiation on the tissues is influenced by parameters such as power, spot size, treatment time and cooling system. Other than pulp chamber, enamel surface is also a critical part where the thermal effect of laser irradiation occurs typically.

Objective: To investigate the effect of irradiation distance on the temperature of the tooth surface.

Methodology: Twelve human teeth samples were irradiated using the Cynergy™ Nd:YAG laser at several distances. Samples were randomly divided into four groups based on four different irradiation distances (1, 2, 3, and 4 cm) between sample and laser tip. The temperature of the sample surface was measured using an infrared thermometer. Paired t-test and one-way ANOVA test were performed for statistical analysis.

Results: Mean temperatures for the samples after laser irradiation were 29.7°C, 30.5°C, 30.7°C, and 32.1°C for an irradiation distance of 1, 2, 3, and 4 cm, respectively. The percentage difference of the temperature before and after irradiation was 7.49% (1 cm), 10.22% (2 cm), 12.85% (3 cm), and 20.81% (4 cm). The p-values for the four groups were less than 0.05 indicating that there was a significant change in the temperature of the samples after laser irradiation.

Conclusion: This study shows that the temperature increases significantly as the irradiation distance increases, even though the spot size area decreases. The temperature increment towards the tooth surface must be identified to avoid pain and damage to the human tooth during the laser procedure.

OC12

The effectiveness of endoscopic diagnosis of upper aerodigestive tract tumours by SPIES

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Introduction: The standard diagnostic procedure in the assessment of upper aerodigestive tract tumours is by the white light endoscopy (WLE) and combined with biopsy. However, white light endoscopy has difficulty in identifying minute epithelial changes and cannot directly differentiate benign from malignant tumours. At present, Storz Professional Image Enhancement System (SPIES) has recently developed an optical technique designed to enhance the visualization of microvasculature on the mucosal surface.

Objective: To evaluate the effectiveness of endoscopic examination by using SPIES in detecting tumours involving the upper aerodigestive tract and to compare with histopathological examination (HPE) findings.

Methodology: A cross sectional study was performed in the Otorhinolaryngology Clinic, Hospital Universiti Sains Malaysia from March 2017 to March 2018. Fifty-nine patients with suspected upper aerodigestive tract tumours had underwent white light endoscopy followed by SPIES endoscopy examination. All the visualized masses were biopsied and sent for histopathological examination. Endoscopic examination findings were compared with histopathological findings. Sensitivity, specificity, positive predictive value, negative predictive value, and accuracy were calculated.

Results: Sensitivity and specificity in the differentiation between WLE versus HPE were 77.5% and 84.2% respectively. The positive predictive value was 91.2% while negative predictive value was 64%. However, sensitivity in the differentiation between SPIES endoscopy and HPE was 70% and specificity was 89.5% while positive predictive value 93.3% and negative predictive value 58.6%.

Conclusion: SPIES endoscopy can be considered as an important tool during diagnosis, treatment, and follow-up of patients with upper aerodigestive tract tumours for its effectiveness in differentiating benign and malignant tumours.

OC13

Changes in human dentine following irradiation of 940 nm diode laser: A surface morphological study

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Introduction: Dentine hypersensitivity is a common dental condition that could cause a huge obstacle for dentist and patient, due to the short, sharp pain arising as a response to stimulation applied on uncovered dentine. Although many substances are available to treat dentine hypersensitivity, they are not effective over the long term. To date, there is not much laser application used in treating dentine hypersensitivity clinically.

Objective: To evaluate the effects of 940 nm diode laser at different parameters on dentine morphology under scanning electron microscopy (SEM).

Methodology: Seven extracted caries-free human premolars were cut vertically, cleaned and divided into 4 experimental groups. Group A (control) was not irradiated. Other groups were irradiated with diode laser 940 nm: Group B (1.5 W), Group C (2.0 W) and Group D (2.5 W), for 10 seconds, continuous and non-contact mode. SEM analyses were performed for all groups to examine the morphological changes of dentinal tubules.

Results: Samples irradiated with 1.5 W setting showed partially narrowing of the dentinal tubules. Diode laser irradiations at 2.0 W and 2.5 W settings caused narrowing or sealing of dentinal tubules without provoking carbonization or any destruction on the dentine surface.

Conclusion: From this study, it is observed that irradiation of 940 nm diode laser at 2.0 W and 2.5 W settings, is able to seal the dentinal tubules and could be effective in the treatment of dentinal hypersensitivity.

OC14

Assessment of treatment outcome based on the age, types of clefts and effects of the different techniques of surgeries in Malay unilateral cleft lip and palate children

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Introduction: Subjects with unilateral cleft lip and palate (UCLP) frequently exhibit underdeveloped maxilla which subsequently leads to Class III malocclusion. The growth-restraining effects of scar tissue from the cheiloplasty and palatoplasty are believed to cause maxillary hypoplasia. However, congenital factors may also be responsible for this abnormal phenomenon. Thus, it is necessary to know which factor is affecting the treatment outcome

(underdeveloped maxilla) so that clinicians can take proper steps or precaution to modify their treatment plan at the early age of the patients.

Objective: To evaluate the effects of cheiloplasty (lip surgery) and palatoplasty (palate surgery) and UCLP types and age of the subjects on upper arch dimensions.

Methodology: Eighty-five laser scanned 3D digital models of UCLP subjects treated with two different techniques of cheiloplasty and palatoplasty were taken before any orthodontic treatment and bone grafting at 5 to 12 years of age. Inter-canine width (ICW), inter-molar width (IMW) and arch depth (AD) measurements of upper arch were measured with Mimics software. Multiple linear regression analyses were used to evaluate the association between cheiloplasty palatoplasty, age, type of UCLP and upper arch dimensions (ICW, IMW and AD). The *p*-value was set at 5%.

Results: Significant association was found between two techniques of cheiloplasty and ICW (*p*=0.001) of maxilla. Age of the subjects also showed significant associations on AD (*p*=0.002) of maxilla.

Conclusion: Modified Millard technique of cheiloplasty and older age of subjects had more adverse effect on the ICW and AD of maxilla respectively in Malay UCLP children.

OC15

Titanium mesh as reconstructive material to correct deformity of the maxilla: Two case presentations

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Introduction: Titanium mesh can be used in immediate reconstruction of the defective maxilla to provide support and prevent overlying skin collapse.

Objective: To highlight the importance of immediate reconstruction of the maxilla to overcome the psychological impairment post-surgery.

Methodology: Two cases were reported. The first one was an 18-year-old female with a complaint of long standing hard swelling over the right cheek, which was diagnosed as Ewing's sarcoma after performing incisional biopsy and the other was a 21-year-old male with the history of left maxillary ameloblastoma reported in the department of Oral and Maxillofacial Surgery of Hospital USM.

Results: A Waber-Ferguson flap was used to remove the sarcoma as well as ameloblastoma, that is extended hemimaxillectomy with immediate reconstruction of maxilla using titanium mesh and denture like surgical plate was provided to the patients. The titanium mesh stays as it was and the denture like surgical plate was replaced by an obturator.

Conclusion: One-month post-surgery, the soft tissue around lower eyelid, cheek and upper lip was found intact giving a proper aesthetic outcome. The technique of reconstructing maxilla with titanium mesh protects the soft tissues from sagging and provides patient's self-esteem prior to further treatment using obturator.

OC16

The sociodemographic profile of patients with schizophrenia in Kelantan: A comparison between psychosocial rehabilitation attendees and non-attendees

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Introduction: Psychosocial rehabilitation is important in managing chronic schizophrenia towards recovery. There are seven psychosocial rehabilitation (PSR) centres that are run by the local health centres and one community mental health centre (CMHC) in Kelantan. Each hospital with psychiatrists also runs psychosocial rehabilitation to improve patient's function.

Objectives: To compare the sociodemographic profile of psychosocial rehabilitation attendees and non-attendees among patients with schizophrenia in Kelantan.

Methodology: A comparative cross-sectional study was performed between two groups of schizophrenia patients who attended psychosocial rehabilitation and who did not. Seventy participants were recruited in each group using simple random sampling technique.

Results: There was a significant difference in marital status between psychosocial rehabilitation attendees and non-attendees, $\chi^2(1) = 8.792, p < 0.05$. Other sociodemographic profiles were not significantly different between the groups.

Conclusions: Sociodemographic profile of patients in both groups were similar except marital status. Marital status profile which was found to be statistically significantly different between the groups will be controlled in the intermediate analysis as one of the confounding factors in subsequent objective.

OC17

External apical root resorption (EARR) in orthodontic treatment: A myth or a fact

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Introduction: External apical root resorption (EARR) is a common phenomenon following an orthodontic treatment. During treatment, teeth become vulnerable to EARR due to application of force on teeth which consists of different treatment mechanics. A considerable diverse amount of EARR is observed at the end of treatment.

Objective: This study assessed the EARR after 'leveling and alignment' stage of orthodontic treatment using 3D cone beam computed tomography (CBCT).

Methodology: A total of 24 CBCT images from 12 patients (mean age 23.42 ± 4.27) were measured using the Planmeca Romexis™ software. CBCT images were obtained before and after alignment and leveling stage of orthodontic treatment. EARR was determined using Axial Guided Navigation of CBCT. All anterior roots were assessed by two investigators using the formula $EARR = R1 - (R2 \times CF)$. Mean differences of the initial and final measurements of the teeth and frequency of EARR were identified using descriptive statistics. EARR of contralateral and

ipsilateral tooth were measured using the paired t-test. Correlation of EARR with the age was assessed using Pearson correlation test.

Result: The reliability of the EARR measurements for two examiners showed strong correlations. EARR was detected using CBCT in 29.85% of all roots after 'leveling and alignment' stage of orthodontic treatment. No significant difference was found in relation to age, EARR of contralateral, ipsilateral tooth except lower lateral incisors.

Conclusion: All roots of the anterior teeth indicate a different amount of EARR after 'leveling and alignment' stage of orthodontic treatment which may accelerate more at the end of orthodontic treatment.

OC18

Sex prediction using dental arch dimensions in Pakhtun Pakistani population

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Introduction: Sex information is one of the reconstructive profiles that are needed in the process of human identification. So far, there is only few information of sexual dimorphism in the dental arch dimensions.

Objective: To formulate sex prediction model using dental arch dimensions by the assistance of digital stereomicroscope with automated calibration system in Pakhtun Pakistani population.

Methods: Dental casts of 128 subjects, consisting of 64 males and 64 females from the Pakhtun Pakistani population of age ranging from 18 to 21 years were examined for the study. The subjects were having malocclusion Class I and healthy. Dental arch dimensions including the arch length, arch perimeter, inter-canine, inter-first premolar, inter-second premolar and inter-molar widths were measured and recorded separately for maxillary arch. Sex differences were assessed. A discriminant function analysis was used to formulate sex prediction model using six upper dental arch dimension variables.

Results: The study revealed that sexual differences in dental arch dimensions were statistically significant for both males and females ($p < 0.05$); where the overall pattern showed males had larger arch dimensions than females. Stepwise discriminant analysis showed the variables exhibiting best discriminant power were found in the inter-second premolar width for the upper arch. This variable significantly contributed to the variance between males and females. The upper arch had 67.2% of original grouped cases correctly classified and 66.4% of cross-validated group cases correctly classified.

Conclusion: It was concluded that the prediction model formulated for the maxillary arch was moderately strong (67.2% correct classification) for sex prediction to differentiate between males and females of Pakhtun Pakistani population and able to be used in the management of disaster victim identification, accidents and crime.

OC19

Urinary VCAM-1, KIM-1 and Endothelin-1 as biomarkers of lupus nephritis: Correlation with immunological parameters in HUSM

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Introduction: Lupus nephritis (LN) is characterised by renal deposition of immune complexes and it is one of the serious complications in systemic lupus erythematosus (SLE).

Objective: To evaluate urinary vascular cell adhesion molecule-1 (VCAM-1), kidney injury molecule-1 (KIM-1) and endothelin-1 (ET-1) as biomarkers of renal disease in LN.

Methodology: Sixty (60) LN patients and 30 healthy controls were involved in this study, conducted at the Hospital Universiti Sains Malaysia (HUSM) from January 2016 to December 2017. The urine samples were measured by using enzyme-linked immunosorbent assay (ELISA). Receiver operating characteristic analysis was performed to obtain the best cut-off values to calculate the performance of these markers. Correlation between these urinary biomarkers and clinical parameters was also tested. Statistical analysis was performed using SPSS software, version 22.0.

