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REVIEW ARTICLE

RESEARCH ARTICLES

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Molecular and Cellular Biomedical Sciences

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Article:

Sandra F, Esposti MD, Ndebele K, Gona P, Knight D, Rosenquist M, et al. Tumor Necrosis Factor-Related Apoptosis-Inducing Ligand Alters Mitochondrial Membrane Lipids. Cancer Res. 2005; 65(18): 8286-97.

Book

Murray PR, Rosenthal KS, Kobayashi GS, Pfaller MA. Medical microbiology. 4th ed. St. Louis: Mosby; 2002.

Chapter in a book:

Rosenberg GA. Matrix metalloproteinase and proteolytic opening of the blood-brain-barrier in neuroinflammation. In: deVries E, Prat A, editors. The Blood-brain Barrier and Its Microenvironment Basic Physiology To Neurological Disease. New York: Taylor and Francis Group; 2005. p.335-58.

Dissertation/Thesis/Essay:

Arlauckas SP. Near infrared fluorescent choline kinase alpha inhibitors for cancer imaging and therapy [Dissertation]. Philadelphia: University of Pennsylvania; 2015.

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Medline Plus [Internet]. Bethesda: US National Library of Medicine; ©2009. Diabetic Kidney Problems [update 2015 Nov 2; cited 2015 Nov 16]. Available from: https://www.nlm.nih.gov/medlineplus/diabetickidneyproblems.html/.

Conference Paper:

Fledelius HS. Myopia and significant visual impairment: global aspects. In: Lin LLK, Shin YF, Hung PT, editors. Myopia Updates II: Proceedings of the 7th International Conference on Myopia 1998 Nov 17-20, Taipei. Tokyo: Springer; 2000. p.3-17.

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CONTENT

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Abstract

DDC 616.994
Hayati N, Panjaitan CC, Sandra F (Department of Conservative Dentistry and Endodontic, Faculty of Dentistry, Universitas Prof. Dr. Moestopo, Jakarta, Indonesia)

Microbiome in Oral Squamous Cell Carcinoma: Mechanisms and Signaling Pathways

Mol Cell Biomed Sci. 2020; 4(2): 52-60

Abstract (English)

Oral squamous cell carcinoma is part of head and neck squamous cell carcinoma which is the ultimate cause of morbidity and mortality in cancer. The alteration of microbial community in the saliva might act as a helpful marker for the prediction, detection and prognosis oral cancer, particularly the transition of cancer precursor lesion. There are three mechanisms of action of oral microbiota in cancer pathogenesis, chronic inflammation of bacterial stimulation, carcinogenesis by cytoskeletal rearrangements, and carcinogenic substances that produced by microorganisms. Changes in the composition of microbiota could therefore have the potential to be used as a significant oral biomarker to predict the pathological transition from oral epithelial precursor lesion to cancer.

Keywords: microbiome, oral cancer cellular proliferation, microorganism, oral cancer, oral squamous cell carcinoma

DDC 614.433
Anasis AM, Rozaliyani A, Wibowo H (Master Program in Biomedical Science, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia)

Density of *Dermatophagoides* spp. and Its Relationship with House-dust Mite Specific Serum IgE in Persistent Asthma

Mol Cell Biomed Sci. 2020; 4(2): 61-7

Abstract (English)

Background: Asthma is a chronic inflammation of the bronchial tree that emerges as a response to exogenous factors, such as allergens, irritants, and infections. Some asthmatic patients had been reported having symptoms of asthma due to house-dust mites (HDM) allergen exposure. It is associated with immune responses which were increased in the form of specific Immunoglobulin E (IgE) production against HDM allergens. This case-control study aimed to determine the HDM profiles in persistent asthmatic patients, including density of mites, as well as its relationship with specific IgE anti-HDM serum levels.

Materials and Methods: A total of 13 patients with persistent asthma and 12 control patients had their specific anti-HDM IgE levels examined using Immulite 2000 xpi. The house dust samples were taken and analyzed with the Fain method.

Results: The results have shown that 69% of patients in the persistent asthma group and 25% of normal patients were positive for IgE anti-HDM. *Dermatophagoides pteronyssinus* is a predominant species with a total of 120 mites (83.9%) of 143 mites. Correlation analysis indicated a positive relationship between IgE anti-HDM levels within the serums of patients and the density of mites in the dust obtained from bedroom spaces (Spearmen Rho, R=0.35, *p*=0.04).

Conclusion: Positive IgE anti-HDM patients in the persistent asthma group were higher (69%) than those in the clinically normal group (25%). The density of mites were dominated by *D. Pteronyssinus.* The bedroom-dust mites density revealed a positive correlation with serum IgE anti-HDM levels in persistent asthma patients.