Results: Urinary VCAM-1, KIM-1 and ET-1 levels were significantly higher in active LN patients as compared to inactive LN patients and healthy controls. These markers correlated significantly with anti-dsDNA, complement C3, complement C4, urinary protein/creatinine ratio (P/C), SLE disease activity index (SLEDAI) and renal SLEDAI scores. However, urinary KIM-1 was not significantly correlated with complement C4. Urinary ET-1 showed higher specificity and sensitivity in differentiating LN patients and healthy controls (area under the curve (AUC 0.809) than urinary VCAM-1 (AUC 0.725) and urinary KIM-1 (AUC 0.640)).

Conclusion: Urinary VCAM-1, KIM-1 and ET-1 may be a potential biomarker for monitoring disease activity in LN patient.

OC20

Thalassemia in the 4th Industrial Revolution era: Economic burden on families in Malaysia

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Introduction: The 4th Industrial Revolution brings technology breakthroughs in genetic testing. Nevertheless, thalassemia continues to exist. With no cure, thalassemia patients require lifelong treatment. Carers experienced financial burden and had lesser chance of employment. All these factors collude to financially burden a household with thalassemia.

Objective: To investigate the economic burden of thalassemia on families in Malaysia.

Methods: A hybrid method of economic analysis and qualitative inquiry were performed. Cost analysis of the out-of-pocket spending was done on 200 respondents from Pahang, Sabah and Terengganu, followed by 20 semi-structured interviews in Sabah.

Results: The monthly mean expenditure was MYR199.87 (SD 278.33) and 25% of all households suffered from catastrophic spending. Nevertheless 31% of the respondents received subsidies, while 63% claimed that their household income was unaffected by thalassemia. The qualitative inquiry revealed a gloomier perspective. Respondents talked about family sacrifices, borrowings and selling off assets, parents' guilt of having to prioritize the sick child, forgotten welfare of other siblings, missed treatments, poor access to care, constant hunger, unpaid bills and the never-ending financial despair.

Conclusion: Despite the excitement of moving towards the 4th Industrial Revolution, forget not the society and their suffering. The burden of thalassemia extends beyond monetary value, with incessant suffering made worse by the sick cycle of disease and poverty. Based on the evidence

of this study, a relook into financial assistance for families affected by thalassemia is needed.

OC22

Evaluation of periodontal health, amount of *Porphyromonas gingivalis* and anti-cyclic citrullinated peptide antibodies among patients with rheumatoid arthritis

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Introduction: Periodontal disease and rheumatoid arthritis (RA) are chronic inflammatory diseases which share many clinical and pathological features. *Porphyromonas gingivalis* is the main periodontal pathogen involves in protein citrullination which results in production of anti-cyclic citrullinated peptide (anti-CCP) antibodies in RA.

Objectives: To evaluate the periodontal health status and its association with RA severity as well as the association between the amount of *Porphyromonas gingivalis* and anti-CCP antibody among RA patients.

Methodology: 100 RA patients were subjected for periodontal examination followed with subgingival plaque samples collection from periodontal pockets for assessment of *Porphyromonas gingivalis* using loop-mediated isothermal amplification method (LAMP). Serum samples were used for analysis of anti-CCP antibody level. RA disease severity was determined based on DAS-28 score system.

Results: Majority of RA patients were female (85%). Mean age of these RA patients was 50.9 (SD13.5). Low RA disease severity was found in 62% of patients. Among them, 47% presented with chronic periodontitis and 52% had gingivitis. *Porphyromonas gingivalis* was detected in all samples with bacteria count ranging from 10 to 10⁹. Positive anti-CCP antibodies was detected in 55% of the collected samples. There was no significant association between periodontal status and RA severity ($p=0.15$). Besides, the relationship between the amount of *P. gingivalis* and anti-CCP antibodies was not significant ($p=0.16$).

Conclusion: Periodontal disease is highly prevalent among RA patients despite non-significant association between these two conditions. Hence, it is important that RA patients should be educated to increase their awareness in oral health care.

OC23

Influence of obesity on salivary matrix metalloproteinase-8 and periodontal parameters in chronic periodontitis patients attending Hospital Universiti Sains Malaysia

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Introduction: Obesity is one of the first outstanding hazards of contemporary society. It is currently classified as a low-grade inflammatory chronic disease with a complex etiology. Chronic periodontitis is an inflammation that affects soft and hard tissues supporting the teeth leading to

tooth loss. Studies have found inflammation markers in the blood of obese adults similar to those discovered in periodontal disease tissues. Matrix metalloproteinase-8 (MMP-8) is the most widely recognized MMPs engaged with periodontal tissue devastation.

Objective: To determine the influence of obesity on the levels of MMP-8 and the periodontal parameters [periodontal pocket depth (PPD), plaque index (PI), and gingival index (GI)] in chronic periodontitis patients.

Methodology: Sixty participants were selected and equally divided into two groups; obese (BMI ≥ 30) exhibiting chronic periodontitis and the other is normal weight patients (BMI ≤ 25) bearer with chronic periodontitis. GI, PI, and PPD were measured. Saliva were collected from both groups and MMP-8 levels were assessed by Enzyme-linked immunosorbent assay (ELISA).

Results: The salivary MMP-8 protein levels were found not statistically significant when compared between obese (0.18 ± 0.20 ng/ml) and normal (0.12 ± 0.08 ng/ml) individuals. Periodontal parameters; PPD, GI and PI, were also compared and found to be not statistically significant.

Conclusion: The findings indicated that the obesity did not influence the salivary MMP-8 protein levels as well as periodontal parameters of PPD, GI, and PI.

OC24

CBCT analysis of bone level in immediate implants using socket shield technique: A report of 15 cases

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Introduction: Various methods have been advocated to avoid the resorption after extraction, such as immediate implants and barrier membranes. The socket shield technique is relatively a new method to avoid buccal bone resorption when immediate implants are performed. Applying the socket shield technique during the immediate implant placement may be a feasible treatment option for cases with high esthetic concerns.

Objective: To preserve a tooth fragment and avoid post-extraction resorption in immediate implant placement cases.

Methodology: The amount of horizontal bone resorption on the buccal surface was measured in pixels and calibrated by a periodontal probe at different points apical to the bottom of gingival sulcus in an interval of 0.5 mm. The volumetric change of the alveolar ridge was analyzed by using the pre-operative and post-operative CBCT scans.

Results: One year follow up of 15 cases had showed minimal horizontal and volumetric change. All cases were successful based on implant success criteria.

Conclusion: This presentation highlights the indications, contraindications, merits and demerits of socket shield technique and CBCT analysis of bone level in immediate implants of 15 cases along with post-operative follow up.

ORAL: MATERIAL SCIENCES

OM01

Synthesis, characterization and physico-chemical evaluation of a novel glass ionomer nano zirconia-silica-hydroxyapatite hybrid material

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Introduction: In dentistry, there has been a growing shift towards using nanoparticles dispersed in the polymer matrix to improve the properties of dental restoratives, particularly conventional glass ionomers (GIC). A novel GIC-nanozirconia-silica-hydroxyapatite (GIC-nanoZrO₂-SiO₂-HA) has been developed which has been shown to possess superior hardness.

Objective: To synthesize, characterize and evaluate the color stability, and fluoride (F⁻) release of the GIC-nanoZrO₂-SiO₂-HA hybrid material.

Methodology: The nanoZrO₂-SiO₂-HA was synthesized using sol-gel technique and characterized using TEM, SEM, EDX, FTIR and XRD. The powder was then added at 5% by weight into the GIC and 10 samples per group were fabricated. The color stability was measured with a spectrophotometer using CIE L*a*b* system, and the F⁻ release was measured using an ISE meter over a one-month period. The data was analyzed with repeated measures ANOVA.

Results: The TEM and SEM confirmed that all particles were in the nanoscale range with spherical zirconia and silica particles embedded in the voids between rod-shaped HA. FTIR and XRD demonstrated the presence of functional groups corresponding to each element and EDX showed that the nano particles were homogeneously dispersed. The color change (ΔE) values for GIC-nanoZrO₂-SiO₂-HA were lower than conventional GIC indicative of greater color stability and F⁻ release was significantly higher for all the time intervals recorded ($p < 0.05$).

Conclusion: Nano ZrO₂- SiO₂- HA can be considered as promising filler for GIC with greater color stability and fluoride elution making it a potentially stronger anticariogenic aesthetic dental material for the future.

OM02

Fabrication of denture adhesive by using modified starches and its effect on mechanical and biological properties

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Introduction: Recently, many dentists acknowledge the importance of denture adhesive and recommend it to the denture wearers. Denture adhesive is commonly applied on the denture base to enhance its better fitting towards the mucosal surface and to fit the denture in place. It is important for denture adhesive to have good mechanical and biological properties.

Objective: To evaluate the effect of modified starches on hardness, adhesiveness, and tensile bond strength properties (TBS) as well as to study the effect of different antimicrobial agents in this denture adhesive on bacteria growth.

Methodology: The investigated starches were corn, potato, tapioca, sago and wheat while the modification agents were sodium hypochlorite (NaOCl) and hydrogen peroxide (H₂O₂). The peppermint oil and tea tree oil were used as antimicrobial agents. The denture adhesives were prepared with 5, 10 and 15 percent (wt. %) loading of starches filler. The chemical and mechanical characterization performed were Fourier Transform Infrared Spectroscopy (FTIR), tensile bonding strength (TBS), adhesiveness and hardness as well as antimicrobial test by using an agar well diffusion method.

Results: Mechanical analysis indicated that denture adhesive with modified starches have higher tensile bond

strength, adhesiveness and hardness. The optimum filler loading is at 5%. Both antimicrobial agents show zone of inhibition on the tested bacteria.

Conclusion: The fabricated denture adhesive has good potential to be used as a natural based denture adhesive as it contains modified starch which has enhanced its properties. So, it has potential to be used as another alternative material for denture adhesive application.

OM03

Fracture resistance of the permanent restorations for endodontically treated mandibular premolars

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Introduction: Endodontic treatment is an attempt to preserve teeth with damaged and infected pulp. Endodontically treated teeth are weaker and prone to fracture. To ensure successful outcome, adequate coronal seal plays a very crucial part.

Objectives: To compare the fracture strength, fracture pattern, types of fracture involved and area of fractured restoration among endodontically treated teeth restored with different materials.

Methodology: Sixty-nine mature human permanent lower premolars recently extracted for orthodontic, periodontal or other reasons were selected and divided into three groups (n=23). Groups 1 and 2 were endodontically treated and prepared with standardized MOD cavities. Group 1 and 2 were restored with amalgam using Nayyar's core technique and glass fiber post with composite resin core, respectively. Group 3 consisted of intact tooth which serve as a control group. All teeth were tested under constant occlusal load until fracture occurred using Universal Testing Machine. Data analysis was carried out using Kruskal Wallis Test complemented by Mann Whitney test with level of significance was set at $p < 0.01$.

Results: A significant differences in fracture strength was observed among all three groups ($p < 0.01$). The mean load required to fracture intact tooth in Group 3 (803.05 ± 182.23 N) was significantly highest, followed by Group 2 (588.90 ± 151.33 N) and lastly Group 1 (388.05 ± 158.09 N). Most fractures occurred within the coronal structure and were considered favourable pattern. Besides, majority of the fractures occurred on restorations, particularly at the distal side.

Conclusion: Teeth restored with fiber post and composite core resulted in higher fracture resistance than teeth restored with Nayyar's core amalgam restoration.

OM04

Investigation of Teflon as frictionless bracket on NiTi archwire bending behaviour in orthodontic levelling treatment

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Introduction: Nickel titanium (NiTi) (shape-memory alloy) archwires are widely used in orthodontic treatment. Major issue during the treatment is the existence of friction between the archwire and bracket, hence, it reduced the effectiveness of the archwire. Friction reduction will speed up the recovery process and reduce patient's pain during treatment.

Objective: To investigate Teflon as frictionless materials for potential bracket materials/coating.

Methodology: Friction Tribometer Test was conducted between Teflon and NiTi archwire to determine Teflon's Coefficient of Friction (CoF) for frictionless behaviour verification. Bending test (Universal Tensile Machine, Instron 3367) was done to investigate bending behaviour of NiTi archwires. Bending jig and Teflon-coated bracket was fabricated. Four commercial NiTi archwires with different shapes and sizes, widely used in orthodontic treatment were selected for bending test using stainless steel (SS) bracket and Teflon-coated bracket. Bending loads on three deflections (2 mm, 3 mm and 4 mm) were analysed to distinguish friction force on the bracket.

Results: CoF for Teflon was recorded as 0.024. From force-deflection graphs, bending load on 3 mm and 4 mm deflection were observed higher on SS bracket compared to Teflon-coated bracket while no significant difference on 2 mm deflection. Plateau trend was observed in all combinations of archwires-Teflon-coated bracket graph as agreed with NiTi behaviour on frictionless condition, while increment trend was observed for SS bracket due to existence of friction.

Conclusion: The archwire recovered from greater magnitude of deflection released lower force than the one recovered from smaller deflection. Teflon has potential to be used as bracket materials/coating due to frictionless behaviour.

OM05

Mineralisation potential of dental pulp stem cells upon exposure to melt-derived bioactive glass

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Introduction: Bioactive glass (BG) received much attention in dentistry and on-going research is geared towards utilising BG as dental materials specifically for regeneration of hard tissue; recognisable by the ionic dissolution products from BG that promote bone forming cells to lay down mineralised matrix.

Objective: To determine response of dental pulp stem cells (DPSC) upon exposure towards BG-conditioned medium with and without osteogenic inductive agents.

Methodology: Melt-derived BG powders based on SiO_2 -CaO-NaO- P_2O_5 system were synthesised and characterised using X-Ray diffraction, Fourier transform infrared spectroscopy, and particle size analyses. The BG-conditioned medium containing BG powders with particle size less than $38 \mu\text{m}$ at different powder to liquid ratio (1, 2, 4 mg/ml) were prepared with or without osteogenic inductive agents and exposed to DPSC at designated time frames and subjected to MTT, ALP and DNA assays.

Results: DPSC exposed to osteogenic (OM) and non-osteogenic (NM) BG-conditioned medium showed higher cell proliferation which is dose-dependent. DPSC were able to proliferate in NM BG-conditioned medium without

addition of osteogenic inductive agent. DPSC alkaline phosphatase (ALP) activity exposed to BG-conditioned medium showed no significant differences between OM and NM within 14 days incubation period. DPSC upon exposure to BG-conditioned medium with or without osteogenic inductive agent showed higher ALP activity suggesting that BG-conditioned medium could induce osteogenic differentiation of DPSC. Thus, ionic dissolution products released from BG plays an important role in osteogenic cell response and differentiation of DPSC towards osteogenic lineages.

Conclusion: BG-conditioned medium without the addition of osteogenic inductive agents were able to induce DPSC towards osteogenic lineages and lay down mineralised nodule suggesting that the ionic dissolution from the BG induce DPSC towards osteogenic differentiation although at a slower rate compared to DPSC exposed to osteogenic (OM) BG-conditioned medium.

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OM06

Preconditioning of scaffolds facilitate cell attachment to bioactive glass scaffold

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Introduction: Bioactive glass (BG) scaffold hybridised with polymeric materials has received attention as substitute material with continuous research focusing on the regeneration of hard tissue.

Objective: To investigate the scaffold preconditioning period that will facilitate dental pulp stem cells (DPSCs) attachment to BG scaffold and promote cell proliferation.

Methodology: Sol-gel derived bioactive glass scaffolds were fabricated and characterised using the x-ray diffraction (XRD), x-ray fluorescence (XRF), Fourier-transform infrared (FTIR) and particle size analysis (PSA) equipment. The scaffolds were preconditioned in normal culture medium and incubated for 1, 4, 24 and 48 hours to determine the pre-conditioning period that would facilitate cell attachment to the scaffold. The scaffold to liquid ratio was 3 mg/ml and subsequently DPSCs were seeded on the scaffolds and incubated for 48 hours to determine cell adhesion using Alamar blue assay. The DPSCs proliferation seeded on the scaffolds were then continuously monitored at designated time frames.

Results: DPSCs showed better cell attachment to bioactive glass scaffold after 48 hours preconditioning and highest percentage of cell adhesion to the scaffold. Highest cell proliferation percentage was also shown when DPSCs were cultured onto 48 hours preconditioned scaffold throughout the study time frame compared to other preconditioning periods.

Conclusion: Preconditioning of BG scaffold before seeding the cells to the scaffold is important to facilitate cell attachment. The scaffold preconditioning method allows the scaffold surfaces to be more efficient in promoting cell attachment during cell seeding.

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ePOSTERS

EP01

Modification of mechanical properties of PMMA-based Palacos® R via introduction of graphene: A preliminary study

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Introduction: PMMA-based Palacos® R has been conventionally used for craniofacial reconstruction due to its ease of handling. Despite being established material, the mechanical properties of Palacos® R could be further improved. Alternatively, the emergence of graphene could be manipulated to engineer the mechanical properties of Palacos® R.

Objective: To compare the compressive properties of unfilled and graphene filled Palacos® R.

Methodology: The morphology of graphene was initially observed via a field emission scanning electron microscope (FESEM) (Quanta 450 FEG, Fei, USA). Unfilled and graphene filled Palacos® R were prepared by mixing the powder and liquid (Palacos® R, Heraeus Medical GmbH, Germany) at a ratio of 1:2 together with 0.5 and 1.0 wt% of graphene (0544DX, SkySpring Nanomaterials Inc, USA) for 30 seconds. The non-sticky and homogenous dough was filled into a 3D printed mould to produce cylindrical compressive specimens (n=3/compositions) with 12mm and 6mm in diameter and height, respectively. The compressive properties of the hardened specimens were determined using a universal testing machine (Shimadzu AGX-2plus, Shimadzu, Japan) at crosshead speed of 1mm/min. The One-Way ANOVA test was employed to compare the compressive properties of unfilled and graphene filled Palacos® R at significant level of $p < 0.05$.

Results: The compressive strength improved by 48% at 0.5 wt% of graphene loading. Whereas the compressive modulus of the graphene filled Palacos® R enhanced by 72-102% as compared to unfilled Palacos® R though statistically insignificant.

Conclusion: With improved mechanical properties, graphene filled Palacos® R could be proposed as a new potential material for craniofacial reconstruction.

EP02

Acinetobacter nosocomialis surface membrane proteins profiling in search of potential surface biomarker(s) for rapid diagnosis

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Introduction: *Acinetobacter nosocomialis*, a member of *Acinetobacter baumannii* complex group is becoming increasingly of health concern in hospital setup. Most of the routine diagnostic techniques for its identification focused on the culture methods and use of commercial products for their diagnosis which are labour intensive and time consuming.

Objectives: To profile surface membrane protein(s) of *A. nosocomialis* towards identification of potential biomarkers.

Methodology: Surface membrane proteins of four *A. nosocomialis* clinical strains, one *A. baumannii* clinical strain and one *A. baumannii* reference strain (ATCC 19606) were extracted using acidified glycine. Sodium dodecyl sulphate gel electrophoresis (SDS-PAGE) was used to profile the extracted surface membrane proteins expressed at 37°C.

Results: SDS-PAGE analysis showed that protein profiles of *A. nosocomialis* strains were 90% identical to that of the *A. baumannii* clinical strain. A total of 13 protein bands were expressed at 37°C in both *A. baumannii* and *A. nosocomialis* strains. Three of these proteins were unique to *A. nosocomialis*.

Conclusion: These surface structures are often the key determinants that mediate bacterial virulence and thus represent important novel targets of diagnostic biomarkers for differentiating *A. baumannii* from *A. nosocomialis*.

EP03

Antimicrobial activity of Aloe vera extract in irreversible hydrocolloid impression material: An in vitro study

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Introduction: Most dental impressions that are sent to the dental laboratories show the presence of numerous pathogenic microorganisms. Research has shown that the conventional methods of disinfecting dental impression (spraying and immersion) are not effective and cause dimensional inaccuracy of the resultant casts. Efforts have been made to address this problem by incorporating disinfectant agent into alginate. Thus, the impression become auto-disinfected and eliminates the need for disinfection procedure.

Objective: To determine the antimicrobial activity of *Aloe vera* extract mixed with irreversible hydrocolloid impression (alginate) against *Staphylococcus aureus* and *Candida albicans*.

Methodology: Three different specimen groups were prepared i.e. alginate mixed with distilled water, alginate mixed with 0.12% Chlorhexidine and alginate mixed with *Aloe vera* extract. The samples were prepared under sterile condition and placed in different petri dishes that are inoculated with *Staphylococcus aureus* and *Candida albicans*. After incubation in aerobiosis, inhibition of the microbial growth was measured, and the results were interpreted. The data was analysed with SPSS 22.0 by using One-way ANOVA test.

Results: The result showed that *Aloe vera* extract mixed with alginate has significantly inhibited *Staphylococcus aureus* and *Candida albicans*.

Conclusion: Alginate mixed with *Aloe vera* extract has the potential to be the future self-disinfected dental impression material. However, further research is needed to evaluate the antimicrobial effect on other oral microorganisms and also its effect to the physical properties of alginate.

EP04

A narrative review of questionnaires used for the study on the usage and acceptability of Hall technique by paediatric dental specialists

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Introduction: Hall technique has been established as a novel method for managing decayed primary molars without local anaesthesia, caries removal and tooth preparation. Despite good evidence of its effectiveness, the usage of Hall technique among specialists are still noticeably low. Many questionnaire-based studies have been conducted to assess Hall technique's acceptability and usage by the paediatric dental specialists.

Objective: To assess the questionnaires on Hall technique and its acceptability by the specialists.

Methodology: Search was performed using Scopus, PubMed, Google Scholar and ProQuest databases published from 2000 to 2018. The keywords used in the search were 'Hall technique', 'preformed metal crown', and 'questionnaire'. After relevant articles were found, critical appraisals were made to select those that were suitable for narrative review. The selection criteria used were questionnaire-based study on Hall technique, usage and acceptability of Hall technique by the specialists.

Result: Based on the keywords, 205 relevant articles were found and out of those, 6 articles were selected for the narrative review.

Conclusion: After reviewing the questionnaires on the basis of scoring criteria, statistical analysis, result and conclusion, it can be concluded that a questionnaire can be an effective tool to assess the usage and acceptability of Hall technique by paediatric dental specialists. We also found that there were no questions about the treatment charge and parents' acceptability with regards to the treatment charges. Furthermore, there should be more questions which can give the information regarding the Hall technique in special need and medically compromised children.

EP05

Paraoxonase activity to oxidized low density lipoprotein ratio in Type 2 diabetes mellitus Malay patients in Hospital Universiti Sains Malaysia

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Introduction: Paraoxonase (PON) is a high-density lipoprotein associated enzyme and prevents the oxidation of low density lipoprotein (LDL) to oxidized LDL (OxLDL). Oxidative stress leads to the complications of Type 2 diabetes mellitus (T2DM) patients and increased PON activity is suggested to reduce oxidative stress thereby reduce the diabetic complications. The complications of T2DM are strongly associated with patient's diabetic control.

Objective: This study assesses the PON activity to oxLDL ratio of Malay healthy subjects, T2DM patients with good control (of HbA1c) and poor control (of HbA1c).

Methodology: A total of 99 subjects were divided into three groups [healthy subjects, good control T2DM (HbA1c ≤ 6.5%)

and poor control T2DM (HbA1c > 6.5%) (each group, n =33)]. Fasting serum samples were collected and analysed for PON activity and oxLDL to calculate PON/OxLDL. The results were expressed as mean±SD which were analysed by one-way ANOVA. The *p* value <0.05 was considered significant.

Results: The PON activity to oxLDL ratio was significantly higher in healthy subjects compared to poor control HbA1c diabetic group. The good control HbA1c group showed higher PON/OxLDL compared to poor control HbA1c group although statistically not significant.

Conclusion: The study showed the higher PON/OxLDL in the order of healthy subjects > good control HbA1c T2DM group > poor control HbA1c T2DM group. Therefore, it could be speculated that good control of T2DM might preserve PON activity and further reducing oxidative stress, which was associated with T2DM complications. However further studies are needed to confirm this.

EP06

A novel chitosan-based accelerated Portland cement for endodontic treatment: evaluation of physicochemical properties, cytotoxicity and mineralization activity

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Introduction: The disadvantages of mineral trioxide aggregate (MTA) are its delayed setting time and high cost, which necessitates the search for an alternative cheaper and better biocompatible endodontic material. Accelerated Portland cement (APC) has favorable physicochemical and biological properties. Chitosan (CT) also has been used in numerous medical applications due to its various biological properties. Thus, in the present study a new endodontic material synthesized from APC in combination with CT was developed.

Objectives: This study aimed to develop chitosan-based accelerated Portland cement (APC-CT), and to evaluate its physicochemical, mechanical and cellular properties.

Methodology: APC-CT was prepared with different CT concentrations. Setting times, compressive strength, pH, and solubility were examined. Cell apoptosis and attachment of stem cells from human exfoliated deciduous teeth (SHED) on APC-CT were assessed and mineralization activity was tested using Alizarin and Von Kossa staining.