Keywords: asthma, density, Dermatophagoides spp.,IgE

DDC 571.878
Girsang E, Lister INE, Ginting CN, Bethasari M, Amalia A, Widowati W (Faculty of Medicine, Universitas Prima Indonesia, Medan, Indonesia)

Comparison of Antiaging and Antioxidant Activities of Protocatechuic and Ferulic Acids

Mol Cell Biomed Sci. 2020; 4(2): 68-75

Abstract (English)

Background: Skin-aging is a progressive changes in the skin combine with cumulative extrinsic factors which are mostly caused by free radicals caused by exposure to lots of free radicals molecules from pollutant, wrongly food intake, or too much sun bathing. These free radicals can be tackled by a treatment using antioxidants. Prevention of aging can be done by escalating antioxidant intake. Protocatechuic acid (PCA) and Ferulic acid (FA) have been known for their scavenging properties on free radicals and antiaging activity. Antioxidant and antiaging activity of both compounds have not been compared comprehensively before. Hence, current study was conducted to compare the potential of PCA and FA for their antioxidant and antiaging activities using various methods.

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Materials and Methods: Antioxidant analysis of PCA and FA was conducted using H2O2 scavenging assay, 2,2'-azinobis-3-ethylbenzothiazoline-6-sulfonic acid (ABTS), 2,2-diphenyl-1-picrylhydrazil (DPPH), and ferric reducing antioxidant power (FRAP). Meanwhile, antiaging activities of PCA and FA were examined using inhibitory activities of tyrosinase, collagenase, elastase, hyaluronidase and tyrosinase.
Results: IC_{50} of scavenging activity of ABTS were 125.18 µg/mL (PCA) and 35.55 µg/mL (FA), inhibition activity of collagenase were 126.16 µg/mL (PCA) and 52.85 µg/mL (FA) and inhibition activity of tyrosinase were 246.42 µg/mL (PCA), 253.58 µg/mL (FA).
Conclusion: In conclusion, FA has better ABTS scavenging and collagenase inhibition activities compared to PCA. Meanwhile, PCA has better activity of tyrosinase inhibition than FA.
Keywords: antioxidant, antiaging, ferulic acid, protocatechuic acid

DDC 616.02774
Marlina, Rahmadian R, Armenia, Widowati W, Rizal, Kusuma HSW, Wibowo SHB, Widodo WS, Sholihah IA (Faculty of Pharmacy, Andalas University, Padang, Indonesia)
Isolation, Characterization, Proliferation and Differentiation of Synovial Membrane-derived Mesenchymal Stem Cells (SM-MSCs) from Osteoarthritis Patients
Mol Cell Biomed Sci. 2020; 4(2): 76-82
Abstract (English)
Background: Mesenchymal stem cells (MSCs) are the cells which has high renewal capacity and and are capable for differentiating into some types of cells. MSCs can be obtained from several tissues including bone marrow, synovial membrane, blood, adipose tissue and periosteum. The proliferation and self-repair ability of MSCs are the advantages to use as stem cells-based therapy of various diseases. The aim of this study was to determine the differentiation, characterization and priliferation of synovial membrane-derived MSCs (SM-MSCs).
Materials and Methods: The cells proliferation capacity was determined by cell counting using trypan blue, characterization of MSCs (cluster of differentiation (CD)90, CD11b, CD73, CD34, CD19, CD45, CD105 and human leukocyte antigen-DR isotype (HLA-DR)) using flow cytometry analysis, and differentiation capability into three lineage cells was determined with red alcian blue, oil red O and alizarin staining.
Results: The type culture of SM-MSCs was adherent and showed positive CD44, CD105, CD73, CD90 and negative of CD19, HLA-DR, CD11b, CD45, CD34 surface marker. Based on the result, SM-MSCs P3 showed differentiation potency into adipogenic, chondrogenic, and osteogenic lineage cells. The population doubling time of SM-MSCs has increased from P3 to P8. The population doubling time of SM-MSCs P3 was 1.69 days and SM-MSCs P8 was 3.64 days.
Conclusion: The results indicated that SM-MCSCs from osteoarthritis patients are able to differentiate into osteocytes, chondrocytes, adipocytes and highly express of CD105, CD73, CD90, CD44 and negative for CD34, CD45, CD14, CD19.
Keywords: synovial membrane, mesenchymal stromal cells, adipocyte, chondrocyte, osteocyte

DDC 616.853
Sidiartha IGL, Suwarba IGNM, Wati DK, Subanada IB (Child Health Department, Faculty of Medicine, Udayana University/Sanglah General Hospital, Bali, Indonesia)
High Blood Ammonia Levels Associated with Long-term Valproic Acids Therapy in Epileptic Children
Mol Cell Biomed Sci. 2020; 4(2): 83-7
Abstract (English)
Background: Valproic acid is an effective drug for controlling seizure in children with epilepsy and it is usually used for treatment as long as two years or more. Blood ammonia level often increased in epileptic children who were treated with long-term valproic acid. The study was conducted to determine the relationship between blood ammonia level with valproic acid therapy in epileptic children.
Materials and Methods: This is an observational study with cross-sectional approach. The subjects were 64 children with epilepsy, average age of 6.2 years old. Subjects were 33 boys and 31 girls. Blood ammonia level was examined using enzymatic glutamate dehydrogenase. Subjects were divided into 2 therapeutic groups based on the duration, doses and combination therapy of valproic acid. Subjects were recruited from Pediatric Neurology Clinic, Sanglah General Hospital, Bali, Indonesia, from May to December 2017. Comparison of blood ammonia level between groups were analyzed using an Independent t-test with significances if the $p<0.05$.
Results: A significant difference of blood ammonia level was found between subjects who were treated with valproic acid less than 2 years and more than 2 years (45.7±16.4 mmol/L vs. 70.9±43.6 mmol/L; $p=0.032$). However, significant difference was not found between the groups according to the doses and combination therapy ($p=0.450$ and $p=0.647$, respectively).
Conclusion: Blood ammonia level was significantly higher in epileptic children who used long-term valproic acid, hence it was recommended to check the blood ammonia level routinely.
Keywords: ammonia, epilepsy, valproic, children