Results: The results were comparable or better than those reported by other studies for MTA. The setting time, compressive strength, pH, and solubility obtained ranged between 40-49 min, 57-39 MPa, 10.87-11.04, and 3.23-2.44%, respectively. No apoptotic effect was detected when treated with the material extracts, with early and late apoptosis percentages of <1.77% and <2.9%, respectively. The SEM image showed flattened cells distributed across and adhered to the material surface. Alizarin red and Von Kossa staining indicated increased mineralization activity with higher CT concentrations.

Conclusion: APC-CT demonstrated enhanced physicochemical properties, biocompatibility, and mineralization activity which shows promise as a potential alternative material to conventional materials in endodontic treatments.

EP07

Biological evaluation of conventional and nanohydroxyapatite-silica glass ionomer cement on dental pulp stem cells: a comparative study

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Introduction: An experimental nanohydroxyapatite-silica-glass ionomer cement (HA-Silica-GIC) was developed to maximize the beneficial properties of conventional GIC (cGIC). However, there is limited information on the biological properties of HA-Silica-GIC.

Objective: To evaluate and compare the cytotoxicity, cell attachment properties and odontogenic differentiation potential of cGIC and nanoHA-Silica-GIC on dental pulp stem cells (DPSCs).

Methodology: Material extracts of nanoHA-Silica-GIC and cGIC were prepared and applied to DPSCs. After 72 hours, the cell viability was determined using MTT assay. The cell attachment properties of DPSCs was examined under scanning electron microscope (SEM) after 24 and 72 hours. The expression of selected odontogenic genes was evaluated using real time RT-PCR on day 1, 7, 10, 14 and 21. Kruskal-Wallis and one-way ANOVA tests were used to analyze the data for MTT assay and real time RT-PCR respectively ($p < 0.05$). SEM images of cell attachment properties are also described.

Results: NanoHA-Silica-GIC and cGIC was shown to be slight to non-cytotoxic at all concentrations, except at 200 mg/ml. NanoHA-Silica-GIC demonstrated better cell viability values than cGIC at all concentrations except at 6.25 mg/ml and 12.5 mg/ml. Nevertheless, the results were not statistically significant ($p > 0.05$). SEM examination revealed the increasing numbers of DPSCs attached to both groups with prominent filopodia, especially after 72 hours. The expression of *DSPP*, *DMP1*, *OCN*, *ALP* and *COL1A1* were up-regulated in DPSCs treated with HA-Silica-GIC in real time RT-PCR.

Conclusions: NanoHA-Silica-GIC exhibited good biocompatibility which is comparable to cGIC, favoured the attachment of DPSCs and induced the odontogenic differentiation of DPSCs.

EP08

The effect of *Centella asiatica* extract against lipopolysaccharide (LPS)-induced learning and memory impairment in rats

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Introduction: *Centella asiatica* (CA) has been reported to have antioxidant, anti-inflammatory and memory enhancing properties. However, the neuroprotective effect of CA extract on spatial learning and memory in Alzheimer diseases rat's model is still uncertain.

Objective: To determine the effect of CA extracts on the learning and memory behaviour in lipopolysaccharide (LPS)-induced neuroinflammation rat model.

Methodology: Twenty-four male Sprague Dawley rats were divided into 4 groups consisting of saline control (C) n=6, LPS

alone (LPS) n=6, LPS treated with CA extract (LPS+CA) n=6, CA alone (CA) n=6. LPS (5mg/kg) was injected once at day 0. The CA extract was administered orally (200 mg/kg) for 14 days through oral gavage. Then, the rats were measured for their spatial learning and memory behaviour by Morris Water Maze (MWM) test for 6 days.

Results: In MWM test, the LPS group took the longest time to locate the hidden platform when compared to the LPS+CA group starting from day 3 until day 5 of training trial days ($p < 0.05$). During the probe test, the LPS group was found to crossover the target platform less ($1.90 \pm 0.52s$) compared to the LPS+ CA group ($2.33 \pm 0.42s$) ($p < 0.05$).

Conclusion: Learning and memory behaviour in LPS group indicates that their cognitive functions were impaired due to LPS injection. Treatment with CA extract orally for 14 days shows an attenuation effect on the learning and memory impairment due to LPS induction.

EP09

Effect of incorporation of nano-hydroxyapatite-silica into conventional glass ionomer cement

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Introduction: Glass ionomer cements (GICs) are used in dentistry due to their self-adhesive, anti-caries and good biocompatibility properties.

Objective: To compare the conventional glass ionomer cement (cGIC) and nano-hydroxyapatite-silica (nano-HA-Si) incorporated GIC on surface roughness, colour stability, sol-sorption and fluoride release property.

Methodology: Nano-hydroxyapatite-silica was synthesized using the one-pot sol-gel technique. It was characterized using Fourier transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), scanning electron microscope (SEM) and transmission electron microscope (TEM). GIC specimens were fabricated according to the manufacturer's instructions, with the addition of 10% of nano-HA-Si by weight. Surface roughness, colour stability, sol-sorption and fluoride release of the cGIC and nano-HA-Si-GIC were evaluated. The results were analysed using repeated measure ANOVA and two-tailed *t*-test.

Results: FTIR and XRD analysis confirmed the formation of hydroxyapatite-silica nano-particles. SEM and TEM images showed that all hydroxyapatite crystals were elongated and covered by smaller silica particles. Nano-HA-Si-GIC reported noticeable slight change in color as compared to cGIC. Nano-HA-Si-GIC was found to have a lower surface roughness value ($0.13 \pm 0.01 \mu m$) as compared to cGIC ($0.16 \pm 0.03 \mu m$). Sol-sorption value of nano-HA-Si-GIC was increased compared to cGIC. Nano-HA-Si-GIC showed a significant increase in fluoride ion releasing property on day 1. Additionally, it was found to have a better and sustained fluoride release over a period of 28 days.

Conclusions: Addition of nano HA-silica to cGIC significantly enhanced the physical and chemical properties of the material. Hence, it can be suggested as a potential future dental restorative material in dentistry.

EP10**Perception of discharge planning implementation among nurses in critical care area at Hospital USM**

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Introduction: Discharge planning is a development of personalized plan for each patient that aimed to reduce length of stay in the hospital and improve the outcome. Past studies have shown that defects in discharge planning are caused by poor communication, lack of assessment and planning, short notice for discharge and inadequate assessment of needs to the vulnerable individuals.

Objectives: To identify the perception of discharge planning implementation among nurses in critical care area at Hospital USM.

Methodology: A cross sectional study was conducted on 100 nurses from the critical care area and was selected through convenient sampling method from January to April 2018. Perception of Discharge Planning Scale (PDPS) was used to collect the data which were then analysed by the SPSS 22.0 software.

Result: In total, 33.0% of the respondent agreed that discharge planning was appropriate in critical care area while 50.0% of the respondent agreed that discharge planning was not a priority in critical care area and 13.0% of the respondent had lack of understanding with regards to discharge planning. There was no significant association ($p=0.13$) between working experience and perception towards discharge planning among nurses in the critical area. However, there was a significant association ($p=0.001$) between critical area nurses' perception towards discharge planning and outcome of discharge planning in critical area.

Conclusion: It is recommended that courses or workshop of discharge planning should be held to expose nurses with more knowledge of discharge planning.

EP11**The effect of educational intervention on knowledge regarding immunization among parents attending Hospital Raja Perempuan Zainab II (HRPZ II), Kelantan**

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Introduction: Immunization has been proven to control and eradicate serious infectious diseases in children. Immunization status among children can be affected by parental knowledge.

Objective: To evaluate the impact of educational intervention as well as predictors influencing knowledge regarding immunization among parents.

Methodology: This was an intervention study conducted from January to August 2017. The inclusion criteria were all parents with children less than 12 years old receiving treatment at HRPZ II, Kelantan. Subjects were recruited through a convenience sampling at pharmacy outpatient counter when they came to refill their prescriptions. They were invited to watch an educational animated movie which was adopted from previous literature. They were required to complete a self-administered questionnaire before and after intervention.

Results: A total of 67 parents were recruited in our study. Most of them were Malay (86.6%, n=58) mothers (52.2%, n=35) with a mean age of 36.2 (SD 6.66) years old. The number of parents who could correctly answered all 10 items significantly increased following educational intervention ($p<0.05$). There was a significant improvement in mean knowledge scores between pre- and post-intervention [5.84(SD 2.26) vs 8.48(SD 1.50), 95%

CI (-3.22, -2.06), $p<0.001$]. Four (4) variables were significant in the final model that explained 48.5% of the variance for baseline knowledge scores; gender, number of pre-school children, education level and exposure score ($p<0.05$).

Conclusion: Educational intervention used in this study was effective in increasing parental knowledge on childhood immunization. Further studies are recommended to identify other predictors influencing parental knowledge regarding immunization.

EP12**Rapid eye movement (REM) sleep deprivation causes endothelial dysfunction in rat model**

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Introduction: Endothelial dysfunction is an early sign of cardiovascular disease. It is manifested by alteration in endothelial function and morphology. To date, there is no study has looked at the association between rapid eye movement (REM) sleep deprivation and endothelial dysfunction.

Objectives: To evaluate the effects of REM sleep deprivation on vascular contractility, vascular morphology and levels of endothelial nitric oxide synthase (eNOS) protein expression.

Methodology: Twenty-four male Sprague-Dawley (SD) rats were equally divided into 3 groups: free-moving control rats (FMC), 72-h REM sleep-deprived rats (REMsd) and tank control rats (TC). Rats were deprived of REM sleep for 72 hours using the inverted flowerpot technique. Thoracic descending aortas were subjected to *in vitro* functional myograph study and morphology assessment using hematoxylin and eosin (H&E) staining and scanning electron microscope (SEM). Levels of eNOS protein expression were measured in femoral arteries by Western blotting.

Results: An impairment of endothelium-dependent relaxation with presence of vasomotion, and low levels of eNOS protein expression were observed in REMsd rats when compared to other groups. All groups showed normal endothelium in H&E staining, but endothelial damage was observed in REMsd rat using SEM.

Conclusion: REM sleep deprivation is associated with abnormal endothelial function and morphology. Decreased eNOS protein expression by the endothelial cells leads to reduce nitric oxide bioavailability, which is an endogenous vasorelaxation factor. Thus, REM sleep deprivation causes endothelial dysfunction in rats.

EP13**Evaluation of artefact in the quality of craniofacial anatomical computed tomography scan (CT) from different types of orthodontic bracket**

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Introduction: Metal artefact is the most common type of artefact in computer tomography (CT) imaging which can affect the diagnostic image quality.

Objective: To evaluate the artefact intensity from different types of orthodontic brackets (stainless steel, titanium, monocrystalline, ceramic) in craniofacial CT scan.

Methodology: This is a prospective in-vitro cross-sectional study. Four types of orthodontic brackets were bonded to the tooth surfaces (from right second premolar to right central incisor for both arches) on a human cadaveric skull consecutively. All scans were done by a single operator using same CT machine (TOSHIBA CGGT-032A) following a standard scanning protocol (kvp-120, exposure time-500, x-ray tube-200, slice thickness 1mm). Artefact intensity for images were measured by calculating their maximum, minimum & mean grey values by using ImageJ software (ImageJ version 1.50i). One-way ANOVA post hoc analysis was used for the data analysis.

Result: From this study, the artefact intensity for stainless steel bracket revealed a higher mean value compared to the other three types of the brackets. The mean values of the artefact intensities are: stainless steel bracket (1.64), titanium (1.56), monocrystalline (1.49) and ceramic (1.47). A significant difference ($p=0.007$) of artefact intensity between stainless-steel and ceramic bracket was observed.

Conclusion: A difference in artefact intensities were observed depending on the types of the brackets. Stainless-steel bracket showed more artefact compared to other type of brackets.

EP14

Knowledge, awareness and attitude of adult basic life support among final year students in School of Health Sciences, Universiti Sains Malaysia

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Introduction: Cardiac arrest is a common emergency and has direct influences on the patient's mortality and morbidity. Cardiopulmonary resuscitation and basic life support (BLS) play important roles in early restoring the function of heart circulation.

Objectives: To assess the knowledge, awareness and attitude level of adult BLS among final year students in School of Health Sciences, Universiti Sains Malaysia (USM). This study also assessed the associated factors of the knowledge, awareness and attitude level.

Methodology: A cross sectional study was conducted on 182 final year students of School of Health Sciences, USM through simple random sampling. This study used a self-administered questionnaire which consisted of four parts: demographic information, knowledge, awareness and attitude towards BLS. The data were analysed using SPSS 24.0 software.

Results: In this study, 80.2% of the respondents presented poor knowledge of BLS, 75.8% had poor awareness, and only 56.0% presented good attitude towards BLS. The knowledge level was significantly associated with gender ($p=0.022$), and experience ($p=0.009$) with BLS, while there was no significant association between awareness level towards gender ($p=0.525$) and experience ($p=0.716$) with BLS. The attitude level had significant associations with type of courses ($p=0.014$) and experience in BLS ($p=0.000$).

Conclusion: The findings indicate that knowledge and awareness of BLS among students were still poor. BLS course teaches essential life-saving skills and it is recommended to be learned by all undergraduate students.

EP15

Brain glutathione level in rats exposed to chronic stress on omega-3 fatty acid and Tualang honey supplementation

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Introduction: Oxidative stress is damage resulting from disequilibrium between oxidants and antioxidants. During stress, the level of GSH, GSSG and GSH: GSSG ratio fluctuates which can reflect the redox thiol status. Omega-3 fatty acid (DHA) and Tualang honey (TH) have been recognized for having antioxidant properties that can control oxidative stress. However, the brain glutathione level is yet to be determined following supplementation with DHA or TH in the chronically stress exposed rat.

Objective: To determine the brain glutathione level following pretreatment with DHA, TH, and their combinations.

Methodology: Male Sprague-Dawley rats were randomly divided into five groups: Control, Stress, DHA treated stress, TH treated stress, and Combined (DHA+TH) treated stress group. The animals were pretreated orally with water, DHA (0.9 g/kg body weight), TH (2.0 g/kg body weight) or both, two times/day at 6-hour intervals. Restraint stress and forced swimming test were conducted during the 6-hour intervals. The rats' bodyweights were taken initially, weekly and at the end of experiment.

Results: Chronic stress caused elevation of GSSG in stress group compared to other groups although the differences were insignificant ($p>0.05$). Pretreatment with DHA significantly ($p<0.05$) increased the GSH level compared to the control, stress and TH treated stress group. GSH/GSSG ratio was significantly ($p<0.05$) increased in DHA treated stress group compared to the stress and TH treated stress group.

Conclusion: DHA supplementation may have protective effect against oxidative stress. However, TH supplementation and its concomitant use with DHA should be considered for better oxidative stress control.

EP16

Oxidised low density lipoprotein (oxLDL)-induced intracellular calcium alone is not sufficient to cause human macrophages cell death

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Introduction: OxLDL has been known to be toxic to various types of cells but its mechanism of action is not fully understood. Previous work in our laboratory has showed the ability of oxLDL to cause calcium influx and increase intracellular calcium. Calcium ionophore A23187 (BrA) has been widely used to study calcium dynamics. It is highly selective and enhances the ability of calcium to cross the cell membrane and increases cytoplasmic calcium.

Objective: To examine the effects of oxLDL as compared to calcium ionophore in inducing intracellular calcium, reactive oxygen species (ROS) and cell death in human macrophages.

Methodology: Human macrophages were treated with LC50 concentration of oxLDL and 5 μ M BrA. After 1 hour and 3 hours of incubation, intracellular calcium and ROS levels were measured by flow cytometer using Fluo 3AM and DHE fluoroprobes respectively. Cell viability was determined using propidium iodide (PI) via flow cytometry assay after 24 hours.

Results: Huge increase in intracellular calcium was seen after an hour incubation with 5 μ M BrA compared to oxLDL. This lead to a large increase in ROS (superoxide) production measured after 3 hours followed by cell viability loss for both

cells incubated with 5 μ M BrA and oxLDL. Both oxLDL and BrA induced intracellular calcium levels which disrupt Ca²⁺ homeostasis and resulted in increased oxidative stress but at different magnitudes.

Conclusion: OxLDL is causing elevation in intracellular calcium levels but the increase is insufficient to cause cell death.

EP17

The flexural properties of flowable composite from rice husk

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Introduction: Flowable composite is a type of tooth-coloured restorative material with a reduced viscosity and better handling ability. Generally, it is composed of filler, monomer and coupling agent. The most commonly used filler namely silica is usually synthesized from expensive and toxic chemical precursors. As an alternative silica source, rice husk provides renewable and sustainable green silica to be used as filler for flowable composite.

Objective: To fabricate flowable composites from rice husk and study the effect of Bis-GMA dilution on their flexural properties.

Methodology: Flowable composites were fabricated by mixing nanohybrid silica from rice husk with Bis-GMA:TEGDMA monomer at three different ratios, 50:50, 45:55 and 40:60. Ten bar shaped samples (25 x 2 x 2 mm) for each group were prepared in split stainless-steel mould, and light cured. Prior to flexural test, all the composites were immersed in distilled water at 37°C for 24 hours. The flexural strength and modulus were measured using universal testing machine (UTM) (AGX-Plus Shimadzu, Japan). The data were analysed by one-way ANOVA followed by Scheffe post hoc test.

Results: All the flowable composites had passed the minimum flexural strength value complied to ISO and their flexural modulus were in the acceptable range. No significant difference was detected on their flexural strength [$F(2,27) = 1.136$; $p > 0.05$], while there was significant difference on their flexural modulus [$F(2,27) = 28.742$; $p < 0.05$].

Conclusion: Flowable composites were successfully fabricated from rice husk. The flowable composites with different dilution of Bis-GMA had no significant effect on their flexural strength but had significant effect on their flexural modulus.

EP18

Preliminary study on the comparison of N-Carboxymethyllysine (CML) level between Type 2 diabetes mellitus patients and healthy subjects

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Introduction: Advanced glycation end products (AGEs) involved in the pathogenesis of all diabetic complications. N-Carboxymethyllysine (CML) is one of the biomarkers of

AGEs. Assessment of CML may help to identify patients at risk of long-term complications.

Objective: To compare the level of CML in Type 2 diabetes mellitus (T2DM) patients and healthy participants.

Methods: A case-control study was conducted at Diabetic Clinic, Hospital Universiti Sains Malaysia, Kelantan. Groups of T2DM aged between 18 to 65 years old were randomly selected from those who were not on dialysis, having severe anemia or poorly controlled hypertension. Healthy participants were those with no medical illness. The exclusion criteria were smoker, alcohol consumer, pregnancy, breast feeding, on antioxidants and received blood transfusion less than one year. Random venous blood for CML was analyzed using Enzyme-linked Immunosorbent Assay (ELISA) and comparison between the two groups was made using Mann-Whitney test.

Results: A total of 39 T2DM [age mean (SD) = 56 (6.17) years old] patients and 40 healthy participants [age mean (SD) = 40 (13.23) years old] were included. There was a significant difference between the level of CML in T2DM patients and healthy participants ($p < 0.001$). The median (IqR) were 479.85 (707.81) and 109.69 (82.02) ng/ml respectively.

Conclusion: The levels of CML among T2DM patients were significantly higher than healthy participants. Thus, CML could be used as a marker for assessment of diabetic complications, however, further studies are needed to confirm it.

EP19

Oral health knowledge and practices of antenatal mothers in Hospital Universiti Sains Malaysia

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Introduction: Current evidence highlights the importance of oral health during pregnancy.

Objective: To assess knowledge, self-perceived oral hygiene status and practices of pregnant mothers in Hospital Universiti Sains Malaysia (USM), Kelantan.

Methodology: This was a cross-sectional survey of 76 pregnant mothers attending Obstetrics & Gynaecology specialist clinic in Hospital USM. The questionnaires contain items relating to self-perceived dental problems, dental visits, barriers to seeking dental care, oral hygiene habits, perceptions of oral health, knowledge about oral health and access to dental care.

Results: In term of oral health knowledge, more than half of the respondents were aware that they had dental problems during pregnancy including cavitated tooth (34.2%) and sensitive tooth (23.7%). However, they have limited knowledge regarding association of mother's poor oral health with low birth weight baby, transmission of decay bacteria to baby's mouth and baby's recommended first dental visit. Majority (98.7%) agreed that their oral health was important as part of general health. Regarding practice, only 35.3% of respondents visited dentist in the last six months. Time constraints (60.5%) and safety concerns regarding dental treatment during pregnancy (30.3%) were the main barriers to seek dental care. Majority (90%) did practise at least twice daily tooth brushing with adult fluoridated toothpaste, while some using daily mouthwash (36.8%) and floss (11.8%).

Conclusions: There is still a limitation of knowledge regarding oral health care among pregnant mothers in Hospital USM. These findings suggest that the need for more vigorous preventive strategies involving dentist and antenatal care providers to improve maternal oral health in Hospital USM.

EP20

Pulse wave analysis combined with pharmacological challenges in the assessment of global endothelial function in patients with hypercholesterolaemia

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Introduction: Pulse wave analysis (PWA) combined with pharmacological challenges has emerged as a potential tool to assess endothelial function. Global endothelial function has been described as the ratio of augmentation index (Alx) changes in response to salbutamol relative to glyceryl trinitrate (GTN). However, data on its clinical use is still limited.

Objective: To compare Alx changes in response to salbutamol and GTN in patients with hypercholesterolaemia and controls using PWA.

Methodology: Ninety-two subjects [46 hypercholesterolaemics, 46 controls] were studied. Baseline Alx was assessed followed by the administration of sublingual GTN, an endothelium independent vasodilator. The maximum Alx change post-GTN was recorded. 30 minutes washout period was allowed before the subsequent administration of inhaled salbutamol, an endothelium dependent vasodilator. The maximum Alx change post-salbutamol was recorded.

Results: Baseline Alx in hypercholesterolaemics and controls were $27.28\% \pm 7.23$ and $26.78\% \pm 8.52$ ($p=0.76$) respectively. Alx change in response to salbutamol in hypercholesterolaemics and controls were $2.97\% \pm 3.95$ and $6.65\% \pm 3.80$ ($p<0.001$) respectively. Alx change in response to GTN in hypercholesterolaemics and controls were $13.41\% \pm 4.57$ and $15.88\% \pm 4.78$ ($p=0.01$) respectively. The ratio of Alx changes in response to salbutamol relative to GTN or global endothelial function was significantly reduced in hypercholesterolaemics compared to controls; 0.21 ± 0.30 and 0.44 ± 0.24 ($p<0.001$) respectively.

Conclusion: Global endothelial function assessed by the ratio of Alx changes relative to GTN was significantly reduced in patients with hypercholesterolaemia. This method may provide a simple and non-invasive way in assessing global endothelial function in hypercholesterolaemia.

EP21

Chemical health risk assessment in teaching laboratories at local university

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Introduction: Chemistry and research with chemicals in university laboratories have been going on for centuries. Students and staffs who are specifically involve with the research and management of chemicals in the laboratories will be exposed to the risk of hazardous chemicals. According to Occupational Safety and Health Act 1994, it is general responsibility of the employer to protect and safeguards the students and staffs from chemicals health risk during their work and activities involving chemicals in the laboratory.

Objective: To assess the chemical health risk on the chemical usage in the teaching laboratory at one of the local universities in Kelantan.

Methodology: Chemical Health Risk Assessment (CHRA) was conducted by doing site visit, observation of the chemical handling practices in the laboratories, interviewing with the students and staffs and also reviewing lab manuals and other related documents or records. In addition, the sufficiency of the

current control measures in the teaching laboratory was also assessed.

Results: The qualitative observation of CHRA had identified that the teaching laboratories in this local university have significant risk and not adequately controlled.

Conclusions: It means that chemicals used in the teaching laboratory may adversely affect the health of the laboratory operators since there were no adequate control measures in the teaching laboratory. Therefore, the risk control or action should be taken in the teaching laboratory in order to reduce the chemical health risk to the laboratory operator and to improve safety practice in that laboratory.

EP22

Coping strategies among family members of children with chronic disease in Hospital Universiti Sains Malaysia

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Introduction: Coping strategy divided into emotion-focused and solution-focused is a conscious effort to solve a personal or interpersonal problem that help in overcoming, minimizing, tolerating stress or conflict. Chronic illness can be influenced by genetic condition or environmental factors or both and it could last from three months to a lifetime. This condition causes both patient and relatives stress.

Objectives: To assess the coping strategies among family members of children with chronic diseases at Hospital Universiti Sains Malaysia.

Methodology: This cross-sectional study was conducted on 58 family members of chronically ill children with acute lymphoblastic leukaemia and epilepsy through convenience sampling. The data were collected by means of a validated and reliable questionnaire, consisting of two sections: socio-demographic and managing children with chronic condition. Collected data sets were analysed with SPSS 24.0 software.