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DDC 616.123
Lukito AA, Bakri S, Kabo P, Wijaya A (Faculty of Medicine, Universitas Pelita Harapan/Siloam Hospitals Lippo Village, Tangerang, Indonesia)

The Mechanism of Coronary Artery Calcification in Centrally Obese Non-Diabetic Men: Study on The Interaction of Leptin, Free Leptin Index, Adiponectin, hs-C Reactive Protein, Bone Morphogenetic Protein-2 and Matrix Gla Protein

Mol Cell Biomed Sci. 2020; 4(2): 88-93

Abstract (English)

Background: The calcium in the artery was thought to be the result of the imbalance or dysregulation of the promoter and inhibitor cytokines influenced by various subclinical and clinical conditions. This study aimed to investigate the interaction between central obesity, as an early subclinical condition, also known as a chronic low grade inflammation condition and coronary artery calcium (CAC) in non-diabetic population including the underlying pathomechanisms of a CAC in the early stage of atherosclerosis.

Materials and Methods: This was a cross-sectional pathway analysis study enrolling 60 central obesity non-diabetic men that underwent coronary calcium score scan, anthropometrics and biomarker assays.

Results: There was a positive correlation between increasing free leptin index/adiponectin (FLI/A) ratio and CAC (r=0.297; p<0.05). There was a positive correlation between increasing FLI/A ratio and plasma high sensitive C-reactive protein (hs-CRP) (r=0.318; p<0.05). Plasma hs-CRP and bone morphogenetic protein-2 (BMP-2)-matrix gla protein (MGP) dysregulation were positively correlated (r=0.221; p<0.05) after adjusted to risk factors including insulin resistance, hypertension, age, and dyslipidemia.

Conclusion: The study found that one of the pathways involved in CAC in the centrally obese non-diabetic male is might be due to an increase of free leptin and decrease of adiponectin. The free leptin and adiponection ratio also increased hs-CRP, which partially correlated to the dysregulation of BMP-2 and MGP.

Keywords: coronary artery calcification, central obesity, adipokines, bone regulator protein, pathomechanism

DDC 615.321
Callixte C, Damascene DJ, Ma'ruf A, Dachlan YP, Sensusiati AD, Daniel N, Winthoko ENVAP (Graduate Program in Immunology, School of Postgraduate, Universitas Airlangga, Surabaya, Indonesia)

Phytoconstituent Analysis and Antibacterial Potential of Epicarp Extracts from Mature Fruits of *Persea americana* Mill

Mol Cell Biomed Sci. 2020; 4(2): 94-9

Abstract (English)

Background: World Health Organization (WHO) has reported the antimicrobial resistance as one among the ten threats to global health in 2019. The development of plant-derived antibiotics is currently considered as a modern medicine's greatest success. *Persea americana* is a plant with high medicinal profile which allow its different parts to be used for therapeutic purposes. This study is aimed to determine the antibacterial potential of ethanol and chloroform extracts from epicarp of mature fruits of *P. americana* Mill against human pathogens.

Materials and Methods: The epicarps of avocado were dried in oven and ground into powder using porcelain mortar and pestle. The powdered plant materials were extracted with both 96% ethanol and chloroform. Extracts were qualitatively screened to examine their bioactive contents and agar well diffusion method was used to analyze the antibacterial activity of extracts against both Gram-positive and Gram-negative bacteria.

Results: Both solvents showed the ability to dissolve the secondary metabolites from avocado epicarps. Phytochemical screening disclosed the presence of alkaloids, proteins, terpenoids, tannins, flavonoids, steroids and phenolic compounds in ethanolic extracts and absence of flavonoids and tannins in chloroform extracts. The extracts showed the inhibition zones ranging from 14±4.5 mm to 26±2.1 mm while streptomycin demonstrated high inhibition zones ranging from 20±3.1 mm to 30 mm. The minimum inhibitory concentration (MIC) values of extracts fall in the range of 0.3125 mg/mL and 20 mg/mL while the MIC values for streptomycin vary from 0.25 mg/mL to 1.25 mg/mL.

Conclusion: The ethanol and chloroform extracts proved to be potentially effective and to be used as natural alternative preventives to fight against various disease-causing bacteria.

Keywords: antibacterial activity, ethanol extract, chloroform extract, Persea americana, Rwanda

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