Results: In total, 39.7 % (n=23) had reported experiencing difficulty; stating parenting stress and burden while providing care for their children. However, there is no statistically significant difference ($p= 0.147$) towards level of family members coping between emotion focused and problem focused strategies. While, 46.7% (n=14) family members of patients with acute lymphoblastic reported having more difficulty in caring.

Conclusion: The findings indicated that 63.3% family members found it easy to cope with difficulties. However, more intervention such as health education and awareness regarding family function and quality of life in caring their children's illness should be implemented by health care providers including the nursing students.

EP23

The evaluation of new GIC-nanozirconia-hydroxyapatite-silica: TEM characterization and compressive strength

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Introduction: Conventional glass ionomer cement (cGIC) has been used for decades as dental restorative materials especially due to their good bonding to tooth structure and fluoride release. However, their weakness in mechanical properties has lessened their wide range of application. A new powder formulation was developed aiming to solve the issue by incorporating nanozirconia-hydroxyapatite-silica (nanoZrO₂-HA-SiO₂) compound into the cGIC powder.

Objective: To evaluate the morphology of the nanoZrO₂-HA-

SiO₂ powder and compressive strength of new GIC-nanoZrO₂-HA-SiO₂ composite.

Methodology: Nanozirconia-hydroxyapatite-silica compound was synthesized using one pot method before incorporated into conventional GIC Fuji IX powder at different percentages from 1-15% using spatulation method. Ten cylindrical shaped samples were prepared for each percentage of addition and the compressive strength was evaluated after 24 hours using Universal Material Testing Machine (Shimadzu, Japan) with crosshead speed of 1 mm/min. One-way ANOVA was used to compare the compressive strength of the new composite with the cGIC.

Results: TEM image showed that the new composite consists of homogenously mixture of elongated hydroxyapatites and spherical zirconia and silica particles. The addition of 5% nanoZrO₂-HA-SiO₂ compound into cGIC has resulted in highest and significant compressive strength value which is 174.47 MPa (±13.65) compared to cGIC Fuji IX which is 148.72 MPa (±9.85) at $p < 0.05$.

Conclusion: Within the limitation of this study, the new GIC-nanoZrO₂-HA-SiO₂ composite showed homogenous mixture of particles and better performance in compressive strength. This new composite has the potential to be commercialized which widen the option of restorative materials in dentistry.

EP24

Effects of *Etilingera elatior* on blood glucose and kidney function of diabetic rats

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Introduction: Diabetes mellitus is a global public health problem. Uncontrolled diabetes leads to the development of various complications such as kidney failure, which is a comorbidity factor in diabetic patient. Traditionally, the flower of *Etilingera elatior* (bunga kantan) has been used as supplement to lower the blood sugar in diabetic patients.

Objective: To evaluate the antidiabetic properties of *E. elatior* aqueous extract (AEE) and its protective effects against kidney damage in streptozotocin (STZ)-induced diabetic rats.

Methodology: AEE was prepared by sonication method. This study was conducted for 12 weeks and rats were divided into 4 groups; consisting of normal, untreated diabetic, AEE-treated diabetic and metformin-treated diabetic groups. Diabetes was induced intraperitoneally with 55 mg/kg of STZ. Blood glucose level was measured every 2 weeks. Renal function test was evaluated at the end of the study. The kidney tissues were evaluated by hematoxylin and eosin stained sections and scanning electron microscopy (SEM) analysis.

Results: AEE significantly reduced the blood glucose level ($p < 0.0001$) and blood urea nitrogen ($p < 0.001$) when compare with untreated diabetic rats. Histological analysis of kidney tissues showed some improvements in both glomerulus and kidney tubules. Results were also supported by SEM image analysis which demonstrated a normal arrangement of podocyte and its foot process.

Conclusion: The findings shows that *E. elatior* has anti-hyperglycaemic activity and may be used therapeutically in minimizing the complications associated with diabetes.

EP25

Exclusive breastfeeding intention and actual exclusive breastfeeding practices among post elective-caesarean delivery women in Kelantan

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Introduction: A woman's intention to breastfeed is one of the predictors of breastfeeding initiation and duration.

Objective: To determine exclusive breastfeeding (EBF) intention and actual EBF practices among post-elective cesarean delivery women in Kelantan.

Methodology: A total of 171 women admitted for elective cesarean delivery at two tertiary hospitals in Kelantan had participated in this prospective cohort study. A Malay version of Infant Feeding Intention (IFI) scale was administered one day before the surgery, and follow-up phone calls were made at 1, 3 and 6-month post-natal to determine actual EBF practices.

Results: Before delivery, 86.5%, 82.5% and 77.2% of the women agreed or strongly agreed to practice EBF for 1, 3 and 6-month respectively. After delivery, the actual EBF practices were reduced to 80.1%, 59.6% and 42.0% at 1, 3 and 6-month respectively. No significant association was found between EBF intention and actual EBF practices at 1-month and 3-month post-natal. However, a significant association was found between EBF intention and practices at 6-month post-natal; women who agreed or strongly agreed to practice EBF were about 2 times more likely to actually exclusively breastfeed their infants than those who were not sure, disagreed or strongly disagreed to breastfeed (OR 2.19, 95% CI: 1.01-4.76).

Conclusions: The number of post-elective cesarean delivery women who actually exclusively breastfed their infants were lower than the number who had the intention prior to delivery, and the practices reduced as the child grew older. Prenatal EBF intention at 6-month was associated with actual post-natal EBF practices at that period.

EP26

Development of holistic cardiac rehabilitation module for Muslim patients using the modified Delphi technique

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Introduction: The holistic cardiac rehabilitation (HCR) module has been built as a special program for Muslim patients suffering from coronary heart disease (CHD). This module is designed to reduce the anxiety and depression experienced by the patients. Reduction of anxiety and depression not only reduce the risk of recurring heart attacks, also to improve the quality of life among the patients.

Objective: To develop an HCR module using the modified Delphi technique.

Methodology: A modified Delphi technique is a consensus method for development of HCR module. This study involved 16 expert panels in two round of modified Delphi technique. The consensus for this study is defined by a 75% of expert

panels response of strongly agree or agree (4= strongly agree, 3= agree, 2= disagree, 1= strongly disagree) and a minimum mean score of 3 on the Likert scale for each component in round two of Delphi technique.

Result: The result for second round of Delphi technique shows the mean score of 3.9 (98%) for health education (CHD), 3.6 (90%) for health education (anxiety and depression), 3.8 (95%) for health education (diet), 3.8 (95%) for spiritual and 3.6 (90%) for physical rehabilitation.

Conclusion: The results show that the expert panels have given their consensus to all the content inside HCR module. Delphi technique was a good tool to gather ideas, suggestions and improvements more easily and transparently from the expert panels. However, the expert panels sometimes take a longer time to provide their feedback.

EP27

Investigation of the bystander effects in DBTRG-05MG human glioblastoma cells irradiated under 6 MV photon beam

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Introduction: Biological effects of ionizing radiation are primarily due to direct targeting of the cells' nucleus leading to DNA damage and cells death. Radiation induced bystander effect (RIBE) occurs when non-targeted cells also showing radiation response through signals transmitted from irradiated cells to non-irradiated cells.

Objective: To investigate the bystander effects in DBTRG-05MG human glioblastoma cells irradiated with 6 MV photon beam.

Methodology: The cells were irradiated with radiation dose of 0, 0.5, 1, 2 and 4 Gy using 6 MV photon beam in single exposure. The irradiated cells' culture media were transferred to non-irradiated bystander cells 1-hour post-irradiation. Cells viability was measured using PrestoBlue assay after 24 and 48 hours. Meanwhile, clonogenic assay were performed to determine the cell survivals of the bystander cells.

Results: The percentage of cell viability in all bystander cells groups compared to the controls show no significant differences ($p > 0.05$) for both 24 and 48 hours incubation time. The cell viability results show no radiation dose dependence for all bystander cells groups. However, the cells survivals are found to decrease around 37% for 4 Gy which suggest the presence of RIBE responses.

Conclusion: The cell survival results demonstrated the possible RIBE responses in bystander cells which received medium transfer from irradiated cells. In contrast to the cell viability measurement that shows no significant differences between irradiated and bystander cells. Our current data conclude that RIBE is important factors that need to be considered in radiation therapy.

EP28

Proteinuria among hypertensive pregnant mothers in Hospital Universiti Sains Malaysia (Hospital USM): A pilot study

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Introduction: Proteinuria is one of the cardinal features of preeclampsia (PE) which contributes to maternal and fetal morbidity and mortality. It is important to know the level and type of proteinuria as they may provide information regarding severity of kidney damage.

Objective: To determine the level and type of proteinuria among hypertensive pregnant mothers in Hospital USM and its association with fetal outcomes.

Methodology: A cross-sectional study of hypertensive mothers in Hospital USM was conducted for a 6-month period. Twenty-four-hour urine samples were collected, and urinary proteins were measured using turbidimetric method on an Olympus AU680 chemistry analyzer. The analyses for proteinuria typing were carried out using Hydragel Urine Profile on an automated Sebia analyzer.

Results: A total of 30 patients were identified. Their mean age was 31 ± 1 years. The mean value of 24-hour urine protein was 0.7 ± 0.83 g/24H. Twenty-one (70%) patients had selective glomerular type, six (20%) patients had non-selective type and three (10%) patients had mixed type proteinuria. From 20 (67%) patients whom developed PE, fetal outcomes were prematurity (27%), intrauterine growth restriction (13%) and intrauterine death (7%). There was no association between the level and type of proteinuria with fetal outcomes ($p > 0.05$).

Conclusion: Proteinuria level among hypertensive pregnant mothers was moderately high. Although a majority were of the selective glomerular type, there were no association with the fetal outcome. A larger study is needed to look at the association of the level and type of proteinuria of proteinuria with severity of PE and fetal outcomes.

EP29

A preliminary report on the association of rs900865 in rheumatoid arthritis and schizophrenia

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Introduction: Rheumatoid arthritis (RA) is a chronic inflammatory polyarthritis disease involving synovial tissue of the joints. Schizophrenia (SZ) is a psychiatric disorder stamped by impairment in the perception and expression of reality. Several studies on SZ have been reported indicating negative association with RA. However, a strong evidence to show this relationship is still vague, especially in the genetic field.

Objective: To investigate the association of rs900865 in both rheumatoid arthritis and schizophrenia.

Methodology: An associated candidate single nucleotide polymorphism (SNP) (rs900865) was selected from an

exploitation of genome wide association studies (GWAS) from two databases; Genetic Association Information Network (GAIN) SZ dataset and the Wellcome Trust Case Control Consortium (WTCCC) RA dataset. We replicated a case-control study that was done to both RA and SZ patients in Malaysia. A total of 159 blood samples (53 samples for each RA, SZ and control group) were extracted and genotyped using the Taqman SNP genotyping. The results were validated by sequencing and analyzed using the SHEsis software.

Results: A non-significant association for the susceptibility of *rs900865* was observed for both RA (OR=1.129, $p=0.67$) and SZ (OR=1.32, $p=0.325$).

Conclusion: Further investigation is needed to study the relationship between *rs900865* that map between INSC gene (involved in retinal development) and SOX6 gene (that plays a role in a number of cell developmental processes and is expressed in both the immune and central nervous systems), as previous studies have shown association between both diseases.

EP30

The effects of Tualang honey on the inflammatory response in rat cerebral cortex following kainic acid administration

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Introduction: Kainic acid (KA) is commonly used experimentally to induce excitotoxicity. Systemic KA administration enhanced the production of inflammatory mediators [e.g. interleukin 1 β (IL-1 β), tumor necrosis factor alpha (TNF α), cyclooxygenase-2 (COX-2)] and concomitantly caused the production of prostaglandins.

Objective: This study investigated the effects of Malaysian Tualang Honey (TH) on the inflammatory response in rat cerebral cortex following KA administration.

Methodology: Male Sprague-Dawley rats were divided into four groups as Control, KA-treated, TH + KA-treated, and Topiramate (TPM-antiepileptic agent) + KA-treated groups (n=6/group). Control and KA-treated groups were pre-treated orally with drinking water, whereas TH + KA-treated and TPM + KA-treated groups pre-treated orally with TH (1.0 g/kg BW) and TPM (40 mg/kg BW), respectively, once every 12 h for five times. KA (15 mg/kg BW) was injected subcutaneously 30 min after the last treatment to all groups except the control group (normal saline). Animals were then sacrificed at 2, 24 or 48 h after KA administration. Pro-inflammatory cytokines (IL-1 β , TNF- α), COX-2 and prostaglandin E2 (PGE2) levels were analysed in rat cerebral cortex.

Results: KA significantly ($p<0.05$) increased IL-1 β , TNF- α , COX-2 and PGE2 levels in the cerebral cortex. Pretreatment with TH significantly ($p<0.05$) ameliorated the increases of IL-1 β and TNF- α , COX-2 and PGE2 levels in the cerebral cortex of KA-induced rats at different time points.

Conclusion: This study demonstrated that KA stimulates IL-1 β , TNF- α and COX-2 levels and concomitantly increases PGE2 level in the cerebral cortex and this was ameliorated by pretreatment with TH through its anti-inflammatory property.

EP31

Syzygium polyanthum as potential renoprotective agent in hypertensive-renal damaged

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Introduction: A strong evidence of kidney failure has been reported to occur in hypertensive humans. *Syzygium polyanthum* (Serai kayu), a well-known herb in Malaysia has been used traditionally as supplement to reduce blood pressure.

Objective: To evaluate the effects of repeated-dose 12-weeks oral administration of *S. polyanthum* aqueous extract (AESP) towards the blood pressure lowering and the morphological improvement in kidney of spontaneous-hypertensive rats (SHR).

Methodology: Twenty-one (21) SHR and 7 Wistar Kyoto (WKY) rats were used in four groups of rats. Group 1:WKY (normal RAT) and Group 2:SHR received distilled water and were designated as negative control groups, respectively. In Group 3:SHR received 20 mg/kg losartan (positive control) and Group 4:SHR received 1500 mg/kg AESP. The changes in Systolic Blood Pressure (SBP) were measured biweekly using a non-invasive technique (tail-cuff method). Meanwhile, morphological changes of kidney were assessed using haematoxylin & eosin staining and Scanning Electron Microscope (SEM). In addition, renal function test (RFT) was also evaluated in this study.

Results: AESP significantly reduced the SBP ($p<0.001$) starting at week 4 and remained lowered until end of week 12. In addition, AESP also improved the morphology structure of kidney damage of SHR. Despite the renal function of AESP-treated SHR not normalised, it was still improved as compared to untreated SHR.

Conclusion: This study strongly suggests that *S. polyanthum* has potential to be anti-hypertensive agent and concurrently has a renoprotective effect in hypertensive-renal damage.

EP32

Perception on the role of dentist in smoking cessation among army personnel in 8th Brigade Infantry, Kelantan

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Introduction: Prevalence of smokers among Malaysian army personnel is high. Smoking is one of the risk factors for chronic diseases. Smoking cessation program can help to ensure the health readiness of army personnel which contributes to their military readiness.

Objective: To compare perceptions on the role of dentist in smoking cessation activity between non-smokers and ever-smokers army personnel.

Methodology: A cross sectional study was carried out among 233 randomly selected fit infantry army personnel in the 8th Brigade Infantry, Kelantan. A validated Bahasa Malaysia questionnaire was used to measure army personnel's perceptions on the role of dentist in smoking cessation activity. Descriptive statistics and Pearson Chi-square test were done using SPSS ver. 22 with statistically significant at $p<0.05$.

Results: There were 42 (18.0%) non-smokers and 191 (82.0%) ever-smokers army personnel involved in the study. All (100%) were male and majority (92.7%) were Malays with a mean age of 25.8 (SD 5.06) years. Majority of non-smokers (81.0%) and ever-smokers (83.8%) expected their dentist to discuss about smoking with patients. Significantly more ever-smokers (30.4%) strongly agree/ agree that dentist should ask about smoking on every visit compared to non-smokers (19.6%); p -value=0.024.

Conclusions: Both non-smokers and ever-smokers have positive perceptions on the role of dentist in smoking cessation activity. Significantly more ever-smokers strongly agree/ agree that dentist should ask about smoking on every visit at dental clinic (p -value=0.024). This provides an insight towards the needs of smoking cessation activity and strengthening the role of dentist in smoking cessation program among the army personnel.

EP33

Incidence and geographical distribution of childhood acute lymphoblastic leukaemia in the state of Kelantan

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Introduction: Acute lymphoblastic leukaemia (ALL) is the commonest paediatric cancer accounting for 85% of childhood leukaemia in Malaysia. The peak incidence of ALL occurs between age two and five years. It is more common among boys than girls with crude incidence rate was 2.8 and 1.7 per 100,000 children respectively. To date there is limited data on geographical distribution of ALL in Malaysia.

Objective: To evaluate the geographic distribution of ALL cases referred to Hospital USM, Kelantan

Methodology: Hospital USM was chosen to represent the tertiary centre for the treatment of paediatric ALL. Paediatric patients who were diagnosed as ALL in Hospital USM were recruited from 2002 to 2017.

Results: A total of 134 cases were identified from which 119 (88.8%) and 15 (11.2%) were B-ALL and T-ALL respectively. The mapping of case according to ALL (B and T cell) was successfully plotted using ArcGIS 10.2 software. The cases were found concentrated over the northern part of Kelantan while there were also cases found sporadically in other part of Kelantan, Terengganu and Pahang states. Statistically, the cases were clustered (NMR: 0.429422, $p < 0.001$).

Conclusion: The cases of ALL patients who seek treatment in Hospital USM were found to be clustered. The cause of clustering needs to be investigated further and this geographic ALL incidence data is important for public health interventions targeting the hotspot area to understand the vulnerable risk factors for ALL.

EP34

Rare case of bilateral optic neuritis in a 5-year-old girl: A case report

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Introduction: Optic Neuritis is an inflammatory process involving the optic nerve. It is more commonly seen in the adult population with kids making up only 5% of cases. In the pediatric age group, it is most commonly seen after infection or immunization. Less commonly, it may also be the first presentation of a demyelinating disorder like multiple sclerosis or Neuromyelitis Optica.

Objective: To report a rare case of bilateral optic neuritis in a 5-year-old girl.

Methodology: A case report.

Results: A 5 year 6-month-old Malay girl presented with a two-day history of bilateral vision loss with change in color vision, not associated with headaches or eye pain. She had previously been admitted 2 weeks earlier with complaints of low grade fever and headaches. She was covered for infection, but all investigations had come back normal. Her vision on presentation was 6/60 in her right eye and 3/60 in her left eye. Optic nerve functions were reduced bilaterally with no relative afferent pupillary defect. She had bilateral hyperemic swollen disc. She was admitted to the pediatric ward and covered for meningitis. CT brain showed no evidence of a space occupying lesion and blood cultures were normal. She was then started on corticosteroid treatment and her vision improved to 6/9 bilaterally.

Conclusion: Bilateral optic neuritis in the pediatric age group is an uncommon presentation. However, if infective causes can be excluded, patients usually respond well to corticosteroid treatment with good visual recovery.

EP35

Additional chromosome abnormalities (ACAs) in Malaysian chronic myeloid leukemia patients undergoing treatment with imatinib mesylate

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Introduction: Even though imatinib mesylate (IM) has become the gold standard drug for treatment of chronic myeloid leukemia (CML), development of resistance in nearly 35% of CML patients on IM therapy is a daunting problem. Resistance to IM could be due to a heterogeneous array of factors. In CML, the occurrence of additional chromosome abnormalities (ACAs) during treatment, subsequent to the initial t(9;22) has been strongly associated with loss of response and herald disease progression.

Objective: To investigate the type and frequency of ACAs in Malaysian CML patients undergoing IM treatment.

Methodology: Bone marrow aspirations of CML patients were short term cultured, chromosome preparations made, stained using GTG banding and karyotyped according to ISCN (2016).

Results: A total of 246 CML patients (160 resistant, 86 good response) were included with age ranging from 20 to 86 years. The prevalence of ACA was 11.8% (29/246). Among the 29 patients, 22 were in chronic phase (75.9%), 4 in accelerated phase (13.8%) and 3 in blast phase (10.3%). ACAs were seen in only those showing IM resistance. The most frequent ACAs were complex abnormalities (46.7%), trisomy 8 (13.3%), hypodiploidy (16.7%) and few other single numerical or structural (23.3%). ACAs were most frequent in

females (51.7%) compared to males (48.3%). Out of these 29, 14 with complex karyotype showed worst prognosis.

Conclusion: Emergence of ACAs constitute an adverse prognostic factor in IM treated CML patients. Only conventional cytogenetic analysis (CCA) can detect ACA and it is mandatory especially in IM resistant patients.

EP36

Bilirubin oxidative metabolites in mitochondria and microsomes of oxidative-stressed liver

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Introduction: The bile pigment bilirubin (BR) is formed in mammals via haem catabolism. Though neurotoxic at high concentrations, BR has been regarded as a potent antioxidant. To achieve the maximum benefit of BR, its intracellular level needs to be carefully regulated. We recently reported cytochrome P450 2A5 (CYP2A5) as bilirubin oxidase in microsomes and mitochondria that would eliminate excess level of toxic BR. Conversely, upon challenging with oxidative stress, BR can be oxidized by reactive oxygen species (ROS) to polar dipyrroles known as BR oxidative metabolites (BOMs). **Objective:** Comparison of BOMs in mitochondria and microsomes of oxidative-stressed liver.

Methodology: Metabolites screening was determined mass spectrometrically in mitochondria and microsomes fractions. These fractions were isolated from liver homogenates of mice, treated with an oxidant stressor.

Results: Three products of BOMs were identified in the BR oxidations of microsomes and mitochondria (ions m/z 301, 315 and 333). The amounts were increased after exposure to oxidative stress. The more hydrophilic dipyrroles (ions m/z 301) is predominantly produced plausibly to assist excretion. The amount was comparable to ion m/z 315. Relatively stable ion m/z 333 was significantly higher in mitochondria as compared to microsomes which could be due to increased ROS availability in this organelle.

Conclusion: During oxidative stress, oxidative products of BR are increased. The profiles of these products are comparable in microsomes and mitochondria, suggesting equal efficiency at BR oxidation.

EP37

Stem cells-endothelial differentiation in 3D *in vitro* model

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Introduction: Multipotent stem cells are characterised by its self-renewal ability and potential to differentiate into many types of cell lineages. This study is focusing on angiogenesis, where the differentiation target is to turn the dental stem cells into endothelial-like cells. Thus, a 3D human amniotic membrane (HAM)-based *in vitro* model mimicking angiogenic microenvironment is proposed to further understand the endothelial differentiation process. The 3D HAM-based scaffold is made up of stem cells from human exfoliated deciduous teeth (SHED) cultured on HAM with the addition of vascular endothelial growth factor (VEGF).

Objectives: To determine the capability of SHED to undergo endothelial-like differentiation on a 3D HAM-based model.

Methodology: SHED was cultured in a complete medium of alpha-minimum essential medium (α -MEM). De-epithelialised glycerol-preserved HAM was used as a scaffold while VEGF was added to induce angiogenesis. Cells were cultured in 3 groups, namely, SHED treated with VEGF (SV), SHED cultured on HAM (SA) and SHED cultured on HAM treated with VEGF (SAV). The endothelial differentiation was evaluated by scanning electron microscope (SEM), haematoxylin and eosin (H&E) and one-step RT-PCR.

Results: The result of SEM showed that SHED had successfully differentiated into endothelial-like cells. Through H&E staining, SHED was found forming a monolayer structure on the stromal side of HAM from day 1 until 14 but infiltrated into the structure at day 21. Meanwhile, gene expression analysis revealed that treated SHED was able to retain its stemness along with the expression of endothelial markers.

Conclusion: Our 3D HAM-based *in vitro* model with the addition of VEGF was able to promote SHED-endothelial differentiation.

EP38

α -globin gene mutations among Orang Asli population at Gombak, Selangor and Gua Musang, Kelantan

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Introduction: Alpha-thalassemia (α -thalassemia) is a hemoglobin genetic abnormality caused by absence or decrease in production of α -globin peptides due to deletion or mutation of one or more of the four α -globin genes. However, there is a lack of data on the prevalence and detailed molecular characterization of α -thalassemia mutations among indigenous populations as many studies have focused mainly on major ethnic groups, mainly Malays, Chinese and Indian.

Objective: To detect α -globin gene deletion and provide data regarding different types of α -gene deletion among Orang Asli population at Gombak, Selangor and Gua Musang, Kelantan.

Methodology: A total of 102 blood samples were collected from recruited respondents at Gombak, Selangor (50) and Gua Musang, Kelantan (52). Four common types of α -thalassemia gene deletion in South East Asian population which were $-\alpha^{3,7}$, $-\alpha^{4,2}$, $-\text{THAI}$ and $-\text{SEA}$ deletion was identified by using Multiplex Gap-Polymerase Chain Reaction (PCR) assay.

Results: The results showed 7 out of 102 respondents had alpha gene deletion, 6 (5.9%) single gene deletion of $-\alpha^{3,7}$ and 1 (1.0%) double deletion of $-\text{SEA}$.

Conclusion: The understanding of prevalence and spectrum of α -thalassemia among Orang Asli is necessary for national thalassemia awareness and prevention program for better health planning, especially among Orang Asli communities in Malaysia.

EP39

Impact of educational aid in pharmacist counselling on quality of life in psoriasis patients

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Introduction: Psoriasis can negatively affect quality of life (QOL). Counselling psoriasis patients may improve their condition and thus enhance their QOL.

Objective: To measure the impact of educational aid in pharmacist counselling on QOL in psoriasis patients.

Methodology: We conducted a pre and post intervention study from September 2017 to February 2018. Inclusion criteria were adult psoriasis patients receiving treatment in Hospital Raja Perempuan Zainab II. Patients who participated in Pharmacy Value Added Service were excluded. A flipchart containing information on the disease and treatment for psoriasis was developed and pilot-tested on 20 subjects. During the first visit, patients were instructed to complete the Dermatology Life Quality Index (DLQI) questionnaire followed by pharmacist counselling. Post assessment using the same questionnaire was done after 2 months. Data were analysed using SPSS version 20.0.

Results: We recruited 70 patients which consisted of 37 (52.9%) male and 33 (47.9%) female. Overall, there was a statistically significant improvement in QOL following intervention based on DLQI score ($p < 0.001$). During the first visit, majority rated psoriasis had moderate effect on their QOL (34.3%, $n=24$) while after intervention, most of the patients found that psoriasis had little effect on their QOL (37.1%, $n=26$). Strong correlations were observed between pre and post questions for items 5, 6, 7.1, 7.2, 8, and 9 ($p < 0.001$).

Conclusions: We noted that the use of educational aid as a part of pharmacist counselling could lead to improvement in QOL among psoriasis patients. Therefore, it should be utilized in other facilities as well.

EP40

 β -globin gene mutations among Orang Asli in Pos Legap, Sungai Siput, Perak

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Introduction: β -thalassemia and β -variant hemoglobinopathy occur due to mutations in the β -globin gene and are commonly found in Malay, Chinese and Indian population. However, the number of studies focusing on Orang Asli populations in Malaysia are very limited.

Objective: To detect different types of β -globin gene mutation among the aborigines in Pos Legap, Sungai Siput, Perak by using the Multiplex ARMS – Polymerase Chain Reaction (MARMS-PCR) techniques.

Methodology: Fifty blood samples were taken from Orang Asli Temiar tribe in Pos Legap, Sungai Siput, Perak. The samples were screened for 12 types of β -globin gene mutation using MARMS-PCR method.

Results: Out of the 50 samples, DNA analysis revealed that 25 samples had shown a positive detection for Cd 26 (G>A) (44%) and IVS 1-1 (G>T) (6%) mutations.

Conclusion: In conclusion, 50% of Temiar tribe are carrier of β -thalassemia and β -variant hemoglobinopathy.

EP41

Validation of a prototype debonding device equipped with force sensitive resistor (FSR) to measure *in vivo* orthodontic bracket debonding force

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Introduction: Conventional *in vitro* orthodontic bond strength studies cannot precisely reflect the effect of various parameters on the orthodontic bracket-adhesive system inside the oral environment. Hence, there is a need to develop a device capable of measuring *in vivo* bracket debonding force as an estimation of the clinical bonding efficiency of different orthodontic bonding systems.

Objective: To validate the application of a prototype orthodontic bracket debonding device capable of measuring bracket debonding force *in vivo*, by comparing to the universal testing machine.

Methodology: Sixty maxillary premolar samples were prepared by following a standardized bonding protocol. The 0.022" metallic brackets were bonded by the Transbond XT adhesive with Transbond Plus self-etching primer and LED light cured for 20 seconds. The samples were randomly divided equally into two groups. The brackets were debonded either by the lift-off debonding instrument (LODI) which was mounted on the universal testing machine or by the LODI based prototype device equipped with force sensitive resistor (FSR) according to the groups. The debonding forces were recorded in Newton units. Independent sample *t*-test was used to detect mean difference of debonding force between the groups.

Results: No significant difference ($p=0.072$) of mean debonding force was found between the universal testing machine (10.43 ± 2.71 N) and the prototype device (9.36 ± 1.65 N).

Conclusion: The prototype debonding device is validated when the bracket debonding force between the 'gold standard' universal testing machine and the FSR equipped prototype device is found to be similar. Thus, this prototype can be used to measure orthodontic bracket debonding force clinically.

EP42

Cultural substrate of N200 component in the experience of emotional arousal among Malaysians

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Introduction: Arousal is the dimension of emotion that sensitive to cultural environment in regulating consciousness, attention and information processing

Objective: To investigate the neural substrate of affective state of arousal (N200 Component) as evoked by Malaysian affective visualization

Methodology: This study was implemented in two phases. In Phase 1, a series of Malaysian affective pictures (60 pictures) were displayed to 47 participants. Participants self-rated their emotional arousal by using the Self-assessment Manikin - a single scale that ranging from 1 (feeling of calm) to 9 (feeling of excited). All pictures were classified into different levels of arousal (1-3 for low, 4-6 for moderate, 7-9 for high). Fifteen pictures (5 for each level of arousal) were randomly selected and installed in E-prime software. In Phase 2, during an electroencephalograph (EEG) session that was

held in the Clinical Neuroscience Laboratory, participants (N=30) were asked to view the displayed pictures passively that evoked different intensities of emotional arousal. The EEG data was captured with a 128 HydroCel GSN connected to a high-input impedance Net Amps 300 amplifier.

Results: Arousal emotional modulation (as indicated by the significant difference of arousal intensities) was observed in the mid-frontal (Fz), temporal (T5) and frontal polar 1, 2 (Fp1, Fp2) regions, indexed by the N200 amplitude. Meanwhile, the arousal emotional modulations in the temporal (T4) and parietal (P4) regions were observed to be indexed by the N200 latency

Conclusion: Cultural substrate of emotional arousal spreads in specific parts of the brain and might influence the rewards system of brain circuitry.

EP43

The association between vitamin D and lipid profile among healthy Malay adults

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Introduction: The effect of vitamin D in regulating lipid profile is one of the proposed mechanisms for the association between vitamin D deficiency and cardiovascular heart disease. However, the relationship between vitamin D status and lipid profile remained unclear.

Objective: To determine the association of vitamin D status with lipid profile among healthy Malay adults.

Methodology: This is cross-sectional study, involving 120 healthy Malay adults, age of 18-50 years old from Kota Bharu, Kelantan, Malaysia which were selected via random sampling. Sample size calculation was done by using single mean formula. To decrease the seasonal variability, the study was conducted within 2 months, between July and August 2015. Serum 25(OH)D, serum triglycerides (TG), serum total cholesterol (TC), serum low density lipoprotein cholesterol (LDL-C) and high-density lipoprotein cholesterol (HDL-C) were measured. Serum 25(OH)D level less than 30 nmol/L is defined as vitamin D deficiency.

Results: The mean and standard deviation (SD) of serum 25(OH)D was 23.50 (SD 8.74) nmol/L. The proportion of vitamin D deficiency among study subjects was 76.7%. The data revealed serum 25(OH)D had significant inverse association with HDL-C ($p=0.009$) and significant positive association with TC, TG and LDL-C ($p=0.005$, $p=0.005$, $p=0.049$ respectively).

Conclusions: Our study shows highly prevalence of vitamin D deficiency among healthy Malay adults in Kota Bharu populations. Serum 25(OH)D was positively associated with TC, TG and LDL-C and negatively associated with HDL-C. Perhaps by optimizing the level of vitamin D might improve the lipid profiles among healthy adults.

EP45

Preliminary study on the glutamate level among bipolar disorder patients in Kelantan

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Introduction: Glutamate pathway has been well documented in schizophrenia related disorder. However, in mood disorder, it is yet to be determined.

Objective: To determine the level of glutamate and the proportion of abnormal glutamate level among patients with bipolar disorder.

Methodology: A cross-sectional study was conducted from October 2017 till June 2018 in Hospital USM. Bipolar patients aged 18 to 65 years old who fulfilled the DSM-5 criteria of Bipolar I and Bipolar II were recruited from psychiatric outpatient clinic. Those with chronic medical illness and either had acute surgery or infarctions to the brain which may interfere with the glutamate level were excluded from the study. The serum glutamate levels were determined using high-performance liquid chromatography method. Patient's glutamate level was compared with the reference value of 1 to 57 μmol/L.

Results: Twelve male and 38 female bipolar patients with mean (SD) age of 40.87 (2.08) years old were recruited. Estimated glutamate level was 83.73 μmol/L (95% CI: 67.33, 100.12 μmol/L). Majority (24 out of 40) had high glutamate level with estimated proportion of abnormal glutamate was 60.0% (95% CI: 44.0, 76.0%). Most of the bipolar disorder patients who have abnormal level of glutamate were in euthymic and manic episode (60.6% and 60.0% respectively).

Conclusion: We observed the pattern of high glutamate in all mood episodes of bipolar disorder patients. These findings suggest that glutamate systems play an important role in disease pathophysiology hence would contribute to the understanding of the development and treatment of bipolar disorder.

EP46

Elevated high sensitive troponin T among end stage renal disease patients on renal replacement therapy without myocardial infarction

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Introduction: End stage renal disease (ESRD) patients had been reported to have greater prevalence of persistently elevated troponin among those without myocardial infarction (MI). This condition provides a diagnostic dilemma to clinicians in managing acute coronary syndrome in this group of patients particularly when the symptoms are atypical or non-conclusive electrocardiogram (ECG) finding.

Objective: To estimate high sensitivity-troponin T (hs-TnT) level among patients with ESRD on renal replacement therapy (RRT) without MI.

Methodology: A cross-sectional study was conducted between September 2017 and April 2018 at Hospital Raja Perempuan Zainab II, Kelantan. All in-center ESRD patients on RRT who had no symptom and ECG changes of MI were selected. Pre-dialysis venous blood samples were obtained and hs-TnT levels were measured using

Electrochemiluminescence Immunoassay method with cobas e411 analyzer. Comparison were made against the 99th percentile upper reference limit of 14 ng/L.

Results: Eighty ESRD patients on RRT (31 male and 49 female) with mean (SD) age of 43.06 (17.06) years were recruited. Troponin T (TnT) level was 108.48 (95% CI: 77.89, 139.03) ng/L and proportion of patients with elevated TnT was 98.75% (95% CI: 96.26, 100.0%). TnT level was higher among patients on continuous ambulatory peritoneal dialysis compared to patients on hemodialysis [median (IQR) of 67.63 (101.33) vs. 38.46 (58.96) ng/L, $p=0.007$].

Conclusion: Almost all ESRD patients on RRT who were asymptomatic of MI had elevated hs-TnT level. Therefore, 99th percentile upper reference limit for hs-TnT cannot be used in ESRD patients.

EP47

Properties of an experimental zirconia stabilized by nano calcium oxide derived from cockle shell and commercial nano calcium oxide

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Introduction: Different oxides have been used to stabilize zirconium oxide (ZrO_2). Use of calcium oxide (CaO) as a stabilizer has been studied previously. However, the use of cockle shell to derive CaO to stabilize zirconia for dental application has not been done before.

Objectives: To characterize CaO derived from cockle shell and study the mechanical properties of zirconia stabilized by CaO derived from cockle shells and from commercial source when sintered at different temperatures.

Methodology: CaO derived from cockle shell and commercial CaO were characterized using a scanning electron microscope (SEM), an energy dispersive X-ray analyzer (EDX) and X-ray diffraction (XRD). Crystals of cockle shell powder were observed under SEM. Flexural and compressive strengths of CaO stabilized zirconia derived from both sources were tested using Universal Testing machine.

Results: EDX showed that the cockle shells contained more calcium oxide than the commercial calcium oxide, whereas the commercial calcium oxide contained more oxygen than the cockle shells. XRD analyses showed that the cockle shell powder contained aragonite, whereas the commercial calcium oxide contained calcite. The flexural and compressive strengths for zirconia stabilized by CaO derived from cockle shell showed no significant difference compared to commercial CaO ($p>0.05$), with the highest strength achieved at 1400°C for both materials.

Conclusion: The mechanical properties of the experimental zirconia stabilized with nano CaO derived from cockle shell were comparable to the zirconia stabilized by commercial nano CaO, thus it may be used as alternative to the current zirconia available in the market for dental application.